Street Smarts

A Bicycle Safety Education Plan for the City of Richmond

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Spring 2014

RIDE RICHMOND

VIRGINIA COMMONWEALTH UNIVERSITY

STREET SMARTS

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Prepared for:
RideRichmond
City of Richmond

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Brantley Tyndall - Executive Director, RideRichmond
Jakob Helmboldt - Pedestrian, Bicycle and Trails Coordinator, City of Richmond
Dr. Damian Pitt - Primary Content Advisor, Virginia Commonwealth University
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Brantley Tyndall
Primary Client – Executive Director, RideRichmond

Jakob Helmboldt
Secondary Client – Pedestrian, Bicycle and Trails Coordinator, City of Richmond

Dr. Damian Pitt
Primary Content Advisor – Virginia Commonwealth University

Prof. James Smither
Professional Plan Master - Virginia Commonwealth University

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Executive Summary

The City of Richmond, Virginia has the potential to become a first-class cycling community, where travel by bicycle is both safe and comfortable for all citizens. However, there is much work to be done before that goal is achieved. At the current moment, the city's bicycle infrastructure is marginal at best. The City of Richmond Bicycle Master Plan represents the city's commitment to creating a safer physical environment for cycling by recommending the creation of over twenty miles of dedicated bike lanes to the existing infrastructure network. Even so, there will still be times and locations where citizens will need to navigate on shared roadways in order to arrive at their destination by bike. This creates the need for a bicycle safety education plan to address the safety-related barriers identified by the community to everyday utilitarian cycling, as well as instruction on safe and legal riding techniques.

The purpose of this plan is to supplement the recommendations of the Bicycle Master Plan with a bicycle safety education program designed to engage and address the needs of those citizens that may not view cycling as a safe, legitimate form of transportation. A community survey conducted for this plan found that safety, especially in reference to sharing the roadways with automobile traffic, serves as a strong deterrent to every day cycling. Furthermore, the community survey revealed that many citizens lack an understanding of safe travel laws and techniques, have never participated in or are even aware of bicycle safety education programs in the city, and feel that the enforcement of laws designed to keep travel safe is largely ineffective.

Aside from the weaknesses mentioned, the City of Richmond has a number of strengths to help foster the implementation of this plan. There is a growing interest in the use of bicycles as a form of transportation. According to the U.S. Census Bureau's 1-year estimates, the number of people in Richmond who commuted to work by bike between 2007 – 2012 increased at a rate eight times greater than that of the nation. Additionally, the city has a number of bicycle advocacy groups that have been formed in recent years; these groups are engaged, motivated, and willing to facilitate partnerships within the community to create a safe environment that promotes cycling.

The recommendations in this plan are based on these strengths and aim to meet the variety of bicycle safety-related needs of a diverse population. The recommendations have been designed using the League of American Bicyclists' 5 E's approach: engineering, education, encouragement, enforcement and evaluation. Education serves as the foundation, with the other elements acting to reinforce the recommendations prescribed in this plan. A key element to this plan's success is the formation of effective community partnerships to reach the highest number of citizens as possible without burdening any one agency or organization to carry it out alone. The advantage of the goals, objectives and strategies set forth in this plan is that they are, for the most part, programmatic, at times building off of and improving upon efforts that have already been initiated within the community. As a result, they have the potential to be implemented within a shorter time frame, and at considerable less cost, than physical improvement to the bicycle infrastructure network. This is not to discredit the importance of supportive cycling infrastructure, but rather to balance the efforts of the Bicycle Master Plan in an effort to start affecting change towards a safe cycling community today.

1 INTRODUCTION

1.1 Client

This Bicycle Safety Education Plan was requested by RideRichmond and fulfills the requirements of the Master of Urban and Regional Planning program in the L. Douglas Wilder School of Government and Public Affairs at Virginia Commonwealth University (VCU). RideRichmond serves as a 501(c)3 non-profit community organization whose mission is to create a safe environment that promotes bicycling for all members of the community through education, events and advocacy. Since 2010, its efforts have included organizing a legislative action day at the General Assembly, organizing Richmond's Bike to Work Day events and, most notably, promoting safety education programs through its initiative known as Richmond Cycle Smart. Through this initiative RideRichmond coordinates the only team of League of American Bicyclists (LAB) certified cycling instructors in the region educating cyclists and motorists alike in the proper skills needed to ride safely in the shared space of our public roadways. Some examples of the work performed through this initiative include school bike rodeos, brown bag lunch sessions at local offices, classes based on LAB curricula, public service announcements, bike commuter mentoring and the proposed development of an on-road skills course in Richmond (RideRichmond, 2013).

The secondary client for this plan is the City of Richmond's Pedestrian, Bicycle and Trails Coordinator. This position was created as a result of recommendations made in the Mayor's Pedestrian, Bicycling and Trails Commission Report 2010 to promote a culture of safe bicycling and pedestrian use as an integral part of the City's transportation system, and to promote the positive health benefits of daily physical activity. The Pedestrian, Bicycle and Trails Coordinator has the authority to implement bicycle and pedestrian plans in the City of Richmond.

1.2 Purpose

The primary goal of RideRichmond is to create a safe environment that promotes bicycling for all members of the community. In support of this mission the purpose of this plan is to create a bicycle safety education program that addresses safety barriers the community recognizes as deterrents to bicycle use for everyday utilitarian purposes. By educating the citizens of Richmond on the proper ways to ride on shared roadways of the urban environment, along with promoting the legal rights and responsibilities of all road users, Richmond has the potential to become a first-class bicycling community where traveling by bicycle is recognized as a legitimate and healthy form of transportation.

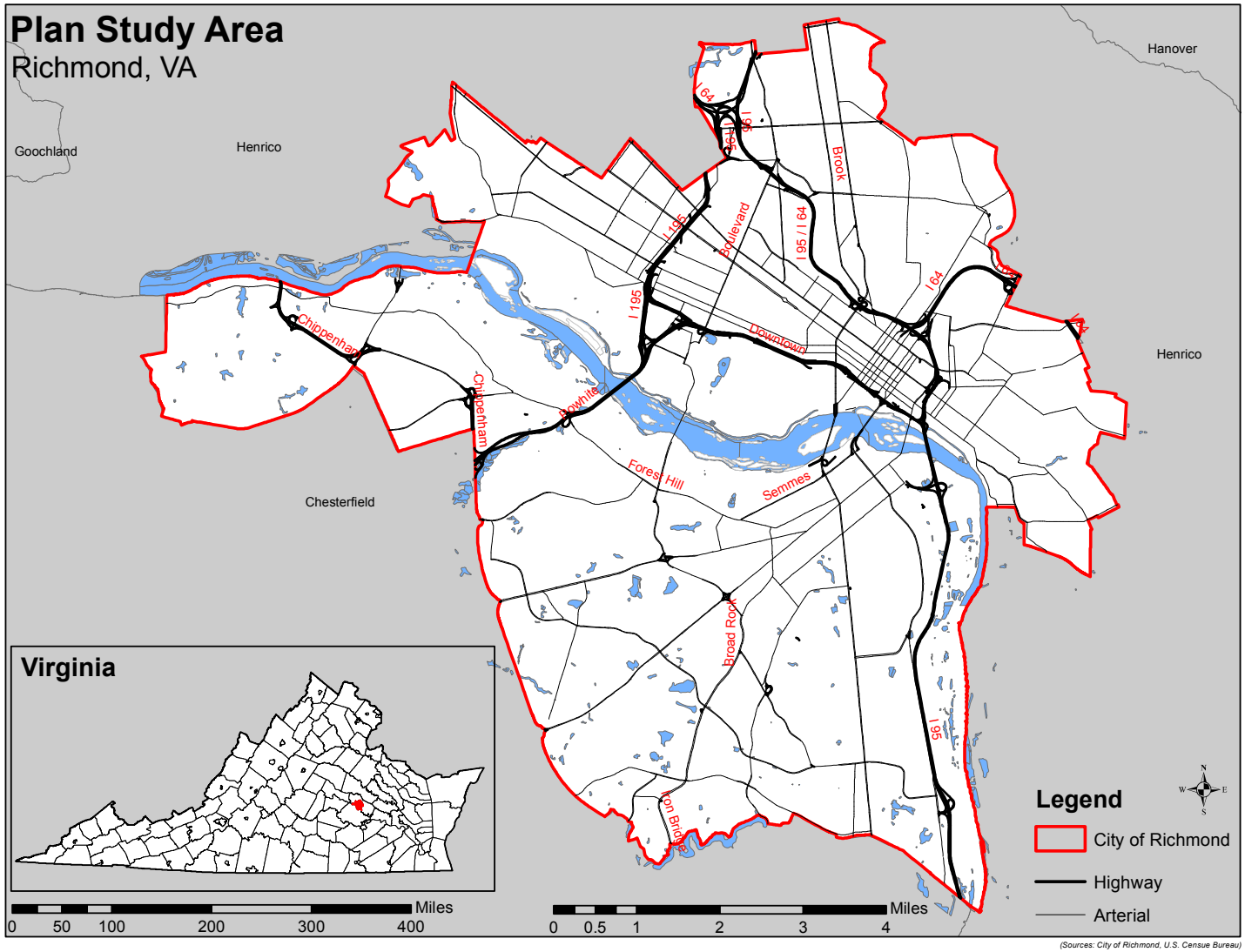
This plan serves as a supplement to the infrastructure improvements recommended in the city's Bicycle Master Plan (BMP). Although supportive infrastructure is important in creating a safe environment that supports bicycling as a mode of transportation, research indicates that infrastructure alone may not be enough to engage those who do not view bicycling as a safe, acceptable means of travel. A more effective approach is to implement a strategy that combines efforts of community design, education and enforcement (Forsyth and Krizek, 2010). This approach is similar to the programs found in the Netherlands, Germany and Denmark where the use of utilitarian cycling has been very successful (Pucher and Beuhler, 2008). Furthermore, the city will not be able to provide bicycle infrastructure along every route an individual may need to travel, making it essential to instill safe riding practices for cyclists to utilize en route to their destination.

Creating a bicycle safety education plan for an entire city is difficult. The City of Richmond has a diverse population with different needs and perceptions of safety related to cycling. Not all citizens posses the same cycling abilities or skills. A successful bicycle safety education plan needs to recognize and address the various needs of each population segment. Implemented properly, the recommendations in this bicycle safety education plan have the ability to provide the citizens of Richmond the skills and confidence they need to engage in the safe, healthy and dependable use of bicycles as a form of transportation.

1.3 Study Area

The study area for the Bicycle Safety Education Plan is the City of Richmond and the plan has been designed to serve all of its citizens. Map 1 illustrates the location of the City of Richmond and its surrounding counties.

Map 1: Plan Study Area - City of Richmond



1.4 Previous Plans

The City of Richmond has created numerous plans to guide its future growth and development. In many of these plans bicycling has been mentioned as key element in creating an integrated transportation system. They offer recommendations for infrastructure and facilities to varying degrees, but fall short of recommending a comprehensive education component to target the perceptions of bicycle safety.

City of Richmond Downtown Plan (2009)

In the City of Richmond Downtown Plan, bicycling is considered one of the key elements of the city's comprehensive approach to transit analysis. The plan limits its recommendation of infrastructure improvements, such as bike lanes, to streets with a posted speed of 30 mph or higher. On all other streets the plan recommends the principle of "vehicular cycling," which states cyclists fare best when they behave and are treated as operators of vehicles with the same rights and responsibilities. Even with this emphasis on bicycles interacting as vehicles on the city's roadways, there is no mention of any program that will educate cyclists and motorists on the safe principles of vehicular cycling.

City of Richmond Master Plan (2010)

The Richmond Master Plan states as one of its four transportation goals that the City of Richmond will support bicycle travel with a safe and effective system of designated bikeways, where bicycle (along with pedestrian) movements will be protected as an integral part of the transportation system. The plan states that in order to develop a successful multi-modal transportation system the specific needs of bicyclists and pedestrians must be accommodated. However, the master plan focuses the emphasis of safety on infrastructure and fails to mention any policy or strategy designed to educate bicyclists and motorists on safe travel behavior.

Mayor's Pedestrian, Bicycling and Trails Commission Report (2010)

In 2010, Mayor Dwight Jones created the Mayor's Pedestrian, Bicycling and Trails Commission to investigate and provide recommendations as to how the city could integrate walking and bicycling as viable modes of transportation. The report noted the city lacked a bicycle safety education program and, as a result, listed a low-cost educational process as one of its goals. Through their surveys the commission found that a large percentage of residents cited unsafe and unlawful behavior by motorists as a major limiting factor to cycling and would increase their utilitarian use of bicycling if they felt safer. Furthermore, the plan found that providing facilities and encouraging attitudinal shifts through public education and policies could promote cycling and engage more residents in a cost-effective means of a healthy and active lifestyle. It was through this report's recommendations the City of Richmond Pedestrian, Bicycle and Trails Coordinator position was created, serving as the secondary client for this plan.

Richmond Strategic Multimodal Transportation Plan (2013)

The most recently adopted plan is the Richmond Strategic Multimodal Transportation Plan, commonly referred to as Richmond Connects. Like many previous plans, Richmond Connects recognizes the City of Richmond is beginning to accommodate bicycling in a greater percent

of modal share and intends to encourage such trips through supportive infrastructure and safety programs. Safety is listed as the number one priority in the plan's guiding principles. The plan explicitly calls for the creation of a Bicycle Master Plan and recommends specific infrastructure projects such as the proposed cycle tracks (barrier-protected bike lanes) along Main and Franklin streets and the bike boulevard along Floyd Avenue. In terms of safety education, the plan suggests a bicycle safety education plan for low-income communities through city and community partnerships. By incorporating a bicycle safety education component in its recommendations, the plan exceeds its predecessors by creating a more encompassed approach to improving bicycle modal share.

1.5 Applicable Planning Theories

Mixed-Scanning Theory

The theory of planning that frames this plan is the mixed-scanning theory, which combines elements of rationalism and incrementalism. This approach utilizes the strengths of each while attempting to mitigate individual shortcomings (Brooks, 2002). A key element of mixed scanning is that it allows for evaluation and decision-making at different scales. The rational component allows for fundamental decisions to be made and serve as long-range guidance (Etzioni, 1967). The incremental component consists of bit decisions focusing on implementation and allowing for necessary adaptations (Brooks, 2002). Collectively both elements are important as influences and factors affecting the perception of bicycle safety evolve through community engagement and implementation of the plan's recommendations.

Within the framework established by the mixed scanning theory, two theories in planning were adopted to guide the plan process: the "theory of planned behavior" and the "social ecological theory". Both are behavioral change theories that attempt to identify the influential forces driving behavior change.

Theory of Planned Behavior

Icek Ajzen (1991) states that the theory of planned behavior is designed to predict behavior in specific contexts based on motivational factors influencing that behavior. In this theory, a specific behavior is determined by an individual's intention, or how hard they are willing to try in order to perform a behavior. That intention is a function of three variables: attitude toward the behavior, subjective norms from

those closest in the individual's life and perceived behavioral control. Together these three variables have been found to predict behavioral intention with a high degree of accuracy. This demonstrates the need for a bicycle safety education plan structured to address each of the three variables motivating an individual to engage in safe cycling practices. In turn, these efforts will balance the bicycle infrastructure improvements throughout the city to increase cycling as a legitimate form of transportation (Figure 1).

Social Ecological Theory

The social ecological theory focuses attention on the environmental and social influences of behavior. In addition to the built environment, which can be enhanced through infrastructure improvements, the decision to commute by bicycle is also influenced by intrapersonal, interpersonal, institutional, community and policy level social factors (McLeroy, Bibeau, Steckler, and Glanz, 1998). By utilizing a cross-sectional approach that reaches each social factor, the Bicycle Safety Education Plan aims to eliminate blind spots that may occur if focused on only one level, while at the same time creating a system of reinforcement that continuously promotes behavioral change (Stokols, 1996). Rather than simply focusing on the individual or intrapersonal factor alone, a community-wide culture of safe cycling will be created to continuously emphasize appropriate techniques (Figure 2).

Figure 1: Theory of Planned Behavior

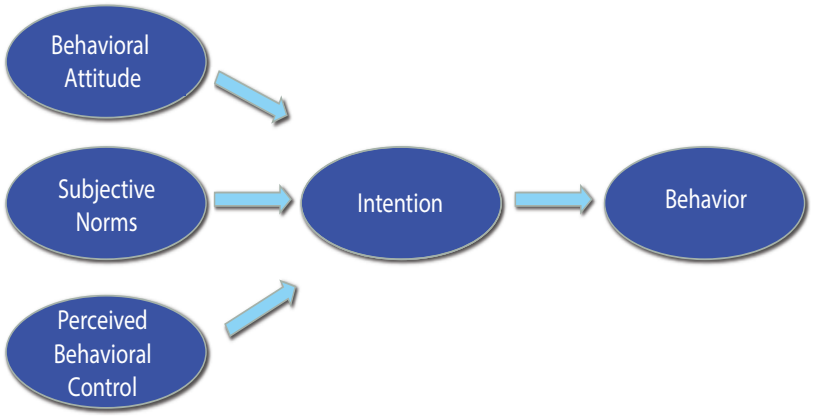


Figure 2: Social Ecological Theory

League of American Bicyclists' 5 E's

The adopted planning method for the Bicycle Safety Education Plan is the League of American Bicyclists' (LAB) 5 E's: engineering, education, encouragement, enforcement and evaluation. This comprehensive approach recognizes that no single element alone is capable of fostering widespread bicycle use. Although this method contains elements other than education, it has been used as a way to reinforce the goals and objectives set forth in the Bicycle Safety Education Plan. However, engineering recommendations have been omitted from this plan as they are covered in the city's Bicycle Master Plan. Numerous bicycle master plans across the country have adopted elements of this approach in the creation of strategies to promote cycling.

1.6 Precedent Plans and Literature

"City of Fort Collins Bicycle Safety Education Plan"

The City of Fort Collins Bicycle Safety Education Plan (2011) was created in recognition of the need for a safety education plan to address the increase in bicyclists that occurred due to changes in public perception toward bike commuting and infrastructure improvements made by the city. The approach to bicycle safety education addresses the fact that different road users, such as bicyclists, motorists and law enforcement officials, have different safety needs, perceptions and responsibilities. A key element to this approach was community engagement sessions to identify the bicycle-safety related issues within the community. Using these identified safety issues, the city adopted the League of American Bicyclists' 5 E's design and the concept of vehicular cycling to create a holistic approach to encourage and reinforce safe traveling behavior.

"Promoting Safe Walking and Cycling to Improve Public Health: Lesson from the Netherlands and Germany"

John Pucher and Lewis Dijkstra (2003) conducted a comparative study examining variations in levels of bicycling and walking in the United States in relation to those in Germany and the Netherlands. In their assessment of the differences in travel behavior, six policies were recognized as promoting walking and bicycling in Germany and the Netherlands. The two that are most relevant to this plan are traffic education and enforcement of traffic regulations. In terms of traffic education, the study found driver training in Germany and the Netherlands to be far more thorough than in the United States, with a strong emphasis on defensive driving and awareness of bicyclists and pedestrians. Moreover,

by the age of 10 all children in Germany and the Netherlands have received extensive training on safe walking and bicycling practices in their school curriculum. The study also found that traffic regulations and enforcement strongly favor walking and cycling in these countries. In Germany and the Netherlands, the police more strictly enforce traffic regulations against all parties using the shared road space, and motorists are held at least partly accountable for accidents involving bicyclists or pedestrians, even if the bicyclist or pedestrian is found to be at fault. The study concluded that the United States is extremely lacking in a supportive approach to promote safe cycling and walking. However, successful policies are in place in these countries, providing the United States a model for creating a safer cycling environment.

Image 1: Cyclists in Monroe Park

(Source: Phil Riggan)

"Walking and Cycling for Healthy Cities"

John Pucher and Ralph Buehler (2010) established a link between the levels of walking and cycling and public health through a comparison of activity levels in the United States, Australia and Europe. They concluded that daily walking and cycling for everyday purposes provide valuable physical activity and significant health benefits that outweigh the perceived risks. In the United States, where the level of cycling and walking is the lowest, perceived traffic danger serves as a significant deterrent, especially for women, children and the elderly. Although many northern European cities lead the world in cycling levels and safety, that wasn't always the case. By implementing a coordinated range of policies, with an emphasis on education and enforcement, many of these countries improved conditions to promote walking and cycling and witnessed a sharp decline in cycling fatalities. As perceptions of risk changed, more people engaged in cycling, which in turn, helped to further improve safety through numbers. More cyclists on the roads resulted in greater driver awareness and legitimized cyclists' rights to use the roadways.

"Promoting Walking and Bicycling: Assessing the Evidence to Assist Planners"

In this article, Ann Forsyth and Kevin Krizek (2010) found the most effective approach to promoting cycling combines elements of hard and soft measures, where hard measures are improvements to the built environment and soft measures include educational campaigns and social outreach. Although a minimal amount of research has been conducted on the effects of soft measures, the evidence is promising. Educational campaigns are most effective for people who identify themselves as "interested, but concerned" and help to change the perceptions of safety, especially for children and parents. This article demonstrates the need to balance infrastructure improvements with educational efforts in order to overcome negative misconceptions regarding cycling safety.

1.7 Approach

A key element of this plan is the identification of the safety-related barriers and travel behaviors that discourage a utilitarian use of cycling. This topic is presented below, followed by a list of questions framed with the LAB 5 E's that have guided this plan. The methods section identifies the sources of data and processes used to answer each question.

What factors, aside from infrastructure, do citizens identify as barriers or impediments to bicycle safety?

This question focuses on specific behaviors performed by all users of shared roadways and how they affect perceptions of safety. Comparisons between issues identified by the community and actual crash statistics may delineate between perceived and actual safety hazards. This is not to discredit perceived safety issues, since perception is a powerful motivator whether it is supported by data or not. Additionally, this process allows for the identification of population segments that may have differing views on travel safety behavior. Research indicates that different population segments such as women, young children and the elderly often have different perceptions of safety and therefore need to be addressed appropriately (Forsyth and Krizek, 2010).

What are the current and proposed bicycle infrastructure elements in the City of Richmond? (LAB 5 E's: Engineering)

Although specific recommendations for infrastructure improvements have been omitted from this plan, it is important to identify the location and type of infrastructure existing in the city, as well as those that are proposed. At the moment, the

infrastructure that exists for bicyclists is minimal and as a result cyclists often need to interact with motorists and pedestrians on the roadway to arrive at their destination. However, the bicycle infrastructure network is staged for improvement through the BMP recommendations. By incorporating both current and proposed bicycling infrastructure elements into this plan, appropriate navigation skills related to the different types of infrastructure can be included in future bicycle safety education courses.

What bicycle safety education programs exist, and to what extent are they implemented? (LAB 5 E's: Education)

With the increased interest in cycling experienced in the City of Richmond recently, a number of advocacy groups have emerged to further promote cycling and safe travel behavior. These organizations have already broken ground on improving bicycle safety education in the city, which establishes a baseline of how the topic is currently addressed and its potential future direction. Through their experiences, these organizations serve as key allies in creating and implementing recommendations set forth in this plan.

What events exist to promote or normalize bicycling as a legitimate form of transportation accessible to everyone? (LAB 5 E's: Encouragement)

Creating opportunities for people to experience cycling with others in a semi-controlled setting reveals the practical advantages of cycling while demonstrating the practice of safe cycling techniques. Such events have the potential of raising further awareness and promotion of bicycle safety-related initiatives in the city. Furthermore, these events provide an opportunity for people to connect with the cycling community.

Image 2: Anthem Moonlight Ride Participants

(Source: Phil Riggan)

What laws and ordinances exist to enforce safe behavior for all parties sharing the roadway? (LAB 5 E's: Enforcement)

Identifying enforceable state and local ordinances designed to provide a safe environment for cycling establishes the legal rights and responsibilities of shared road users. Equally significant is determining the level of understanding all community members have in regards to rules of the road. In establishing the legal framework for safe travel behavior, it is important to discern the level of local discretion that exists in changing or creating new ordinances. This will help in addressing the safety concerns asked previously. However, as the Commonwealth of Virginia is a Dillon's Rule state, this extent may be highly limited. Local governments in Dillon's Rule states only have the powers expressly granted to them by the General Assembly and therefore cannot adopt whatever ordinance they desire unless the authority to do so has already been admitted (Kemptner, 2014).

What strategies are being implemented by the Richmond Police Department to enforce safety laws and ordinances? LAB 5 E's: Enforcement)

Established laws do little to create a safe environment if they are not enforced. Enforcing travel safety laws has the potential for the community to feel that it is protected to some extent and provides incentive to follow the laws.

How should a bicycle safety education plan be evaluated to determine the effectiveness of its recommendations? (LAB 5 E's: Evaluation)

A bicycle safety education plan needs to be continuously evaluated to determine its effectiveness and analyze the prioritization of recommendations. A plan that is continuously evaluated and amended as needed has a greater potential to meet its goals and objectives through the implementation. Bicycling safety is unique: research indicates an increasing the number of people who travel by bicycle creates a safer cycling environment. Motorist behavior changes with a raised level of awareness when more cyclists take to the streets (Jacobson, 2003). This may change the perception of bicycle safety and require the reprioritization of effective strategies.

Image 3: Richmond Police Department Bicycle Patrol Officers

(Source: Richmond Police Department)

1.8 Methods

A bicycle safety education plan survey was created to gather data on community perceptions of bicycle safety and barriers to everyday cycling that should be addressed in this plan. A previous survey was conducted as part of the BMP process and allowed participants to provide their email addresses for future correspondence related to bicycling in Richmond. From this list, the city sent out a follow-up email to more than one thousand individuals, promoting a link to the new bicycle safety education plan survey. The link to this survey was voluntarily shared on Facebook by Bike Walk RVA and other individuals in the community. In addition, the survey was administered at three different coffee shops to allow people to discuss their bicycle safety concerns in person: Lift (218 W Broad St); GlobeHopper (2100 E Main St); and Crossroads (3600 Forest Hill Ave).

The survey participants were then divided into three groups: the complete survey sample, the Confident Group and the Concerned Group, based on their self-identified cycling habits and comfort levels. This approach, using descriptive statistics, allowed comparisons between the respondents for each of the survey questions. Tables and appropriate charts were created to visually display the proportions of responses to each question.

A number of in-person interviews were conducted as a result of feedback from the community survey, and attempted to answer the research questions posed earlier. Those who were interviewed included:

- *Former Driver's Education Department Chair for Hermitage High School:*

  Provided information on the Virginia driver's education curriculum and the flexibility in which it may be administered throughout the Commonwealth.

- *Driver's Education Driving Range Coordinator for Richmond Public Schools:*

  Elaborated on the specific structure of the driver's education course as administered in the Richmond Public Schools system, and areas of needed improvement regarding cyclist and motorist safety on shared roadways.

- *Executive Officer of Planning and Analysis for the Richmond Police Department:*

  Addressed questions regarding the enforcement of local travel safety laws, officer training and bicycle education opportunities provided by the department.

- *Training Manager for Greater Richmond Transit Company (GRTC):*

  Responded to questions pertaining to operator training and conflicts between bus operators and other users of the roads, primarily cyclists.

- *Safety Chair for the Richmond Area Bicycling Association (RABA) and the Executive Director of RideRichmond:*

  Provided information on the bicycle safety education programs their organizations coordinate as well as bicycle safety-related issues in the region.

- *Community Engagement Coordinator for Sports Backers' Bike Walk RVA:*

  Helped identify community cycling events in the area.

Additional data was collected from various government and community organizations for analysis. The U.S. Census Bureau provided population data from the 2010 census, journey to work trips from the 2007 and 2012 American Community Survey (1-year estimates) and geographic boundary layers for the use in Geographic Information Systems (GIS). The Virginia Department of Education presented enrollment data for each school and grade level in the Richmond Public Schools system. Crash data was obtained by the Virginia Department of Motor Vehicles annual reports. The laws that pertain to cyclists, as well as those that are proposed, were collected from the Code of Virginia, the Virginia Department of Motor Vehicles and the Virginia Bicycling Federation. Sports Backers provided the locations of the existing bicycle network and the routes proposed for the BMP. The City of Richmond GIS department provided further GIS layers for geo-political boundaries, school locations and zones, GRTC bus routes and the existing street network. Finally, precedent plans from other localities were analyzed for effective methods of plan evaluation.

The information from above-mentioned sources was organized and analyzed to gain understanding and answers the research questions. Where appropriate, GIS was used to create maps illustrating spatial relationships between data.

1.9 Roadmap to the Document

Part 2 of this document provides information needed to answer questions for constructing a bicycle safety education program for the City of Richmond.

The first section identifies and analyzes the current cycling conditions in Richmond in order to establish a trend in cycling use. This section begins with a modal share analysis to determine the levels and types of bicycling currently utilized in the city, a timeline of bicycling related milestones that have occurred in the city and maps of existing and proposed bicycle infrastructure facilities. The purpose of this analysis is to highlight the trend of increased cycling in Richmond and to illustrate the need for a bicycle safety education plan that instructs residents on the proper ways to ride safely on city streets.

The second section begins with the key question for this plan: what are the safety-related barriers and perceptions that deter citizens from utilizing the bicycle as a legitimate mode of transportation? The answers to this question are compared to existing safety data to identify the difference between perceived and actual threats to safety. The remainder of the section addresses the questions related to the LAB 5 E's. A map showing the current and proposed bicycle infrastructure facilities in the city related to population distribution illustrates the first element, engineering. The second element, education, identifies current bicycle safety education programs in the city, the organizations that promote bicycle safety and the extent to which their programs are implemented. The third element, encouragement, is demonstrated through the current events held to promote bicycling as a safe form of transportation accessible and acceptable to all members of the community. The fourth element, enforcement, presents the legal rights and responsibilities of all users of shared roadways, as well as the enforcement program implemented by the Richmond Police Department to ensure a safe environment. The final element, evaluation, highlights the need to continuously evaluate and adapt the plan to maximize its effectiveness as barriers and perceptions of bicycle safety evolve through time.

The last section summarizes the analysis of the data to answer the previously mentioned questions. By identifying the strengths and weaknesses for the City of Richmond in providing and promoting a safe environment for cycling, a bicycle safety education plan can be created to address these issues and increase cycling as a legitimate and safe form of transportation.

Part 3 presents the plan for developing a bicycle safety education program for the City of Richmond. This part begins with an overarching vision statement based on the goals and objectives identified through community engagement that are to be achieved through this plan. The recommendations are presented based on the LAB 5 E's: engineering, education, encouragement, enforcement and evaluation. Specific engineering recommendations are largely omitted since they have been prescribed in the City of Richmond's Bicycle Master Plan. The recommendations also include an implementation schedule that details when specific goals, objectives, policies and actions are to be implemented in order to achieve the plan's recommendations.

Under a separate cover an appendix contains the detailed results of the surveys, data analysis, crash statistics and travel laws collected and researched for this plan.

2 RESEARCH AND DATA

2.1 The State of Cycling

The use of cycling as a means of transportation continually increased over recent years in the City of Richmond. According to the U.S. Census Bureau's American Community Survey (1-year estimates), the number of people in Richmond who commute to work by bike increased 160% from 2007 – 2012, an increase that far exceeds that of the nation (20%) during the same time period (Table 1). Although on the rise, this still represents only 2.6% of the city's population. Furthermore, those commuting to work by bike in Richmond are disproportionately male at 78.4%, which exceeds the nation at 66.7% male. A 2010 study by Virginia Commonwealth University found that approximately 15,000 students (47%) use a bicycle for transportation.

Illustrated in Table 2 is a timeline of bicycle-related events, programs, organizations, infrastructure and policies created since 2007 in Richmond. Some were created to help increase bicycling mode share, while others were created as a result of increased cycling. The timeline shows a trend of momentum in turning Richmond into a first-class cycling community. Last year (2013) was an active year for the city with new advocacy groups, supportive infrastructure, and most notably City Council taking formal steps to make Richmond more bicycle-friendly. These steps included the creation of a bicycle master plan to direct the city's future growth in cycling, along with the approval of funding to design the Floyd Ave bike boulevard, downtown cycle tracks and the Cannon Creek connector.

Table 1: Percentage of Trips to Work by Bike

	Year	Working Population	Overall		Male		Female	
			Percent	Population	Percent	Population	Percent	Population
Richmond	2007	87,277	1.0%	873	1.6%	698	0.4%	175
	2012	98,653	2.6%	2,656	4.0%	2,012	1.1%	553
	Change	***13.0%***	***160.0%***	***1,692***	***150.0%***	***1,313***	***175.0%***	***379***
United States	2007	139,259,684	0.5%	696,298	0.7%	541,565	0.2%	154,733
	2012	140,862,960	0.6%	845,178	0.8%	563,452	0.4%	281,726
	Change	***1.2%***	***20.0%***	***148,879***	***14.3%***	***21,886***	***100.0%***	***126,993***

(Source: US Census - American Community Survey 2007 and 2012 1-year estimates)

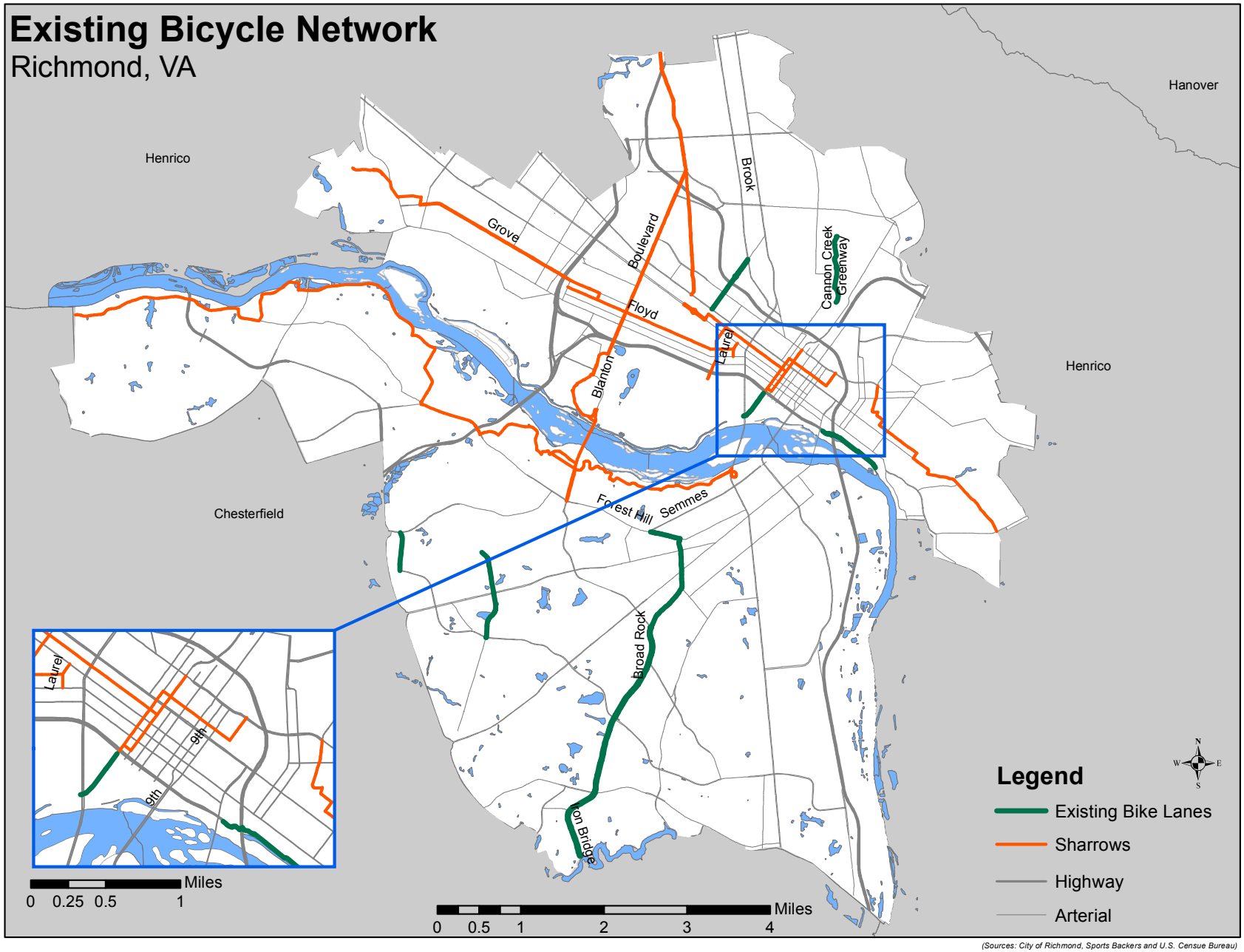
Table 2: Richmond Bicycling Timeline

2007
Annual Bike to Work Day event started in Richmond
2009
Virginia Capital Trail - Richmond Downtown Phase 1 trail portion opens
2010
Mayor establishes Pedestrian, Bicycle and Trails Commission (PBTC) First annual Anthem Moonlight Ride Mayor's PBT releases reommendations Funding approved for Cannon Creek Greenway Richmond announces its intent to bid on the 2015 Road World Championships
2011
RideRichmond forms to advocate for safe cycling Richmond hires Jake Helmboldt to coordinate bicycle and pedestrian initiatives Richmond is awarded 2015 Road World Championships
2012
First annual Snowflake Ride Bike route signs began appearing in Richmond Sharrows begin appearing throughout Richmond Cannon Creek Greenway Phase I opens First Martin's Tour of Richmond Richmond Cycle Smart initiative begins
2013
Bicycle Action Day staged at the General Assembly session (did not occur in 2014) Max Hepp-Buchanan hired to lead Sports Backers Bike Walk RVA regional initiative Greater Richmond Bicycle Coalition forms USA Cycling announces the Collegiate Road National Championships in Richmond City council approves matching funds from grant for downtown cycletracks City Council appoves funding for Cannon Creek connector Project begins to create a Bicycle Master Plan for the City of Richmond City Council approves funding for the design of a bike boulevard on Floyd Ave Virginia Capital Trail - Great Shiplock Park Trailhead opens in Richmond (2013) Charter 2015 initiative begins to make businesses more bike-friendly
2014
Completion of the Bicycle Master Plan 2014 USA Cycling Collegiate Road National Championships
2015
UCI World Road Cycling Championships

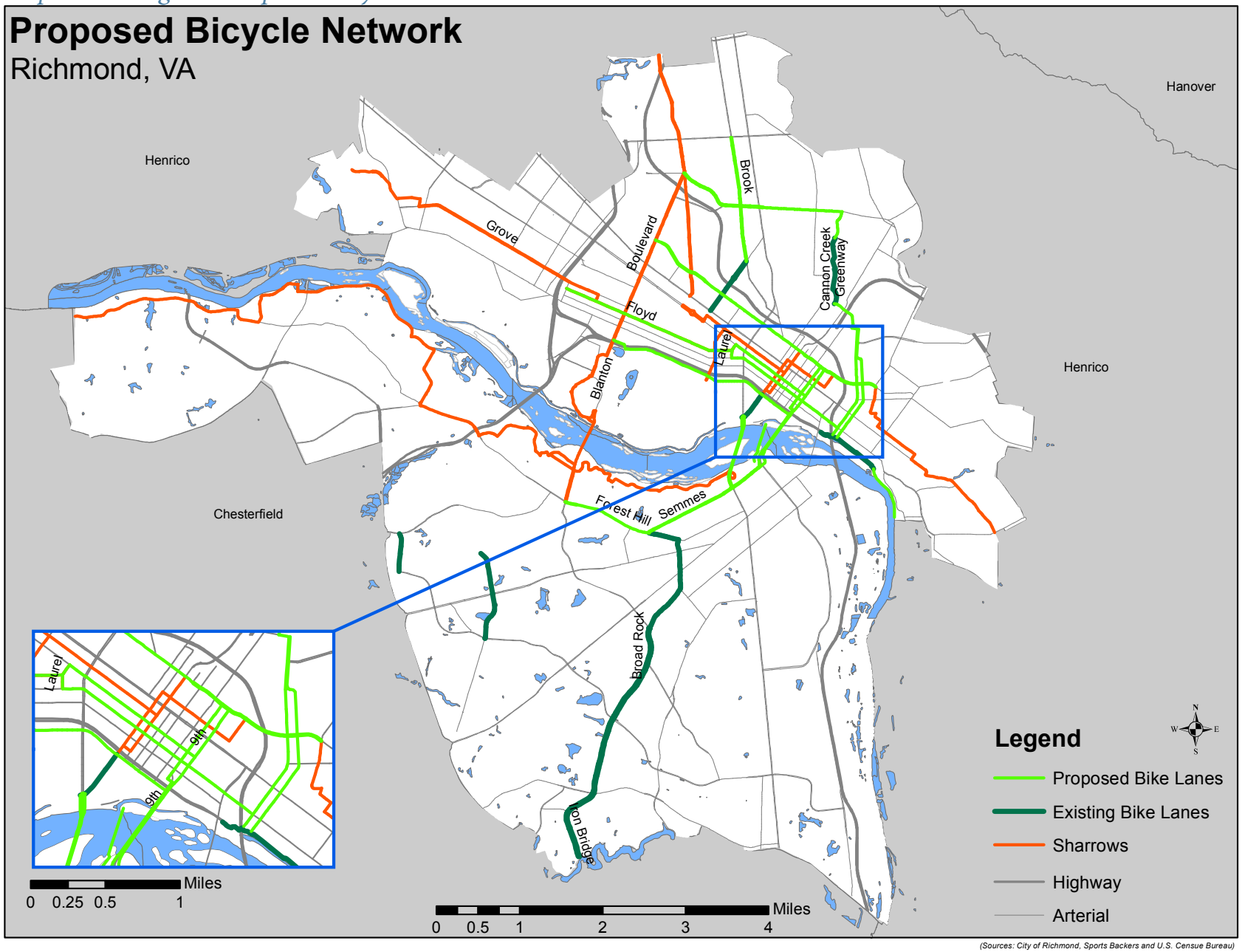
The bicycle network that currently exists in the City of Richmond is quite sparse, and is heavily dominated by sharrows, or shared lane markings. While this type of dedicated bicycle route does provide a designated network, it still forces cyclists to interact with other vehicles on shared roadways. There are only two routes that provide shared-use paths separated from traffic: the Virginia Capital Trail and the Cannon Creek Greenway. Neither path is connected to the overall bicycle network in Richmond, forcing cyclists to ride with traffic for access. In addition, bike lanes are only present as disconnected sections along Lombardy St between Broad St and Brook Rd, Douglasdale Rd and a portion of 2nd St north of the James River, along with Route 10/Broad Rock Blvd, Hioaks St and German School Rd on the City's south side.

The bicycle network is most contiguous in the downtown core of the city with spurs that extend to the north side, west end and east end. The network on the south side of Richmond does not connect directly to the downtown network, with three of the routes (Hioaks St, German School Rd, and Route 10/Broad Rock Blvd) completely isolated from other routes. The most continuous route on the south side is from Westover Hills Blvd heading west along the James River. Map 2 on the following page shows the location of the existing bike network in the City of Richmond.

Map 2: Existing Bicycle Network



Map 3: Existing and Proposed Bicycle Network



The Bicycle Master Plan has expanded the bicycle infrastructure network throughout the city by providing greater connectivity for cyclists. Map 3 on the previous page includes the locations of the proposed dedicated bike infrastructure recommended to the city by Sports Backers' Bike Walk RVA initiative. The goal is to have 20 new miles of bicycle infrastructure in place by the time Richmond hosts the 2015 UCI World Cycling Championships. In addition to expanding the network, the BMP has included opportunities for enhanced infrastructure beyond sharrows where possible. Examples include the Floyd Ave bike boulevard from Laurel St. to Thompson St., and cycle tracks (barrier protected bike lanes) that form a loop along Laurel – Franklin – 8th – and Main Streets.

Image 4: Cannon Creek Greenway

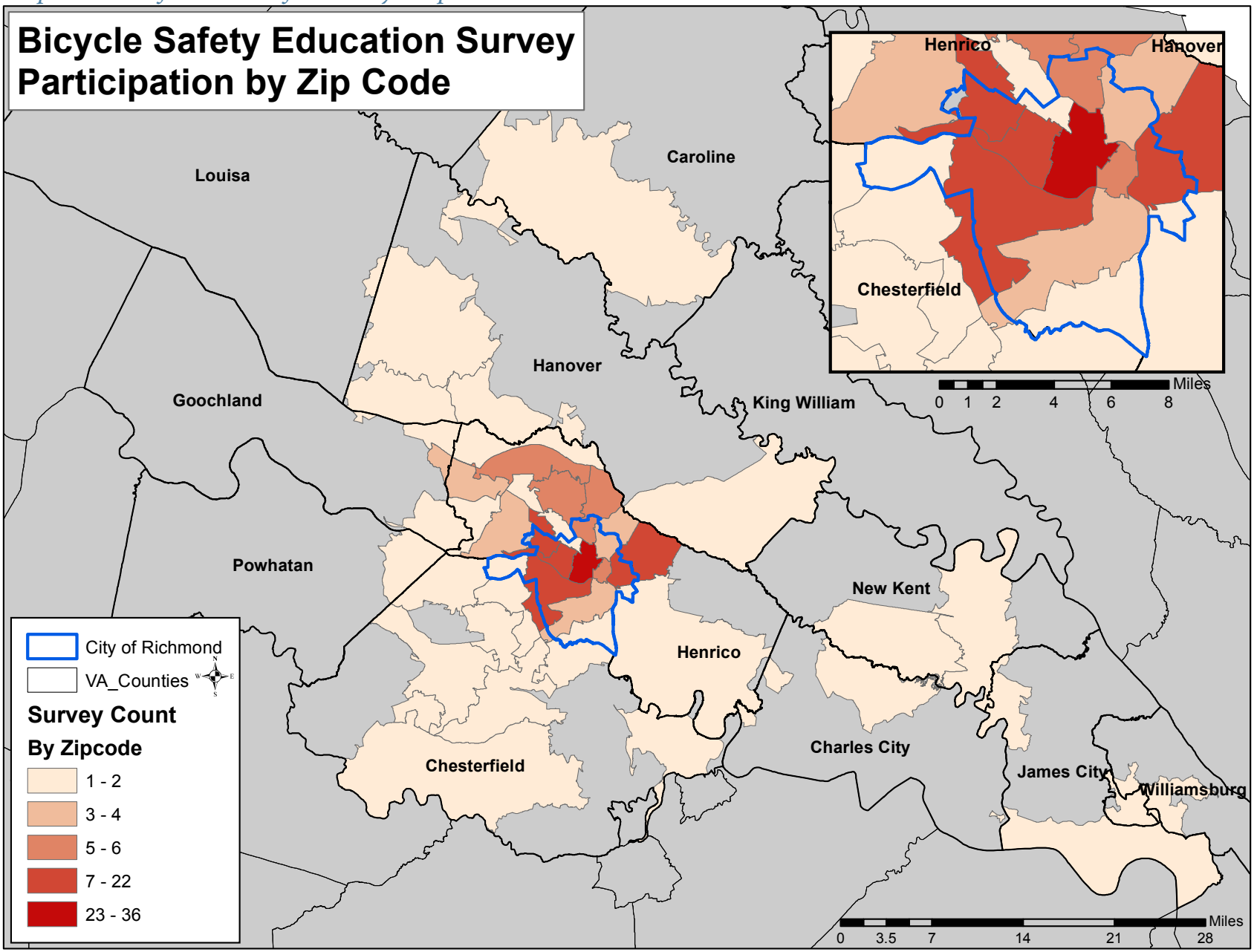
(Source: Phil Riggan)

2.2 Safety Perceptions and Considerations

A total of 177 people completed the community bicycle safety education survey. Map 4 illustrates where the respondents live who participated. About 70% live in the City of Richmond, with the rest living in other parts of the Richmond Metropolitan Statistical Area. Although the study area for this plan is the City of Richmond, those living outside the city were left in the sampling due to the fact that Richmond serves as the center of the region with many individuals working, traveling and recreating in the city.

It should be noted that the survey method was not administered via a random sample, where every person in the community had an equal opportunity of being selected to participate and therefore is not completely representative of the community's demographics. For instance, an overwhelming majority of the respondents identified their race as white (93.5%) and educated (89.5% earned a bachelor's degree or higher). A copy of the survey instrument is provided in Appendix A and complete survey results are located in Appendix B.

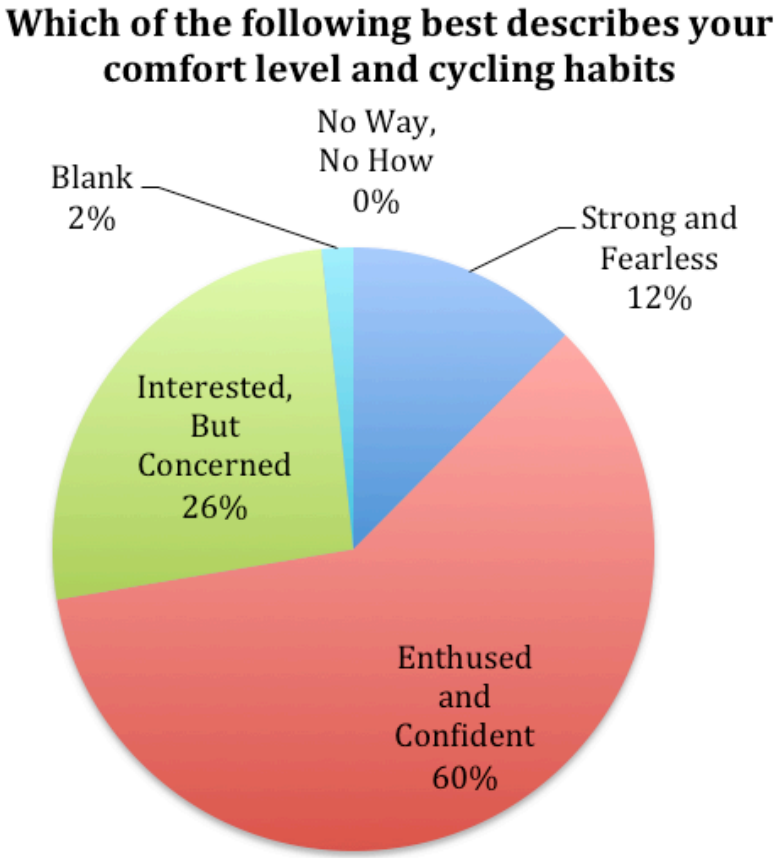
Map 4: Place of Residence for Survey Respondents



(Source: City of Richmond, U.S. Census Bureau)

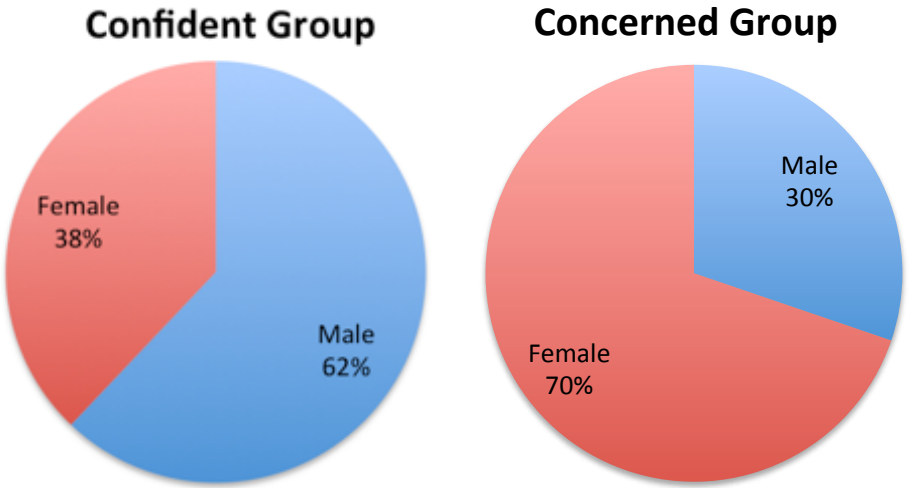
The first question in the survey asked respondents to identify their cycling comfort level and habits. Figure 3 displays the results to this question. The majority responded as being either "Strong & Fearless" (12.4%) or "Enthused & Confident" (59.9%). Only 26.0% identified as being "Interested, But Concerned", and no one responded as "No Way, No How."

Figure 3: Self-Identified Cycling Habits and Comfort Level



Even though Richmond as a whole can benefit from a bicycle safety education plan, it is the "Interested, But Concerned" group that represents the greatest potential to increase bicycling mode share by addressing safety concerns through this plan. For that reason the results of each survey question were broken down into three groups: the complete survey sample; the Confident Group consisting of the "Strong & Fearless" and "Enthused & Confident" respondents (73.3% total); and the Concerned Group consisting of the "Interested, But Concerned" respondents (26.0% total). Figure 4 reveals a significant gender difference between the two groups, with the majority of the Confident Group represented by males and the majority of the Concerned Group represented by females.

Figure 4: Gender of Survey Respondents



It should also be mentioned that the majority of respondents received the survey from the City of Richmond's Pedestrian, Bicycling and Trails Coordinator after having expressed a previous interest in improving bicycling conditions. This may have skewed results toward the Confident Group since the respondents were not selected randomly. Similarly, when asked the same question on the BMP survey 69.5% identified with the Confident Group, and 29.4% identified with the Concerned Group. The number of people who answered each question from the three groups served as the basis for percentages in the results. The complete breakdown of survey questions and results is available in the Appendix B.

Safety perception was the first topic addressed in the survey. Overall there was very little agreement that the city as a whole is safe for cycling, with slightly more of the Confident Group agreeing or strongly agreeing (Figure 5). However, the majority of respondents in both groups agreed or strongly agreed that the neighborhood where they live is safe for cycling (Figure 6). Furthermore, the concern for safety limits the amount that respondents in each group ride their bike, with the majority of each agreeing that they would ride more if they felt safer on the city's streets (Figure 7).

Figure 5: The City of Richmond as a whole is safe for cycling.

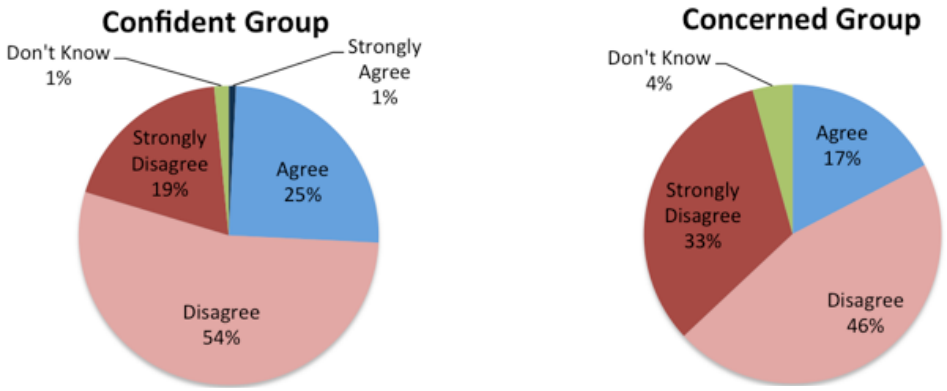


Figure 6: The neighborhood where I live is safe for cycling.

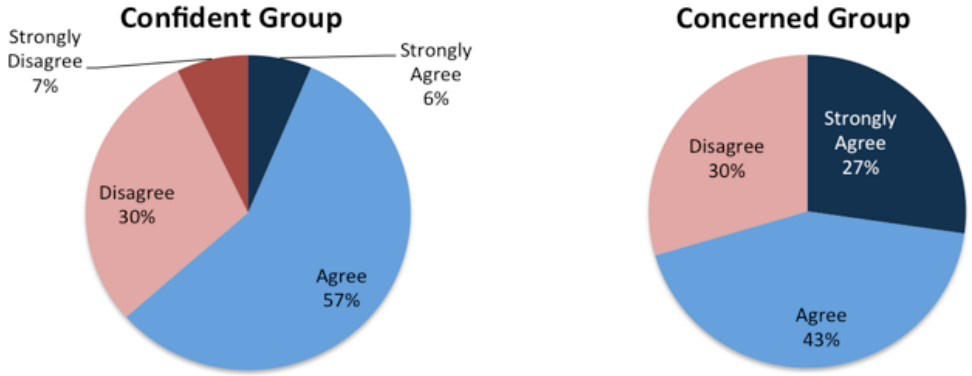
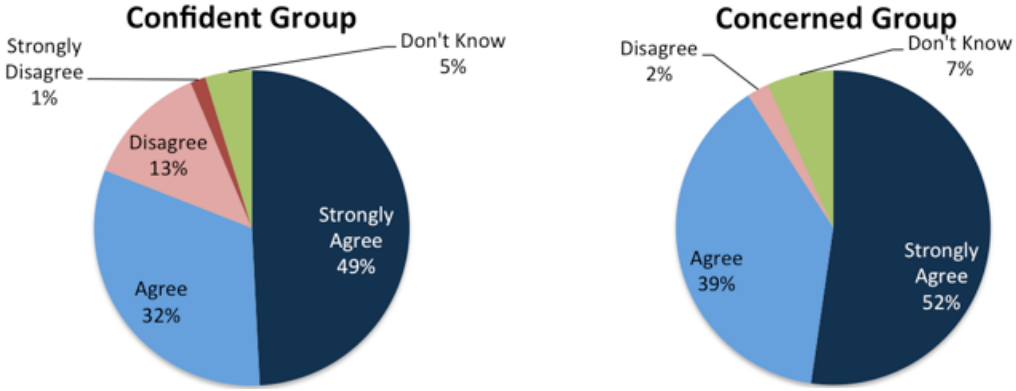
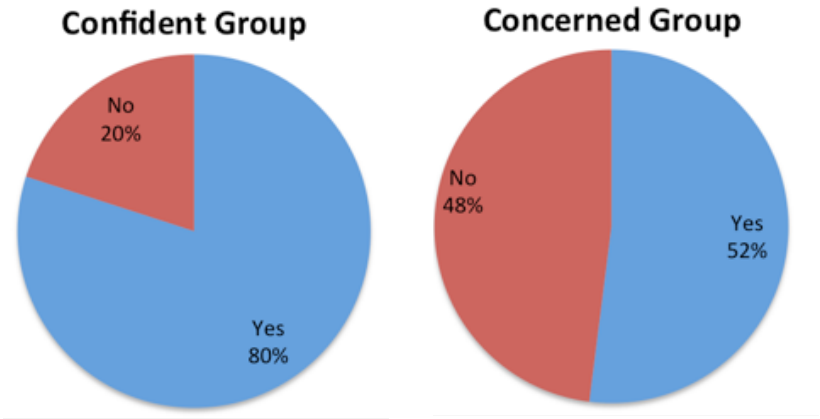


Figure 7: I would ride my bike more if I felt safer on the city's streets.



Parents' decision to let their children ride bikes in shared roadways was also reflected in the different perceptions of bicycling safety between the Confident and Concerned Groups. Figure 8 shows that 80% of the Confident Group would allow their children to ride on their neighborhood streets, compared to only 52% for the Concerned Group.

Figure 8: Would you allow your children to ride on your neighborhood streets?



The percentage of both groups dropped considerably when asked if they would be willing to allow their children to ride their bikes to school. Once again, the Confident Group responded with a greater proportion reporting yes, but still noticeably lower than in their own neighborhood (Figure 9). According to the open-ended responses to this question, many factors are at play including distance, busy arterials along the route, and the vulnerability of young children being by themselves. However, Figure 10 surprisingly shows that 90% of the Confident Group and 91% of the Concerned Group would allow their children to ride their bikes to school if their neighborhood had a designated parent to escort them.

Figure 9: Would you allow your child/children to ride their bike to school?

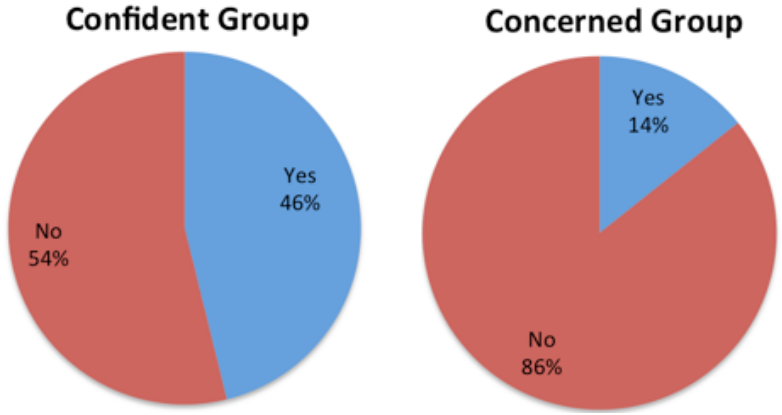
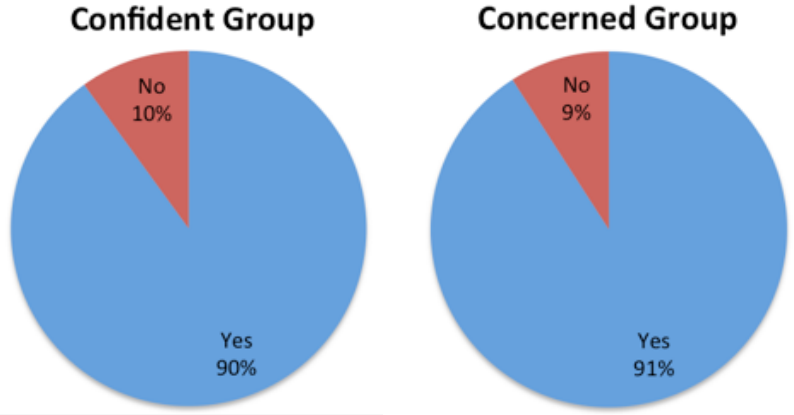


Figure 10: Would you be more willing to allow your child/children to ride to school if escorted by a designated neighborhood parent?



Safety is a powerful influence on route choice as well, particularly in reference to motor vehicle traffic. Both the Confident and Concerned Groups cited volume of traffic, speed of traffic and safety of route as top variables in route selection, with 100% of the Concerned Group indicating these variables are important or very important (Table 3). Both groups were least concerned with convenience, with shortest travel distance and shortest travel time reported as the least important variables. This indicates that the safety of a route is the most influential variable in route selection. In addition, the respondents were given the opportunity to list other considerations not presented in the survey when choosing a route and the most cited response was road surface conditions, specifically potholes.

Table 3: What determines the route you will take when traveling by bicycle?

Percentage of Respondents Who Indicated "Important" or "Very Important"

Variable	Confident Group	Concerned Group
Shortest travel distance	69%	73%
Shortest travel time	74%	40%
Dedicated bike infrastructure	83%	93%
Volume of traffic	96%	100%
Speed of traffic	94%	100%
Safety of route	96%	100%

Overall, the Concerned Group indicated that driver behaviors while cycling make them more nervous than the Confident Group, which may be indicative of the self-identified cycling habits and comfort level that was used to create the two groups. Both groups reported texting/talking on their phones and passing too close as two of the top driver behaviors that make them nervous when cycling (Table 4). Additionally, the Concerned Group reported following too close and the Confident Group gave equal concern to following too close, passing at too high a speed and parked cars opening doors as other behaviors that make them nervous while cycling. The most cited open-ended responses were motorists not being aware of cyclists and turning in a manner dangerous to cyclists. Overall, the high rate of responses for both groups in Table 4 indicates that driver behavior highly influences sense of safety while cycling on the roadways.

Table 4: To what degree do the following driver behaviors make you nervous when cycling in Richmond?

Percentage of Respondents Who Indicated "Nervous" or "Very Nervous"

Variable	Confident Group	Concerned Group
Following too close	86%	93%
Passing too close	94%	93%
Passing too fast	86%	88%
Not passing when appropriate	76%	81%
Beeping horn aggressively	83%	86%
Parked cars opening doors	86%	81%
Texting/Talking on phones	91%	95%

As most cyclists in Richmond are also drivers, a similar question regarding cyclist behaviors that make the respondents most nervous when driving in Richmond was presented. Both groups reported a lesser degree of nervousness from cyclists than from drivers, with not being highly visible as the variable that makes them most nervous (Table 5). For every variable except riding unpredictably, the Concerned Group reported being more nervous than the Confident Group.

Table 5: To what degree do the following bicyclist behaviors make you nervous when driving in Richmond?

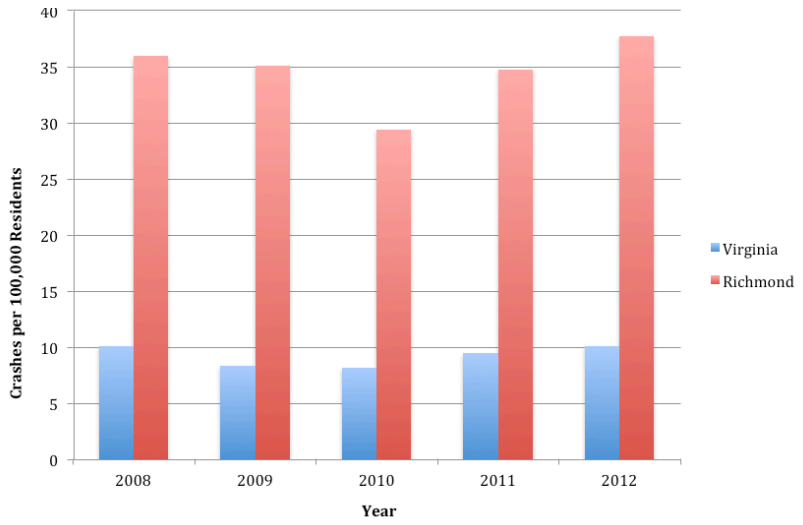
Percentage of Respondents Who Indicated "Nervous" or "Very Nervous"

Variable	Confident Group	Concerned Group
Riding unpredictably	83%	72%
Not being highly visible	85%	96%
Riding against the traffic flow	84%	87%
Riding on sidewalks	49%	63%
Failing to stop at stop signs	61%	78%
Failing to stop at stop lights	74%	80%
Failing to yield	76%	91%

2.3 Bicycling Crash Data

This section compares what the community members stated as threats to bicycling and actual bicycle crash data from the Virginia Department of Motor Vehicles were examined. Figure 11 shows the number of bicycle crashes per 100,000 residents for the Commonwealth of Virginia and the City of Richmond from 2008 – 2012 using bicycle crash data from the Virginia Department of Transportation and population data from the 2010 U.S. Census and the American Community Survey (3-year estimates). The rate of bicycle crashes increased slightly and steadily over the last three years for both the city and commonwealth, potentially due to the increase in bicycle

Figure 11: Number of Bicycle Crashes per 100,000 Residents in Richmond and Virginia (2008 - 2012)



(Source: Virginia Department of Motor Vehicles and U.S. Census Bureau)

mode share during that time period. Figure 9 shows the rate of bicycle crashes to be much higher in Richmond than Virginia as a whole. This may be due to the compact urban density offered by the city, allowing convenient travel by bicycle.

Figure 12 demonstrates that almost every reported bicycle crash in Richmond resulted in injury to the cyclist. Fortunately, fatalities were limited from 2008 – 2012 with only four reported out of 352 crashes. However, even one fatality is too many.

The DMV data also indicates that the majority of crashes disproportionately involve males. Of the 3,658 crashes that occurred in the state from 2008 – 2012, 82.6% involved males. This may be due to the disproportionately high number of males who use the bicycle as a mode of transportation, as well as female aversion to risk. Figure 13 shows the distribution of bicycle crashes by age cohort in Virginia. The distribution of bicycle crashes is not evenly distributed with just over half of the crashes involving people between the ages of 10 and 30.

Figure 12: Richmond Bicycle Crash Injuries and Fatalities (2008-2012)

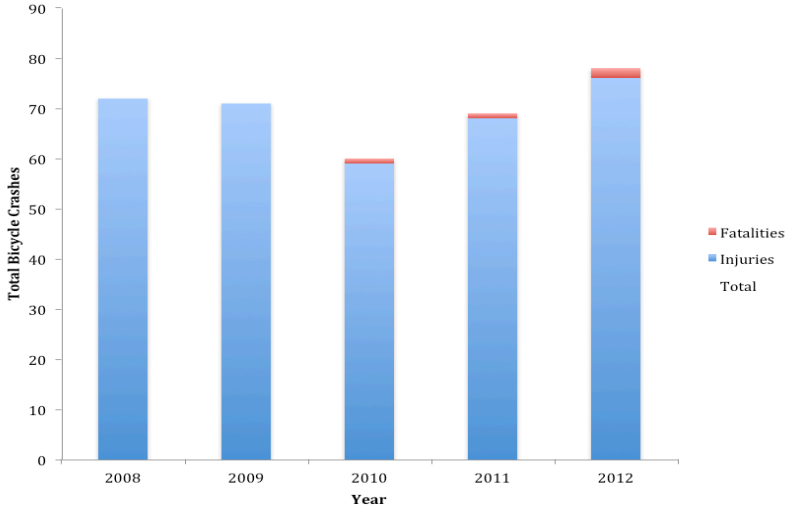
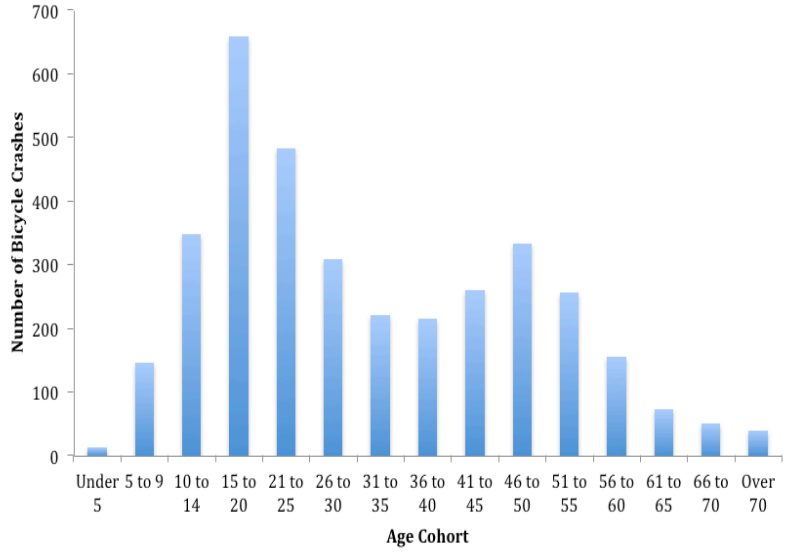


Figure 13: Total Number of Bicycle Crashes by Age Cohort in Virginia (2008-2012)



(Source: Virginia Department of Motor Vehicles)

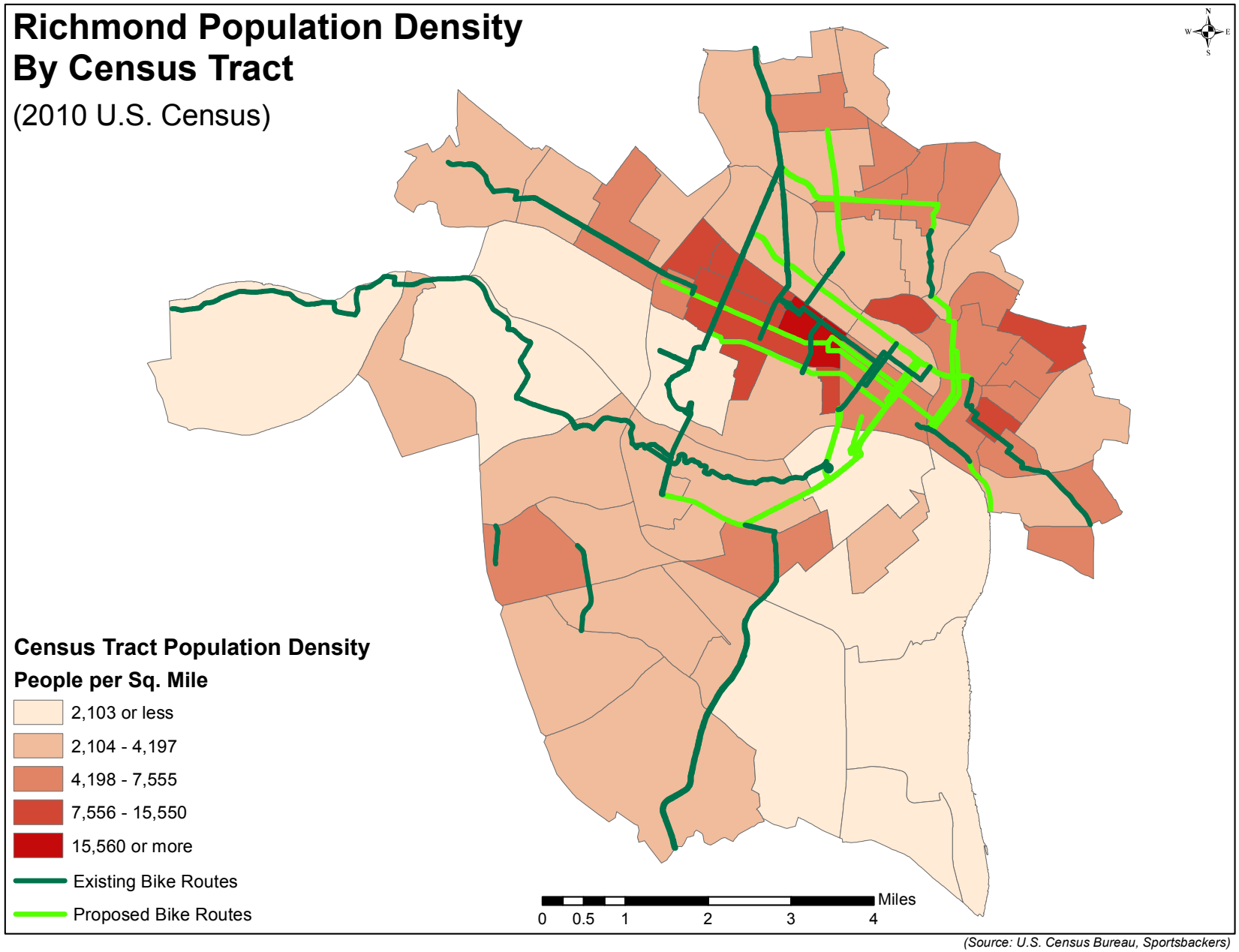
Very detailed data related to the behavior, bicycle and environment of bicycle crashes was also obtained from the DMV. The top three cyclist behaviors responsible for crashes from 2008 – 2012 were "No Violation" (38.7%), "Failure to Yield" (19.0%), and "Other" (14.9%). Comparatively, according the community survey's sample the top three cyclist behaviors that made the respondents nervous when driving were "Not being visible" (88.1%), "Riding against the flow of traffic" (84.2%) and "Riding in an unpredictable manner" (84.0%). Notable from the DMV data was the fact that 74.8% of crashes occurred when cyclists were simply going straight, 87.9% occurred with proper, functioning equipment (including lights), 92.8% occurred during no adverse weather conditions and 74.7% occurred during daylight hours. This suggests that most bicycle involved crashes occur under optimum conditions and scenarios, and that it is not necessarily scofflaw behavior or cyclist negligence leading to accidents. However, bicycle crash statistics are notoriously inaccurate, as most go unreported unless they result in serious injury (Jacob Helmboldt, personal communication, January 25, 2014). This leads to data that is not completely representative. Concurrently, it becomes quite difficult to determine the exact location of bicycle crashes. A complete table of bicycle involved crash data can be found in the Appendix C.

2.4 Infrastructure Considerations

Map 5 illustrates the location of both current and proposed bikeways in relation to population density in the city. The bikeway designation includes bike lanes and sharrows. The majority of the bicycle infrastructure network proposed to the city by Bike Walk RVA is concentrated in and around the downtown core, extending into the Fan and Museum Districts where population density is the greatest. However, even with the expanded network, there are portions of the city where significant population densities will be underserved. These include portions of the north side, east end and south side. In these locations, residents will still need to rely on operating their bicycles safely on the city streets in order utilize this form of transportation.

Image 5: Grove Avenue Sharrow

Map 5: Richmond Population Density



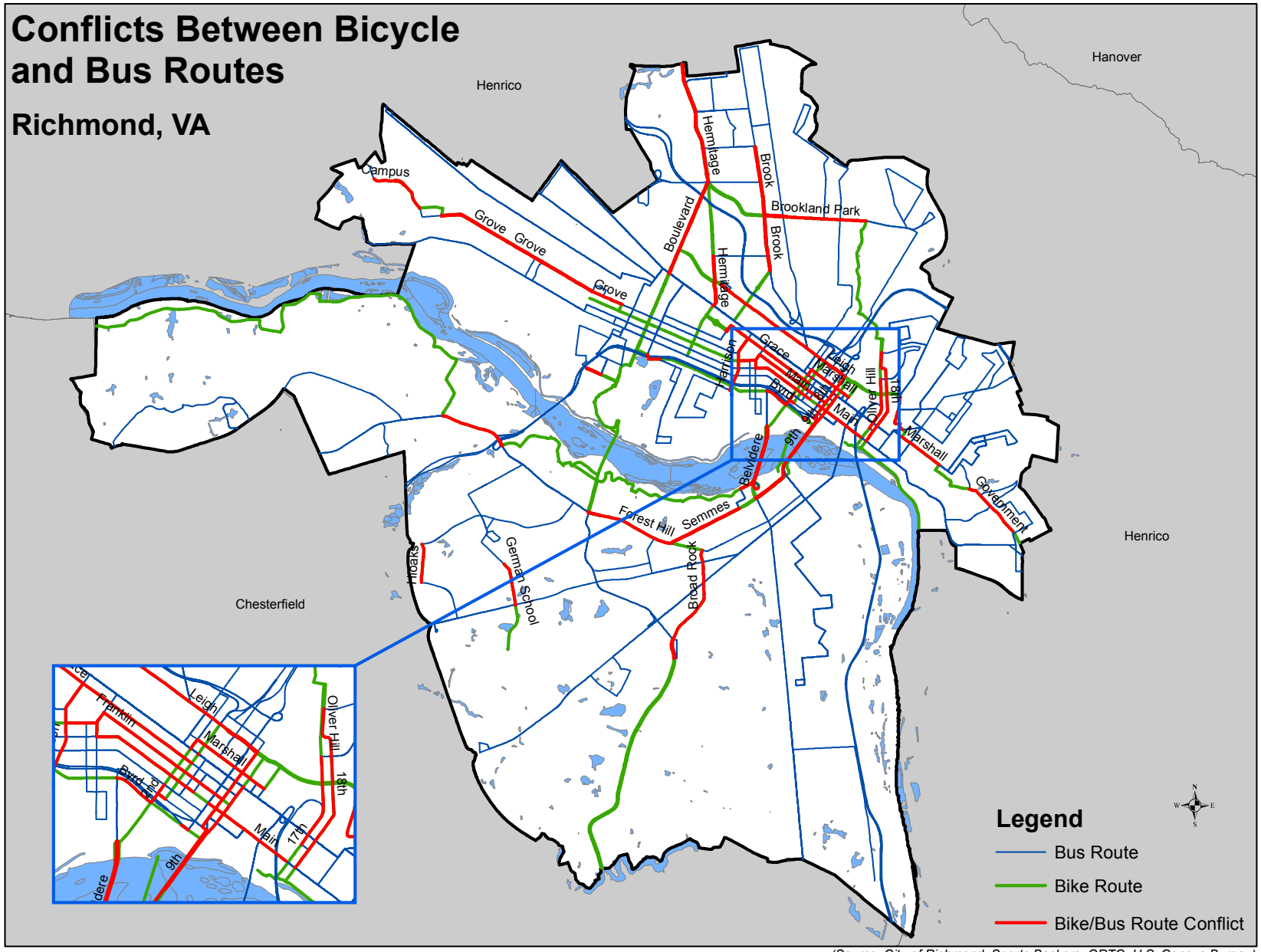
(Source: U.S. Census Bureau, Sportsbackers)

Image 6: Cyclists and pedestrians crossing a busy intersection at Harrison and Franklin

In -person interviews and the community survey revealed a conflict between cyclists and the Greater Richmond Transit Company (GRTC), specifically regarding aggressive operator behavior and lack of understanding in how sharrows work. This became apparent by reactions from both cyclists and operators after the installation of sharrows throughout the city. Map 6 illustrates existing GRTC bus routes, current and proposed bicycle network, and locations where conflicts potentially exist as a result of GRTC and bicycle routes sharing the same roads.

According to GRTC Training Manager (personal communication, February 6, 2014), the frustration goes both ways. GRTC operators participate in a six-week training program that has been enhanced in recent years with a heightened emphasis on interacting with cyclists. The bus navigation training focuses on sharing the road, providing proper spacing when passing or changing lanes if possible, providing space when traveling behind a cyclist and braking in turns to anticipate cyclists. The biggest issue facing GRTC operators is cyclists who ride with an invincible attitude, disregarding the rules of the road. Buses are at a significant disadvantage due to their size when it comes to stopping or reacting to situations that occur unexpectedly. Greater Richmond Transit Company officials also pointed out that training is difficult without stronger collaboration with the city in order to prepare operators to changing conditions that come with the installation of bicycle infrastructure.

Map 6: Potential Bus and Bicycle Conflicts (existing and proposed bicycle routes)



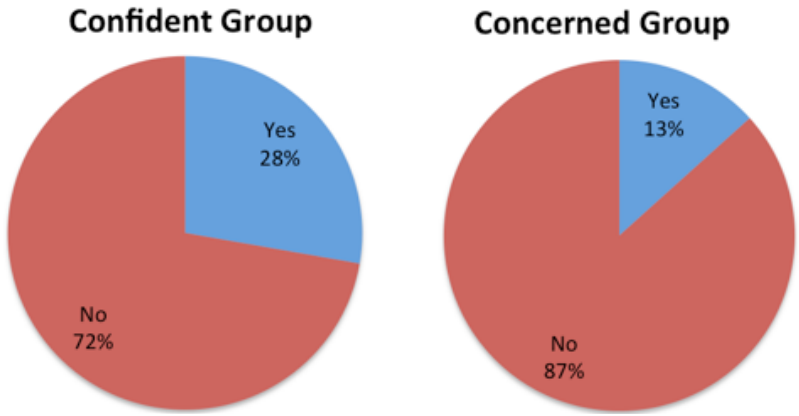
(Source: City of Richmond, Sports Backers, GRTC, U.S. Census Bureau)

2.5 Education Considerations

A number of organizations offer bicycle safety education programs in the City of Richmond. However, the implementation is not widespread and each operates independently, lacking a cohesive effort. When asked in the survey if respondents were aware of any bicycle safety education courses offered in Richmond, the overwhelming majority of each group reported no (Figure 14). Of those who reported yes, the organization that was most recognized was RideRichmond, with the Richmond Area Bicycling Association second.

Since 2012, RideRichmond has been providing bicycle safety education through its Richmond Cycle Smart initiative. Richmond Cycle Smart utilizes a team of League of American Bicyclists (LAB) certified instructors to educate citizens on safe cycling techniques, with an emphasis on both cyclist and motorist behavior. These efforts include bicycle rodeos held at local elementary and middle schools, as well as brown

Figure 14: Are you aware of any bicycle safety education courses in the City of Richmond?



Since 2012, RideRichmond has been providing bicycle safety education through its Richmond Cycle Smart initiative. Richmond Cycle Smart utilizes a team of League of American Bicyclists (LAB) certified instructors to educate citizens on safe cycling techniques, with an emphasis on both cyclist and motorist behavior. These efforts include bicycle rodeos held at local elementary and middle schools, as well as brown bag lunch sessions conducted at businesses and offices in the city. In addition, RideRichmond participates in events such as RVA Streets Alive!, where they provide the community an opportunity to learn about bicycle skills and safety (RideRichmond, 2013).

The Richmond Area Bicycling Association (RABA) provides a bicycle safety education program by request a few times each year. Five LAB certified instructors who are members of RABA provide bicycle safety education, primarily to children, at the request of parents who are concerned for their children's safety. According to RABA, many adults do not feel they need to participate in a bicycle safety education course, despite their skill level. However, they have noted the adults who participate in the program take more out of it than anticipated (personal communication, February 6, 2014).

The Richmond Police Department (RPD) offers a bicycle safety education course through their community outreach program Police Athletic League (PAL). This effort includes bicycle rodeos at the city's housing developments where police offers work with the children in the community on safe cycling techniques, offer hands-on practice with bicycles that have been seized and rehabilitated by RPD and hand out helmets. RPD identified areas where they could improve

bicycle safety education by getting more involved in the Richmond Public School system through their onsite resource officers or by bringing in additional officers that have been trained in bicycle safety. The RPD already partners with VCU in its bicycle safety education programs, but notes that more could be done with the university to address the high percentage of students that travel by bicycle (personal communication, February 6, 2014).

The former Driver's Education Department Head at Hermitage High School (personal communication, February 6, 2014), and the Driving Range Coordinator for Richmond Public Schools (personal communication, February 12, 2014) were interviewed to determine the extent to which bicycle safety is addressed in driver's education programs within public schools. The driver's education curriculum in the Commonwealth of Virginia is the only curriculum with content mandated by the General Assembly. In this fashion, there are 21 modules that must be taught whether the course is offered by a public school system or a private instructor. Of the 21 modules, only one consists of material related to bicycle safety. The emphasis in this module is presented from the driver's perspective: awareness of cyclists and pedestrians, pavement markings and the use of hand signals to indicate turning or stopping. Absent from this curriculum are the rights and responsibilities of cyclists.

The Richmond Public Schools (RPS) offer driver's education through their 10th grade required Health and Physical Education course, with only one semester being dedicated to driver's education. RPS recognized a need for greater emphasis on bicycle safety in the driver's education curriculum due to increased bicycle mode share that is occurring. The topic is addressed more often in the elementary and middle schools with collaboration from outside organizations, but is not widespread or cohesive throughout the district. Although efforts could be improved in the elementary and middle school grade levels, the topic is a real need at the high school levels. It was noted that many students in the RPS system do not have access to a vehicle in their homes and could benefit from learning safe cycling skills.

Potential exists for greater collaboration with outside advocacy groups to help provide experienced instruction and hands-on education in the schools. Currently RPS has the greatest number of students enrolled per grade at the elementary level, with decreasing numbers into middle school and high school (Table 6). As a result, it may be more beneficial to begin addressing bicycle safety education at the elementary level to lay a foundation and maximize the number of people that the program reaches. Once established in the elementary schools, a bicycle safety education program could move into the middle schools to follow up with what has already been

Table 6: Average Student Enrollment by Grade

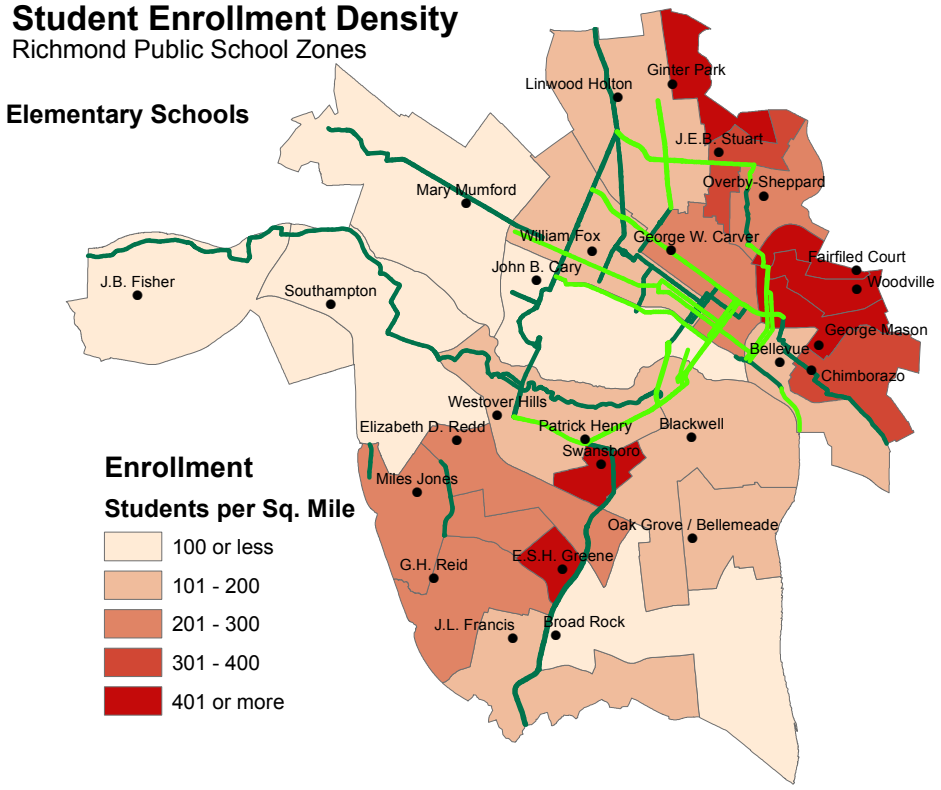
Richmond Public Schools (2012)

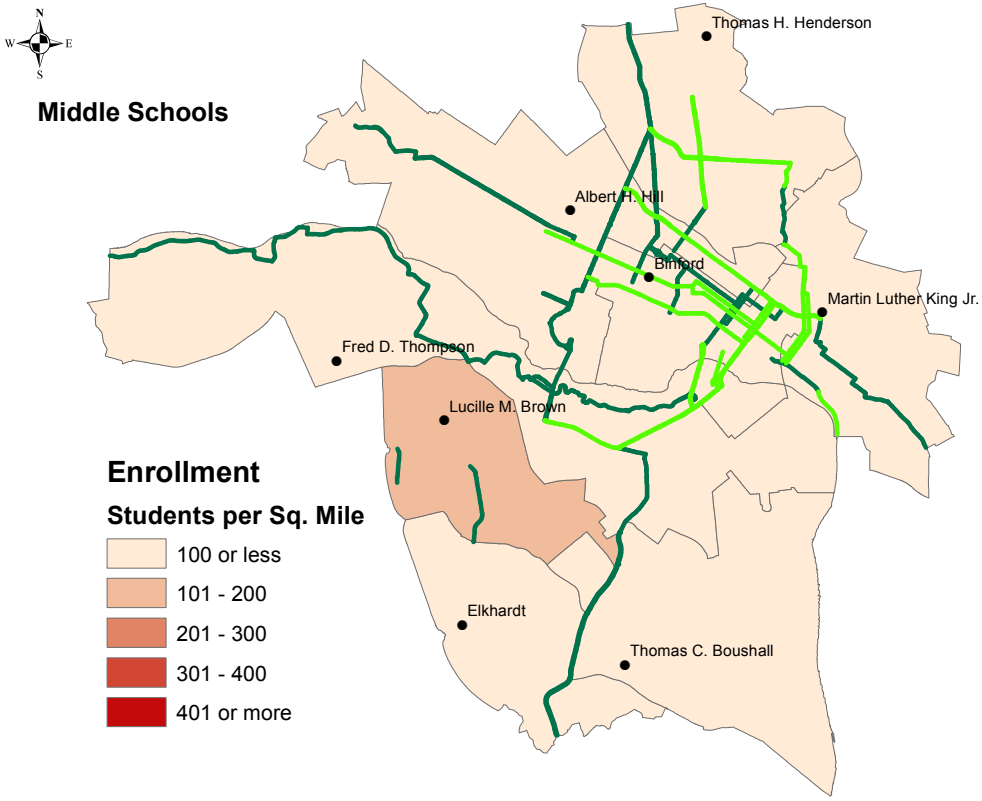
Level	Grades	Average
Elementary School	K - 5	2,340
Middle School	6 - 8	1,447
High School	9 - 12	1,324

(Source: Virginia Deptartment of Education)

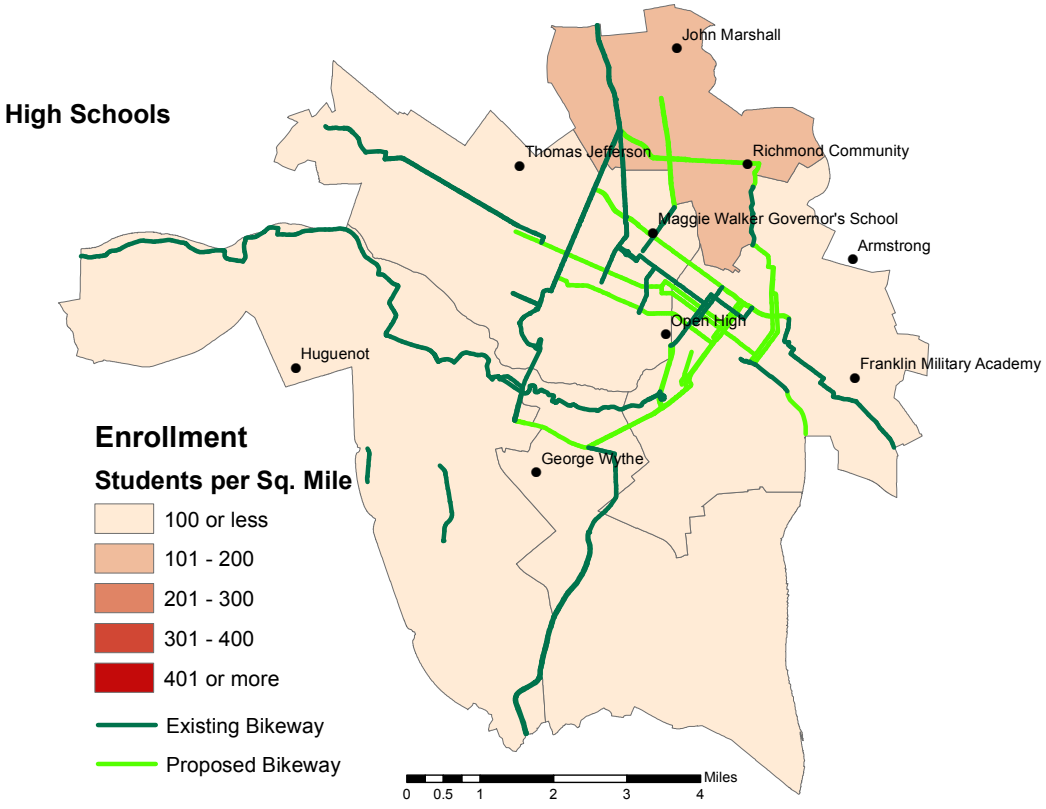
addressed, as well as introduce new topics such as fundamentals of urban cycling and pre-driver's education concepts. At the high school level the emphasis could be placed on operating a vehicle in a manner that respects all users of the roadway through the driver's education curriculum. Map 7 is a series of three maps illustrating the student enrollment densities for each school zone at elementary, middle and high school levels, along with current and proposed bicycle network. The maps indicate the majority of the schools are located in areas that will be inadequately served by the proposed infrastructure improvements.

Map 7: Student Enrollment Density by School Zone





Very few survey respondents have ever participated in a bicycle safety education course, which is not surprising due to lack of awareness for such programs stated earlier. Figure 15 illustrates the participation rate between the two groups. Respondents in the Confident Group identified themselves as either "Strong and Fearless" or "Enthused and Confident," which could be due to greater participation in a bicycle safety education course.



(Source: Virginia Dept. of Eductation, Sports Backers, City of Richmond)

The survey revealed that interest does exist for participation in a bicycle safety education course. Figure 16 shows that 60% of the Concerned Group would be interested in participating in such a course, and 53% of the Confident Group expressed the same interest.

Figure 15: Have you ever participated in a bicycle safety education course?

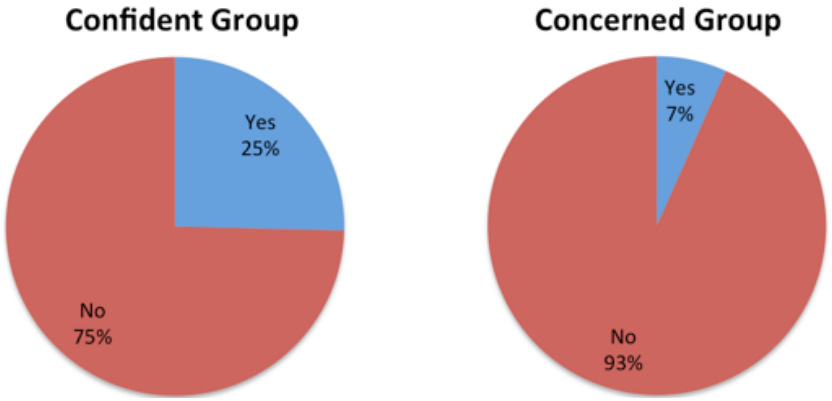
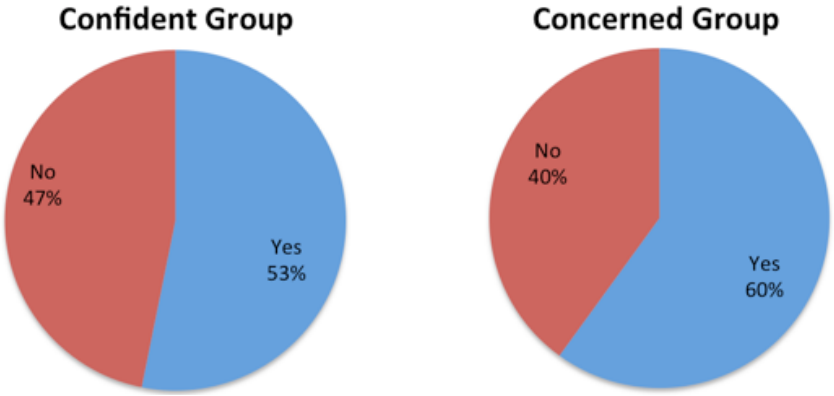


Figure 16: Would you be interested in participating in a bicycle safety education course?



However, participation in a bicycle safety education course has the greatest potential to increase ridership among the Concerned Group. Again, this may be a reflection of the respondents' self-identified comfort level and cycling habits. Figure 17 illustrates the indication by 61% of the Concerned Group that participation in a bicycle safety education course is likely or very likely to increase the amount they ride their bike, compared to only 27% for Confident Group.

Additionally, 87% of the Concerned Group indicated that if their child participated in a bicycle safety education course they would be more likely to allow them to ride on the road. Only 75% of the Confident Group expressed the same response (Figure 18). This may be due to the previously mentioned fact that more of the Confident Group would allow their children to ride on their neighborhood streets and to school. The data shows safety considerations the Concerned Group parents have for themselves get projected onto their children.

Figure 17: How likely would participation in a bicycle safety education course increase the amount you ride your bike?

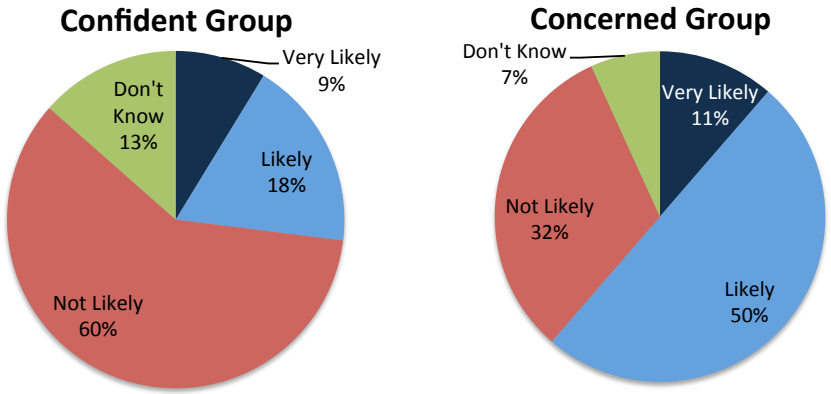


Figure 18: Would you be more likely to allow your child/ children to ride on the road if they participated in a bicycle safety education course?

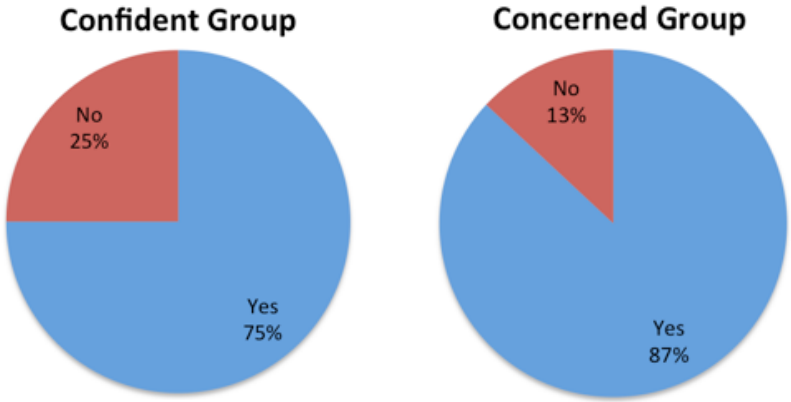


Image 7: Cycling family

(Source: Phil Riggan)

2.6 Event and Encouragement Considerations

A number of events over the last seven years have been created to allow citizens to participate in cycling with others in a semi-controlled environment. These opportunities allow community members to practice safe cycling techniques with others in a way that validates cycling as a form of transportation accessible to everyone. In addition to learning safe techniques from others, these events provide an opportunity for citizens to connect with the cycling community. Although mentioned earlier in the timeline, Table 7 provides a list of events which provide these opportunities, along with the year they were created and organizations that put them on.

According to the community survey, these events are a valuable opportunity that, through participation, may increase the amount that they ride their bikes. Figure 19 shows over half of the Confident group would likely ride more if they participated in such events. This increases to 71% for the Concerned Group.

Table 7: Annual Cycling Event Opportunities

Event and Organization

Inaugural Year	Event	Organization
2007	Richmond Bike to Work Day	City of Richmond
2010	Anthem Moonlight Ride	Sportsbackers
2012	Snowflake Ride Heart of Virginia Bike Ride Martin's Tour of Richmond	Richmond Cycle Corp Richmond Area Bicycling Association Sportsbackers
2013	RVA Streets Alive!	Sportsbackers

Figure 19: How likely would events designed to let you practice safe cycling increase the amount you ride your bike?

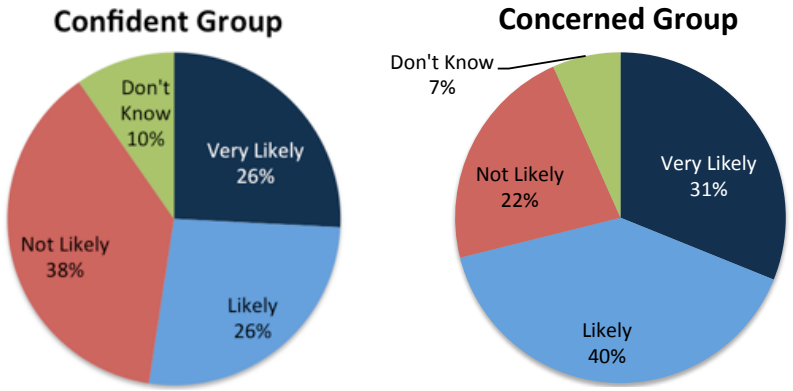


Image 8: Martin's Tour of Richmond Participants

(Source: Phil Riggan)

2.7 Enforcement Considerations

The Code of Virginia provides a number of provisions outlining the legal rights and responsibilities of cyclists on shared roadways. A summary of cycling-related laws provided by the Virginia Department of Motor Vehicles (2013) is presented below. A complete list of the laws and references in the Code of Virginia is presented in the Appendix D.

- *Rights and Duties:*

The Code of Virginia states that cyclists operating on a shared roadway have the same rights and responsibilities as drivers of vehicles. The exception would be when riding on a sidewalk, which is allowed in the City of Richmond. In this case, cyclists have the same rights and responsibilities as pedestrians, must yield the right of way to pedestrians and provide an audible signal when passing.

- *Traffic Controls:*

Cyclists are to obey all traffic signs, signals, lights and markings the same as a motor vehicle when operating on the road. Cyclists are afforded the exception of proceeding through a red light if they come to a complete stop and wait through two complete light cycles or two minutes, whichever is shorter. If proceeding through a stoplight under these conditions, cyclists must yield the right of way to drivers approaching the intersection.

- *Where to Ride:*

The Code of Virginia states that cyclists must ride with the flow of traffic as safely practicable to the right side of the road. This does not mean that cyclists must ride as close to the right side as possible, for exposing oneself to the threat of being hit by an opening car door does not meet the definition of riding as close to the right side as safely practicable. Cyclists may not ride more than two abreast on highways, must form a single file when being overtaken by a vehicle, and my not ride between two lanes of moving traffic.

- *Changing Directions:*

Hand signals are required by all cyclists when changing lanes, making turns or stopping. However, the law does allow an exception to signaling if both hands are needed to maintain proper control of the bike (i.e. steering or braking). Cyclists are to make left turns in the same fashion as a motorist, pulling into the intersection and turning at the corner.

- *Passing:*

Cyclists may pass another vehicle on either the right or left side if safe to do so, but may not travel between two lanes of moving traffic going in the same direction in order to pass. Motorists must provide a two-foot buffer when passing cyclists on the left.

- *Safety Considerations:*

Cyclists are prohibited from riding with no hands on the handle bars, carrying more people than the bicycle is designed to accommodate (with an exception for adults carrying a child in a bike seat or trailer), attach themselves to another vehicle, or wear headphones in both ears while riding (one ear is allowed).

- *Helmet Use:*

Helmet use by children under the age of 15 is not required in the City of Richmond. The General Assembly allows local discretion in enacting this ordinance.

- *Equipment:*

All bicycles must have a white headlight visible from 500 feet and a red reflector visible from 600 feet when operated between sunset and sunrise. On roads with posted speeds above 35 mph a steady or blinking red taillight visible from 500 feet must also be included. Bicycles must also have at least one operating brake when riding on the roadways.

- *Accidents:*

If involved in an accident causing injury, death or property damage, a cyclist must stop and provide their name and address to police and anyone involved. If damage occurs to unattended property, cyclists must attempt to find the owner and if the owner cannot be found they must leave a note at the scene and contact the police.

- *Proposed Laws:*

Three new bills related to cycling were proposed in the 2014 Virginia General Assembly session. Senate Bill 97 increased the buffer required by vehicles when passing a cyclist from two feet to three feet. House Bill 82 and 811 would have applied the same law prohibiting motorists from following other motor vehicles too closely to cyclists, but would not have prohibited cyclists from practicing the technique of drafting off of one another. Senate Bill 225 would have required motorists to open the doors of their parked cars into moving traffic only when safe to do so. This bill would have held motorists responsible if they were to open their car door and strike a moving vehicle or cyclist, an action commonly referred to as "dooring." Of the three proposed laws, only Senate Bill 97 requiring a three-foot passing barrier was adopted (Virginia Bicycling Federation, 2014). This law will go into effect on July 1, 2014 (FABB, 2014).

The community survey attempted to gauge familiarity citizens have with existing bicycle-related laws by providing nine statements referencing some of the laws mentioned above and answering "True", "False", or "Don't Know." Interestingly, the Concerned Group answered more of the statements correct, and the Confident Group responded to more of the questions as "Don't Know". This perhaps indicates that Concerned Group has a greater understanding of the laws due to their reservations regarding everyday cycling. A complete list of the survey responses to this question can be found in Appendix B.

The issue of enforcing safe travel laws for both cyclists and motorists was discussed in an interview with RPD's Executive Officer of Planning and Analysis (personal communication, February 6, 2014). With more cyclists taking to the streets in Richmond, this has become a strong point of contention as cyclists feel motorists aren't following laws that provide them with safety, and motorists feel cyclists ignore laws governing cycling behavior. RPD has no specific strategy or plan for enforcing bicycle safety laws in the city. Rather, the issue is addressed as opportunities present themselves. However, enforcement of cyclists who violate the laws has increased. In 2012, 47 citations were issued to cyclists. In 2013, that number rose to 83, representing a 76.6% increase

in one year (Riggan, 2013). The most common citations were for running red lights or stop signs, and not having proper headlights or rear reflectors. It is important to note that violation of state traffic laws while on a bicycle is considered a traffic violation with similar ramifications that apply to motorists. This may include fines and increased auto insurance premiums. Furthermore, if a cyclist does not make clear to the clerk of the court that their infraction occurred while operating a bicycle they will receive points on their driving record. Many cyclists are unaware of these consequences until after they have received a citation (Richmond Pedestrian, Bicycle and Trails Coordinator, personal communication, March 7, 2014).

The RPD conducts a 40-hour training course to officers that follows the International Police Mountain Bike Association curriculum, of which four hours is dedicated to laws that apply to cyclists and motorists on shared roadways. The problem is that not all officers are required to take this course which, according to the RPD, results in many officers not seeing cycling violations as a serious offense, or simply not understanding the laws themselves. As a result, Figure 20 shows 52% of both groups felt that RPD'S enforcement of safe travel laws to motorists who violate them was ineffective. The results indicate the community feels RPD is even less effective at enforcing safe travel laws against bicyclists who violate them. Figure 21 reveals that only 13% of the Confident Group and no one in the Concerned Group felt RPD was effective in this manner.

Figure 20: How do you rate RPD's effectiveness at enforcing safe travel laws to motorists who violate them?

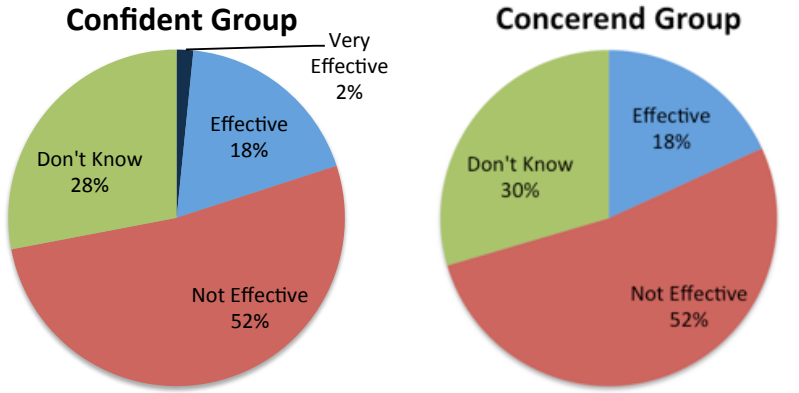
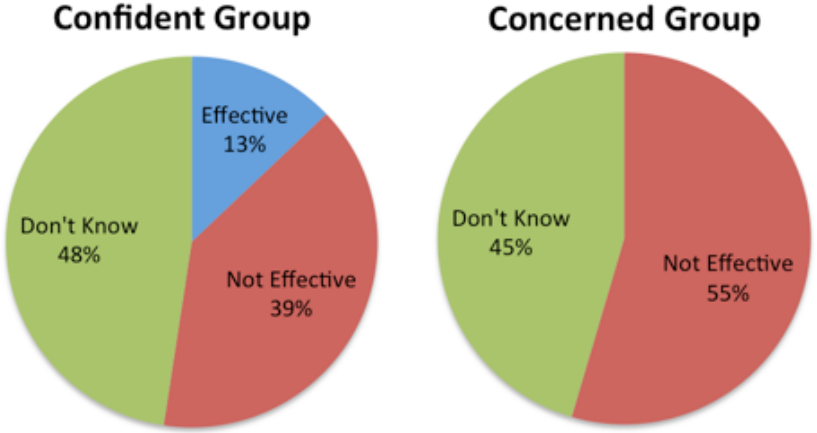


Figure 21: How do you rate RPD's effectiveness at enforcing safe travel laws to bicyclists who violate them?



2.8 Evaluation Considerations

The City of Richmond is making strides in creating a more bicycle-friendly community. As a result, conditions related to bicycle safety may very well change moving forward. As improved infrastructure, bicycle mode share and bicycle safety education participation rates increase, the perceptions of bicycle safety may shift as a result. Evaluation of this plan's effectiveness at addressing safety barriers allows its focus to be adapted to changing needs of the community. A variety of metrics could be used to evaluate safety perceptions and mode share. Surveys are very useful in gathering data from the community, but as was evident in this plan's survey, they have the potential of only reaching a select segment of the population. A more scientific selection process would help alleviate this problem.

2.9 Summary of Findings

Those individuals who identified themselves as "Interested, But Concerned" are more prone to letting perceptions of bicycle safety limit the frequency that they ride a bicycle in the city. As a result, their choice of route is heavily influenced by safety factors. Confident cyclists cite safety as a consideration in route choice, but are also motivated by factors of convenience, such as shortest travel time and distance. The safety concerns people have are also applied to their children; this has the potential to improperly condition children at a young age that cycling is a dangerous activity and that bikes should remain on driveways and sidewalks, while the road is reserved for motor vehicles. Moreover, females are found to be more resistant than males at engaging in utilitarian cycling due to safety concerns.

The City of Richmond is making steps to improve the bicycle infrastructure network. However, there is still a long way to go before citizens will be able to freely ride throughout the city on dedicated, separated bike routes, forcing cyclists to interact with vehicles on the roadway to complete bicycle trips throughout the city in the meantime. Plus, it will be impossible to completely eliminate bicycle-vehicle interactions, especially at intersections.

Citizens are more nervous of driver behaviors while bicycling than cyclist behaviors while driving. However, most cyclists in Richmond also drive cars. By teaching people the concepts of safe cycling, they may become more aware of cyclists and what to expect from them when operating a vehicle. Ultimately, bicycle safety is the responsibility of everyone sharing the roadways. Cyclists and motorists alike need to remain indiscriminate in following the laws at all times in order

to serve as an example to each other.

Although bicycle safety education is offered throughout the community, programs are both weak in the number of participants and public awareness. Furthermore, parents are more interested in having their children participate in a bicycle safety education program than adults are for themselves. However, many adults have never received any formal training in bicycle safety. The mentality is that they know how to ride a bike therefore participating in a bicycle safety education program will not benefit them. The opportunity exists to increase the amount of people that a program could reach by diversifying the curriculum to meet different needs of Richmond's population. Examples include incorporating it into the public school curriculum or partnering with Virginia Commonwealth University, adult classes to accommodate busy working schedules, and women's only, family and Spanish language courses.

In addition to a diverse, well-implemented bicycle safety education program, training facilities could also be utilized as a tool for teaching both motorist and cyclist safety techniques. A road cycling skills center, often referred to as a "bicycle safety town," could provide opportunities for cyclists to practice safe cycling techniques on a mock road complete with various lane markings and absent automobiles. This would allow citizens to freely establish a foundation of bicycle safety in a threat-free environment.

Recent years have provided more opportunities for people to practice safe cycling techniques in a semi-controlled environment. Additional events can be created to provide such opportunities, but they are not always easy to implement. A lot of coordinating between multiple agencies and organizations is required in order to turn miles of city streets into a safe environment for cyclists to participate. Caution is needed as well to avoid a saturation point, where motorists may become frustrated with cyclists for continuously being inconvenienced by road closures. This may have the effect of creating a hostile attitude towards cyclists. With the variety of cycling events in and around Richmond each year, it may be more beneficial to selectively market each event to the experience level that is most appropriate. For instance, the Anthem Moonlight Ride is a great opportunity for family participation, whereas the Tour de Richmond may be more appropriate for cyclists with advanced skill-sets. Group rides designed to establish a specific skill-set, such as commuting, are another option to be considered.

The laws exist to provide the legal framework needed to create a safe cycling environment in Richmond. The problem is many citizens do not fully understand the rights and responsibilities of cyclists on shared roadways. In addition to addressing this issue through a bicycle safety education program, opportunities exist to increase awareness of the laws through a public relations campaign and social media.

The enforcement of safety laws can also be improved. Without a bicycling safety education program, most laws are taught through enforcement after a violation has occurred, rather than through preventative measures that aim to help citizens understand and abide by the laws. More police officers could benefit by taking a bicycle safety education course. A stronger partnership between RPD and VCU and RPS could strengthen efforts of an education program. RPD also supports

a diversion program that would allow first time offenders to participate in a safety education course in lieu of a violation. After all, the city already provides such a program to motorists for select violations.

Metrics will be key in the evaluation process, and a variety methods are available that may help direct this plan's focus into the future. Annual community surveys could be distributed in a more scientific manner to gauge the community's safety perceptions and needs as they evolve through time. The participation rate would still be voluntary, but this method would ensure more citizens have an opportunity to participate and be represented in the process. For individuals participating in any bicycle safety education program, a uniform before and after survey could be administered to measure the effectiveness of the program, with the ability to identify areas of improvement within the program. Bicycle counts and crash data may be analyzed to see if mode share is increasing in a safe manner, while establishing a baseline for comparison. Ideally, an effective bicycle safety education plan would increase the number of citizens traveling by bicycle, while at the same time decrease the number of bicycle-related crashes.

3 PLAN RECOMMENDATIONS

3.1 Vision

The City of Richmond will be a first-class cycling community, providing safe, convenient opportunities for bicycle travel through supportive infrastructure that is balanced by a bicycle safety education program. With safety as the primary concern for its citizens and visitors alike, policies and programmatic steps will be taken that reduce crashes, increase ridership, and foster mutual respect for all users on shared roadways.

Education, encouragement and enforcement will serve as the foundations for a collaborative process that addresses the safety concerns and needs of a diverse population. Through this comprehensive approach Richmond will serve as an example of the lengths that can be achieved in creating a safe cycling environment.

3.2 Goals

Goal 1: The City of Richmond will foster a safe environment for cycling through support of bicycle safety education programs that teach members of the community how to safely and responsibly navigate Richmond's city streets.

The variety of bicycle safety education needs in Richmond is a reflection of the city's diverse population. As a result, bicycle safety education initiatives need to be equally as diverse in order to address the unique needs and concerns that exist. First identifying target audiences who share similar bicycle safety needs and concerns can achieve this. From this point bicycle safety education programs can be adapted to meet those needs.

Goal 2: The City of Richmond will make all bicycling-related information easily accessible to all citizens and visitors.

In order to create a safer cycling environment through education initiatives, information needs to be readily available to interested members of the community. This information may include data pertaining to the state of cycling in Richmond, bicycle safety statistics, organizations that conduct bicycle safety courses, locations of the bicycle network elements, local bicycle advocacy groups and more. At the current moment most of this data is available in some form online, but it is not centrally located in an easy to access fashion and is often outdated. By consolidating information related to bicycling in Richmond, community members will be better equipped to make informed decisions related cycling in the city.

Goal 3: The City of Richmond will be a first-class cycling community that is dedicated to providing appropriate infrastructure to facilitate safe, convenient travel by bicycle.

Supportive bicycling infrastructure is the most effective way to create a commitment to bicycling safety. However, the current state of the bicycle network in the City of Richmond is marginal at best. The city is taking steps to improve the bicycling infrastructure through the Bicycle Master Plan. For this reason, specific route and infrastructure recommendations have been omitted from this plan. What is included are recommendations to improve the safety and use of bicycle infrastructure in the City of Richmond.

Goal 4: The City of Richmond will support events that encourage safe cycling techniques, allow citizens to connect with the local cycling community and experience the practical benefits of utilitarian cycling.

Events designed to promote safe cycling bring people together to the share the experience of cycling in Richmond. These events can be used to reinforce safe practices learned through bicycle safety education courses, as well as provide the opportunity to gain additional skills through hands-on instruction and examples set by the participation of others. Depending on the disposition of those participating, events ranging from the organized Bike to Work Day ride to small group rides on the weekend have the same potential to provide these beneficial opportunities. Furthermore, seeing others safely participate in cycling through organized events, especially those focused on utility transportation, reiterates bicycling as a legitimate, accessible form of transportation.

Goal 5: The Richmond Police Department will be dedicated to enforcing a legal framework that creates a safe travel environment for all users of shared roadways.

Promoting bicycle safety through education and encouragement does little to affect widespread change if the legal framework fostering a safe environment is not enforced. The primary responsibility of enforcing safe travel laws falls on the Richmond Police Department. Through improved training and a strategic approach to enforcement, citizens can feel assured that the laws designed to protect and afford rights to safe travel are being used to protect them as designed. Yet enforcement of safe travel laws is not the responsibility of the Richmond Police Department alone: all members of the community, regardless of their mode of transportation, must be accountable for their own travel behavior to further uphold the laws and to serve as examples to one another.

Goal 6: The City of Richmond will develop an effective method of plan evaluation to ensure that the community's bicycle safety needs and concerns are continuously met as conditions evolve through time.

As the recommendations in this plan and the Bicycle Master Plan are implemented, both the physical and social environment of cycling has the potential to change. Attitudes may shift, ridership may increase, tensions may ease and a mutual respect between all road users may be achieved. In order to keep up with the changing trends and conditions related to bicycle safety in Richmond, this plan's recommendations and strategies will need to be continuously monitored to allow for effective adaptations to meet changing needs.

3.3 Objectives, Strategies and Implementation

The objectives and strategies recommended in this section are designed to accomplish the goals and achieve the vision set forth in this plan. Where possible, organizations responsible for the implementation of each strategy have been recommended. Moving forward it may be necessary to delegate the responsibility to a different organization due to constraints and opportunities that arise. At the end of this section a list of potential community partners is provided from the Greater Richmond Bicycle Coalition's list of partners.

An implementation schedule has been incorporated into the strategy recommendations based on four different phases. Phase I represents strategies to be implemented by the end of 2014. Phase II represents strategies that may take longer to implement and are designed to be implemented by the time Richmond hosts the 2015 UCI World Cycling Championships in September, 2015. Phase III represents strategies that are more difficult to implement due to their scope, cost or the organizational structure needed. Phase III strategies are designed for implementation by 2017. The final phase, Phase IV, includes the most difficult programmatic recommendations and therefore follows a five-year timeline with implementation by 2019.

Table 8: Plan Implementation Phases

Phase	Time Frame
Phase I	By the end of 2014
Phase II	By the 2015 UCI World Championships (September)
Phase III	By the end of 2017
Phase IV	By the end of 2019

Goal 1: The City of Richmond will foster a safe environment for cycling through support of bicycle safety education programs that teach members of the community how to safely and responsibly navigate Richmond's city streets.

Objective 1.1: Provide necessary resources to support the implementation of bicycle safety education courses throughout the city.

Strategies		Implementation Phase	Responsible Organizations
1.1.1	Increase the number of League of American Bicyclists certified instructors from 10 to 25 by 2015 to facilitate the expansion of bicycle safety education initiatives and teach interested citizens how to lead their own course	**Phase I**	City of Richmond, Local bicycle advocacy groups, Interested community members
1.1.2	Create bicycle education toolkits with necessary instructional materials that can easily be transported to different locations to use in bicycle safety education courses.	**Phase I**	City of Richmond, Local bicycle advocacy groups
1.1.3	Apply for Virginia Department of Transportation Safe Routes to School and federal MAP-21 grants to provide start-up funding for bicycle safety education programs in Richmond Public Schools.	**Phase II**	Richmond Public Schools, VDOT
1.1.4	Develop a student mentor program that allows interested high school students to gain additional training in order to help facilitate community efforts in bicycle safety education programs, while allowing the students to acquire community service credits toward graduation.	**Phase II**	Richmond Public Schools Local bicycle advocacy groups Community organizations

Objective 1.2: Create a diverse bicycle safety education program based on the League of American Bicyclists' curriculum materials to address the various needs of identified target audiences.

Strategies		Implementation Phase	Responsible Organizations
1.2.1	Create a women's bicycle safety education course taught by experienced female cyclists to address the unique needs of female cyclists.	**Phase II**	Local bicycle advocacy groups, Women's advocacy groups
1.2.2	Create seniors' bicycle safety education course taught by experienced senior cyclists to address the unique needs of the older populations.	**Phase II**	Local bicycle advocacy groups, Senior advocacy groups
1.2.3	Offer bicycle safety education courses in Spanish to reach the members of the Hispanic community.	**Phase II**	Local bicycle advocacy groups, Hispanic community groups
1.2.4	Partner with neighborhood associations to provide family bicycle safety education classes within their communities designed to teach parents of young children how to establish a foundation of safe cycling habits.	**Phase II**	Local bicycle advocacy groups, Neighborhood associations, Interested community members
1.2.5	Design a workplace bicycle safety education course that meets the demands of busy working adults and can be conducted in a short time frame at the job site.	**Phase II**	Local bicycle advocacy groups, Local business community
1.2.6	Incorporate a bicycle safety education course opportunity into new and transfer student orientation Virginia Commonwealth University.	**Phase II**	Virginia Commonwealth University, Local bicycle advocacy groups
1.2.7	Offer specialized courses for experienced riders seeking to increase their skill sets in touring, group riding and training.	**Phase II**	Local bicycle advocacy groups

Objective 1.3: Provide bicycle safety education to 5,000 Richmond Public School students annually.

Strategies		Implementation Phase	Responsible Organizations
1.3.1	Identify at least one health and physical education faculty member per school attend an instructors training session to learn how to effectively teach bicycle safety education at each school level.	**Phase III**	Richmond Public Schools, Local bicycle advocacy groups
1.3.2	Provide professional development points towards state recertification for teachers who participate in an instructors training program.	**Phase III**	Richmond Public Schools
1.3.3	Utilize experienced cycling volunteers and Richmond Police Department staff to supplement bicycle safety education in the Richmond Public School system.	**Phase III**	Richmond Police Department, Local bicycle advocacy groups
1.3.4	Incorporate the League of American Bicyclists' Bicycling Skills 123 Youth curriculum at the elementary school level through all 3rd grade health and physical education courses.	**Phase III**	Richmond Public Schools, Local bicycle advocacy groups
1.3.5	Incorporate the American Alliance for Health, Physical Education, Recreation and Dance's Bikeology (Parts I and II) curriculum at the middle school level through all 6th grade health and physical education courses.	**Phase III**	Richmond Public Schools, Local bicycle advocacy groups
1.3.6	Assess and include all material and programmatic costs of a district-wide bicycle safety education program in the fiscal year 2016-2017 budget.	**Phase III**	Richmond Public Schools
1.3.7	Incorporate the League of American Bicyclists' Traffic Skills 101 curriculum at the high school level through the required 10th grade health and physical education course which includes driver's education.	**Phase IV**	Richmond Public Schools, Local bicycle advocacy groups

Goal 2: The City of Richmond will make all bicycling-related information easily accessible to all citizens and visitors.

Objective 2.1: Develop a Street Smarts website that centralizes all bicycle-related information for the City of Richmond.

Strategies		Implementation Phase	Responsible Organizations
2.1.1	Provide marketing of bicycle safety education programs and opportunities offered by different organizations in the city.	**Phase I**	City of Richmond, Local bicycle advocacy groups, RideFinders
2.1.2	Outline applicable laws that govern safe travel behavior in a clear and concise manner.	**Phase I**	City of Richmond Richmond Police Department
2.1.3	Allow a forum where members of the cycling community can connect.	**Phase I**	Local bicycle advocacy groups, Interested community members
2.1.4	Provide important and relevant cycling information that allows individuals to make informed decisions related to cycling in the city.	**Phase I**	City of Richmond, Local bicycle advocacy groups, Interested community members, RideFinders
2.1.5	Provide maps of the existing bicycle network that include type of infrastructure, appropriate experience level and key destinations.	**Phase II**	City of Richmond, Local bicycle advocacy groups, RideFinders

Objective 2.2: Create an effective public relations campaign to communicate safe cycling techniques, benefits, rights and responsibilities.

Strategies		Implementation Phase	Responsible Organizations
2.2.1	Utilize GRTC bus advertisement space to promote campaign messages.	**Phase I**	City of Richmond, GRTC/RideFinders
2.2.2	Partner with existing businesses to use illuminated advertising marquees and electronic communication services to promote campaign messages and laws related to safe travel behavior.	**Phase I**	Local business community
2.2.3	Design a series of informative fliers containing safe travel laws, rights, responsibilities, and best practices to be posted at places of employment and rotated regularly.	**Phase I**	Local bicycle advocacy groups, Local business community, Charter 2015
2.2.4	Expand distribution of RideRichmond's spoke cards detailing cyclists' rights and responsibilities at local bike shops, gas stations, banks, and coffee shops.	**Phase I**	RideRichmond, Local business community
2.2.5	Embrace a variety of different mediums to facilitate the distribution of campaign messages including billboards, email, website links, Facebook, Twitter, radio, television, newspaper print and direct mailings through city billing invoices.	**Phase I**	City of Richmond, Local bicycle advocacy groups
2.2.6	Adopt a "Share the Road" and "3-2-1" campaign message: 3 feet to pass, 2 riders max abreast, 1 single file line when being passed.	**Phase II**	City of Richmond, Local bicycle advocacy groups

Objective 2.3: Create a full-time Bicycle Safety Outreach position under the Pedestrian, Bicycle and Trails Coordinator to facilitate the coordination of bicycle safety education opportunities in the City of Richmond.

Strategies		Implementation Phase	Responsible Organizations
2.3.1	Establish curriculum and programmatic requirements for all city-endorsed bicycle safety education programs in Richmond.	**Phase III**	City of Richmond, Local bicycle advocacy groups
2.3.2	Connect interested citizens and groups to appropriate organizations to provide their bicycle safety education course needs.	**Phase III**	City of Richmond, Local bicycle advocacy groups
2.3.3	Manage and maintain up to date information on the city's Street Smarts website.	**Phase III**	City of Richmond, Local bicycle advocacy groups
2.3.4	Assist in the application of grant funds to finance bicycle safety education initiatives in the city.	**Phase III**	City of Richmond
2.3.5	Coordinate an instructor-training program led by League of American Bicyclists certified instructors to provide community members with the skills necessary to effectively teach bicycle safety education.	**Phase III**	City of Richmond, Local bicycle advocacy groups, Interested community members
2.3.6	Collaborate with local bicycle advocacy groups and community organizations to promote bicycle safety education programs in the City of Richmond.	**Phase III**	City of Richmond, Local bicycle advocacy groups, Community partners

Goal 3: The City of Richmond will be a first-class cycling community that is dedicated to providing appropriate infrastructure to facilitate safe, convenient travel by bicycle.

Objective 3.1: Create a community bicycle skills training center, commonly known as a bicycle safety town.

Strategies		Implementation Phase	Responsible Organizations
3.1.1	Retrofit the Richmond Public Schools' driver's education driving range at 1722 Arlington Rd with bike lanes and shared lane markings to be used by the driver's education program along with city-endorsed bicycle safety education programs.	**Phase III**	Richmond Public Schools, City of Richmond, VDOT, Local bicycle advocacy groups

Objective 3.2: Maintain safe travel conditions on established bike routes.

Strategies		Implementation Phase	Responsible Organizations
3.2.1	Install signage indicating "Bikes May Use Full Lane" along routes with sharrows or other shared lane markings.	**Phase III**	City of Richmond, VDOT
3.2.2	Create a citywide management plan to address and maintain surface conditions of designated bike routes.	**Phase III**	City of Richmond
3.2.3	Develop an online application on the Street Smarts website for citizens to report maintenance issues on designated bike routes, similar to See-Click-Fix.	**Phase III**	City of Richmond

Objective3.3: Facilitate easy, safe trip planning along the bicycle network.

Strategies		Implementation Phase	Responsible Organizations
3.3.1	Develop an online trip-building application for the Street Smarts website that provides individuals with multiple route options from their point of origin to their destination utilizing the existing bicycle infrastructure network as much as possible.	**Phase III**	City of Richmond, GRTC/RideFinders
3.3.2	Provide estimated travel distances and travel times.	**Phase III**	City of Richmond, GRTC/RideFinders
3.3.3	Use real-time traffic data to indicate the volume of traffic along proposed routes.	**Phase III**	City of Richmond, GRTC/RideFinders
3.3.4	Create a mobile version of the application accessible by smartphones.	**Phase III**	City of Richmond, GRTC/RideFinders

Goal 4: The City of Richmond will support events that encourage safe cycling techniques, allow citizens to connect with the local cycling community and to experience the practical benefits of utilitarian cycling.

Objective 4.1: Promote bicycle commuting to school as a school and district-wide event that increases the total number of students traveling by bike annually.

Strategies		Implementation Phase	Responsible Organizations
4.1.1	Identify a group of parent and adult volunteers to lead neighborhood elementary students to school by bike each day.	Phase I	Neighborhood associations, Interested community members
4.1.2	Create a school-wide and district-wide student commuter challenge that keeps track of how many days each student travels to school by bike.	Phase II	Richmond Public Schools, Local bicycle advocacy groups
4.1.3	Solicit donations from local businesses and organizations to award prizes to the student commuter at each school and the top student commuter at each school level in the district.	Phase II	Local business community, Local bicycle advocacy groups
4.1.4	Incorporate Safe Routes to School resources through the Virginia Department of Transportation and federal MAP-21 funds to establish safe, dedicated routes to each school in the Richmond Public School system.	Phase III	Richmond Public Schools, VDOT

Objective 4.2: Provide group ride opportunities for all experience and fitness levels.

Strategies		Implementation Phase	Responsible Organizations
4.2.1	Utilize the Street Smarts website to create an online forum where interested community members can create and connect with others for group rides at all experience and fitness levels.	Phase I	Local bicycle advocacy groups, Interested community members
4.2.2	Continue city support of community cycling events that allow citizens to practice safe cycling techniques with others in a semi-controlled environment.	Phase I	City of Richmond, Richmond Police Department, Event promotion organizations

Objective 4.3: Increase the number of people commuting to work by bike each year through the continuous promotion of bicycling as a safe, legitimate form of transportation.

Strategies		Implementation Phase	Responsible Organizations
4.3.1	Expand the annual Bike to Work Day event to the full workweek to incorporate group rides from and through each the City Council Districts.	**Phase I**	City of Richmond, Local bicycle advocacy groups, Interested community members
4.3.2	Create a Commuter Mentor program available through the Street Smarts website to help interested individuals connect with experienced commuters to become more familiar with best practices and route selection.	**Phase I**	Local bicycle advocacy groups, Interested community members, RideFinders
4.3.3	Encourage employers to discount monthly parking fees for employees who exercise the option of commuting to work by bike.	**Phase II**	Local business community, RideFinders

Objective 4.4: Create incentives for participation in bicycle safety education programs.

Strategies		Implementation Phase	Responsible Organizations
4.4.1	Partner with local businesses to create a discount card program offering deals and savings to individuals who have completed a city-endorsed bicycle safety education course.	**Phase II**	Local business community, Local bike advocacy groups

Goal 5: The Richmond Police Department will be dedicated to enforcing a legal framework that creates a safe travel environment for all users of shared roadways.

Objective 5.1: Support and advocate for legislation that creates a convenient, safe cycling environment.

Strategies		Implementation Phase	Responsible Organizations
5.1.1	Introduce "Idaho Stop Law" legislation to the 2015 General Assembly session.	Phase I	Local bicycle advocacy groups
5.1.2	Reintroduce revised legislation pertaining to "dooring" and tailgating to the 2015 General Assembly session.	Phase I	Local bicycle advocacy groups

Objective 5.2: Improve officer understanding and enforcement of safe travel laws.

Strategies		Implementation Phase	Responsible Organizations
5.2.1	Target specific enforcement areas identified through bicycle counts and crash statistics.	Phase I	Richmond Police Department, City of Richmond
5.2.2	Require that all new officers hired participate in the International Police Mountain Bike Association curriculum beginning in 2015.	Phase I	Richmond Police Department
5.2.3	Establish a strategic bicycle safety enforcement plan by 2017 to enforce travel safety laws for all users of shared roadways.	Phase III	Richmond Police Department
5.2.4	Train 100% of the active patrol force in the International Police Mountain Bike Association curriculum by enrolling 20% of the force annually in the program.	Phase IV	Richmond Police Department

Objective 5.3: Create a diversion program approved through the General District Court system that allows first-time offenders of certain bicycle violations to participate in a bicycle safety education course in lieu of a citation.

Strategies		Implementation Phase	Responsible Organizations
5.3.1	Form a partnership between local bicycle safety advocacy groups and the Richmond Police Department to provide instruction.	**Phase II**	Local bicycle advocacy groups, Richmond Police Department
5.3.2	Request permission from the Department of Motor Vehicles to use their property at 2300 W Broad St as a program site.	**Phase II**	Department of Motor Vehicles, Richmond Police Department, Local bicycle advocacy groups
5.3.3	Offer classes twice a month, one held on a Saturday afternoon and one on a Wednesday evening in order to accommodate a variety of work and family schedules.	**Phase III**	City of Richmond, Local bicycle advocacy groups
5.3.4	Require a registration fee from participants to cover the cost of the program.	**Phase III**	Local bicycle advocacy groups, Program participants

Goal 6: The City of Richmond will develop an effective method of plan evaluation to ensure that the community's bicycle safety needs and concerns are continuously met as bicycling conditions evolve through time.

Objective 6.1: Identify the community's bicycling safety needs and concerns annually.

Strategies		Implementation Phase	Responsible Organizations
6.1.1	Provide an online version of the annual community bicycling safety survey through the Street Smarts website and distributed through social media to allow participation from residents not receiving a Department of Public Utilities billing statement.	**Phase I**	City of Richmond
6.1.2	Continue to identify population segments with different bicycle safety needs and concerns.	**Phase I**	City of Richmond
6.1.3	Form stronger collaboration between GRTC and commercial fleet community by including representation at all bicycle planning events	**Phase I**	City of Richmond, GRTC, Local business community
6.1.4	Send out an annual community bicycling safety survey to citizens through the Department of Public Utilities billing statements every May.	**Phase II**	City of Richmond

Objective 6.2: Improve citywide bicycle crash statistics and reporting.

Strategies		Implementation Phase	Responsible Organizations
6.2.1	Create a detailed method of recording bicycle crash incident variables by the Richmond Police Department based off the state FR 300M reporting form.	**Phase I**	Richmond Police Department
6.2.2	Design a link on the Street Smarts website that allows citizens to report bicycle crashes that do not involve the Richmond Police Department.	**Phase I**	City of Richmond

Objective 6.3: Establish an effective, unified system to monitor accurate bike counts throughout the city.

Strategies		Implementation Phase	Responsible Organizations
6.3.1	Monitor the number of students who commute to school each month through the student commuter challenge.	**Phase II**	Richmond Public Schools, City of Richmond
6.3.2	Employ an effective system of bike counts throughout the city on an annual basis to identify trends in usage.	**Phase II**	City of Richmond, Local bike advocacy groups

Objective 6.4: Monitor the effectiveness of bicycle safety education courses.

Strategies		Implementation Phase	Responsible Organizations
6.4.1	Develop a comprehensive pre-test and post-test to be administered to participants through the Street Smarts website in all city-endorsed bicycle safety education programs.	**Phase I**	City of Richmond, Local bicycle advocacy groups
6.4.2	Conduct a three month follow up survey to gauge participants' retention of course materials, shifts in perceptions of bicycle safety, and changes in frequency in which they travel by bike.	**Phase II**	City of Richmond, Local bicycle advocacy groups
6.4.3	Compare bicycle safety education participation rates to crash statistics and bicycle counts to determine if program participation decreases crash incidents.	**Phase II**	City of Richmond, Richmond Police Department
6.4.4	Adapt the instructors training program to meet the changing bicycle safety needs of the community.	**Phase II**	City of Richmond, Local bicycle advocacy groups

Objective 6.5: Make all bicycling safety evaluation data available to the public on an annual basis.

Strategies		Implementation Phase	Responsible Organizations
6.5.1	Publish annual report of complete community bicycle safety survey results, crash statistics, bicycle counts, and bicycle safety education participation rates on the Street Smarts website.	**Phase II**	City of Richmond
6.5.2	Distribute an abridged in monthly Department of Public Utilities billing statement every October highlighting the key findings from the annual report published on the Street Smarts website	**Phase II**	City of Richmond

3.4 Potential Community Partners

Listed below are potential partner organizations that could be included in the implementation of this plan's recommendations. Where possible to define, appropriate partnerships were included in the recommendations above. As the bicycle safety education plan develops and evolves through time, and the strengths of the organizations below are identified, it will be possible to form specific collaborations to implement the recommendations.

City of Richmond

- Pedestrian, Bicycle and Trails Commission
- Office of the City Attorney
- Geographic Information Systems
- Department of Parks, Recreation and Community Facilities
- Department of Public Works
- Department of Public Utilities
- Office of Budget and Planning
- Information Technology
- Office of Multicultural Affairs
- Department of Justice Services
- Richmond Police Department
- Richmond Public Schools

Local Bicycle Advocacy Groups

- RideRichmond
- Sports Backers' Bike Walk RVA
- Richmond Area Bicycling Association
- Charter 2015
- Women's Multisports of Richmond
- VCU RamBikes
- Richmond Bicycle Studio

Community Partners

- Virginia Commonwealth University
- GRTC and RideFinders
- Area faith-based organizations
- Neighborhood civic associations
- Senior Center of Greater Richmond
- YMCA
- Neighborhood Resource Center
- Boy and Girl Scouts of America
- Police Athletic League
- Richmond Cycle Corps
- Boys and Girls Club of Metro Richmond
- Church Hill Activities and Tutoring
- Rosmy
- Dominion Youth Services

Health Institutions

- VCU Health Systems
- Bon Secours Richmond Health System
- Retreat Doctor's Hospital
- CJW Medical Center
- Richmond Ambulance Authority
- Richmond Volunteer Rescue Squad

4 CONCLUSION

Increased participation and interest in cycling in Richmond over recent years warrant the need to create a safer environment to not only protect but also promote safe cycling. The infrastructure improvements the city is currently engaged in are designed to achieve this through supportive infrastructure that improves the physical design of the city. However, infrastructure alone may not be enough to engage those who have strong reservations towards cycling due to safety considerations. For this reason, a bicycle safety education program is needed to address the safety needs and concerns recognized by citizens as barriers to everyday cycling. Moreover, bicycle infrastructure improvements are expensive and can take considerable time to implement. In the meantime, the recommendations in this plan are largely programmatic and, in some cases built off programs and efforts currently being carried out by local advocacy groups. As a result, it may be possible, through this plan, to begin affecting change to create a safer cycling environment quicker with less capital investment.

The bicycle safety-related perceptions and barriers identified in this plan are different for each member of the community based on previous experience and confidence level. For some, bicycle safety may play only a small role in their decision to travel by bike, whereas for others bicycle safety considerations may prevent them from engaging in this activity altogether. This plan has been designed to address the various safety concerns in a way that reaches all members of the Richmond community. This is achieved through a multifaceted approach focusing on education, encouragement and enforcement.

An effective bicycle education program requires collaboration between multiple community and city government organizations to implement the necessary recommendations. Local bicycle advocacy groups in Richmond have been working hard to improve bicycle safety in Richmond, but they cannot do it alone. Moving forward, city administration needs to take a greater leadership role in ensuring Richmond is not only safe for cyclists, but for all users of shared roadways. This requires the dedication of capital, time and personnel to see recommendations are carried out and partnerships with community organizations are given support to continue their efforts. At the same time, it is important to maintain each community organization's autonomy. Doing so allows them to continue to reach the diverse population segments and safety needs of the city residents. The stage has been set for Richmond to become a first-class cycling community moving into the future. With all interested parties working together to create a safe environment for cycling this becomes a goal we can achieve.


Entrance
Sanctuary
Meeting
Rooms
St. John's
Episcopal

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APPENDIX A

Bicycle Safety Education Community Survey Instrument

Safety Perceptions

1. Which of the following best describes your bicycling habits and comfort level?

- ○ Strong & Fearless - I'm willing to ride in almost any traffic conditions
- ○ Enthused & Confident - I'm willing to ride in traffic, but I prefer dedicated bike infrastructure and will seek out routes with less traffic, even if the route is longer
- ○ Interested, but Concerned - I would like to bike more, but I prefer to not ride in traffic and am most comfortable on separate bike paths or physically protected bike lanes
- ○ No Way, No How - I will not ride a bicycle under any circumstances

2. Please identify the extent to which you agree or disagree with the following statements:

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't know
The City of Richmond as a whole is safe for bicycling.	○	○	○	○	○
The community where I live is safe for bicycling.	○	○	○	○	○
I would ride my bike more often if I felt safer on City streets.	○	○	○	○	○
The safest place for a bicyclist to ride is on the sidewalk.	○	○	○	○	○
Designated routes marked with signage create a safer riding environment.	○	○	○	○	○

3. What determines the route you will take when traveling by bicycle?

	Very Important	Important	Not Important	Don't Know
Shortest travel distance	○	○	○	○
Shortest travel time	○	○	○	○
Dedicated bike infrastructure (sharrows, bike lanes, paths, etc.)	○	○	○	○
Volume of traffic	○	○	○	○
Speed of traffic	○	○	○	○
Safety of route	○	○	○	○

Other (please specify)

4. To what degree do the following driver behaviors make you nervous when bicycling in Richmond?

	Very Nervous	Nervous	Not An Issue	Don't Know
Following too close	○	○	○	○
Not providing enough room when passing	○	○	○	○
Passing at too high of speed	○	○	○	○
Failing to pass when appropriate	○	○	○	○
Beeping their horn in an aggressive manner	○	○	○	○
Parked cars opening doors without looking	○	○	○	○
Texting or talking on their phones	○	○	○	○

Other (please specify)

5. To what degree do the following bicyclist behaviors make you nervous when driving in Richmond?

	Very Nervous	Nervous	Not An Issue	Don't Know
Riding in an unpredictable manner	○	○	○	○
Not being highly visible (lights, bright colors)	○	○	○	○
Riding against the flow of traffic	○	○	○	○
Riding on the sidewalk	○	○	○	○
Failing to stop at stop signs	○	○	○	○
Failing to stop at stop lights	○	○	○	○
Failing to yield	○	○	○	○

Other (please specify)

Child Safety

6. Do you have children under the age of 18 living in your home?

- Yes
- No

7. Would you allow your child/children to ride their bike on your neighborhood streets?

- Yes
- No
- Not Applicable

If not, please indicate why

8. Would you allow your child/children to ride their bike to school?

- Yes
- No
- Not Applicable

If not, please indicate why

9. If your neighborhood had a designated parent/adult to escort children to school on bikes, would you be more willing to allow them to ride to school?

- Yes
- No
- Not Applicable

If not, please indicate why

10. If your child participated in a bicycle safety skills course, would you be more likely to allow them to ride on the road?

- Yes
- No
- Not Applicable

If not, please indicate why

Safety Education

11. Are you aware of any bicycle safety education courses in the City of Richmond?

- Yes
- No

If yes, through what organization(s)?

12. Have you ever participated in a bicycle safety education course?

- Yes
- No

13. Would you be interested in participating in a bicycle safety education course?

- Yes
- No

14. How likely would participation in a bicycle safety education course increase the amount you ride your bike?

- Very Likely
- Likely
- Not Likely
- Don't Know

15. How likely would events designed to let you practice safe cycling with others in a semi-controlled environment increase your likelihood to ride more often? (Examples: Sports Backers Anthem Moonlight Ride, RideRichmond's Bike to Work Week Ride, etc.)

- Very Likely
- Likely
- Not Likely
- Don't Know

Safety Laws

16. Based on your knowledge of local laws, please indicate whether the following statements are True or False.

	True	False	Don't Know
Bicyclists have the same rights and responsibilities as motorists on the roadways.	○	○	○
It is illegal to ride on the sidewalks in the City of Richmond.	○	○	○
Bicyclists under the age of 14 are required to wear a helmet in the City of Richmond.	○	○	○
A headlight is required when riding at night on all roads.	○	○	○
A rear red reflector is required at all times when riding at night.	○	○	○
Bicyclists are required to signal their intention to stop or turn.	○	○	○
Bicyclists are required to ride with the direction of traffic.	○	○	○
Bicyclists may proceed through a red light after coming to a complete stop for 2 minutes or two complete light cycles, whichever is shorter.	○	○	○
Bicyclists are allowed to wear headphones in one ear while riding.	○	○	○

17. How do you rate the Richmond Police Department's effectiveness at enforcing safe travel laws to motorists who violate them?

- ○ Very Effective
- ○ Effective
- ○ Not Effective
- ○ Don't Know

18. How do you rate the Richmond Police Department's effectiveness at enforcing safe travel laws to bicyclists who violate them?

- ○ Very Effective
- ○ Effective
- ○ Not Effective
- ○ Don't Know

19. Are there any other considerations that would make you feel more safe riding on the streets of Richmond?

Demographics

20. Which category below includes your age?

- ○ Under 18
- ○ 18-25
- ○ 26-35
- ○ 36-45
- ○ 46-55
- ○ 56-65
- ○ 66 or older

21. What is your gender?

- ○ Male
- ○ Female

22. What is your marital status?

- ○ Single
- ○ Married
- ○ Divorced
- ○ Widowed

23. What is your race/ethnicity? Please choose all that apply.

- ☐ White
- ☐ Black or African-American
- ☐ Hispanic or Latino
- ☐ Asian
- ☐ Native Hawaiian or Pacific Islander
- ☐ American Indian or Alaskan Native

Other (please specify)

24. What is your highest level of education you have completed?

- ○ Did not complete high school
- ○ High school diploma or GED
- ○ Some college
- ○ Associate's degree or trade school
- ○ Bachelor's degree
- ○ Graduate degree
- ○ Post graduate degree

25. Which of the following best describes your employment status?

- ○ Employed, full-time
- ○ Employed, part-time
- ○ Not employed
- ○ Retired
- ○ Student

26. What range does your household income fall in?

- ○ Less than $25,000
- ○ $25,001-$50,000
- ○ $50,001-$75,000
- ○ $75,001-$100,000
- ○ $100,001-$125,000
- ○ More than $125,000

27. Are you a resident of the City of Richmond?

- ○ Yes
- ○ No

28. What is the zip code where you live?

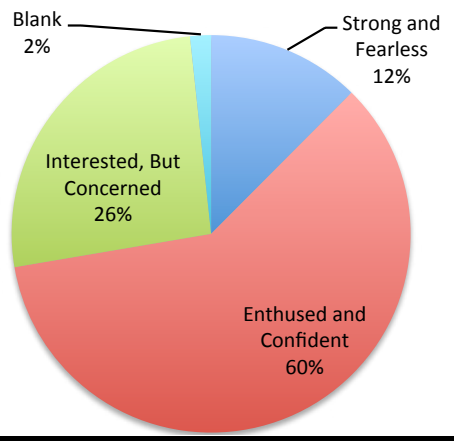
APPENDIX B

Bicycle Safety Education Community Survey - Complete Results

I. Safety Perceptions

Question 1: Which of the following best describes your comfort level and bicycling habits?

Strong and Fearless	I'm willing to ride in almost any traffic conditions	22	12.4%
Enthused and Confident	I'm willing to ride in traffic, but I prefer dedicated bike infrastructure and will seek out routes with less traffic, even if the route is longer	106	59.9%
Interested, But Concerned	I would like to bike more, but I prefer to not ride in traffic and am most comfortable on separate bike paths or physically protected bike lanes	46	26.0%
No Way, No How	I will not ride a bicycle under any circumstances	0	0.0%
Blank	Did not answer question	3	1.7%
Total		***177***	***100.0%***

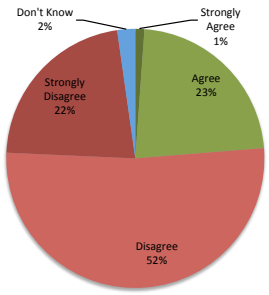


Confident Group	"Strong & Fearless"; "Enthused & Confident"	128	72.3%
Concerned Group	"Interested, But Concerned"	46	26.0%

Question 2: Please identify the extent to which you agree or disagree with the following statements:

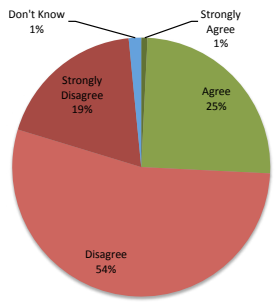
Complete Survey Sample

The City of Richmond as a whole is safe for bicycling.		
Strongly Agree	2	1.1%
Agree	40	22.6%
Disagree	92	52.0%
Strongly Disagree	39	22.0%
Don't Know	4	2.3%
Total	***177***	***100.0%***



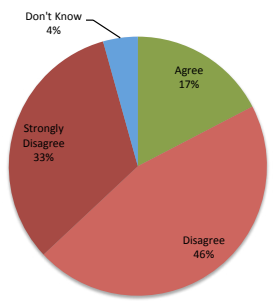
Confident Group

The City of Richmond as a whole is safe for bicycling.		
Strongly Agree	1	0.8%
Agree	32	25.0%
Disagree	69	53.9%
Strongly Disagree	24	18.8%
Don't Know	2	1.6%
Total	***128***	***100.0%***



Concerned Group

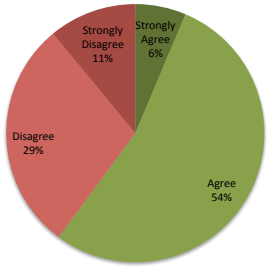
The City of Richmond as a whole is safe for bicycling.		
Strongly Agree	0	0.0%
Agree	8	17.4%
Disagree	21	45.7%
Strongly Disagree	15	32.6%
Don't Know	2	4.3%
Total	***46***	***100.0%***



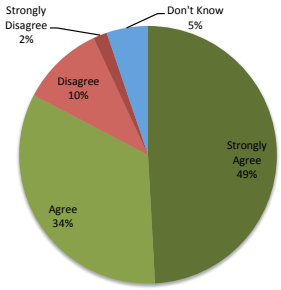
Question 2: Please identify the extent to which you agree or disagree with the following statements: (continued)

Complete Survey Sample

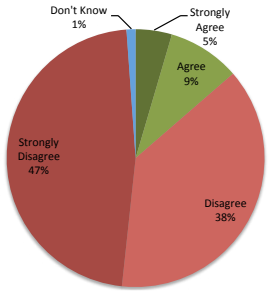
The community where I live is safe for bicycling.		
Strongly Agree	11	6.4%
Agree	93	53.8%
Disagree	50	28.9%
Strongly Disagree	19	11.0%
Don't Know	0	0.0%
Total	*173*	*100.0%*



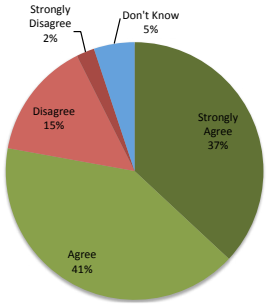
I would ride my bike more often if I felt safer on City streets.		
Strongly Agree	85	49.1%
Agree	58	33.5%
Disagree	18	10.4%
Strongly Disagree	3	1.7%
Don't Know	9	5.2%
Total	*173*	*100.0%*



The safest place for a bicyclist to ride is on the sidewalk.		
Strongly Agree	8	4.5%
Agree	16	9.1%
Disagree	67	38.1%
Strongly Disagree	83	47.2%
Don't Know	2	1.1%
Total	*176*	*100.0%*

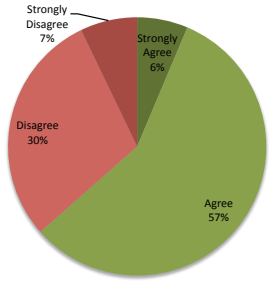


Designated routes marked with signage create a safer riding environment.		
Strongly Agree	65	36.9%
Agree	72	40.9%
Disagree	26	14.8%
Strongly Disagree	4	2.3%
Don't Know	9	5.1%
Total	*176*	*100.0%*

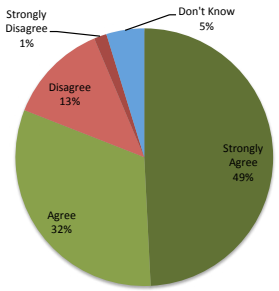


Confident Group

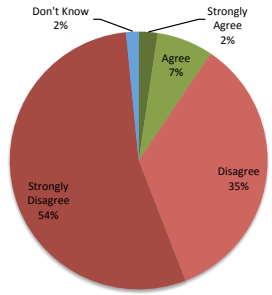
The community where I live is safe for bicycling.		
Strongly Agree	8	6.3%
Agree	72	57.1%
Disagree	37	29.4%
Strongly Disagree	9	7.1%
Don't Know	0	0.0%
Total	*126*	*100.0%*



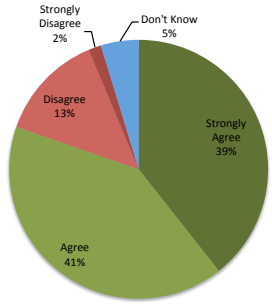
I would ride my bike more often if I felt safer on City streets.		
Strongly Agree	62	49.2%
Agree	40	31.7%
Disagree	16	12.7%
Strongly Disagree	2	1.6%
Don't Know	6	4.8%
Total	*126*	*100.0%*



The safest place for a bicyclist to ride is on the sidewalk.		
Strongly Agree	3	2.4%
Agree	9	7.1%
Disagree	44	34.6%
Strongly Disagree	69	54.3%
Don't Know	2	1.6%
Total	*127*	*100.0%*

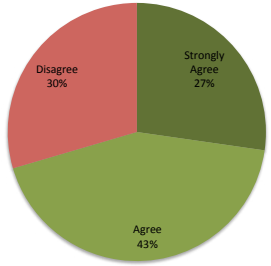


Designated routes marked with signage create a safer riding environment.		
Strongly Agree	50	39.4%
Agree	52	40.9%
Disagree	17	13.4%
Strongly Disagree	2	1.6%
Don't Know	6	4.7%
Total	*127*	*100.0%*

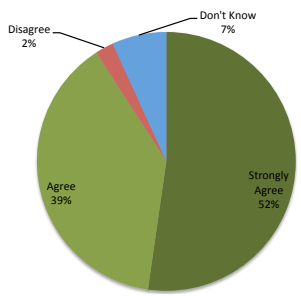


Concerned Group

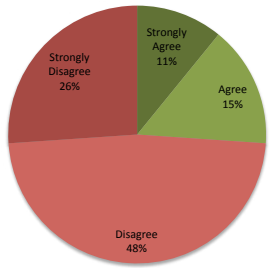
The community where I live is safe for bicycling.		
Strongly Agree	12	27.3%
Agree	19	43.2%
Disagree	13	29.5%
Strongly Disagree	0	0.0%
Don't Know	0	0.0%
Total	*44*	*100.0%*



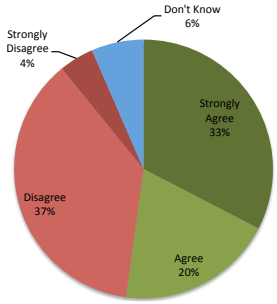
I would ride my bike more often if I felt safer on City streets.		
Strongly Agree	23	52.3%
Agree	17	38.6%
Disagree	1	2.3%
Strongly Disagree	0	0.0%
Don't Know	3	6.8%
Total	*44*	*100.0%*



The safest place for a bicyclist to ride is on the sidewalk.		
Strongly Agree	5	10.9%
Agree	7	15.2%
Disagree	22	47.8%
Strongly Disagree	12	26.1%
Don't Know	0	0.0%
Total	*46*	*100.0%*



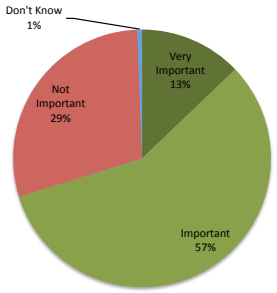
Designated routes marked with signage create a safer riding environment.		
Strongly Agree	15	32.6%
Agree	9	19.6%
Disagree	17	37.0%
Strongly Disagree	2	4.3%
Don't Know	3	6.5%
Total	*46*	*100.0%*



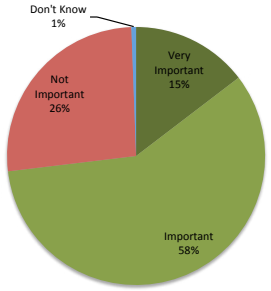
Question 3: What determines the route you will take when travelling by bicycle?

Complete Survey Sample

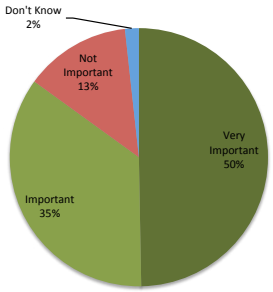
Shortest travel distance		
Very Important	22	12.9%
Important	98	57.3%
Not Important	50	29.2%
Don't Know	1	0.6%
Total	***171***	***100.0%***



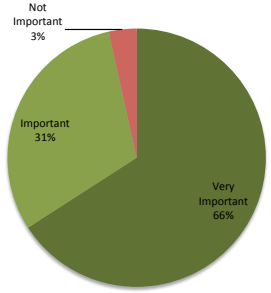
Shortest travel time		
Very Important	25	14.6%
Important	100	58.5%
Not Important	45	26.3%
Don't Know	1	0.6%
Total	***171***	***100.0%***



Dedicated bike infrastructure (sharrows, bike lanes, paths, etc.)		
Very Important	86	49.7%
Important	61	35.3%
Not Important	23	13.3%
Don't Know	3	1.7%
Total	***173***	***100.0%***

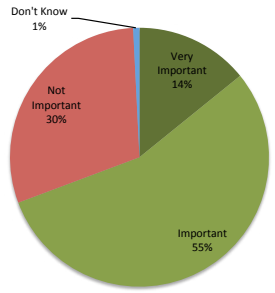


Volume of traffic		
Very Important	114	65.9%
Important	53	30.6%
Not Important	6	3.5%
Don't Know	0	0.0%
Total	***173***	***100.0%***

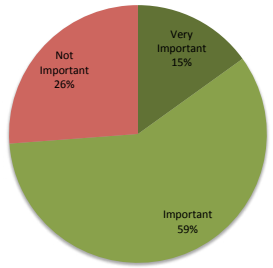


Strong & Fearless and Enthused & Confident Subsample

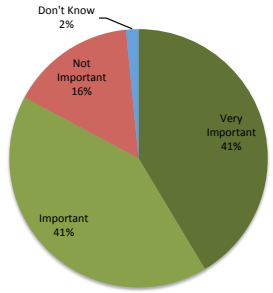
Shortest travel distance		
Very Important	18	14.2%
Important	70	55.1%
Not Important	38	29.9%
Don't Know	1	0.8%
Total	***127***	***100.0%***



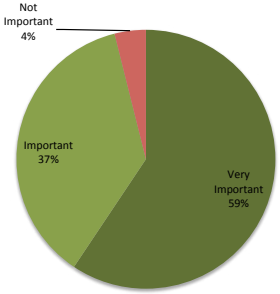
Shortest travel time		
Very Important	19	15.1%
Important	74	58.7%
Not Important	33	26.2%
Don't Know	0	0.0%
Total	***126***	***100.0%***



Dedicated bike infrastructure (sharrows, bike lanes, paths, etc.)		
Very Important	53	41.4%
Important	53	41.4%
Not Important	20	15.6%
Don't Know	2	1.6%
Total	***128***	***100.0%***

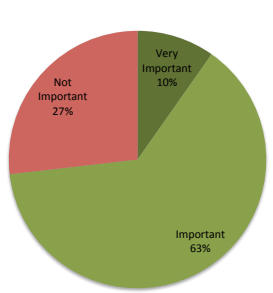


Volume of traffic		
Very Important	76	59.4%
Important	47	36.7%
Not Important	5	3.9%
Don't Know	0	0.0%
Total	***128***	***100.0%***

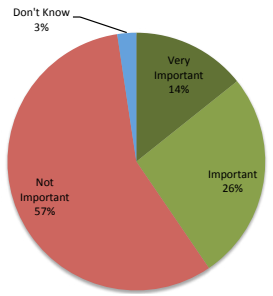


Interested, But Concerned Subsample

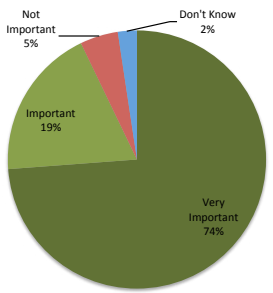
Shortest travel distance		
Very Important	4	9.8%
Important	26	63.4%
Not Important	11	26.8%
Don't Know	0	0.0%
Total	***41***	***100.0%***



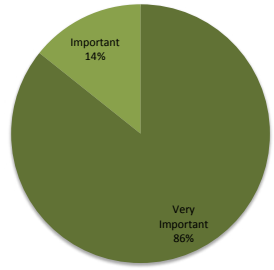
Shortest travel time		
Very Important	6	14.3%
Important	11	26.2%
Not Important	24	57.1%
Don't Know	1	2.4%
Total	***42***	***100.0%***



Dedicated bike infrastructure (sharrows, bike lanes, paths, etc.)		
Very Important	31	73.8%
Important	8	19.0%
Not Important	2	4.8%
Don't Know	1	2.4%
Total	***42***	***100.0%***



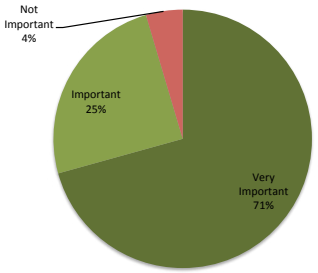
Volume of traffic		
Very Important	36	85.7%
Important	6	14.3%
Not Important	0	0.0%
Don't Know	0	0.0%
Total	***42***	***100.0%***



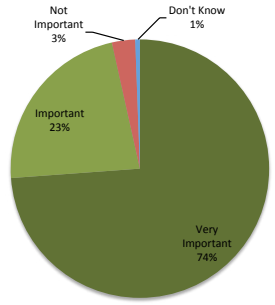
Question 3: What determines the route you will take when travelling by bicycle? (continued)

Complete Survey Sample

Speed of traffic		
Very Important	123	70.7%
Important	43	24.7%
Not Important	8	4.6%
Don't Know	0	0.0%
Total	*174*	*100.0%*

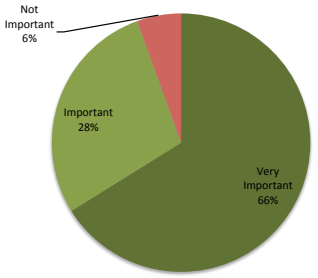


Safety of route		
Very Important	127	73.8%
Important	39	22.7%
Not Important	5	2.9%
Don't Know	1	0.6%
Total	*172*	*100.0%*

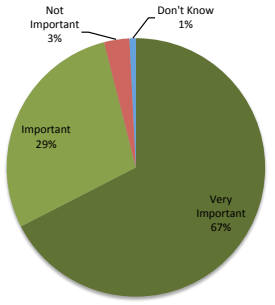


Strong & Fearless and Enthused & Confident Subsample

Speed of traffic		
Very Important	84	66.1%
Important	36	28.3%
Not Important	7	5.5%
Don't Know	0	0.0%
Total	*127*	*100.0%*

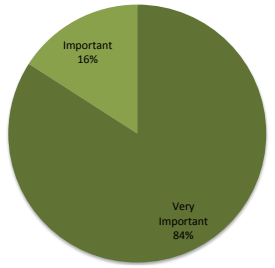


Safety of route		
Very Important	85	67.5%
Important	36	28.6%
Not Important	4	3.2%
Don't Know	1	0.8%
Total	*126*	*100.0%*

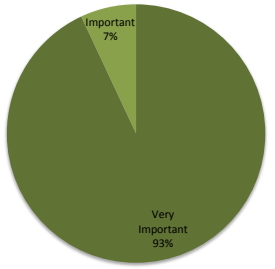


Interested, But Concerned Subsample

Speed of traffic		
Very Important	37	84.1%
Important	7	15.9%
Not Important	0	0.0%
Don't Know	0	0.0%
Total	*44*	*100.0%*



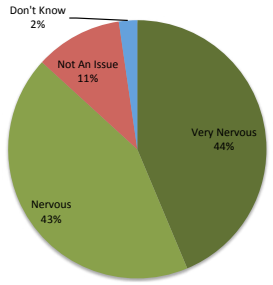
Safety of route		
Very Important	40	93.0%
Important	3	7.0%
Not Important	0	0.0%
Don't Know	0	0.0%
Total	*43*	*100.0%*



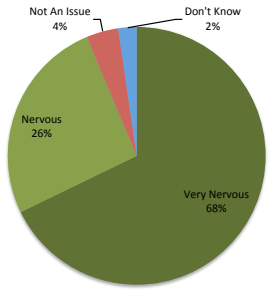
Question 4: To what degree do the following driver behaviors make you nervous when bicycling in Richmond?

Complete Survey Sample

Following too close		
Very Nervous	76	43.7%
Nervous	75	43.1%
Not An Issue	19	10.9%
Don't Know	4	2.3%
Total	*174*	*100.0%*

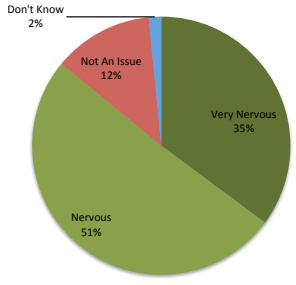


Not providing enough room when passing		
Very Nervous	118	67.8%
Nervous	45	25.9%
Not An Issue	7	4.0%
Don't Know	4	2.3%
Total	*174*	*100.0%*

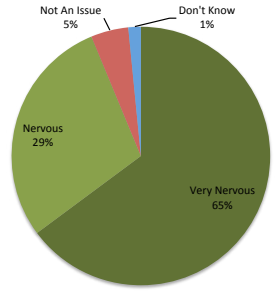


Strong & Fearless and Enthused & Confident Subsample

Following too close		
Very Nervous	45	35.2%
Nervous	65	50.8%
Not An Issue	16	12.5%
Don't Know	2	1.6%
Total	*128*	*100.0%*

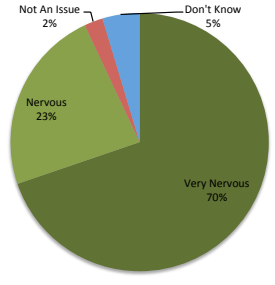


Not providing enough room when passing		
Very Nervous	83	64.8%
Nervous	37	28.9%
Not An Issue	6	4.7%
Don't Know	2	1.6%
Total	*128*	*100.0%*

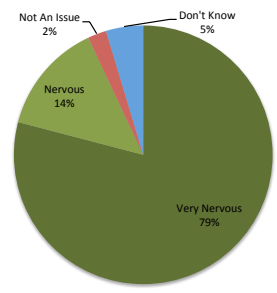


Interested, But Concerned Subsample

Following too close		
Very Nervous	30	69.8%
Nervous	10	23.3%
Not An Issue	1	2.3%
Don't Know	2	4.7%
Total	*43*	*100.0%*



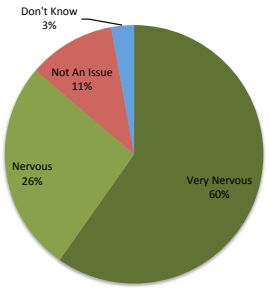
Not providing enough room when passing		
Very Nervous	34	79.1%
Nervous	6	14.0%
Not An Issue	1	2.3%
Don't Know	2	4.7%
Total	*43*	*100.0%*



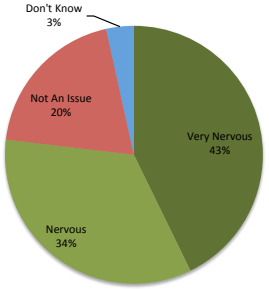
Question 4: To what degree do the following driver behaviors make you nervous when bicycling in Richmond? (continued)

Complete Survey Sample

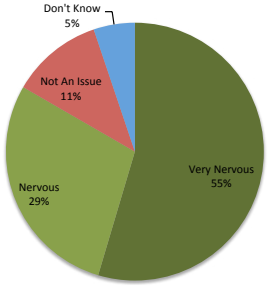
Passing at too high of speed		
Very Nervous	104	59.8%
Nervous	46	26.4%
Not An Issue	19	10.9%
Don't Know	5	2.9%
Total	***174***	***100.0%***



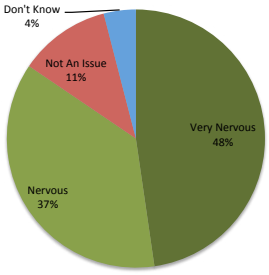
Failing to pass when appropriate		
Very Nervous	74	42.8%
Nervous	59	34.1%
Not An Issue	34	19.7%
Don't Know	6	3.5%
Total	***173***	***100.0%***



Beeping their horn in an aggressive manner		
Very Nervous	95	54.6%
Nervous	50	28.7%
Not An Issue	20	11.5%
Don't Know	9	5.2%
Total	***174***	***100.0%***

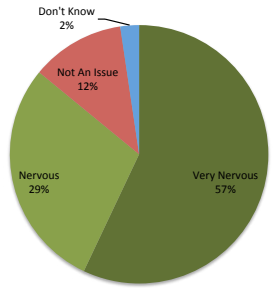


Parked cars opening doors without looking		
Very Nervous	83	47.7%
Nervous	64	36.8%
Not An Issue	20	11.5%
Don't Know	7	4.0%
Total	***174***	***100.0%***

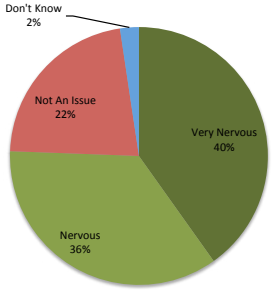


Strong & Fearless and Enthused & Confident Subsample

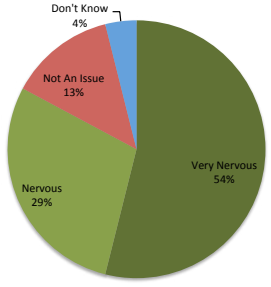
Passing at too high of speed		
Very Nervous	73	57.0%
Nervous	37	28.9%
Not An Issue	15	11.7%
Don't Know	3	2.3%
Total	***128***	***100.0%***



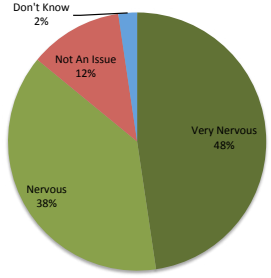
Failing to pass when appropriate		
Very Nervous	51	40.2%
Nervous	45	35.4%
Not An Issue	28	22.0%
Don't Know	3	2.4%
Total	***127***	***100.0%***



Beeping their horn in an aggressive manner		
Very Nervous	69	53.9%
Nervous	37	28.9%
Not An Issue	17	13.3%
Don't Know	5	3.9%
Total	***128***	***100.0%***

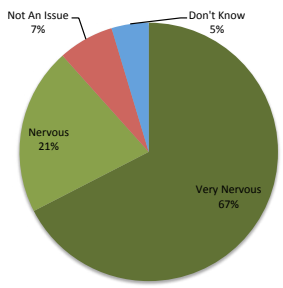


Parked cars opening doors without looking		
Very Nervous	61	47.7%
Nervous	49	38.3%
Not An Issue	15	11.7%
Don't Know	3	2.3%
Total	***128***	***100.0%***

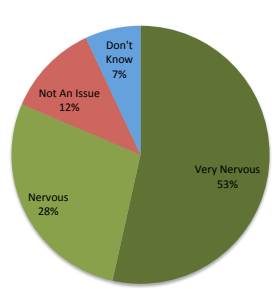


Interested, But Concerned Subsample

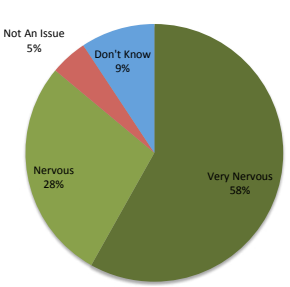
Passing at too high of speed		
Very Nervous	29	67.4%
Nervous	9	20.9%
Not An Issue	3	7.0%
Don't Know	2	4.7%
Total	***43***	***100.0%***



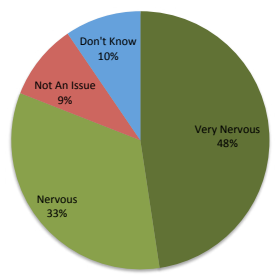
Failing to pass when appropriate		
Very Nervous	23	53.5%
Nervous	12	27.9%
Not An Issue	5	11.6%
Don't Know	3	7.0%
Total	***43***	***100.0%***



Beeping their horn in an aggressive manner		
Very Nervous	25	58.1%
Nervous	12	27.9%
Not An Issue	2	4.7%
Don't Know	4	9.3%
Total	***43***	***100.0%***



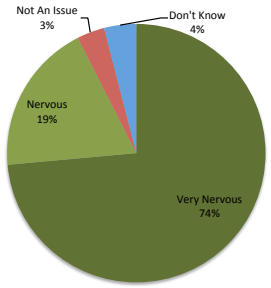
Parked cars opening doors without looking		
Very Nervous	20	47.6%
Nervous	14	33.3%
Not An Issue	4	9.5%
Don't Know	4	9.5%
Total	***42***	***100.0%***



Question 4: To what degree do the following driver behaviors make you nervous when bicycling in Richmond? (continued)

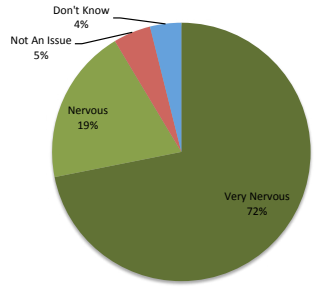
Complete Survey Sample

Texting or talking on their phones		
Very Nervous	128	73.6%
Nervous	33	19.0%
Not An Issue	6	3.4%
Don't Know	7	4.0%
Total	*174*	*100.0%*



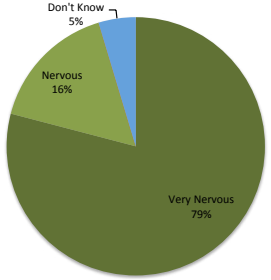
Strong & Fearless and Enthused & Confident Subsample

Texting or talking on their phones		
Very Nervous	92	71.9%
Nervous	25	19.5%
Not An Issue	6	4.7%
Don't Know	5	3.9%
Total	*128*	*100.0%*



Interested, But Concerned Subsample

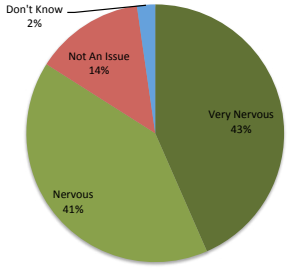
Texting or talking on their phones		
Very Nervous	34	79.1%
Nervous	7	16.3%
Not An Issue	0	0.0%
Don't Know	2	4.7%
Total	*43*	*100.0%*



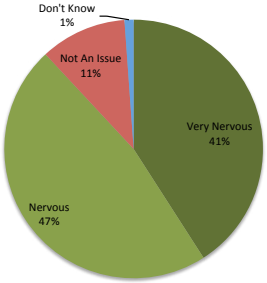
Question 5: To what degree do the following bicyclist behaviors make you nervous when driving in Richmond?

Complete Survey Sample

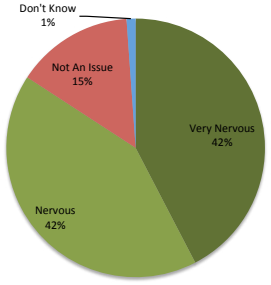
Riding in an unpredictable manner		
Very Nervous	76	43.4%
Nervous	71	40.6%
Not An Issue	24	13.7%
Don't Know	4	2.3%
Total	*175*	*100.0%*



Not being highly visible (lights, bright colors)		
Very Nervous	72	40.9%
Nervous	83	47.2%
Not An Issue	19	10.8%
Don't Know	2	1.1%
Total	*176*	*100.0%*

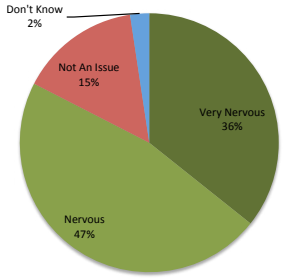


Riding against the flow of traffic		
Very Nervous	75	42.4%
Nervous	74	41.8%
Not An Issue	26	14.7%
Don't Know	2	1.1%
Total	*177*	*100.0%*

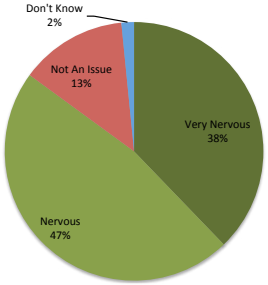


Strong & Fearless and Enthused & Confident Subsample

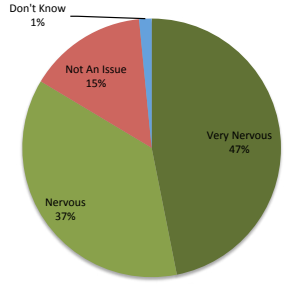
Riding in an unpredictable manner		
Very Nervous	45	35.7%
Nervous	59	46.8%
Not An Issue	19	15.1%
Don't Know	3	2.4%
Total	*126*	*100.0%*



Not being highly visible (lights, bright colors)		
Very Nervous	48	37.8%
Nervous	60	47.2%
Not An Issue	17	13.4%
Don't Know	2	1.6%
Total	*127*	*100.0%*

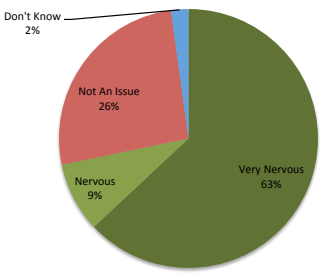


Riding against the flow of traffic		
Very Nervous	60	46.9%
Nervous	47	36.7%
Not An Issue	19	14.8%
Don't Know	2	1.6%
Total	*128*	*100.0%*

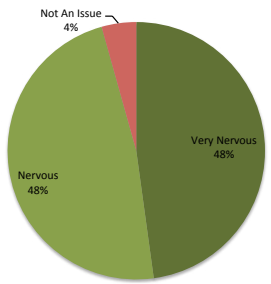


Interested, But Concerned Subsample

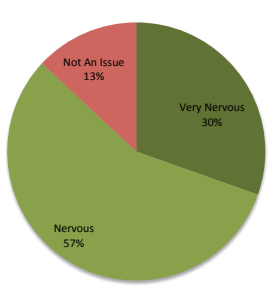
Riding in an unpredictable manner		
Very Nervous	29	63.0%
Nervous	4	8.7%
Not An Issue	12	26.1%
Don't Know	1	2.2%
Total	*46*	*100.0%*



Not being highly visible (lights, bright colors)		
Very Nervous	22	47.8%
Nervous	22	47.8%
Not An Issue	2	4.3%
Don't Know	0	0.0%
Total	*46*	*100.0%*



Riding against the flow of traffic		
Very Nervous	14	30.4%
Nervous	26	56.5%
Not An Issue	6	13.0%
Don't Know	0	0.0%
Total	*46*	*100.0%*

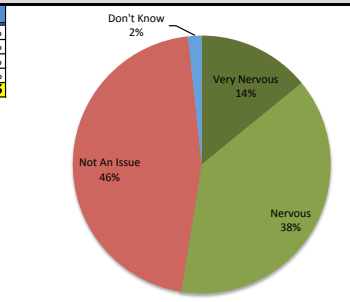


Question 5: To what degree do the following bicyclist behaviors make you nervous when driving in Richmond? (continued)

Complete Survey Sample

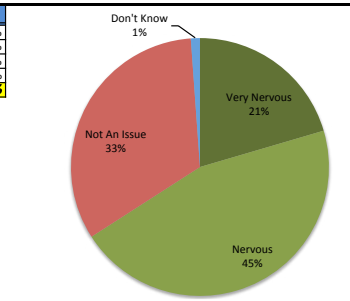
Riding on the sidewalk

Very Nervous	25	14.1%
Nervous	68	38.4%
Not An Issue	81	45.8%
Don't Know	3	1.7%
Total	***177***	***100.0%***



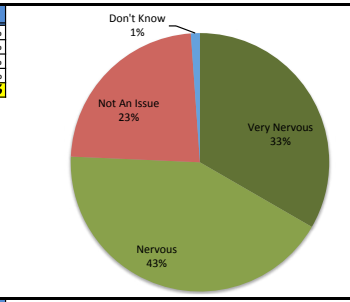
Failing to stop at stop signs

Very Nervous	36	20.5%
Nervous	80	45.5%
Not An Issue	58	33.0%
Don't Know	2	1.1%
Total	***176***	***100.0%***



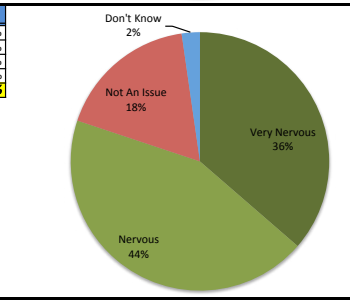
Failing to stop at stop lights

Very Nervous	59	33.3%
Nervous	75	42.4%
Not An Issue	41	23.2%
Don't Know	2	1.1%
Total	***177***	***100.0%***



Failing to yield

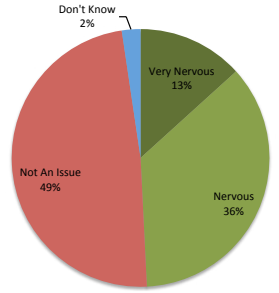
Very Nervous	64	36.4%
Nervous	77	43.8%
Not An Issue	31	17.6%
Don't Know	4	2.3%
Total	***176***	***100.0%***



Strong & Fearless and Enthused & Confident Subsample

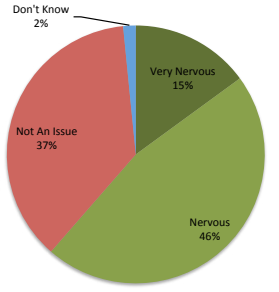
Riding on the sidewalk

Very Nervous	17	13.3%
Nervous	46	35.9%
Not An Issue	62	48.4%
Don't Know	3	2.3%
Total	***128***	***100.0%***



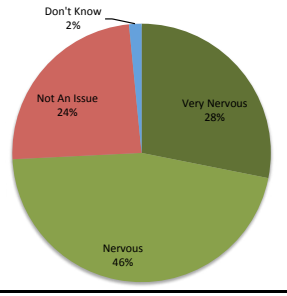
Failing to stop at stop signs

Very Nervous	19	15.0%
Nervous	59	46.5%
Not An Issue	47	37.0%
Don't Know	2	1.6%
Total	***127***	***100.0%***



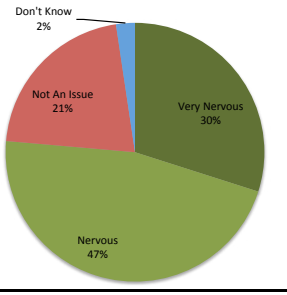
Failing to stop at stop lights

Very Nervous	36	28.1%
Nervous	59	46.1%
Not An Issue	31	24.2%
Don't Know	2	1.6%
Total	***128***	***100.0%***



Failing to yield

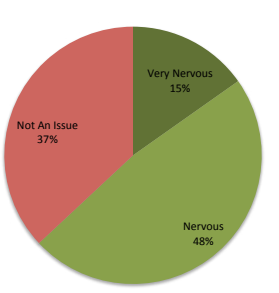
Very Nervous	38	29.9%
Nervous	59	46.5%
Not An Issue	27	21.3%
Don't Know	3	2.4%
Total	***127***	***100.0%***



Interested, But Concerned Subsample

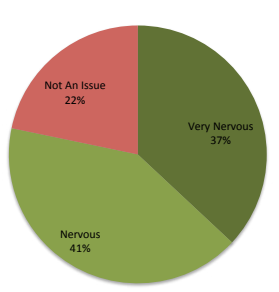
Riding on the sidewalk

Very Nervous	7	15.2%
Nervous	22	47.8%
Not An Issue	17	37.0%
Don't Know	0	0.0%
Total	***46***	***100.0%***



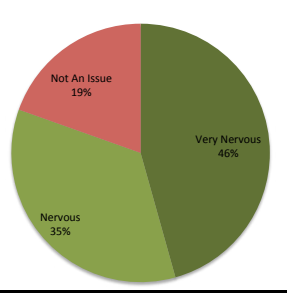
Failing to stop at stop signs

Very Nervous	17	37.0%
Nervous	19	41.3%
Not An Issue	10	21.7%
Don't Know	0	0.0%
Total	***46***	***100.0%***



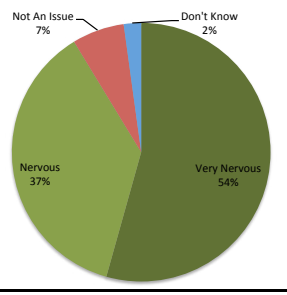
Failing to stop at stop lights

Very Nervous	21	45.7%
Nervous	16	34.8%
Not An Issue	9	19.6%
Don't Know	0	0.0%
Total	***46***	***100.0%***



Failing to yield

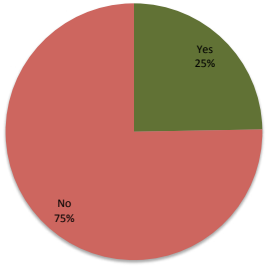
Very Nervous	25	54.3%
Nervous	17	37.0%
Not An Issue	3	6.5%
Don't Know	1	2.2%
Total	***46***	***100.0%***



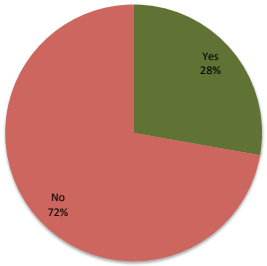
II. Child Safety

Question 6: Do you have children under the age of 18 living in your home?

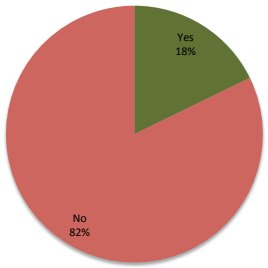
Complete Survey Sample		
Yes	43	24.7%
No	131	75.3%
Total	***174***	***100.0%***



Strong & Fearless and Enthused & Confident Subsample		
Yes	35	27.8%
No	91	72.2%
Total	***126***	***100.0%***

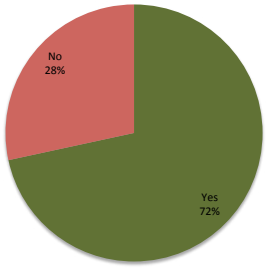


Interested, But Concerned Subsample		
Yes	8	17.8%
No	37	82.2%
Total	***45***	***100.0%***

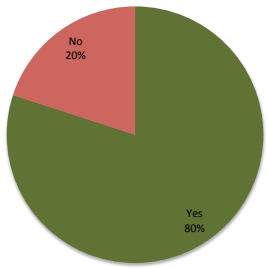


Question 7: Would you allow your child/children to ride their bike on your neighborhood streets?

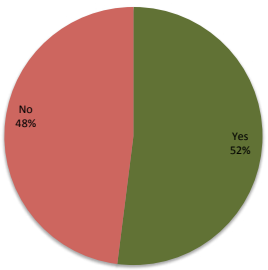
Complete Survey Sample		
Yes	58	71.6%
No	23	28.4%
Not Applicable	90	
Total	***171***	***100.0%***



Strong & Fearless and Enthused & Confident Subsample		
Yes	44	80.0%
No	11	20.0%
Not Applicable	70	
Total	***125***	***100.0%***

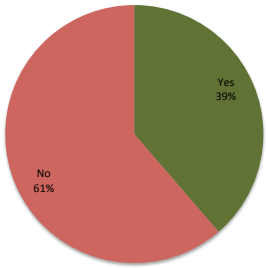


Interested, But Concerned Subsample		
Yes	13	52.0%
No	12	48.0%
Not Applicable	18	
Total	***43***	***100.0%***

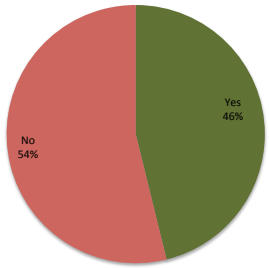


Question 8: Would you allow your child/children to ride their bike to school?

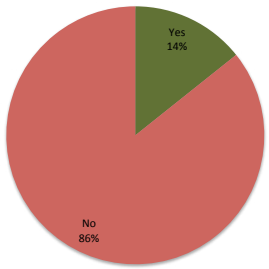
Complete Survey Sample		
Yes	29	38.7%
No	46	61.3%
Not Applicable	97	
Total	***172***	***100.0%***



Strong & Fearless and Enthused & Confident Subsample		
Yes	24	46.2%
No	28	53.8%
Not Applicable	73	
Total	***125***	***100.0%***

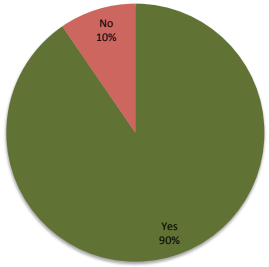


Interested, But Concerned Subsample		
Yes	3	14.3%
No	18	85.7%
Not Applicable	22	
Total	***43***	***100.0%***

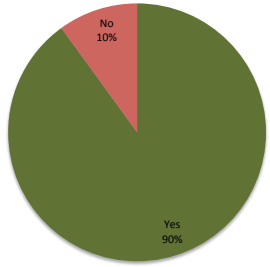


Question 9: If your neighborhood had a designated parent/adult to escort children to school on bikes, would you be more willing to let them ride to school?

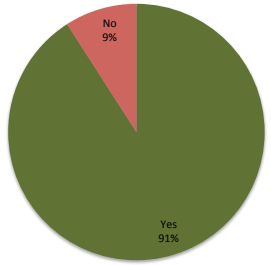
Complete Survey Sample		
Yes	66	90.4%
No	7	9.6%
Not Applicable	98	
Total	***171***	***100.0%***



Strong & Fearless and Enthused & Confident Subsample		
Yes	45	90.0%
No	5	10.0%
Not Applicable	74	
Total	***124***	***100.0%***

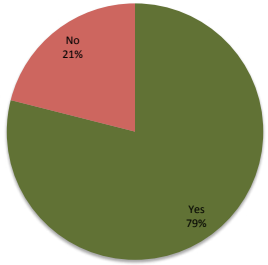


Interested, But Concerned Subsample		
Yes	20	90.9%
No	2	9.1%
Not Applicable	22	
Total	***44***	***100.0%***

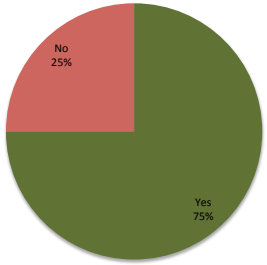


Question 10: If your child participated in a bicycle safety skills course, would you be more likely to allow them to ride on the road?

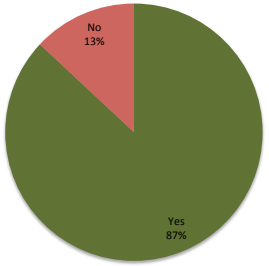
Complete Survey Sample		
Yes	60	78.9%
No	16	21.1%
Not Applicable	94	
Total	***170***	***100.0%***



Strong & Fearless and Enthused & Confident Subsample		
Yes	39	75.0%
No	13	25.0%
Not Applicable	71	
Total	***123***	***100.0%***



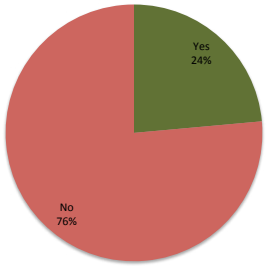
Interested, But Concerned Subsample		
Yes	20	87.0%
No	3	13.0%
Not Applicable	21	
Total	***44***	***100.0%***



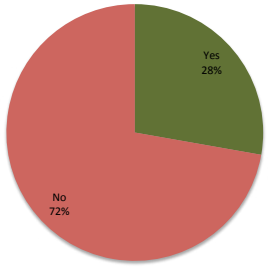
III. Bicycle Safety Education

Question 11: Are you aware of any bicycle safety education courses in the City of Richmond?

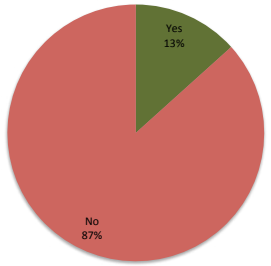
Complete Survey Sample		
Yes	41	23.6%
No	133	76.4%
Total	***174***	***100.0%***



Strong & Fearless and Enthused & Confident Subsample		
Yes	35	27.8%
No	91	72.2%
Total	***126***	***100.0%***

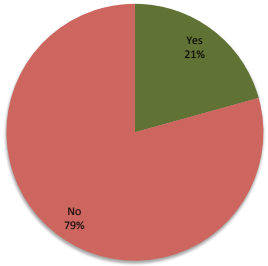


Interested, But Concerned Subsample		
Yes	6	13.3%
No	39	86.7%
Total	***45***	***100.0%***

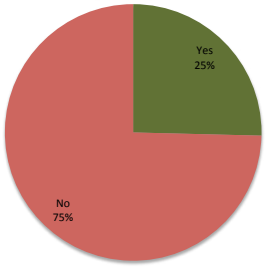


Question 12: Have you ever participated in a bicycle safety education course?

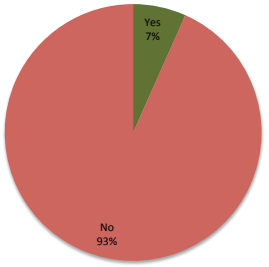
Complete Survey Sample		
Yes	36	20.7%
No	138	79.3%
Total	***174***	***100.0%***



Strong & Fearless and Enthused & Confident Subsample		
Yes	32	25.4%
No	94	74.6%
Total	***126***	***100.0%***

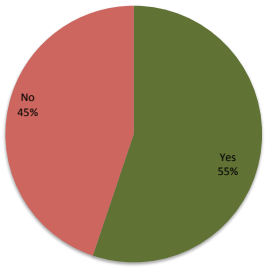


Interested, But Concerned Subsample		
Yes	3	6.7%
No	42	93.3%
Total	***45***	***100.0%***

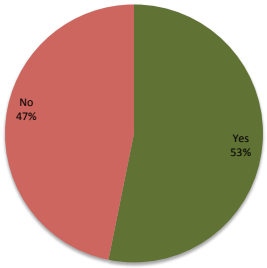


Question 13: Would you be interested in participating in a bicycle safety education course?

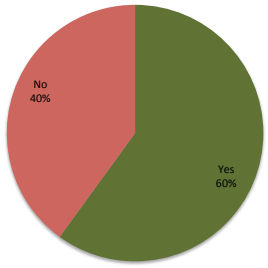
Complete Survey Sample		
Yes	96	55.2%
No	78	44.8%
Total	***174***	***100.0%***



Strong & Fearless and Enthused & Confident Subsample		
Yes	67	53.2%
No	59	46.8%
Total	***126***	***100.0%***

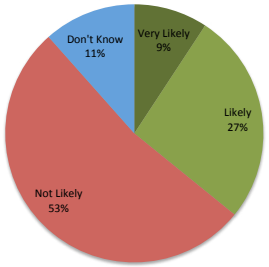


Interested, But Concerned Subsample		
Yes	27	60.0%
No	18	40.0%
Total	***45***	***100.0%***

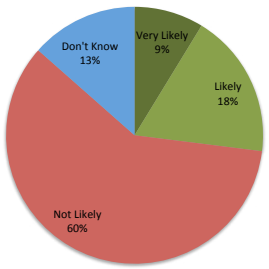


Question 14: How likely would participation in a bicycle safety education course increase the amount you ride your bike?

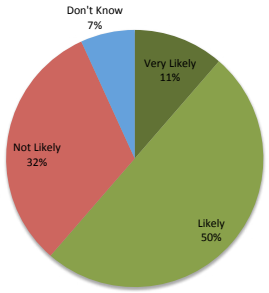
Complete Survey Sample		
Very Likely	16	9.2%
Likely	46	26.6%
Not Likely	91	52.6%
Don't Know	20	11.6%
Total	***173***	***100.0%***



Strong & Fearless and Enthused & Confident Subsample		
Very Likely	11	8.7%
Likely	23	18.3%
Not Likely	75	59.5%
Don't Know	17	13.5%
Total	***126***	***100.0%***

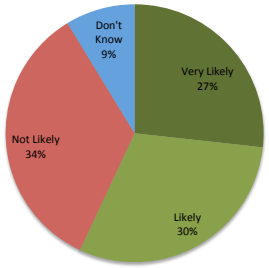


Interested, But Concerned Subsample		
Very Likely	5	11.4%
Likely	22	50.0%
Not Likely	14	31.8%
Don't Know	3	6.8%
Total	***44***	***100.0%***

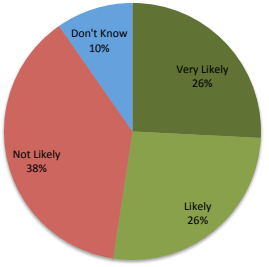


Question 15: How likely would events designed to let you practice safe cycling with others in semi-controlled environment increase your likelihood of riding more often?

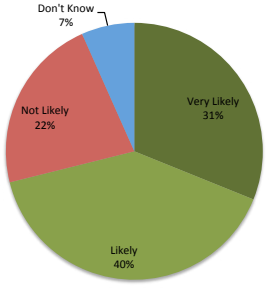
Complete Survey Sample		
Very Likely	46	26.7%
Likely	52	30.2%
Not Likely	59	34.3%
Don't Know	15	8.7%
Total	***172***	***100.0%***



Strong & Fearless and Enthused & Confident Subsample		
Very Likely	32	25.8%
Likely	33	26.6%
Not Likely	47	37.9%
Don't Know	12	9.7%
Total	***124***	***100.0%***



Interested, But Concerned Subsample		
Very Likely	14	31.1%
Likely	18	40.0%
Not Likely	10	22.2%
Don't Know	3	6.7%
Total	***45***	***100.0%***

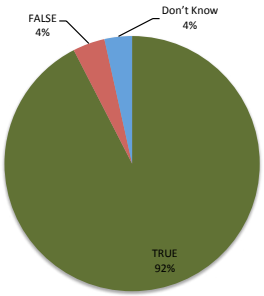


IV. Safety Laws

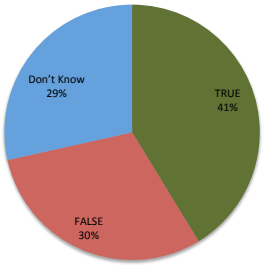
Question 16: Based on your knowledge of local laws, please indicate whether the following statements are True or False.

Complete Survey Sample

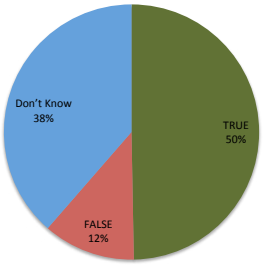
Bicyclists have the same rights and responsibilities as motorists on the roadways.		
TRUE	159	92.4%
FALSE	7	4.1%
Don't Know	6	3.5%
Total	***172***	***100.0%***



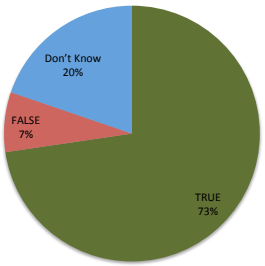
It is illegal to ride on the sidewalks in the City of Richmond.		
TRUE	71	41.3%
FALSE	52	30.2%
Don't Know	49	28.5%
Total	***172***	***100.0%***



Bicyclists under the age of 14 are required to wear a helmet in the City of Richmond.		
TRUE	85	49.7%
FALSE	20	11.7%
Don't Know	66	38.6%
Total	***171***	***100.0%***

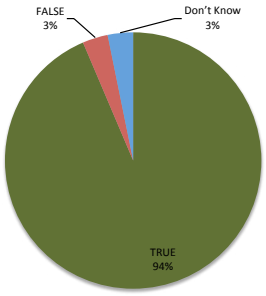


A headlight is required when riding at night on all roads.		
TRUE	125	72.7%
FALSE	13	7.6%
Don't Know	34	19.8%
Total	***172***	***100.0%***

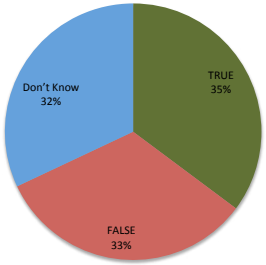


Strong & Fearless and Enthused & Confident Subsample

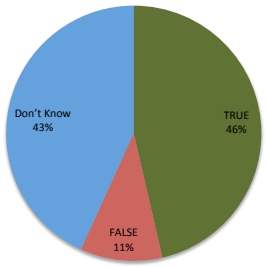
Bicyclists have the same rights and responsibilities as motorists on the roadways.		
TRUE	117	93.6%
FALSE	4	3.2%
Don't Know	4	3.2%
Total	***125***	***100.0%***



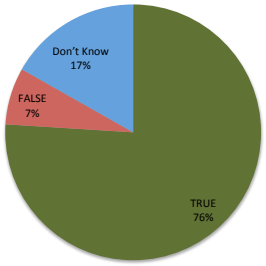
It is illegal to ride on the sidewalks in the City of Richmond.		
TRUE	44	35.2%
FALSE	41	32.8%
Don't Know	40	32.0%
Total	***125***	***100.0%***



Bicyclists under the age of 14 are required to wear a helmet in the City of Richmond.		
TRUE	58	46.4%
FALSE	13	10.4%
Don't Know	54	43.2%
Total	***125***	***100.0%***

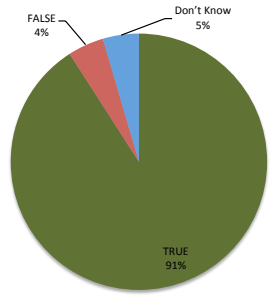


A headlight is required when riding at night on all roads.		
TRUE	95	76.0%
FALSE	9	7.2%
Don't Know	21	16.8%
Total	***125***	***100.0%***



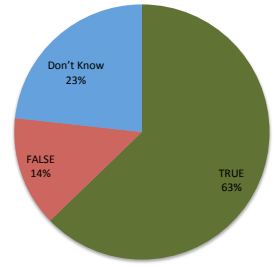
Interested, But Concerned Subsample

Bicyclists have the same rights and responsibilities as motorists on the roadways.		
TRUE	40	90.9%
FALSE	2	4.5%
Don't Know	2	4.5%
Total	***44***	***100.0%***

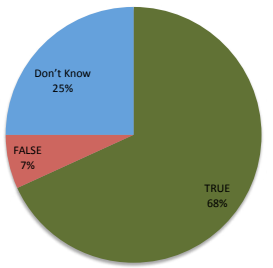


It is illegal to ride on the sidewalks in the City of Richmond.		
TRUE	26	59.1%
FALSE	9	20.5%
Don't Know	9	20.5%
Total	***44***	***100.0%***

Bicyclists under the age of 14 are required to wear a helmet in the City of Richmond.		
TRUE	27	62.8%
FALSE	6	14.0%
Don't Know	10	23.3%
Total	***43***	***100.0%***



A headlight is required when riding at night on all roads.		
TRUE	30	68.2%
FALSE	3	6.8%
Don't Know	11	25.0%
Total	***44***	***100.0%***

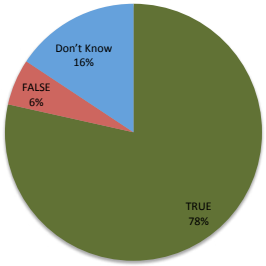


Question 16: Based on your knowledge of local laws, please indicate whether the following statements are True or False. (continued)

Complete Survey Sample

A rear red reflector is required at all times when riding at night.

TRUE	135	78.5%
FALSE	10	5.8%
Don't Know	27	15.7%
Total	***172***	***100.0%***

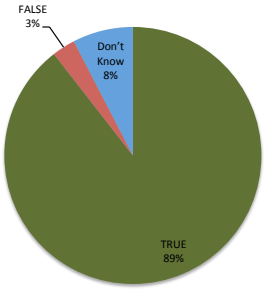


Bicyclists are required to signal their intention to stop or turn.

TRUE	134	77.9%
FALSE	10	5.8%
Don't Know	28	16.3%
Total	***172***	***100.0%***

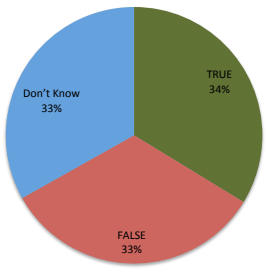
Bicyclists are required to ride with the direction of traffic.

TRUE	153	89.5%
FALSE	5	2.9%
Don't Know	13	7.6%
Total	***171***	***100.0%***



Bicyclists may proceed through a red light after coming to a complete stop for 2 minutes or two complete light cycles, whichever is shorter.

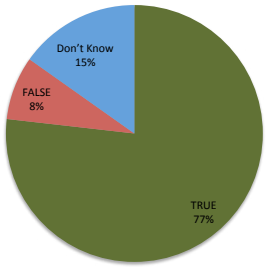
TRUE	58	33.7%
FALSE	57	33.1%
Don't Know	57	33.1%
Total	***172***	***100.0%***



Strong & Fearless and Enthused & Confident Subsample

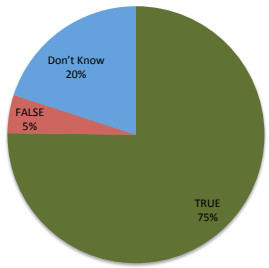
A rear red reflector is required at all times when riding at night.

TRUE	96	76.8%
FALSE	10	8.0%
Don't Know	19	15.2%
Total	***125***	***100.0%***



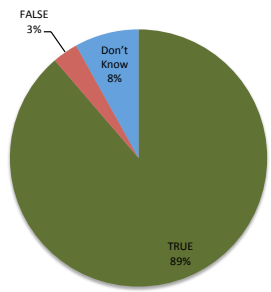
Bicyclists are required to signal their intention to stop or turn.

TRUE	94	75.2%
FALSE	6	4.8%
Don't Know	25	20.0%
Total	***125***	***100.0%***



Bicyclists are required to ride with the direction of traffic.

TRUE	110	88.7%
FALSE	4	3.2%
Don't Know	10	8.1%
Total	***124***	***100.0%***



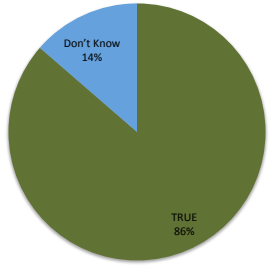
Bicyclists may proceed through a red light after coming to a complete stop for 2 minutes or two complete light cycles, whichever is shorter.

TRUE	47	37.6%
FALSE	38	30.4%
Don't Know	40	32.0%
Total	***125***	***100.0%***

Interested, But Concerned Subsample

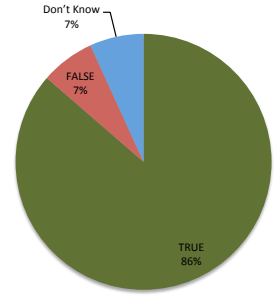
A rear red reflector is required at all times when riding at night.

TRUE	38	86.4%
FALSE	0	0.0%
Don't Know	6	13.6%
Total	***44***	***100.0%***



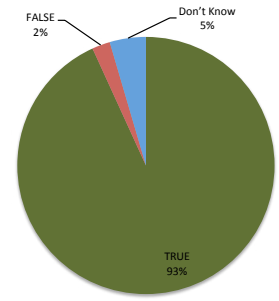
Bicyclists are required to signal their intention to stop or turn.

TRUE	38	86.4%
FALSE	3	6.8%
Don't Know	3	6.8%
Total	***44***	***100.0%***



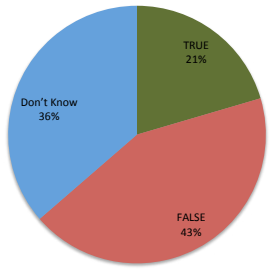
Bicyclists are required to ride with the direction of traffic.

TRUE	41	93.2%
FALSE	1	2.3%
Don't Know	2	4.5%
Total	***44***	***100.0%***



Bicyclists may proceed through a red light after coming to a complete stop for 2 minutes or two complete light cycles, whichever is shorter.

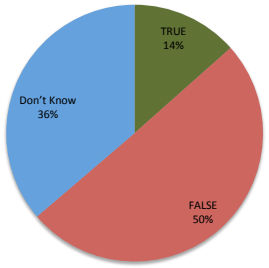
TRUE	9	20.5%
FALSE	19	43.2%
Don't Know	16	36.4%
Total	***44***	***100.0%***



Question 16: Based on your knowledge of local laws, please indicate whether the following statements are True or False. (continued)

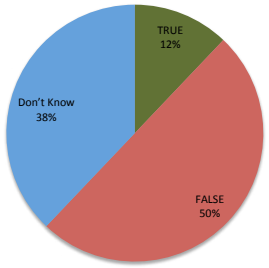
Complete Survey Sample

Bicyclists are allowed to wear headphones in one ear while riding.		
TRUE	23	13.5%
FALSE	86	50.3%
Don't Know	62	36.3%
Total	***171***	***100.0%***



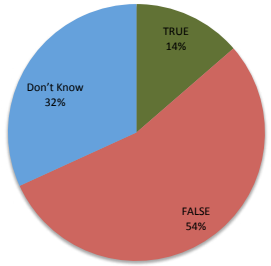
Strong & Fearless and Enthused & Confident Subsample

Bicyclists are allowed to wear headphones in one ear while riding.		
TRUE	15	12.1%
FALSE	62	50.0%
Don't Know	47	37.9%
Total	***124***	***100.0%***



Interested, But Concerned Subsample

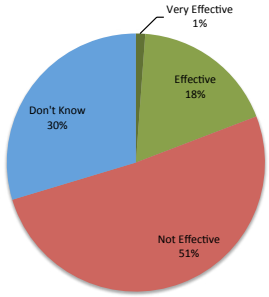
Bicyclists are allowed to wear headphones in one ear while riding.		
TRUE	6	13.6%
FALSE	24	54.5%
Don't Know	14	31.8%
Total	***44***	***100.0%***



Question 17: How do you rate the Richmond Police Department's effectiveness at enforcing safe travel laws to motorists who violate them?

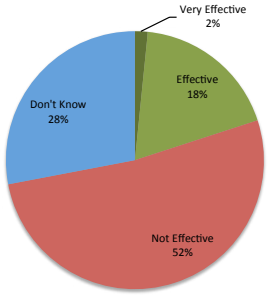
Complete Survey Sample

Very Effective	2	1.2%
Effective	31	18.0%
Not Effective	88	51.2%
Don't Know	51	29.7%
Total	***172***	***100.0%***



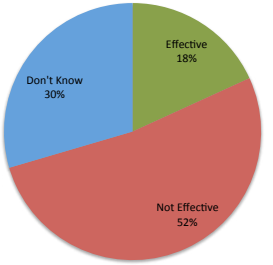
Strong & Fearless and Enthused & Confident Subsample

Very Effective	2	1.6%
Effective	23	18.4%
Not Effective	65	52.0%
Don't Know	35	28.0%
Total	***125***	***100.0%***



Interested, But Concerned Subsample

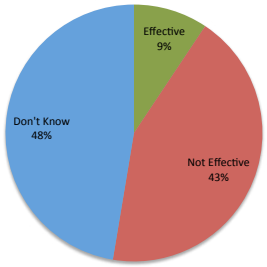
Very Effective	0	0.0%
Effective	8	18.2%
Not Effective	23	52.3%
Don't Know	13	29.5%
Total	***44***	***100.0%***



Question 18: How do you rate the Richmond Police Department's effectiveness at enforcing safe travel laws to bicyclists who violate them?

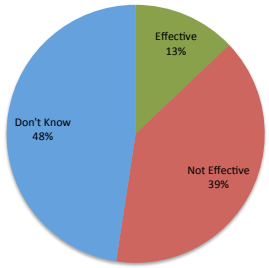
Complete Survey Sample

Very Effective	0	0.0%
Effective	16	9.4%
Not Effective	74	43.3%
Don't Know	81	47.4%
Total	***171***	***100.0%***



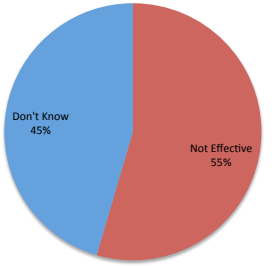
Strong & Fearless and Enthused & Confident Subsample

Very Effective	0	0.0%
Effective	16	12.9%
Not Effective	49	39.5%
Don't Know	59	47.6%
Total	***124***	***100.0%***



Interested, But Concerned Subsample

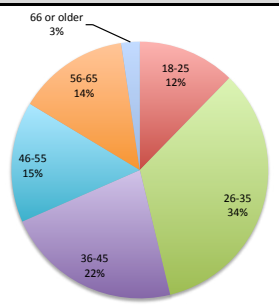
Very Effective	0	0.0%
Effective	0	0.0%
Not Effective	24	54.5%
Don't Know	20	45.5%
Total	***44***	***100.0%***



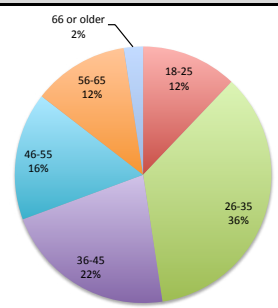
V. Demographics

Demographic 1: Which category includes your age?

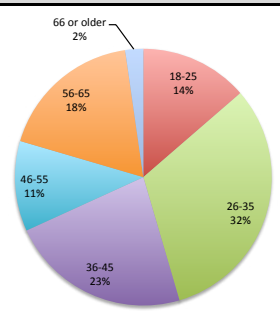
Complete Survey Sample		
Under 18	0	0.0%
18-25	21	12.3%
26-35	58	33.9%
36-45	38	22.2%
46-55	26	15.2%
56-65	24	14.0%
66 or older	4	2.3%
Total	***171***	***100.0%***



Strong & Fearless and Enthused & Confident Subsample		
Under 18	0	0.0%
18-25	15	12.1%
26-35	44	35.5%
36-45	27	21.8%
46-55	20	16.1%
56-65	15	12.1%
66 or older	3	2.4%
Total	***124***	***100.0%***

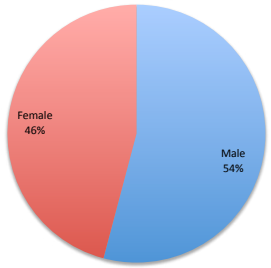


Interested, But Concerned Subsample		
Under 18	0	0.0%
18-25	6	13.6%
26-35	14	31.8%
36-45	10	22.7%
46-55	5	11.4%
56-65	8	18.2%
66 or older	1	2.3%
Total	***44***	***100.0%***

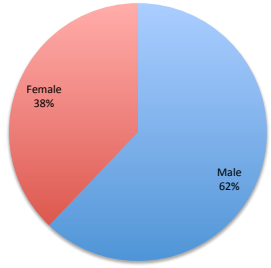


Demographic 2: What is your gender?

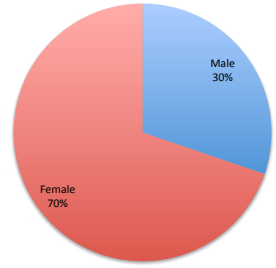
Complete Survey Sample		
Male	92	54.1%
Female	78	45.9%
Total	***170***	***100.0%***



Strong & Fearless and Enthused & Confident Subsample		
Male	77	62.1%
Female	47	37.9%
Total	***124***	***100.0%***

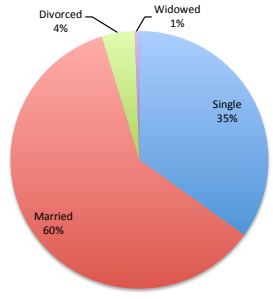


Interested, But Concerned Subsample		
Male	13	30.2%
Female	30	69.8%
Total	***43***	***100.0%***

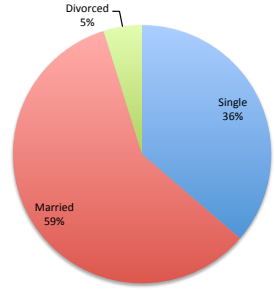


Demographic 3: What is your marital status?

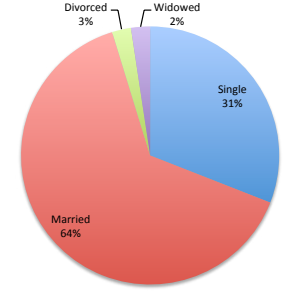
Complete Survey Sample		
Single	59	34.9%
Married	102	60.4%
Divorced	7	4.1%
Widowed	1	0.6%
Total	***169***	***100.0%***



Strong & Fearless and Enthused & Confident Subsample		
Single	45	36.3%
Married	73	58.9%
Divorced	6	4.8%
Widowed	0	0.0%
Total	***124***	***100.0%***

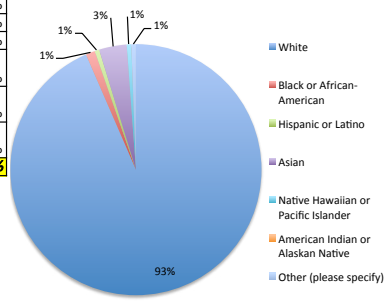


Interested, But Concerned Subsample		
Single	13	31.0%
Married	27	64.3%
Divorced	1	2.4%
Widowed	1	2.4%
Total	***42***	***100.0%***

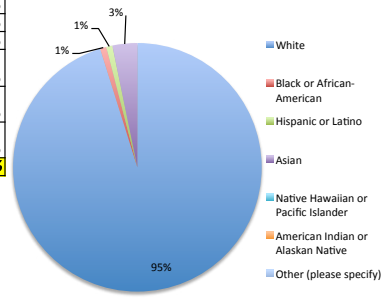


Demographic 4: What is your race/ethnicity? Please chose all that apply.

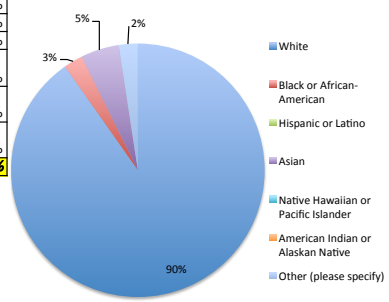
Complete Survey Sample		
White	158	93.5%
Black or African-American	2	1.2%
Hispanic or Latino	1	0.6%
Asian	6	3.6%
Native Hawaiian or Pacific Islander	1	0.6%
American Indian or Alaskan Native	0	0.0%
Other (please specify)	1	0.6%
Total	***169***	***100.0%***



Strong & Fearless and Enthused & Confident Subsample		
White	118	95.2%
Black or African-American	1	0.8%
Hispanic or Latino	1	0.8%
Asian	4	3.2%
Native Hawaiian or Pacific Islander	0	0.0%
American Indian or Alaskan Native	0	0.0%
Other (please specify)	0	0.0%
Total	***124***	***100.0%***

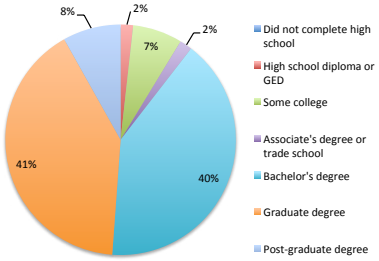


Interested, But Concerned Subsample		
White	37	90.2%
Black or African-American	1	2.4%
Hispanic or Latino	0	0.0%
Asian	2	4.9%
Native Hawaiian or Pacific Islander	0	0.0%
American Indian or Alaskan Native	0	0.0%
Other (please specify)	1	2.4%
Total	***41***	***100.0%***

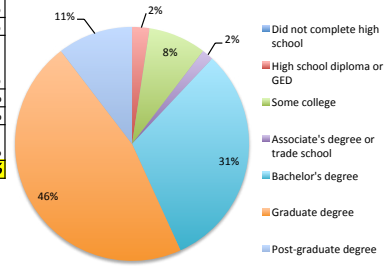


Demographic 5: What is your highest level of education you have completed?

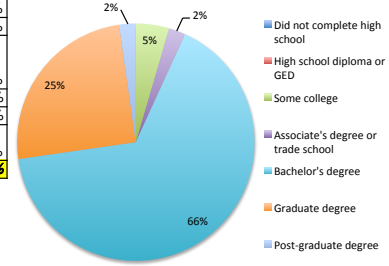
Complete Survey Sample		
Did not complete high school	0	0.0%
High school diploma or GED	3	1.7%
Some college	12	7.0%
Associate's degree or trade school	3	1.7%
Bachelor's degree	70	40.7%
Graduate degree	70	40.7%
Post-graduate degree	14	8.1%
Total	***172***	***100.0%***



Strong & Fearless and Enthused & Confident Subsample		
Did not complete high school	0	0.0%
High school diploma or GED	3	2.4%
Some college	10	8.0%
Associate's degree or trade school	2	1.6%
Bachelor's degree	39	31.2%
Graduate degree	58	46.4%
Post-graduate degree	13	10.4%
Total	***125***	***100.0%***

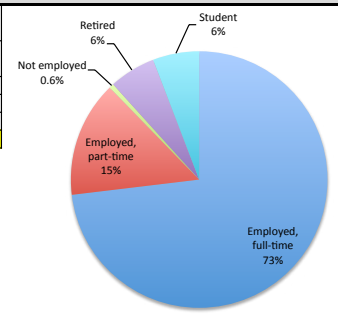


Interested, But Concerned Subsample		
Did not complete high school	0	0.0%
High school diploma or GED	0	0.0%
Some college	2	4.5%
Associate's degree or trade school	1	2.3%
Bachelor's degree	29	65.9%
Graduate degree	11	25.0%
Post-graduate degree	1	2.3%
Total	***44***	***100.0%***

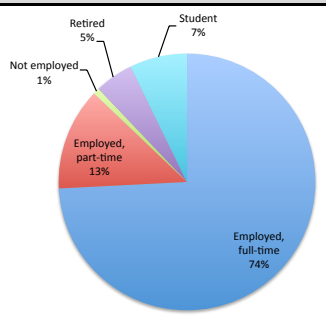


Demographic 6: Which of the following best describes your employment status?

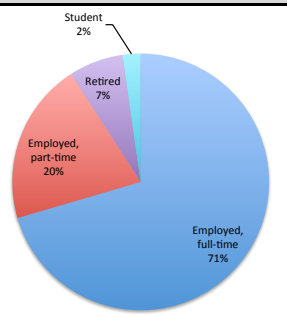
Complete Survey Sample		
Employed, full-time	125	73.1%
Employed, part-time	25	14.6%
Not employed	1	0.6%
Retired	10	5.8%
Student	10	5.8%
Total	***171***	***100.0%***



Strong & Fearless and Enthused & Confident Subsample		
Employed, full-time	92	74.2%
Employed, part-time	16	12.9%
Not employed	1	0.8%
Retired	6	4.8%
Student	9	7.3%
Total	***124***	***100.0%***

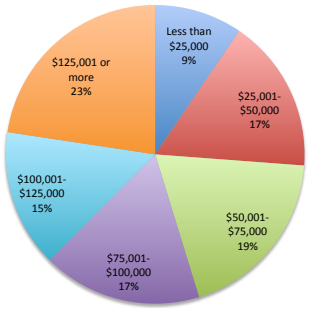


Interested, But Concerned Subsample		
Employed, full-time	31	70.5%
Employed, part-time	9	20.5%
Not employed	0	0.0%
Retired	3	6.8%
Student	1	2.3%
Total	***44***	***100.0%***

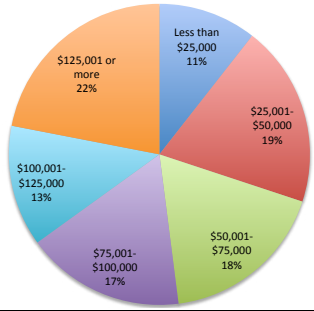


Demographic 7: What range does your household income fall in?

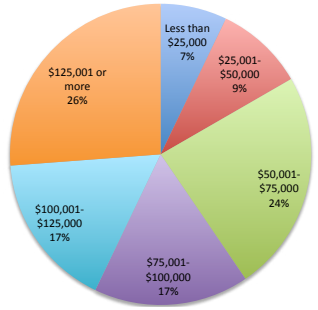
Complete Survey Sample		
Less than $25,000	16	9.5%
$25,001-$50,000	28	16.7%
$50,001-$75,000	32	19.0%
$75,001-$100,000	29	17.3%
$100,001-$125,000	25	14.9%
$125,001 or more	38	22.6%
Total	***168***	***100.0%***



Strong & Fearless and Enthused & Confident Subsample		
Less than $25,000	13	10.6%
$25,001-$50,000	24	19.5%
$50,001-$75,000	22	17.9%
$75,001-$100,000	21	17.1%
$100,001-$125,000	16	13.0%
$125,001 or more	27	22.0%
Total	***123***	***100.0%***

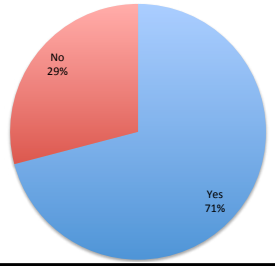


Interested, But Concerned Subsample		
Less than $25,000	3	7.1%
$25,001-$50,000	4	9.5%
$50,001-$75,000	10	23.8%
$75,001-$100,000	7	16.7%
$100,001-$125,000	7	16.7%
$125,001 or more	11	26.2%
Total	***42***	***100.0%***

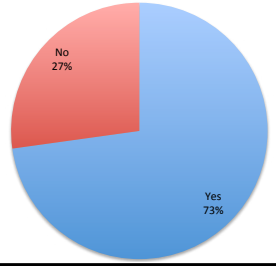


Demographic 8: Are you a resident of the City of Richmond?

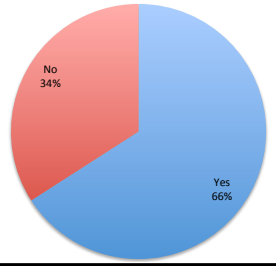
Complete Survey Sample		
Yes	122	70.9%
No	50	29.1%
Total	***172***	***100.0%***



Strong & Fearless and Enthused & Confident Subsample		
Yes	91	72.8%
No	34	27.2%
Total	***125***	***100.0%***

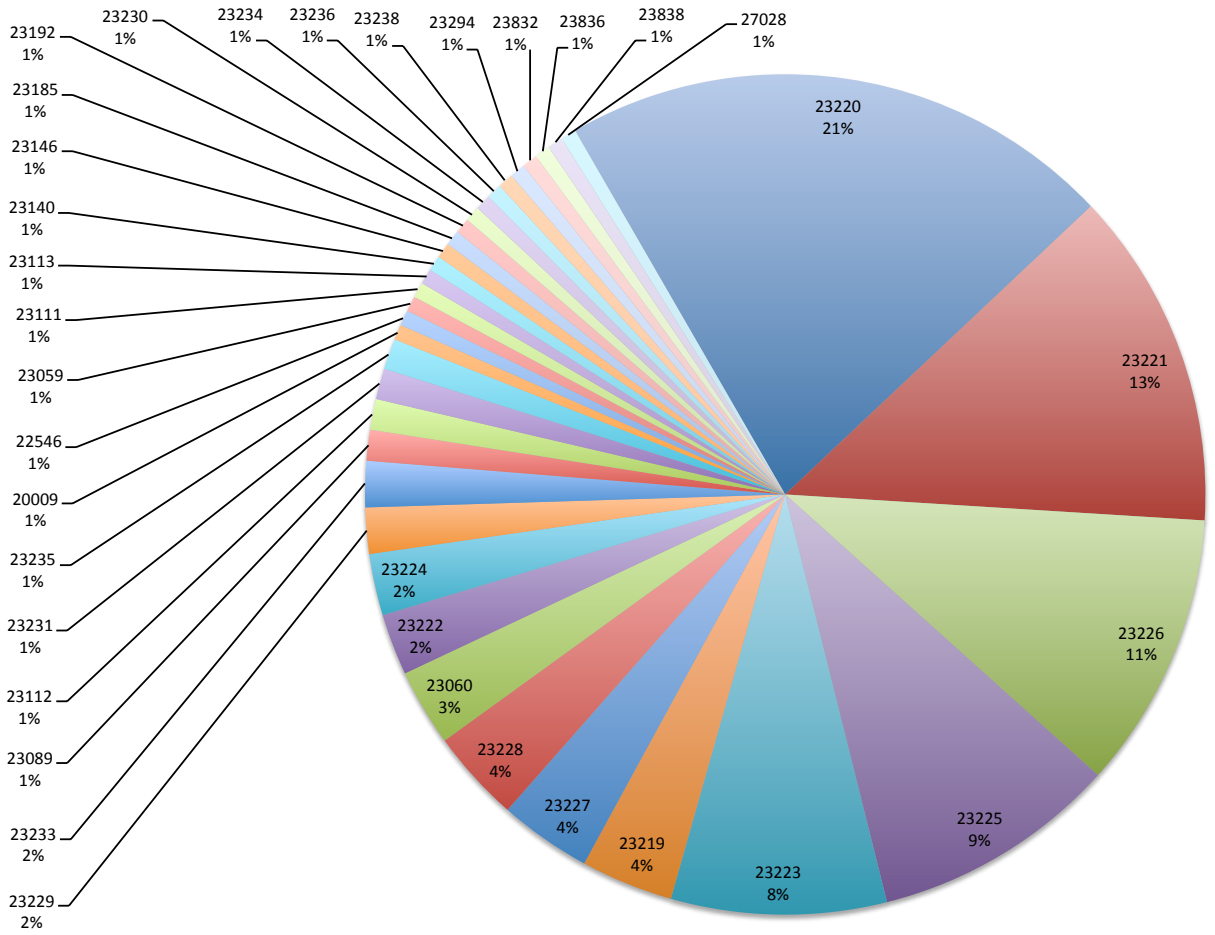


Interested, But Concerned Subsample		
Yes	29	65.9%
No	15	34.1%
Total	***44***	***100.0%***



Demographic 9: What is the zip code where you live?

What is the zip code where you live?		
23220	36	21.3%
23221	22	13.0%
23226	18	10.7%
23225	16	9.5%
23223	14	8.3%
23219	6	3.6%
23227	6	3.6%
23228	6	3.6%
23060	5	3.0%
23222	4	2.4%
23224	4	2.4%
23229	3	1.8%
23233	3	1.8%
23089	2	1.2%
23112	2	1.2%
23231	2	1.2%
23235	2	1.2%
20009	1	0.6%
22546	1	0.6%
23059	1	0.6%
23111	1	0.6%
23113	1	0.6%
23140	1	0.6%
23146	1	0.6%
23185	1	0.6%
23192	1	0.6%
23230	1	0.6%
23234	1	0.6%
23236	1	0.6%
23238	1	0.6%
23294	1	0.6%
23832	1	0.6%
23836	1	0.6%
23838	1	0.6%
27028	1	0.6%
Total	*169*	*100.0%*



Virginia Bicycle Crash Data (2008 - 2012)

Virginia Department of Motor Vehicles - Virginia Highway Safety Office

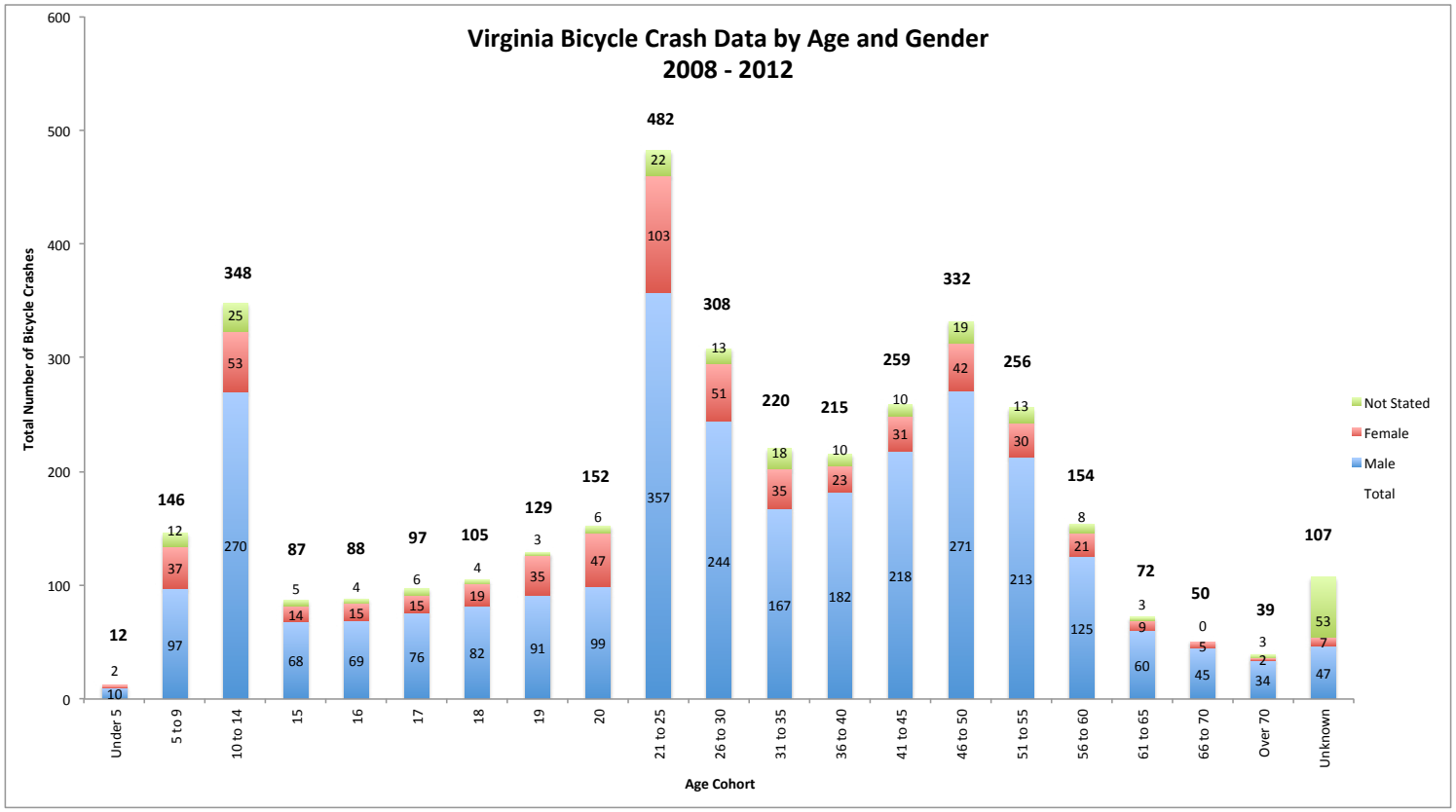
			2008		2009		2010		2011		2012		2008-2012 Totals	
			Crashes	Percent	Crashes	Percent	Crashes	Percent	Crashes	Percent	Crashes	Percent	Crashes	Percent
The Driver	Driver Action	No Violation	249	36.8%	225	34.9%	249	38.4%	301	39.6%	353	42.8%	1,377	38.7%
		Failure to Yield	143	21.1%	135	21.0%	108	16.7%	139	18.3%	151	18.3%	676	19.0%
		Other	110	16.2%	90	14.0%	95	14.7%	116	15.2%	117	14.2%	528	14.9%
		Ran Traffic Control	53	7.8%	49	7.6%	63	9.7%	59	7.8%	68	8.2%	292	8.2%
		Left of Center - Not Passing	46	6.8%	42	6.5%	34	5.2%	47	6.2%	39	4.7%	208	5.9%
		Improper Turn	22	3.2%	11	1.7%	19	2.9%	13	1.7%	20	2.4%	85	2.4%
		Improper Lane Change	16	2.4%	12	1.9%	13	2.0%	19	2.5%	17	2.1%	77	2.2%
		Improper Passing	9	1.3%	7	1.1%	15	2.3%	15	2.0%	17	2.1%	63	1.8%
		Lightes Not On	15	2.2%	18	2.8%	13	2.0%	22	2.9%	15	1.8%	83	2.3%
		Not Applicable	0	0.0%	23	3.6%	18	2.8%	13	1.7%	15	1.8%	69	1.9%
		Avoiding Other Vehicles	0	0.0%	6	0.9%	0	0.0%	5	0.7%	5	0.6%	16	0.5%
		Following Too Close	3	0.4%	6	0.9%	3	0.5%	4	0.5%	4	0.5%	20	0.6%
		Speed To Fast	3	0.4%	5	0.8%	13	2.0%	6	0.8%	3	0.4%	30	0.8%
		Hit and Run	3	0.4%	2	0.3%	2	0.3%	2	0.3%	1	0.1%	10	0.3%
		Avoiding Pedestrians	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
		Illegal or Improper Parking	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
		Improper Backing	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
		Driver Distraction	5	0.7%	13	2.0%	3	0.5%	x	x	x	x	21	0.6%
		Total	***677***	***100%***	***644***	***100%***	***648***	***100%***	***761***	***100%***	***825***	***100%***	***3,555***	***100%***
		Not Stated	***100***		***3***		***0***		***0***		***0***		***103***	
		Grand Total	***777***		***647***		***648***		***761***		***825***		***3,658***	
	Drinking	Not Impaired	601	90.8%	515	90.0%	541	93.9%	627	91.8%	687	93.9%	2,971	92.1%
		Drinking - Impaired	29	4.4%	27	4.7%	16	2.8%	31	4.5%	23	3.1%	126	3.9%
		Drinking - Impairment Unknown	23	3.5%	22	3.8%	15	2.6%	20	2.9%	12	1.6%	92	2.9%
		Drinking - Not Impaired	9	1.4%	8	1.4%	4	0.7%	5	0.7%	10	1.4%	36	1.1%
		Total	***662***	***100%***	***572***	***100%***	***576***	***100%***	***683***	***100%***	***732***	***100%***	***3,225***	***100%***
		Not Stated	***115***		***75***		***72***		***78***		***93***		***433***	
		Grand Total	***777***		***647***		***648***		***761***		***825***		***3,658***	
	Physical	Not Impaired	616	94.2%	535	94.4%	558	93.9%	685	96.3%	738	96.2%	3,132	95.1%
		Other	31	4.7%	25	4.4%	28	4.7%	21	3.0%	26	3.4%	131	4.0%
		Phsyical Defect	5	0.8%	5	0.9%	5	0.8%	4	0.6%	3	0.4%	22	0.7%
		Apparently Asleep	0	0.0%	2	0.4%	0	0.0%	0	0.0%	0	0.0%	2	0.1%
		Fatiqued	2	0.3%	0	0.0%	2	0.3%	1	0.1%	0	0.0%	5	0.2%
		Ill	0	0.0%	0	0.0%	1	0.2%	0	0.0%	0	0.0%	1	0.0%
		Total	***654***	***100%***	***567***	***100%***	***594***	***100%***	***711***	***100%***	***767***	***100%***	***3,293***	***100%***
		Not Stated	***123***		***80***		***54***		***50***		***58***		***365***	
		Grand Total	***777***		***647***		***648***		***761***		***825***		***3,658***	
Vehicle	Vehicle Action	Going Straight	514	74.2%	468	72.4%	486	75.0%	575	75.6%	629	76.2%	2,672	74.8%
		Other	80	11.5%	73	11.3%	67	10.3%	80	10.5%	79	9.6%	379	10.6%
		Turning Left	53	7.6%	40	6.2%	36	5.6%	46	6.0%	54	6.5%	229	6.4%
		Changing Lanes	14	2.0%	12	1.9%	13	2.0%	12	1.6%	15	1.8%	66	1.8%
		Turning Right	14	2.0%	20	3.1%	15	2.3%	15	2.0%	11	1.3%	75	2.1%
		Not Applicable	0	0.0%	17	2.6%	10	1.5%	10	1.3%	8	1.0%	45	1.3%
		Passing	4	0.6%	4	0.6%	6	0.9%	5	0.7%	7	0.8%	26	0.7%
		Stopped in Traffic Lane	4	0.6%	3	0.5%	3	0.5%	10	1.3%	7	0.8%	27	0.8%
		Slowing or Stopping	6	0.9%	5	0.8%	5	0.8%	1	0.1%	6	0.7%	23	0.6%
		Ran Off Road	2	0.3%	3	0.5%	6	0.9%	3	0.4%	5	0.6%	19	0.5%
		Making U-Turn	1	0.1%	1	0.2%	1	0.2%	4	0.5%	4	0.5%	11	0.3%
		Backing	1	0.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.0%
		Total	***693***	***100%***	***646***	***100%***	***648***	***100%***	***761***	***100%***	***825***	***100%***	***3,573***	***100%***
		Not Stated	***84***		***1***		***0***		***0***		***0***		***85***	
		Grand Total	***777***		***647***		***648***		***761***		***825***		***3,658***	
	Vehicle Defect	No Defect	613	92.5%	542	84.0%	555	85.6%	676	88.8%	726	88.0%	3,112	87.9%
		Not Applicable	0	0.0%	37	5.7%	44	6.8%	39	5.1%	49	5.9%	169	4.8%
		Brakes	17	2.6%	23	3.6%	23	3.5%	21	2.8%	21	2.5%	105	3.0%
		Lights	19	2.9%	16	2.5%	10	1.5%	15	2.0%	16	1.9%	76	2.1%
		Other	12	1.8%	22	3.4%	14	2.2%	10	1.3%	11	1.3%	69	1.9%
		Tires	2	0.3%	1	0.2%	2	0.3%	0	0.0%	2	0.2%	7	0.2%
		Motor	0	0.0%	1	0.2%	0	0.0%	0	0.0%	0	0.0%	1	0.0%
		Steering	0	0.0%	3	0.5%	0	0.0%	0	0.0%	0	0.0%	3	0.1%
		Total	***663***	***100%***	***645***	***100%***	***648***	***100%***	***761***	***100%***	***825***	***100%***	***3,542***	***100%***
		Not Stated	***114***		***2***		***0***		***0***		***0***		***116***	
		Grand Total	***777***		***647***		***648***		***761***		***825***		***3,658***	
Environment	Weather Description	No Adverse Conditions	702	91.4%	571	89.9%	602	93.9%	707	94.4%	757	94.2%	3,339	92.8%
		Rain	50	6.5%	46	7.2%	30	4.7%	37	4.9%	36	4.5%	199	5.5%
		Mist	10	1.3%	10	1.6%	5	0.8%	3	0.4%	8	1.0%	36	1.0%
		Fog	4	0.5%	0	0.0%	1	0.2%	0	0.0%	2	0.2%	7	0.2%
		Severe Crosswinds	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.1%	1	0.0%
		Blowing, Sand, Soil, Dirt or Snow	0	0.0%	1	0.2%	0	0.0%	0	0.0%	0	0.0%	1	0.0%
		Not Applicable	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
		Other	1	0.1%	2	0.3%	0	0.0%	2	0.3%	0	0.0%	5	0.1%
		Sleet/Hail	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
		Smoke/Dust	0	0.0%	1	0.2%	0	0.0%	0	0.0%	0	0.0%	1	0.0%
		Snow	1	0.1%	4	0.6%	3	0.5%	0	0.0%	0	0.0%	8	0.2%
		Total	***768***	***100%***	***635***	***100%***	***641***	***100%***	***749***	***100%***	***804***	***100%***	***3,597***	***100%***
		Not Stated	***2***		***8***		***0***		***0***		***0***		***10***	
		Grand Total	***770***		***643***		***641***		***749***		***804***		***3,607***	
	Lighting	Daylight	572	74.4%	458	72.0%	492	76.8%	558	74.5%	608	75.6%	2,688	74.7%
		Darkness - Road Lighted	109	14.2%	94	14.8%	83	12.9%	111	14.8%	113	14.1%	510	14.2%
		Darkness - Road Not Lighted	43	5.6%	41	6.4%	26	4.1%	38	5.1%	37	4.6%	185	5.1%
		Dusk	31	4.0%	21	3.3%	25	3.9%	25	3.3%	30	3.7%	132	3.7%
		Dawn	13	1.7%	18	2.8%	14	2.2%	14	1.9%	13	1.6%	72	2.0%
		Darkness - Unknown Road Lighting	1	0.1%	4	0.6%	1	0.2%	3	0.4%	2	0.2%	11	0.3%
		Unknown	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.1%	1	0.0%
		Not Applicable	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
		Total	***769***	***100%***	***636***	***100%***	***641***	***100%***	***749***	***100%***	***804***	***100%***	***3,599***	***100%***
		Not Stated	***1***		***7***		***0***		***0***		***0***		***8***	
		Grand Total	***770***		***643***		***641***		***749***		***804***		***3,607***	
	Traffic Controls	Other	224	29.3%	184	28.9%	201	31.4%	241	32.2%	237	29.5%	1,087	30.2%
		Traffic Signals	214	28.0%	174	27.3%	156	24.3%	194	25.9%	215	26.7%	953	26.5%
		Stop Sign	147	19.2%	139	21.8%	144	22.5%	167	22.3%	176	21.9%	773	21.5%
		No Controls	150	19.6%	109	17.1%	118	18.4%	127	17.0%	147	18.3%	651	18.1%
		No Passing Zone	24	3.1%	22	3.5%	13	2.0%	13	1.7%	20	2.5%	92	2.6%
		Yield Sign	5	0.7%	4	0.6%	6	0.9%	6	0.8%	7	0.9%	28	0.8%
		Slow/Warning Sign	0	0.0%	0	0.0%	2	0.3%	0	0.0%	2	0.2%	4	0.1%
		Not Applicable	0	0.0%	3	0.5%	0	0.0%	0	0.0%	0	0.0%	3	0.1%
		Railroad Gates Signal	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
		Railroad Signal	0	0.0%	0	0.0%	0	0.0%	1	0.1%	0	0.0%	1	0.0%
		Railroad Warning Sign	0	0.0%	2	0.3%	1	0.2%	0	0.0%	0	0.0%	3	0.1%
		Total	***764***	***100%***	***637***	***100%***	***641***	***100%***	***749***	***100%***	***804***	***100%***	***3,595***	***100%***
		Not Stated	***6***		***6***		***0***		***0***		***0***		***12***	
		Grand Total	***770***		***643***		***641***		***749***		***804***		***3,607***	

(Source: Virginia Dept. of Motor Vehicles)

Virginia Department of Motor Vehicles - Virginia Highway Safety Office

Age	2008					2009					2010					2011					2012					Total 2008 - 2012				
	Male	Female	Not Stated	Total	Percent Males	Male	Female	Not Stated	Total	Percent Male	Male	Female	Not Stated	Total	Percent Male	Male	Female	Not Stated	Total	Percent Male	Male	Female	Not Stated	Total	Percent Male	Male	Female	Not Stated	Total	Percent Male
Under 5	2	0	0	2	100.0%	1	0	0	1	100.0%	0	2	0	2	0.0%	2	0	0	2	100.0%	5	0	0	5	100.0%	10	2	0	12	83.3%
5 to 9	25	14	2	41	64.1%	22	5	3	30	81.5%	15	4	1	20	78.9%	18	5	4	27	78.3%	17	9	2	28	65.4%	97	37	12	146	72.4%
10 to 14	55	10	6	71	84.6%	55	11	5	71	83.3%	43	10	5	58	81.1%	67	14	6	87	82.7%	50	8	3	61	86.2%	270	53	25	348	83.6%
15	18	4	0	22	81.8%	11	5	3	19	68.8%	12	1	2	15	92.3%	16	1	0	17	94.1%	11	3	0	14	78.6%	68	14	5	87	82.9%
16	12	2	1	15	85.7%	17	4	1	22	81.0%	17	2	1	20	89.5%	16	4	1	21	80.0%	7	3	0	10	70.0%	69	15	4	88	82.1%
17	9	4	2	15	69.2%	15	4	0	19	78.9%	21	1	0	22	95.5%	12	4	1	17	75.0%	19	2	3	24	90.5%	76	15	6	97	83.5%
18	18	3	0	21	85.7%	13	3	1	17	81.3%	13	5	2	20	72.2%	22	4	1	27	84.6%	16	4	0	20	80.0%	82	19	4	105	81.2%
19	23	9	0	32	71.9%	17	9	1	27	65.4%	16	8	0	24	66.7%	17	2	0	19	89.5%	18	7	2	27	72.0%	91	35	3	129	72.2%
20	17	9	1	27	65.4%	17	4	0	21	81.0%	16	8	1	25	66.7%	25	14	3	42	64.1%	24	12	1	37	66.7%	99	47	6	152	67.8%
21 to 25	76	22	3	101	77.6%	78	14	3	95	84.8%	58	20	7	85	74.4%	78	18	6	102	81.3%	67	29	3	99	69.8%	357	103	22	482	77.6%
26 to 30	55	13	2	70	80.9%	39	10	2	51	79.6%	40	6	3	49	87.0%	49	8	3	60	86.0%	61	14	3	78	81.3%	244	51	13	308	82.7%
31 to 35	40	3	2	45	93.0%	24	8	5	37	75.0%	36	9	2	47	80.0%	30	8	5	43	78.9%	37	7	4	48	84.1%	167	35	18	220	82.7%
36 to 40	47	5	2	54	90.4%	28	2	3	33	93.3%	38	6	1	45	86.4%	28	3	0	31	90.3%	41	7	4	52	85.4%	182	23	10	215	88.8%
41 to 45	45	7	1	53	86.5%	37	7	2	46	84.1%	32	1	2	35	97.0%	48	4	2	54	92.3%	56	12	3	71	82.4%	218	31	10	259	87.6%
46 to 50	63	10	3	76	86.3%	30	4	4	38	88.2%	56	4	4	64	93.3%	57	11	4	72	83.8%	65	13	4	82	83.3%	271	42	19	332	86.6%
51 to 55	41	2	3	46	95.3%	40	6	1	47	87.0%	41	7	3	51	85.4%	45	8	2	55	84.9%	46	7	4	57	86.8%	213	30	13	256	87.7%
56 to 60	21	4	0	25	84.0%	19	2	0	21	90.5%	20	4	2	26	83.3%	27	4	1	32	87.1%	38	7	5	50	84.4%	125	21	8	154	85.6%
61 to 65	9	2	1	12	81.8%	8	2	0	10	80.0%	11	0	1	12	100.0%	14	1	1	16	93.3%	18	4	0	22	81.8%	60	9	3	72	87.0%
66 to 70	15	0	0	15	100.0%	6	1	0	7	85.7%	6	0	0	6	100.0%	8	1	0	9	88.9%	10	3	0	13	76.9%	45	5	0	50	90.0%
Over 70	4	0	0	4	100.0%	7	2	0	9	77.8%	9	0	1	10	100.0%	4	0	2	6	100.0%	10	0	0	10	100.0%	34	2	3	39	94.4%
Unknown	8	0	22	30	100.0%	8	0	18	26	100.0%	7	0	5	12	100.0%	13	3	6	22	81.3%	11	4	2	17	73.3%	47	7	53	107	87.0%
Total	***603***	***123***	***51***	***777***	***83.1%***	***492***	***103***	***52***	***647***	***82.7%***	***507***	***98***	***43***	***648***	***83.8%***	***596***	***117***	***48***	***761***	***83.6%***	***627***	***155***	***43***	***825***	***80.2%***	***2,825***	***596***	***237***	***3,658***	***82.6%***

(Source: Virginia Dept. of Motor Vehicles)



APPENDIX D

Bicycling Related Laws and Ordinances from the Code of Virginia

Section	Law (subsections and subdivisions where applicable)
§ 15.2-1720	Localities authorized to license bicycles, electric power-assisted bicycles, mopeds, and electric personal assistive mobility devices; disposition of unclaimed bicycles, electric power-assisted bicycles, mopeds, and electric personal assistive mobility devices. Any locality may, by ordinance, (i) provide for the public sale or donation to a charitable organization of any bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped that has been in the possession of the police or sheriff's department, unclaimed, for more than thirty days; (ii) require every resident owner of a bicycle, electric power-assisted bicycle, electric personal assistive mobility device, or moped to obtain a license therefor and a license plate, tag, or adhesive license decal of such design and material as the ordinance may prescribe, to be substantially attached to the bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped; (iii) prescribe the license fee, the license application forms and the license form; and (iv) prescribe penalties for operating a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped on public roads or streets within the locality without an attached license plate, tag, or adhesive decal. The ordinance shall require the license plates, tags, or adhesive decals to be provided by and at the cost of the locality. Any locality may provide that the license plates, tags, or adhesive decals shall be valid for the life of the bicycles, electric personal assistive mobility devices, electric power-assisted bicycles, and mopeds to which they are attached or for such other period as it may prescribe and may prescribe such fee therefor as it may deem reasonable. When any town license is required as provided for herein, the license shall be in lieu of any license required by any county ordinance. Any bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped found and delivered to the police or sheriff's department by a private person that thereafter remains unclaimed for thirty days after the final date of publication as required herein may be given to the finder; however, the location and description of the bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped shall be published at least once a week for two successive weeks in a newspaper of general circulation within the locality. In addition, if there is a license, tag, or adhesive license decal affixed to the bicycle, electric personal assistive mobility device, or electric power-assisted bicycle, or moped, the record owner shall be notified directly.
§ 46.2-800	Riding bicycles, electric personal assistive mobility devices, electric power-assisted bicycles, or mopeds; riding or driving animals. Every person riding a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, moped, or an animal or driving an animal on a highway shall be subject to the provisions of this chapter and shall have all of the rights and duties applicable to the driver of a vehicle, unless the context of the provision clearly indicates otherwise. The provisions of subsections A and C of § 46.2-920 applicable to operation of emergency vehicles under emergency conditions shall also apply, mutatis mutandis, to bicycles, electric personal assistive mobility devices, electric power-assisted bicycles, and mopeds operated under similar emergency conditions by law-enforcement officers.

Section	Law (subsections and subdivisions where applicable)
§ 46.2-802	Drive on right side of highways. Except as otherwise provided by law, on all highways of sufficient width, the driver of a vehicle shall drive on the right half of the highway, unless it is impracticable to travel on such side of the highway and except when overtaking and passing another vehicle, subject to the provisions applicable to overtaking and passing set forth in Article 4 (§46.2-837 et seq.) of this chapter.
§ 46.2-808	Commonwealth Transportation Board may prohibit certain uses of controlled access highways; penalty. A. The Commonwealth Transportation Board may, when necessary to promote safety, prohibit the use of controlled access highways or any part thereof by any or all of the following: 1. Pedestrians, 2. Persons riding bicycles, electric power-assisted bicycles, electric personal assistive mobility devices, or mopeds, 3. Animal-drawn vehicles, 4. Self-propelled machinery or equipment, and 5. Animals led, ridden or driven on the hoof. B. The termini of any section of controlled access highways, use of which is restricted under the provisions of this section, shall be clearly indicated by a conspicuous marker. C. This section shall not apply to any vehicle or equipment owned or controlled by the Virginia Department of Transportation, while actually engaged in the construction, reconstruction, or maintenance of highways or to any vehicle or equipment for which a permit has been obtained for operation on such highway. Any person violating a restriction or prohibition imposed pursuant to this section shall be guilty of a traffic infraction.
§ 46.2-826	Stop before entering public highway or sidewalk from private road, etc.; yielding right-of-way. The driver of a vehicle entering a public highway or sidewalk from a private road, driveway, alley, or building shall stop immediately before entering such highway or sidewalk and yield the right-of-way to vehicles approaching on such public highway and to pedestrians or vehicles approaching on such public sidewalk. The provisions of this section shall not apply at an intersection of public and private roads controlled by a traffic control device. At any such intersection, all movement of traffic into and through the intersection shall be controlled by the traffic control device.
§ 46.2-830	Uniform traffic control devices on highways; drivers to obey traffic control devices; enforcement of section. The Commissioner of Highways may classify, designate, and mark state highways and provide a uniform system of traffic control devices for such highways under the jurisdiction of the Commonwealth. Such system of traffic control devices shall correlate with and, so far as possible, conform to the system adopted in other states. All drivers of vehicles shall obey lawfully erected traffic control devices. No provision of this section relating to the prohibition of disobeying traffic control devices or violating local traffic control devices

Section	Law (subsections and subdivisions where applicable)
§ 46.2-830 (continued)	shall be enforced against an alleged violator if, at the time and place of the alleged violation, any such traffic control device is not in proper position and sufficiently legible to be seen by an ordinarily observant person.
§ 46.2-833	Traffic lights; penalty. A. Signals by traffic lights shall be as follows: - Steady red indicates that moving traffic shall stop and remain stopped as long as the red signal is shown, except in the direction indicated by a steady green arrow. - Green indicates the traffic shall move in the direction of the signal and remain in motion as long as the green signal is given, except that such traffic shall yield to other vehicles and pedestrians lawfully within the intersection. - Steady amber indicates that a change is about to be made in the direction of the moving of traffic. When the amber signal is shown, traffic which has not already entered the intersection, including the crosswalks, shall stop if it is not reasonably safe to continue, but traffic which has already entered the intersection shall continue to move until the intersection has been cleared. - Flashing circular red indicates that traffic shall stop before entering an intersection. Such traffic shall yield the right-of-way to pedestrian and vehicular traffic lawfully within the intersection. - Flashing red arrow indicates that traffic shall stop before entering an intersection. After stopping, traffic may cautiously enter the intersection to turn in the direction of the signal. Such traffic shall yield the right-of-way to pedestrian and vehicular traffic lawfully within the intersection. - Flashing circular amber indicates that traffic may proceed through the intersection or past such signal with reasonable care under the circumstances. Such traffic shall yield the right-of-way to pedestrian and vehicular traffic lawfully within the intersection. - Flashing amber arrow indicates that traffic may turn in the direction of such signal with reasonable care under the circumstances. Such traffic shall yield the right-of-way to pedestrian and vehicular traffic lawfully within the intersection. B. Notwithstanding any other provision of law, if a driver of a motorcycle or moped or a bicycle rider approaches an intersection that is controlled by a traffic light, the driver or rider may proceed through the intersection on a steady red light only if the driver or rider (i) comes to a full and complete stop at the intersection for two complete cycles of the traffic light or for two minutes, whichever is shorter, (ii) exercises due care as provided by law, (iii) otherwise treats the traffic control device as a stop sign, (iv) determines that it is safe to proceed, and (v) yields the right of way to the driver of any vehicle approaching on such other highway from either direction. C. If the traffic lights controlling an intersection are out of service because of a power failure or other event that prevents the giving of signals by the traffic lights, the drivers of vehicles approaching such an intersection shall proceed as though such intersection were controlled by a stop sign on all approaches. The provisions of this subsection shall not apply to: intersections controlled by portable stop signs, intersections with law-enforcement officers or other authorized persons directing traffic, or intersections controlled by traffic lights displaying flashing red or flashing amber lights as provided in subsection A. D. The driver of any motor vehicle may be detained or arrested for a violation of this section if the detaining law-enforcement officer is in uniform, displays his badge of authority, and (i) has observed the violation or (ii) has received a message by radio or other wireless telecommunication device from another law-enforcement officer who observed the violation. In the case of a person being detained or arrested based on a radio message, the message shall be sent immediately after the violation is observed, and the

Section	Law (subsections and subdivisions where applicable)
§ 46.2-833 (continued)	observing officer shall furnish the license number or other positive identification of the vehicle to the detaining officer. Violation of any provision of this section shall constitute a traffic infraction punishable by a fine of no more than $350.
§ 46.2-839	Passing bicycle, electric personal assistive mobility device, electric power-assisted bicycle, moped, animal, or animal-drawn vehicle. Any driver of any vehicle overtaking a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, moped, animal, or animal-drawn vehicle proceeding in the same direction shall pass at a reasonable speed at least two feet to the left of the overtaken bicycle, electric personal assistive mobility device, electric power-assisted bicycle, moped, animal, or animal-drawn vehicle and shall not again proceed to the right side of the highway until safely clear of such overtaken bicycle, electric personal assistive mobility device, electric power-assisted bicycle, moped, animal, or animal-drawn vehicle.
§ 46.2-846	Required position and method of turning at intersections; local regulations. A. Except where turning is prohibited, a driver intending to turn at an intersection or other location on any highway shall execute the turn as provided in this section. 1. Right turns: Both the approach for a right turn and a right turn shall be made as close as practicable to the right curb or edge of the roadway. 2. Left turns on two-way roadways: At any intersection where traffic is permitted to move in both directions on each roadway entering the intersection, an approach for a left turn shall be made from the right half of the roadway and as close as possible to the roadway's center line, passing to the right of the center line where it enters the intersection. After entering the intersection, the left turn shall be made so as to leave the intersection to the right of the center line of the roadway being entered. Whenever practicable, the left turn shall be made to the left of the center of the intersection. 3. Left turns on other than two-way roadways: At any intersection where traffic is restricted to one direction on one or more of the roadways, and at any crossover from one roadway of a divided highway to another roadway thereof on which traffic moves in the opposite direction, the driver intending to turn left at any such intersection or crossover shall approach the intersection or crossover in the extreme left lane lawfully available to traffic moving in the direction of travel of such vehicle and after entering the intersection or crossover the left turn shall be made so as to leave the intersection or crossover, as nearly as practicable, in the left lane lawfully available to traffic moving in such direction upon the roadway being entered. B. Local authorities having the power to regulate traffic in their respective jurisdictions may cause traffic control devices to be placed within or adjacent to intersections and thereby direct that a different course from that specified in this section be traveled by vehicles turning at any intersection. When traffic control devices are so placed, no driver shall turn a vehicle at an intersection other than as directed by such traffic control devices.
§ 46.2-847	Left turns by bicycles, electric personal assistive mobility devices, electric power-assisted bicycles, and mopeds. A person riding a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped and intending to turn left shall either follow a course described in § 46.2-846 or make the turn as provided in this section. A person riding a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped and intending to turn

Section	Law (subsections and subdivisions where applicable)
§ 46.2-847 (continued)	left shall approach the turn as close as practicable to the right curb or edge of the roadway. After proceeding across the intersecting roadway, the rider shall comply with traffic signs or signals and continue his turn as close as practicable to the right curb or edge of the roadway being entered. Notwithstanding the foregoing provisions of this section, the Commissioner of Highways and local authorities, in their respective jurisdictions, may cause official traffic control devices to be placed at intersections to direct that a specific course be traveled by turning bicycles, electric personal assistive mobility devices, electric power-assisted bicycles, and mopeds. When such devices are so placed, no person shall turn a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped other than as directed by such devices.
§ 46.2-848	Signals required on backing, stopping, or turning. Every driver who intends to back, stop, turn, or partly turn from a direct line shall first see that such movement can be made safely and, whenever the operation of any other vehicle may be affected by such movement, shall give the signals required in this article, plainly visible to the driver of such other vehicle, of his intention to make such movement.
§ 46.2-849	How signals given. A. Signals required by § 46.2-848 shall be given by means of the hand and arm or by some mechanical or electrical device approved by the Superintendent, in the manner specified in this section. Whenever the signal is given by means of the hand and arm, the driver shall indicate his intention to start, stop, turn, or partly turn by extending the hand and arm beyond the left side of the vehicle in the manner following: 1. For left turn or to pull to the left, the arm shall be extended in a horizontal position straight from and level with the shoulder; 2. For right turn or to pull to the right, the arm shall be extended upward; 3. For slowing down or stopping, the arm shall be extended downward. B. Wherever the lawful speed is more than 35 miles per hour, such signals shall be given continuously for a distance of at least 100 feet, and in all other cases at least 50 feet, before slowing down, stopping, turning, or partly turning. C. A person riding a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped shall signal his intention to stop or turn. Such signals, however, need not be given continuously if both hands are needed in the control or operation of the bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped. D. Notwithstanding the foregoing provisions of this section, a person operating a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped may signal a right turn or pull to the right by extending the right hand and arm in a horizontal position straight from and level with the shoulder beyond the right side of the bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped, and may signal slowing down or stopping by extending the right arm downward.
§ 46.2-894	Duty of driver to stop, etc., in event of accident involving injury or death or damage to attended property; penalty. The driver of any vehicle involved in an accident in which a person is killed or injured or in which an attended vehicle or other attended property is damaged shall immediately stop as close to the scene of the accident as possible without obstructing traffic, as

Section	Law (subsections and subdivisions where applicable)
§ 46.2-894 (continued)	provided in § 46.2-888, and report his name, address, driver's license number, and vehicle registration number forthwith to the State Police or local law-enforcement agency, to the person struck and injured if such person appears to be capable of understanding and retaining the information, or to the driver or some other occupant of the vehicle collided with or to the custodian of other damaged property. The driver shall also render reasonable assistance to any person injured in such accident, including taking such injured person to a physician, surgeon, or hospital if it is apparent that medical treatment is necessary or is requested by the injured person. Where, because of injuries sustained in the accident, the driver is prevented from complying with the foregoing provisions of this section, the driver shall, as soon as reasonably possible, make the required report to the State Police or local law-enforcement agency and make a reasonable effort to locate the person struck, or the driver or some other occupant of the vehicle collided with, or the custodian of the damaged property, and report to such person or persons his name, address, driver's license number, and vehicle registration number. Any person convicted of a violation of this section is guilty of (i) a Class 5 felony if the accident results in injury to or the death of any person, or if the accident results in more than $1000 of damage to property or (ii) a Class 1 misdemeanor if the accident results in damage of $1000 or less to property.
§ 46.2-895	Duty of certain persons accompanying driver to report accidents involving injury, death, or damage to attended property. If the driver fails to stop and make the report required by § 46.2-894, every person sixteen years of age or older in the vehicle with the driver at the time of the accident, who has knowledge of the accident, shall have a duty to ensure that a report is made within twenty-four hours from the time of the accident to the State Police or, if the accident occurs in a city or town, to the local law-enforcement agency. The report shall include his name, address, and such other information within his knowledge as the driver is required to report pursuant to § 46.2-894.
§ 46.2-896	Duties of driver in event of accident involving damage only to unattended property. The driver of any vehicle involved in an accident in which no person is killed or injured, but in which an unattended vehicle or other unattended property is damaged, shall make a reasonable effort to find the owner or custodian of such property and shall report to the owner or custodian the information which the driver is required to report pursuant to §46.2-894 if such owner or custodian is found. If the owner or custodian of such damaged vehicle or property cannot be found, the driver shall leave a note or other sufficient information including driver identification and contact information in a conspicuous place at the scene of the accident and shall report the accident in writing within 24 hours to the State Police or the local law-enforcement agency. Such note or other information and written report shall contain the information that the driver is required to report pursuant to § 46.2-894. The written report shall, in addition, state the date, time, and place of the accident and the driver's description of the property damage. Where, because of injuries sustained in the accident, the driver is prevented from complying with the foregoing provisions of this section, the driver shall, as soon as reasonably possible, make the required report to the State Police or local law-enforcement agency and make a reasonable effort to locate the owner or custodian of the unattended vehicle or property and report to him the information required by § 46.2-894.

Section	Law (subsections and subdivisions where applicable)
§ 46.2-903	Riding or driving vehicles other than bicycles, electric power-assisted bicycles, or electric personal assistive mobility devices on sidewalks. No person shall ride or drive any vehicle other than (i) an emergency vehicle, as defined in § 46.2-920, (ii) a vehicle engaged in snow or ice removal and control operations, (iii) a wheel chair or wheel chair conveyance, whether self-propelled or otherwise, (iv) a bicycle, (v) an electric personal assistive mobility device, or (vi) an electric power-assisted bicycle on the sidewalks of any county, city, or town of the Commonwealth.
§ 46.2-904	Use of roller skates and skateboards on sidewalks and shared-use paths; operation of bicycles, motorized skateboards or foot-scooters, motor-driven cycles, electric power-assisted bicycles, and electric personal assistive mobility devices on sidewalks and crosswalks and shared-use paths; local ordinances. The governing body of any county, city, or town may by ordinance prohibit the use of roller skates and skateboards and/or the riding of bicycles, electric personal assistive mobility devices, motorized skateboards or foot-scooters, motor-driven cycles, or electric power-assisted bicycles on designated sidewalks or crosswalks, including those of any church, school, recreational facility, or any business property open to the public where such activity is prohibited. Signs indicating such prohibition shall be conspicuously posted in general areas where use of roller skates and skateboards, and/or bicycle, electric personal assistive mobility devices, motorized skateboards or foot-scooters, motor-driven cycles, or electric power-assisted bicycle riding is prohibited. A person riding a bicycle, electric personal assistive mobility device, motorized skateboard or foot-scooter, motor-driven cycle, or an electric power-assisted bicycle on a sidewalk, shared-use path, or across a roadway on a crosswalk, shall yield the right-of-way to any pedestrian and shall give an audible signal before overtaking and passing any pedestrian. No person shall ride a bicycle, electric personal assistive mobility device, motorized skateboard or foot-scooter, motor-driven cycle, or an electric power-assisted bicycle on a sidewalk, or across a roadway on a crosswalk, where such use of bicycles, electric personal assistive mobility devices, motorized skateboards or foot-scooters, motor-driven cycles, or electric power-assisted bicycles is prohibited by official traffic control devices. A person riding a bicycle, electric personal assistive mobility device, motorized skateboard or foot-scooter, motor-driven cycle, or an electric power-assisted bicycle on a sidewalk, shared-use path, or across a roadway on a crosswalk, shall have all the rights and duties of a pedestrian under the same circumstances. A violation of any ordinance adopted pursuant to this section shall be punishable by a civil penalty of not more than $50.
§ 46.2-905	Riding bicycles, electric personal assistive mobility devices, electric power-assisted bicycles, and mopeds on roadways and bicycle paths. Any person operating a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped on a roadway at less than the normal speed of traffic at the time and place under conditions then existing shall ride as close as safely practicable to the right curb or edge of the roadway, except under any of the following circumstances: 1. When overtaking and passing another vehicle proceeding in the same direction;

Section	Law (subsections and subdivisions where applicable)
§ 46.2-905 (continued)	2. When preparing for a left turn at an intersection or into a private road or driveway; 3. When reasonably necessary to avoid conditions including, but not limited to, fixed or moving objects, parked or moving vehicles, pedestrians, animals, surface hazards, or substandard width lanes that make it unsafe to continue along the right curb or edge; 4. When avoiding riding in a lane that must turn or diverge to the right; and 5. When riding upon a one-way road or highway, a person may also ride as near the left-hand curb or edge of such roadway as safely practicable. For purposes of this section, a "substandard width lane" is a lane too narrow for a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, motorized skateboard or foot-scooter, or moped and another vehicle to pass safely side by side within the lane. Persons riding bicycles, electric personal assistive mobility devices, or electric power-assisted bicycles on a highway shall not ride more than two abreast. Persons riding two abreast shall not impede the normal and reasonable movement of traffic, shall move into a single file formation as quickly as is practicable when being overtaken from the rear by a faster moving vehicle, and, on a laned roadway, shall ride in a single lane. Notwithstanding any other provision of law to the contrary, the Department of Conservation and Recreation shall permit the operation of electric personal assistive mobility devices on any bicycle path or trail designated by the Department for such use.
§ 46.2-906	Carrying articles or passengers on bicycles, electric personal assistive mobility devices, electric power-assisted bicycles, and mopeds. No person operating a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped on a highway shall carry any package, bundle, or article that prevents the driver from keeping at least one hand on the handlebars. No bicycle or moped shall be used to carry more persons at one time than the number of persons for which it was designed or is equipped, except that an adult bicycle rider may carry a child less than six years old if such child is securely attached to the bicycle in a seat or trailer designed for carrying children.
§ 46.2-906.1	Local ordinances may require riders of bicycles, electric personal assistive mobility devices, and electric power-assisted bicycles to wear helmets. The governing body of any county, city or town may, by ordinance, provide that every person 14 years of age or younger shall wear a protective helmet that at least meets the Consumer Product Safety Commission standard whenever riding or being carried on a bicycle, an electric personal assistive mobility device, a toy vehicle, or an electric power-assisted bicycle on any highway as defined in § 46.2-100, sidewalk, or public bicycle path. Violation of any such ordinance shall be punishable by a fine of $25. However, such fine shall be suspended (i) for first-time violators and (ii) for violators who, subsequent to the violation but prior to imposition of the fine, purchase helmets of the type required by the ordinance. Violation of any such ordinance shall not constitute negligence, or assumption of risk, be considered in mitigation of damages of whatever nature, be admissible in evidence, or be the subject of comment by counsel in any action for the recovery of damages arising out of the operation of any bicycle, electric personal assistive mobility device, toy vehicle, or electric power-assisted bicycle, nor shall.

Section	Law (subsections and subdivisions where applicable)
§ 46.2-906.1 (continued)	anything in this section change any existing law, rule, or procedure pertaining to any civil action.
§ 46.2-907	Overtaking and passing vehicles. A person riding a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, motorized skateboard or foot-scooter, or moped may overtake and pass another vehicle on either the left or right side, staying in the same lane as the overtaken vehicle, or changing to a different lane, or riding off the roadway as necessary to pass with safety. A person riding a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, motorized skateboard or foot-scooter, or moped may overtake and pass another vehicle only under conditions that permit the movement to be made with safety. A person riding a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, motorized skateboard or foot-scooter, or moped shall not travel between two lanes of traffic moving in the same direction, except where one lane is a separate turn lane or a mandatory turn lane. Except as otherwise provided in this section, a person riding a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, motorized skateboard or foot-scooter, or moped shall comply with all rules applicable to the driver of a motor vehicle when overtaking and passing.
§ 46.2-908	Registration of bicycle, electric personal assistive mobility device, and electric power-assisted bicycle serial numbers. Any person who owns a bicycle, electric personal assistive mobility device, or electric power-assisted bicycle may register its serial number with the local law-enforcement agency of the political subdivision in which such person resides.
§ 46.2-924	Drivers to stop for pedestrians; installation of certain signs; penalty. A. The driver of any vehicle on a highway shall yield the right-of-way to any pedestrian crossing such highway: 1. At any clearly marked crosswalk, whether at mid-block or at the end of any block; 2. At any regular pedestrian crossing included in the prolongation of the lateral boundary lines of the adjacent sidewalk at the end of a block; 3. At any intersection when the driver is approaching on a highway or street where the legal maximum speed does not exceed 35 miles per hour. B. Notwithstanding the provisions of subsection A, at intersections or crosswalks where the movement of traffic is being regulated by law-enforcement officers or traffic control devices, the driver shall yield according to the direction of the law-enforcement officer or device. No pedestrian shall enter or cross an intersection in disregard of approaching traffic. The drivers of vehicles entering, crossing, or turning at intersections shall change their course, slow down, or stop if necessary to permit pedestrians to cross such intersections safely and expeditiously.

Section	Law (subsections and subdivisions where applicable)
§ 46.2-924 (continued)	Pedestrians crossing highways at intersections shall at all times have the right-of-way over vehicles making turns into the highways being crossed by the pedestrians. C. The governing body of Arlington County, Fairfax County, Loudoun County and any town therein, the City of Alexandria, the City of Fairfax, and the City of Falls Church may by ordinance provide for the installation and maintenance of highway signs at marked crosswalks specifically requiring operators of motor vehicles, at the locations where such signs are installed, to yield the right-of-way to pedestrians crossing or attempting to cross the highway. Any operator of a motor vehicle who fails at such locations to yield the right-of-way to pedestrians as required by such signs shall be guilty of a traffic infraction punishable by a fine of no less than $100 or more than $500. The Department of Transportation shall develop criteria for the design, location, and installation of such signs. The provisions of this section shall not apply to any limited access highway. D. Where a shared-use path crosses a highway at a clearly marked crosswalk and there are no traffic control signals at such crossing, the local governing body may by ordinance require pedestrians, cyclists, and any other users of such shared-used path to come to a complete stop prior to entering such crosswalk. Such local ordinance may provide for a fine not to exceed $100 for violations. Any locality adopting such an ordinance shall install and maintain stop signs, consistent with standards adopted by the Commonwealth Transportation Board and to the extent necessary in coordination with the Department of Transportation. At such crosswalks, no user of such shared-use path shall enter the crosswalk in disregard of approaching traffic. E. A locality adopting an ordinance under subsection D shall coordinate the enforcement and placement of any stop signs affecting a shared-use path owned and operated by a park authority formed under Chapter 57 (§ 15.2-5700 et seq.) of Title 15.2 with such authority.
§ 46.2-932	Playing on highways; use of toy vehicle on highways, persons riding bicycles, electric personal assistive mobility devices, electric power-assisted bicycles, mopeds, etc., not to attach to vehicles; exception. A. No person shall play on a highway, other than on the sidewalks thereof, within a city or town or on any part of a highway outside the limits of a city or town designated by the Commissioner of Highways exclusively for vehicular travel. No person shall use any toy vehicle on the roadway of any highway that (i) has a speed limit greater than 25 miles per hour, (ii) has more than two travel lanes, or (iii) is located outside a residence district as defined in § 46.2-100. The governing bodies of counties, cities, and towns may designate areas on highways under their control where play is permitted and may impose reasonable restrictions on play on such highways. Persons using such devices, except bicycles, electric personal assistive mobility devices, electric power-assisted bicycles, mopeds, and motorcycles, shall keep as near as safely practicable to the far right side or edge of the right traffic lane so that they will be proceeding in the same direction as other traffic. No person riding on any bicycle, electric personal assistive mobility device, electric power-assisted bicycle, moped, roller skates, skateboards or other devices on wheels or runners, shall attach the same or himself to any vehicle on a highway. B. Notwithstanding the provisions of subsection A of this section, the governing body of Arlington County may by ordinance permit the use of devices on wheels or runners on highways under such county's control, subject to such limitations and conditions as the governing body may deem necessary and reasonable.

Section	Law (subsections and subdivisions where applicable)
§ 46.2-1015	Lights on bicycles, electric personal assistive mobility devices, electric power-assisted bicycles, and mopeds. A. Every bicycle, electric personal assistive mobility device, electric power-assisted bicycle, and moped when in use between sunset and sunrise shall be equipped with a headlight on the front emitting a white light visible in clear weather from a distance of at least 500 feet to the front and a red reflector visible from a distance of at least 600 feet to the rear when directly in front of lawful lower beams of headlights on a motor vehicle. Such lights and reflector shall be of types approved by the Superintendent. In addition to the foregoing provisions of this section, a bicycle or its rider may be equipped with lights or reflectors. These lights may be steady burning or blinking. B. Every bicycle, or its rider, shall be equipped with a taillight on the rear emitting a red light plainly visible in clear weather from a distance of at least 500 feet to the rear when in use between sunset and sunrise and operating on any highway with a speed limit of 35 mph or greater. Any such taillight shall be of a type approved by the Superintendent.
§ 46.2-1066	Brakes. Every motor vehicle when driven on a highway shall be equipped with brakes adequate to control the movements of and to stop and hold such vehicle. The brakes shall be maintained in good working order and shall conform to the provisions of this article. Every bicycle, electric power-assisted bicycle, and moped, when operated on a highway, shall be equipped with a brake that will enable the operator to make the braked wheels skid on dry, level, clean pavement. Every electric personal assistive mobility device, when operated on a highway, shall be equipped with a system that, when activated or engaged, will enable the operator to bring the device to a controlled stop.
§ 46.2-1078	Unlawful to operate motor vehicle, bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped while using earphones. It shall be unlawful for any person to operate a motor vehicle, bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped on the highways in the Commonwealth while using earphones on or in both ears. For the purpose of this section, "earphones" shall mean any device worn on or in both ears that converts electrical energy to sound waves or which impairs or hinders the person's ability to hear, but shall not include (i) any prosthetic device that aids the hard of hearing, (ii) earphones installed in helmets worn by motorcycle operators and riders and used as part of a communications system, or (iii) nonprosthetic, closed-ear, open-back, electronic noise-cancellation devices designed and used to enhance the hearing ability of persons who operate vehicles in high-noise environments, provided any such device is being worn by the operator of a vehicle with a gross vehicle weight rating of 26,000 pounds or more. The provisions of this section shall not apply to the driver of any emergency vehicle as defined in §46.2-920.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