



BikePedRVA 2045 (Draft)

Introduction

The Richmond Regional Transportation Planning Organization is leading an update of the Bicycle and Pedestrian Plan in conjunction with the update to the long-range transportation plan, ConnectRVA 2045. This tool serves as a resource for the Active Transportation Steering Committee as well as residents of the Richmond Region and will be continuously developed along with updates to the long-range transportation plan.

This story map should be considered a draft and, as such, any information is subject to change prior to the adoption of the final bicycle and pedestrian plan. Upon plan adoption, this story map will serve as an interactive executive summary.



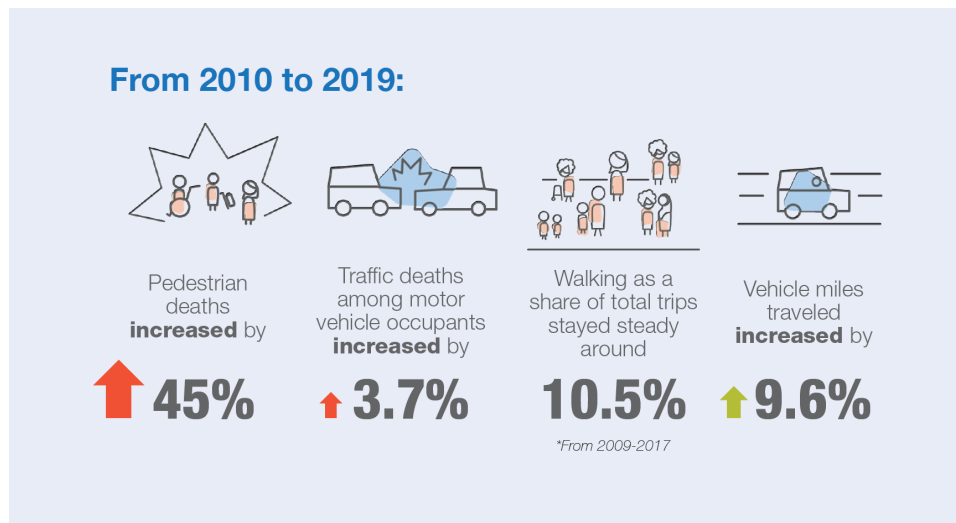
Phases of the Planning Process

The focus of *BikePedRVA 2045* is on building a cross-regional network interconnected and supported by local level projects for sidewalks, neighborhood connectors, bikeable streets, complete streets elements that altogether create more complete systems for moving people on foot, bike, or to transit connections safely.

The recognition of equity and climate needs grounded and guided the development of this plan, details of which will be expanded on more in the description of the process, vision, goals, objectives, and planning framework. In summary, investments in road safety often coincide with social and environmental justice goals. This makes a strong regional active transportation network with broad access a strategy with multiple benefits in economics, health, climate, equity, safety, and community building.

Safe Streets

Pedestrian fatalities have been steadily increasing nationwide. In fact, the number of people struck and killed each year in the U.S. has grown by 45 percent between 2010 to 2019 according to the [Dangerous by Design 2021](#) report by Smart Growth America. Drivers struck and killed 53,435 people who were walking on streets nationwide over that decade, more than 17 people per day.



Several factors of note have contributed to the increased fatality rate among pedestrians over the past decade:

- More people are **driving trucks and SUVs** which are two to three times more likely than smaller personal vehicles to kill vulnerable road users in the event of a crash.
- Safety targets that would aggressively address the reduction of serious injuries and fatalities of pedestrians have been ignored by many states—not including Virginia.
- Designing roads for **high(er) speeds** dramatically increases the likelihood that a person struck while walking will be killed. Studies have shown that good design leads to better driving behavior, fewer mistakes and mistakes with less deadly impact.
- Federal safety measures of automobiles do not measure or take into account the safety of people outside the vehicle.

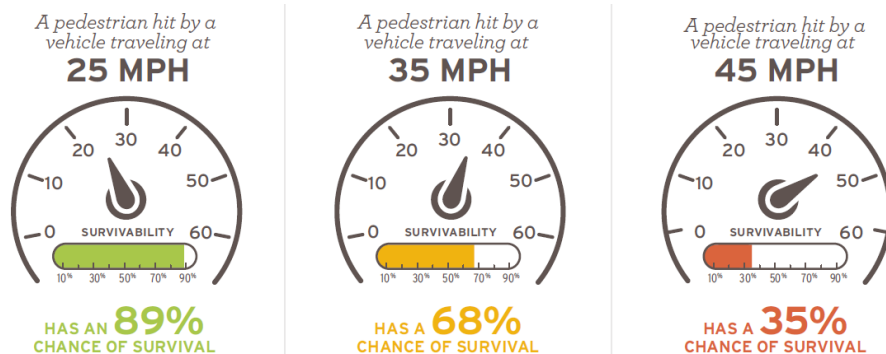


Visual cues supported by road design and geometry contribute to safer pedestrian environments.

During the pandemic, traffic volumes and vehicle miles travelled (VMT) decreased. However, data from the National Highway Traffic Safety Administration (NHTSA) indicates that from April-June 2020, the pedestrian fatality rate increased by 32 percent to its highest level in 15 years. This is during a time that the overall driving rate decreased by 26 percent. The study found that speeding went up due to more available road space. Proactively designing more streets for slower speeds may have helped prevent such an increase.

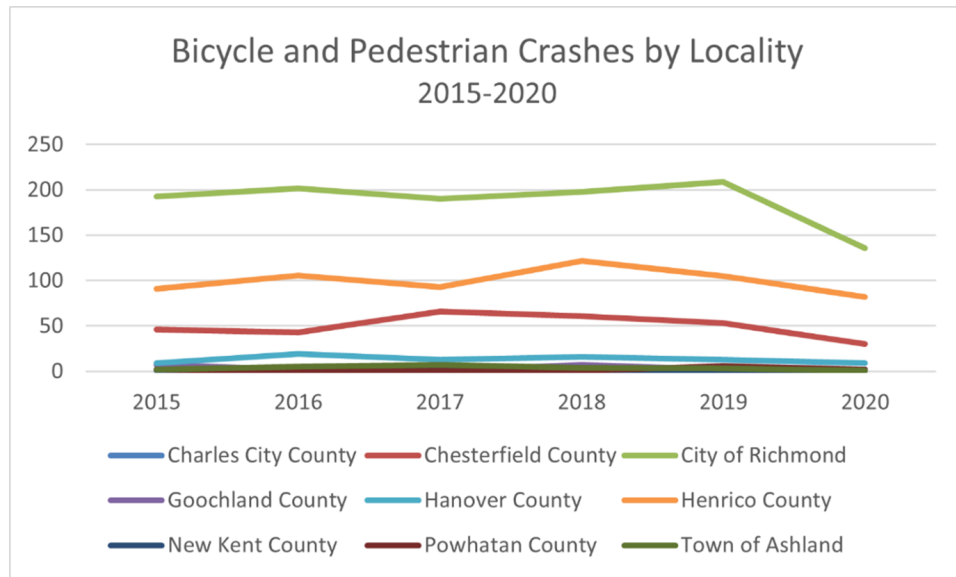
From April-June 2020, the pedestrian fatality rate [in the U.S.] increased by 32 percent to its highest level in 15 years.

Speed is a culprit in all fatal crashes. However, it is a tricky factor to control motorists are often deceived by how fast they are traveling due to high road design speeds. Most drivers can relate to the reality of driving along a particular stretch of road and looking at the speedometer only to realize that you are inadvertently going 5–10 mph over the limit. This is a common occurrence that is helped by overly wide roads, a high number of lanes, and clear sightlines that encourage speed and throughput. But that 5–10 mph difference is often the difference between life and death for a person who is struck by a moving vehicle. When a vehicle reaches 58 mph, studies show that a pedestrian has only a 10% chance of survival when hit.

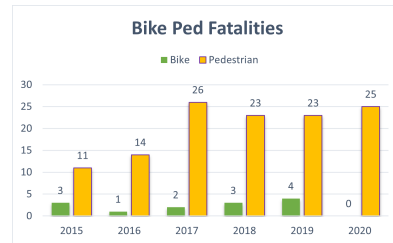


Smart Growth America (SGA) calculates a “Pedestrian Danger Index” (PDI) by state or metro area based on the number of people killed by drivers while walking, normalized by the universe of state population residing in a metro area and prevalence of walkers for all trips and to work. Since their earlier report of 2008-2017, the 2021 report found increased PDI scores in 49 of 50 states and 84 of the top 100 metros. Virginia is ranked 25th among the 50 states and Washington DC with 1.3 fatalities per 100,000 population and a 45.2 PDI (compared to Florida with the highest 201.4 PDI and Vermont at the lower end with 15.2 PDI). Of concern, is the increase from 2019 to 2021 of 1.9 fatalities per 100,000 population. The Richmond MSA is in the middle of the ranking among the top 100 metro areas at #47 with an 89.4 PDI, or a 12.2 percent increase over the decade.

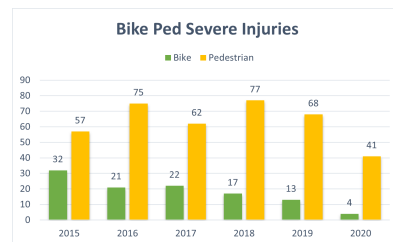
Focused attention on communities with EJ population concentrations is vitally important because they are shown to be most vulnerable to pedestrian injury and fatalities resulting from vehicular crashes. SGA found that low-income households are subjected to poorly designed pedestrian infrastructure or none at all. They are also significantly less likely to have access to a vehicle or live where they can reach daily needs safely and affordably outside a car. Older adults—often people of color—walking in low-income communities continue to be disproportionately represented in fatal pedestrian crashes.



In this region, most vehicular crashes from 2015 to 2020 involving a bicyclist or pedestrian have occurred in the urbanized area. One-half of these crashes occurred in the City of Richmond, followed by Henrico and Chesterfield counties. The trend for serious injuries is downward for the region, except for Hanover County where crashes with serious injury to a bicyclist or pedestrian increased by 50 percent. Bicycle and pedestrian fatalities in the City of Richmond have decreased by 100 percent while they have increased in every other locality. Henrico has seen a 250 percent increase in bicyclist or pedestrian fatalities in the last five years.

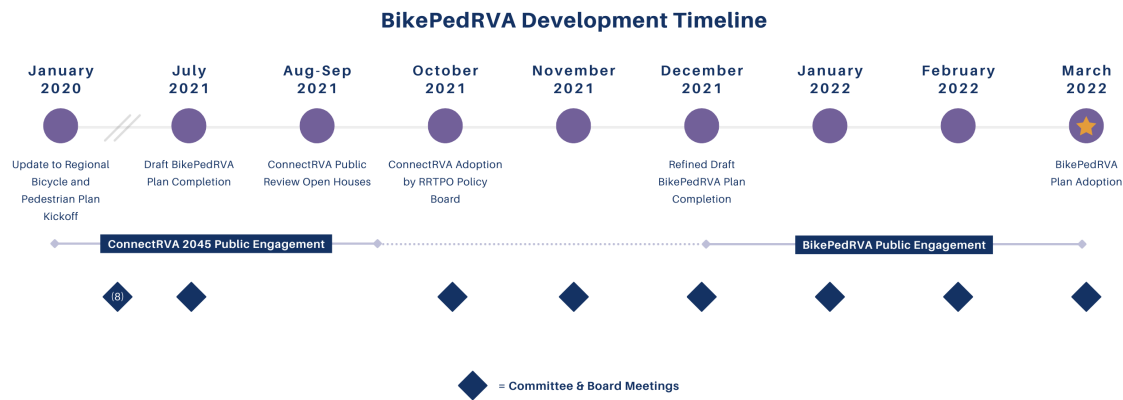


Over the past five years, serious injuries resulting from crashes among all modes in the region have declined by nearly 27 percent, dropping from the high of 729 in 2015 to 533 in 2020. For bicycle/pedestrian non-motorized modes, the decline in serious injuries has been even greater with a nearly 50 percent decrease. However, while fatalities in all modes



started to drop in 2016, the five-year change has resulted in a 20 percent increase in fatalities from 80 in 2015 to 96 in 2020. Bicycle and pedestrian fatalities have increased more than 78 percent rising from 14 in 2015 to 25 in 2020. The good news is that the City of Richmond recorded zero fatal crashes for bicyclists in 2020, which is a positive outcome but not yet indicative of an overall trend.

Process



Engaging

Steering Committee

A steering committee representing the region’s localities, transportation agencies and active transportation advocates was established to work with the PlanRVA staff to guide the process for *BikePedRVA 2045*. Since January 2020, the steering committee has regularly met to discuss major issues and needs and to develop an inventory of existing and proposed infrastructure that depicts projects at different levels of scale, duration, or complexity.

Public Engagement

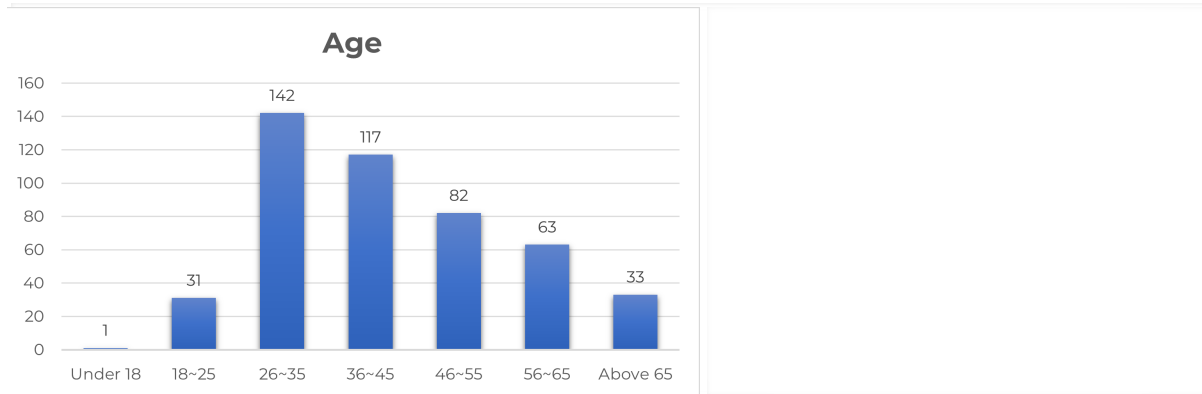
Public input has been solicited as part of

The public engagement process for ConnectRVA2045 began with the posting on March 12, 2020 of an ArcGIS map inviting public comment on transportation issues and providing the opportunity to note locations and specifics on the map.



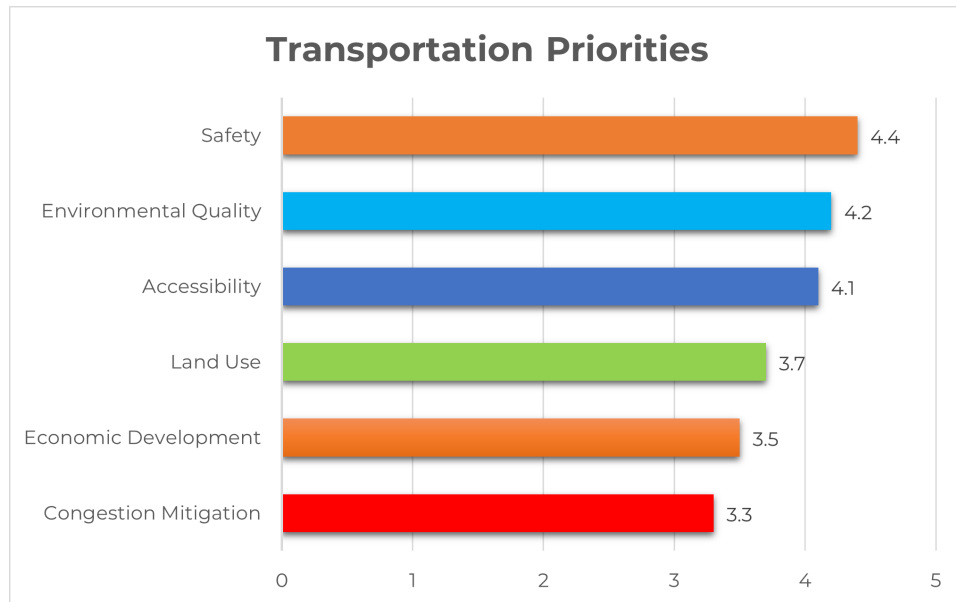
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representing the balance. The median age of the respondents was 41 years old and average commute was 15.4 miles.



Demographic information from the ConnectRVA 2045 Goals and Priorities survey

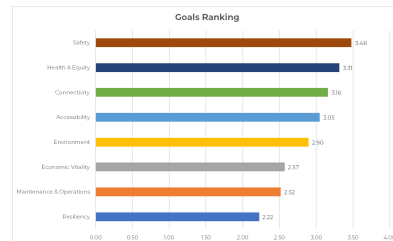
Of the six different priority areas, **safety** ranked the highest with bike/ped—transit and safer routes to schools being the most frequently mentioned. **Environmental quality** with protection of natural resources cited as being the most important within this category. **Accessibility** with a focus on sidewalks and bikeways, access for those with disabilities, better connections between transit options, and improved options for low-income and communities of color all equally weighted. **Land use** measured by priority on coordination between land use and transportation and creating walkable neighborhoods received the next highest attention. **Economic development** expressed in terms of connection of workers with jobs, local businesses, and improved quality of life was ranked sixth and **congestion mitigation** was the lowest priority with more respondents calling for attention to road maintenance and reduced travel time.



Priorities ranked by the public from the second ConnectRVA 2045 survey

The third public survey was posted from August 15 to October 11, 2020 and received 949 responses. Respondents to this survey were once again predominantly from the metro area, but also included a greater proportion of responses from Powhatan County than the first survey. The highest cohort of respondents was from the 31-40 age bracket. Race and ethnicity of the respondents were not as representative of the region's population composition with 82 percent of the respondents identifying as "White Caucasian," seven percent as "Black or African American," and only four percent as "Hispanic or Latino."

As in the first survey, goal selection was not mutually exclusive allowing multiple goals to be ranked by respondents equally. The range from the lowest category of "resiliency" to the highest of "safety" was only 1.26 points. With a high of 3.48 out of 4.0, the most mentioned area of strategic emphasis within the Safety category was "evacuation routes." Health and Equity at 3.31 called for "public input" and focus on "Environmental." Connectivity at



Goals ranked by the public in the third ConnectRVA 2045 survey

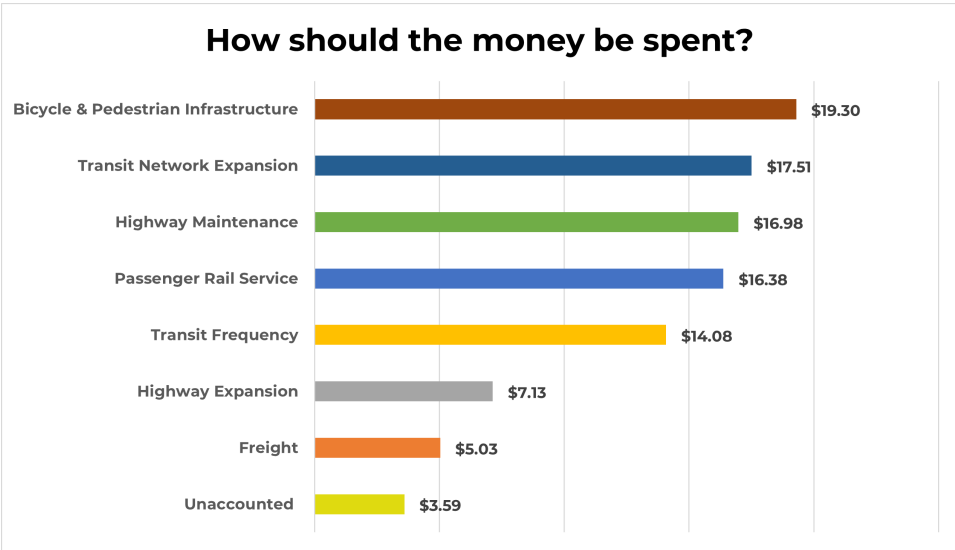
3.16 garnered the most interest in making “transit stops convenient,” and strategies for better bike/pedestrian access and walkability factored highly in this category. Accessibility rated at 3.05 (out of 4.0) suggested a focus on “community-based programs.”

A helpful aspect of the second survey was an open-ended question asking respondents to craft their own Vision Statement for regional transportation. A total of 265 respondents provided their answers which helped guide the Long-Range Transportation Plan Advisory Committee as well as the *BikePedRVA 2045* steering committee in devising the draft Vision Statement for discussion and input by committee members. The top word choices within their responses confirmed the priorities expressed through the survey questions are particularly illuminating.

A fourth public survey asked participants, “how should our region spend transportation funds?” This survey was directly distributed to 454 individuals serving on all RRTPO committees and interested parties. Community groups, advocates, localities and partners of the RRTPO also posted the survey on their own web sites. A total of 278 people participated in the survey which was open from April 16 to May 14, 2021.

A very similar group of respondents participated in this survey as the previous one. The highest by age were in the 30-39 age bracket, closely followed by those over 60. Race and ethnicity of the respondents were not as representative of the region’s population composition with 83 percent of the respondents identifying as “White Caucasian”, six percent as “Black or African American” and only four percent as “Hispanic or Latino”. In sum, the representation of respondents to this survey indicates a need to broaden opportunities in the future through our partners for greater,

more representative participation both demographically and geographically.



Respondents' priority rankings of transportation projects based on an hypothetical allocation of \$100

Many suggestions were made about public engagement which will be considered once opportunities for direct public engagement are opened, including meeting directly with stakeholders and those affected, attending festivals and farmers markets, and council or supervisor district meetings.

Definitions

The terms “bicycle” and “pedestrian” are synonymous with “active transportation” and includes people who walk, bike, roll, scoot, or use another human-powered or assisted mobility device. The classifications used both in BikePedRVA 2045 and the companion online story map (link) are primarily derived from the National Association of City Transportation Officials (NACTO) with additional language from the American Association of State Highway and Transportation Officials (AASHTO) and the Virginia Department of Transportation (VDOT).

This plan is centered around the evolving best practices of

bikeway development that are observable through examples in both in the United States and internationally. These conditions emphasize separation from motor vehicle traffic and enhanced use of low stress routes for cyclists and pedestrians in shared environments.

Active transportation infrastructure referenced in this plan includes public sidewalks and shared-use paths, as well as the continuum of bikeway facilities including four basic types of routes. These include a variety of facility subtypes, but for the purposes of generalizing infrastructure at a regional level, the simplified characterization detailed below was adopted. These terms are used to classify both existing infrastructure as well as future and proposed routes.

Shared Use Path

"Facilities physically separated from motorized vehicular traffic by an open space (buffer) or barrier and either within the highway ROW or within an independent ROW" (VDOT).

Photo: Virginia Capital Trail

Cycle Track

"An exclusive bike facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bike lane" (NACTO).

*Photo: 1st Street,
Richmond*

Bike Lane

"A portion of the roadway that has been designated by striping, signage, and pavement markings for the preferential or exclusive use of bicyclists" (NACTO).

*Photo: Thamesford
Way, Henrico*

Mixed Traffic

"Streets with low motorized traffic volumes and speeds, designated and designed to give bicycle travel priority" (NACTO).

Photo: Floyd Avenue, Richmond

Connector Path

Photo: Framar Drive, Chesterfield

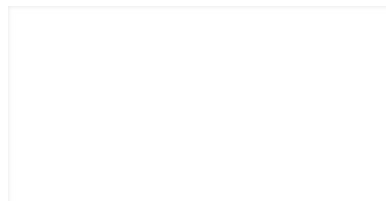
Certain facilities are appropriate in varying contexts across the urban, suburban, and rural areas of the region. As shown on Exhibit #, the volume of vehicular traffic and posted speed limits of the roadway system serve to define the context in which a bikeway facility is located, particularly from a safety standpoint. Consideration for design standards and detailed specifications for bicycle and pedestrian facilities is a central objective of this plan leading to greater regional understanding and common acceptance for future planning and design. Minimum standards are often set to guide funding as bicycle and pedestrian “accommodations” for road improvement projects to meet VDOT policy. The policy analysis section of this document addresses the parameters of these strategies. The plan explores higher standards for safety and elevation of walking and biking as safe travel choices through better practices found in the Richmond region and other regions that can offer a more complete transportation network capable of serving more people for active use.

Shared lane markings (also called “sharrows”) are used in many of the region’s localities to remind motorists they are in a lane used by non-motorized vehicles, but the designation does not serve as bicycle infrastructure or a bikeway in itself. Sharrows are appropriate when used for wayfinding along bicycle networks where current gaps exist. Sharrow locations are not specified on the inventory mapping for this plan, unless part of a designated national, regional, or local route.

Another alternative is available in areas of mixed traffic. In areas where traffic volume is slightly higher than a typical local street and space is not available for a conventional bike lane, “advisory shoulders” or “advisory bike lanes” can be used to designate space for cyclists and establish a street as a shared roadway. In this treatment, white dashed lanes are used to signify defined space for bikes on the edges of the roadway, with an unmarked and undivided space for motor vehicles in the center. Motor vehicles travel bi-

directionally in the middle of the road and shift into the advisory lane when meeting oncoming traffic. When the lane is occupied by a cyclist or pedestrian, the motor vehicle yields until safe to pass. No advisory shoulders are currently used in the region, although Richmond has explored them as an option. Advisory shoulders are appropriate in a wide range of treatments, from more active residential streets to lower-speed rural roads.

Building better walking infrastructure from a regional perspective means encouraging (and funding) sidewalk construction in the region where residential, employment and service-based



Pedestrian Hybrid Beacon on Grove Avenue in Richmond

uses coexist. This usually equates to building sidewalks on all arterial, collector, and most local roads. However, this does not mean that building the same type of sidewalk in every context is appropriate. In many areas like neighborhood streets with little traffic, sidewalks 5 feet in width might be adequate, whereas at least 10-12 feet is often needed in more active settings or in urban areas where space needs to be reserved for street trees, benches, outdoor dining, passersby, and transit stops or stations. In some rural or suburban areas, an advisory shoulder or related treatment may be appropriate in lieu of a traditional sidewalk. Sidewalks are only useful if they can be fully used by all types of users, including people with wheelchairs, strollers, and other mobility devices that require wider clearance. An effective sidewalk network goes beyond the sidewalk itself and requires comfort and safety considerations for ADA curb ramps, height clearance under trees, crosswalks, safety islands, intersections, and signalized crossings where appropriate.

Vision

Over a series of Steering Committee meetings, PlanRVA staff led a discussion centered around the untapped value of investing in Active Transportation as a mode for transportation and not merely for recreational use. Part of the challenge is to address active transportation in the context of planning for the full range of transportation needs over the long-term to serve the region's population. The ConnectRVA 2045 process provides guidance in the form of Project Inclusion Guidelines ([link](#)) which set essential objectives for individual project types to meet to be considered as contributing to the regional transportation network now and into the long-term future.

Projects on segregated lanes within dedicated rights-of-way

Projects of independent utility that are part of a larger multi-jurisdiction network or significantly contribute to filling identified gaps in an existing bike/ped network

Projects that directly connect and support the existing transit service

Eligible active transportation projects

Being qualified as an eligible project through the long-range plan requires a level of project detail for individual project scoring relative to all the proposed projects for all modes to be considered in the 'constrained plan' list. The constrained plan is intended to only include regional projects for which a budget including all funds are identified from all sources of revenue for transportation projects.

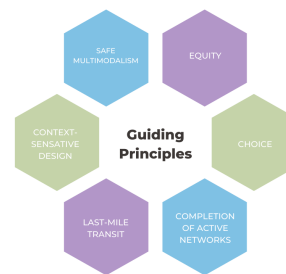
Additional projects beyond those in the constrained project list are included in the BikePedRVA plan because they contribute directly to accomplishing one or more of the following guiding principles, meet the related goals and objectives, or can potentially fill a vital network connection identified by this plan. Such projects may not be included in the constrained plan because they are local in nature at this point of the process or are not yet formulated with a defined route and/or cost estimate.

Some of these projects will be undertaken with local funds or through private development agreements but contribute to the completion of the regional network envisioned by this plan or fill a vital gap to connect two or more local projects.

Guiding principles

Working within the framework of *ConnectRVA 2045*, six principles were approved by the Bicycle-Pedestrian Steering Committee to guide this process. These guiding principles support the following vision for the plan.

1. **Provide a safe, multi-modal regional transportation system** recognizing that vehicle speed and conflict between modes lead to higher roadway injury and fatality rates.



Guiding principles for BikePedRVA 2045

2. **Build Equity** into all transportation planning and spending in the region with focus on connecting historically disregarded communities to employment and services.
3. **Ensure choice among all travel options** (walk, bike, transit, automobile) region-wide.
4. **Prioritize completion of regional bicycle & pedestrian networks** for individual and community health.
5. **Make last-mile transit access a priority** for a more resilient transportation system.
6. **Incorporate context sensitive design** of all facilities to reduce conflicts and enhance sustainable communities.

Vision

The Richmond Region provides **mobility**
for people of all ages and abilities

through a safe, continuous, recognizable, and intuitive pedestrian and bicycle network. Efforts to make walking and biking a safe travel mode are well-integrated into all regional and local comprehensive and related plans, implementing ordinances and guidelines to equitably enhance the quality of life, strengthen local economies, and preserve the natural environment.

The guiding principles and vision taken together help to establish specific goals, objectives, and corresponding performance measures as part of *BikePedRVA 2045*.

Goals



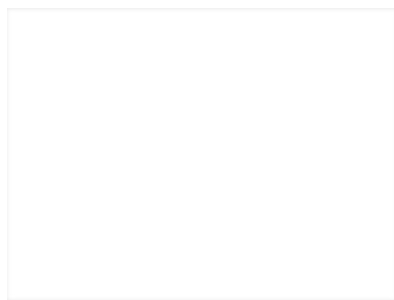
Goals of BikePedRVA 2045

Benefits

Public investments in bicycle and pedestrian infrastructure benefit the local economy, public health, climate, equity, and strengthens communities. The benefits that follow investment in sidewalks and bicycle facilities are so clearly documented that local governments can be assured of a healthy return in terms of revenue and quality of life. Facilities for walking and bicycling pay for themselves through more optimal land use and location efficient communities— areas that "require less time, money, and greenhouse gas emissions for residents to meet their everyday travel requirements." How we measure the effectiveness of these investments is vitally important to successful implementation of the *BikePedRVA 2045* plan through continued reinvestment as project priorities are set and funding decisions are made in the future.

Beyond safety, making communities more walking-, bicycling-, and transit-friendly also frequently promotes economic development and tourism. There is a growing market demand nationwide for vibrant, walkable neighborhoods with a variety of transportation options, with employers around the country responding by moving to downtowns and walkable districts to attract and retain talent. These trends are visible not just in Richmond's Downtown but can also be seen in newer development patterns in places like Libbie Mill, Innsbrook, the Village of Midlothian, and Chester.

Economy



Restaurant along the Virginia Capital Trail

Communities that invest in walking and biking benefit from higher property values, better talent attraction, and boosts in retail sales as a result of more active and accessible commercial areas. Evidence shows that walking and cycling infrastructure

projects create more jobs than roadway projects, with cycling

infrastructure providing double the return than driving infrastructure. One New York study pointed to evidence that a modest biking investment of \$10 million led to roughly \$230 million in net societal benefit— a staggering 2200% return on investment. In the Richmond region, a 2019 report showed that the Virginia Capital Trail contributed almost \$9 million in just economic activity in one year alone.

Cost of construction and maintenance of active transportation facilities represents approximately three percent of the total funding devoted to the construction and maintenance of the regional transportation system. Walkable and bikeable communities provide higher tax revenue per acre and encourage transportation that does not contribute to economic costs associated with congestion, road-wear, collisions, injury, and death. Evidence points to walking and cycling being a net-positive for municipal budgets, as opposed to driving. The benefits of cycling for transpiration are so strong that a significant increase in cycling can even positively affect non-cyclists by promoting better health through reduced exposure to pollution.

Health

By its very nature, active transportation provides significantly more health benefits than does automobile use. Regular walking and biking offer an escape from the sedentary lifestyle that communities built around automobiles provide. One major study found that people biking to work had roughly half the chance of dying prematurely, developing heart disease, or developing cancer. Contributing to better walking, bicycling facilities provides direct health benefits to the user in the form of safety while providing wide-reaching public health benefits.

Exposure to pollutants from motor vehicles is linked to pediatric asthma cases, an issue that disproportionately affects those of lower economic standing, who will continue to

see disparate effects as we make the slow transition to clean renewable energy.

Physical inactivity has a direct impact on the quantity and quality of our years on Earth, accounting for approximately 3.2 million deaths annually and the loss of over 69 million disability-adjusted life years (DALYs). Dense motor traffic and the absence of parks and sidewalks are specific examples that can discourage outdoor activity. By designing our transportation networks to encourage physical activity and the joyful experience of daily travel, we can encourage healthy practices from a young age and cultivate a healthy physical environment for all stages of life.

Introducing active travel at a young age is a simple, cost-effective, and widely recognized method to improve childhood health and is the general idea behind programs like Safe Routes to School Partnerships. Benefits like place attachment, environmental literacy, and community belonging can also be established at an early age through neighborhood walking and cycling.

Stronger walking and biking networks, with a focus on separated facilities can help eliminate walking and bicycling deaths caused by car crashes. Investing in stronger walking and biking networks fosters an increase in usage, which leads to a "strength in numbers effect" and lowers the rate of injury on walkways and bikeways. This makes walking and biking infrastructure a sound public health investment that can provide significant health care savings. Finally, active transportation helps reduce negative health effects from vehicle emissions, which have been shown to be the leading cause of over 200,000 annual premature deaths in the United States.

Climate



Driving is the largest average



*Deer spotted along Gambles Mill
Corridor*

contributor to an individual's carbon footprint and comes with a host of negative externalities on local environments. When we build auto-dependent communities we are encouraging damaging

developmental patterns to continue at a time when we are beginning to see a clearer picture of the immediate effects of climate change on the planet and community, including here in Virginia.

We were able to witness some effects of transportation on climate during the early stages of COVID lockdown when air quality in urbanized areas improved because of a reduction of VMT. Fortunately, this also coincided with a renewed interest in active transportation including an increase in cycling and planning interventions such as open streets or even temporarily closing certain streets off to motor traffic.

In recent years, researchers looking into the effects of transportation on pollution began to measure carbon emissions per person rather than per square mile. This way of assessing energy use is called "location efficiency" and it finds that more walkable and dense communities (even in rural and suburban contexts) utilize much less energy than sprawling suburban communities where a car is required for most trips. Location efficiency is a good way to measure the sustainability of transportation systems and the long-term costs of maintenance.

Electric cars are important tools for transitioning to sustainable transportation networks, but the technology isn't advanced enough and the cost not accessible enough for most people, as the entry price are in the \$30-40,000 range. Additionally, electric cars do not solve the negative externalities associated with automobiles such as safety,

health, cost, resources, and the runaway costs of auto-dependent development. Unlike electric cars, pro-walking and bicycle policies can be implemented now for immediate impact.

Building communities with walking and biking as a priority represents a cost-effective investment in the transportation system that have immense co-benefits for the climate. Carbon emissions from motorized transportation is the largest single source of greenhouse gases in the United States and worldwide gas and diesel engines still account for over 95% of transportation emissions. Additionally, oil and fluid runoff from motor engines enter streams and waterways, further polluting sensitive ecological and recreation areas. The act of walking and biking produce virtually zero emissions.

While electrifying cars and trucks is an important step in a sustainable and resilient transportation system, biking and walking are proven and simple methods to lower carbon emissions that can see dramatic returns on relatively little investments. Retrofitting auto-dependent areas with separated paths, reconfigured roadways, and human-scale infrastructure can allow the freedom for an individual to go to the grocery store without needing to drive or perhaps gives them the comfort and confidence to bike to work one or two days a week. These small changes could result in significant reductions in transportation-related pollutants and contribute to a more livable community.

Equity

Active transportation offers a better ability to achieve a more equitable transportation environment. As mentioned earlier, those most vulnerable to traffic-related injuries and fatalities are people walking and biking along roadways— a group sometimes referred to as “vulnerable road users” (VRUs). These individuals spend more time traveling and face

greater uncertainty about their ability to get from place to place.

Vulnerable road users are commonly part of historically underserved communities and transportation limitations often further shut them out from access to opportunities that are afforded to people with their own vehicle. Reallocating road space to VRUs and reducing lane width will increase safety. Improving the walking and biking environment can dramatically improve the quality of life and opportunities for people who are unable to afford a personal vehicle. Every car owner must cover the cost of transportation, but some families and individuals bear a greater burden. The cost of owning a car was estimated to be \$9,556 per year in 2017, which amounts to 67% of the annual income for an individual or 36% annual income for a family of four living below the poverty line. This does not consider housing costs, meaning that affordable housing (housing costing 30% or less of annual income) without other means of transport is not possible for an individual or family of four living in poverty.

A strong walking and biking network provide mobility and independence for children, the elderly, and people with disabilities— groups that often rely on others for daily transportation needs. Walking and biking infrastructure is important for all ages and abilities and ensures equitable access for all people. This increased independence can help encourage more responsible and community-minded children and simultaneously help older adults age in place and maintain their autonomy. Passive but significant physical activity resulting from walking and cycling is becoming increasingly rare among young children, as schools— a source of daily trips for most children— are being built further from neighborhood centers and often now built next to busy arterial and collector roads. Increasing the number of children cycling to schools, parks, or a friend's house

“requires a comprehensive effort to build communities where children can safely ride bikes”.



Idle Free Zone sign at a school pick-up area

Exposure to pollutants from motor vehicles is linked to pediatric asthma cases, an issue that disproportionately affects those of lower economic standing, who will continue to see disparate effects as we make the slow transition to clean renewable energy.

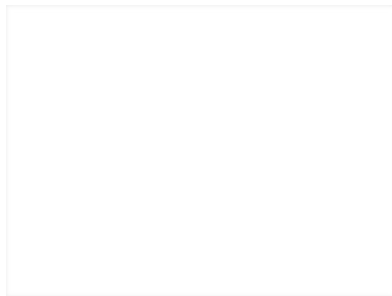
As stated earlier in this section, walking and biking allows us to achieve a more equitable transportation environment, but transportation directly relates to overall quality of life. As researchers have pointed out, “the broader transport equity issue is providing every person with access so they can fully participate in society”. Improving pedestrian and cycling safety and connectivity, and the exponential possibilities these modes bring when paired with transit, can be life-changing when it comes to individual opportunity.

Safety

Clear, separate biking and walking options provided within or alongside the regional roadway and transit system provide greater safety for all users, reducing vehicular conflicts that result in injury and death particularly for the walker or cyclist. Making the roadway system more complete can produce economic benefits. A 2015 analysis conducted by National Complete Streets Coalition (NCSC) evaluated 37 projects around the country and found that projects to support walking and biking reduced crashes and injuries, as well as the costs associated with them. The analysis found that the safer conditions saved a total of \$18.1 million in collision and injury costs in one year alone. A number of these projects also boosted employment levels, property values, investment from the private sector, and net new businesses.

Safe and dependable active transportation facilities also benefit those who cannot drive due to age or ability, giving more freedom to those who might otherwise depend on a driver to get them around. This allows people with disabilities to live more independently, seniors to age in place in their own community, and kids to get to sports practice without having to rely on parents to shuttle them.

Community Building



Pedestrians in Carver after a snowfall

Beyond measurable health benefits, walking and biking can greatly aid interaction among community members and increase feelings of connection and joy. For some, a sidewalk, bicycle, or e-bike could mean finally being able to go to the grocery store or doctor on

their own. Walking and biking facilities allow people to get to jobs, shopping, and recreation along with providing places for people to meet and interact in an outdoor public space, a unique benefit of active transportation. Walkable and bikeable communities show evidence of stronger social capital, community volunteering, and trust among neighbors.

As transportation connects the community, it intersects with virtually every facet of civic life. Transportation is a vital component of land use, housing, stormwater management, and environmental health.

Approach

Existing Conditions

An inventory of regional bike routes together with an understanding of relevant planning factors can help with the design of an equitable and accessible active transportation

network. The elements in the following maps were selected as certain factors that reflect the guiding principles of this plan.



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In the Richmond Region, major **rivers** acts as one of the main barriers to active transportation.

Deficient bridges or culverts, railroads, and rivers provide scores of possible opportunities including [rails-with-trails](#) projects and incorporating increased multi-modal access on re-engineered bridges.

Deficient Bridge or Culvert



Rail Lines

. . . .

Rivers



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Pedestrian injuries and **deaths** caused by automobile crashes are a stark and graphic visual for opportunities to improve walking safety and comfort in the region. *Data is from 1/2015 — 10/2020 ([VDOT/Virginia Roads](#)).*

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Similarly, **cyclist injuries** and **deaths** caused by automobile crashes show opportunities to improve biking safety and comfort in the region. *Data is from 1/2015 — 10/2020 (VDOT/Virginia Roads).*

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The **Health Opportunity Index** is a tool developed by the Virginia Department of Health that "provides a composite measure of the social determinants of health – the social, economic, educational, demographic and environmental factors that relate to a community's well-being".

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Environmental Justice Areas are made up of higher concentrations of historically neglected communities (non-White, elderly, disabled, people with limited English proficiency, people living in poverty, and non-car owners), allowing better planning of future active transportation investments in communities that need it most.

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Activity Centers are areas with a high concentration of






employment and economic activity.

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Similar to rail lines, **power transmission lines** provide unparalleled network routing options throughout the region. Several regions in North America have utilized these existing pathways, with the Finch Hydro Corridor in Toronto an example of one successful 14-mile project.

Schools, parks, health facilities, and government services all should be prioritized for connection on a regional walking and biking network.

Safe Routes to School programs led by the [Safe Routes Partnership](#) and [National Center for Safe Routes to School](#) provide tools and examples for connecting educational sites to the active transportation network.

-  Schools and Educational Facilities
-  Parks and Recreation Facilities
-  Hospitals and Medical Facilities
-  Government Buildings and Services
-  Major Destinations

Public transit primarily composed of **GRTC Bus Routes** is a vital component of our regional network that compliments active transportation, exponentially increasing the mobility of walking or biking alone.

GRTC Bus Routes

- BRT
- Local

Express routes not shown

Additionally, it is important to consider **development**

projects that will change current land use and/or have a notable impact on local or regional transportation.

Development Projects

- Mixed Use
- Residential
- Commercial
- Non-Commercial

Level of Stress

A bicycle **level of stress** (LOS) analysis is a method of rating the bicycle transportation network by how accessible they are to cyclists. Comfort level and risk tolerance for cycling vary widely among the public. Studies show that the public can be split into three general categories of bicyclist based on risk-tolerance and comfort with cycling: *interested but concerned*, *somewhat confident*, and *highly confident*. Another way to look at people in relation to bicycling is simply *casual/less confident* vs. *experienced/confident*, as outlined in [AASHTO's Guide for the Development of Bicycle Facilities](#). Whichever method is used, the underlying commonality is that more people feel comfortable cycling in facilities physically separated from motor vehicle traffic. Investing in separated facilities where people feel safe riding is the surest way to get people on bikes.



Bicyclist Design User Profiles (FWHA)

Building an effective active transportation system requires identifying and making use of low-stress networks through investment in safer facilities for people walking or biking. The following mapping uses level of stress methodology adapted from the Mineta Transportation Institute's [Low-Stress Bicycling and Network Connectivity report](#), and was presented to the steering committee earlier in this process. It is meant to aid in identifying low-stress roadways that can be used to bolster a regional cycling network. The map includes most public roadways with the exception of interstates, expressways, and roads that prohibit bicycles.

Posted Speed (MPH)	# of Travel Lanes	Mixed Traffic		
		≤3000 AADT*	3000-6000 AADT	>6000 AADT
≤25	1-2	1	2	3
	3-4	3	3	3
	≥5	4	4	4
>25 to ≤35	1-2	2	3	3
	≥3	4	4	4
>35	≥1	4	4	4

*or no AADT data available

Overview of Level of Stress methodology (FAMPO)

The level of stress analysis rates each linkage on a *scale from one to four*, with four representing a highly auto-oriented environment and one representing a low-stress environment. The *interested but concerned* and *somewhat confident*

bicyclists are more comfortable with routes that are rated a one, such as a shared use path or a 20 mph bicycle boulevard. On the opposite end, only *highly confident* riders would feel comfortable riding on a route rated as a four. This analysis utilizes a simple methodology to overcome limitations in roadway data that are prevalent at a regional level. The variables included in the analysis are: (1) posted speed limit, (2) number of travel lanes, and (2) the volume measured as the average annual daily traffic (AADT) count for each road segment. Note that it does not consider other cycling safety concerns such as the slope of the road, presence or absence of a shoulder, lighting, intersections, or the number of curb cuts.

Powered by Esri

Bicycling Level of Stress in the Richmond Region

Use the map controls in the bottom right corner or double-click to zoom. On a mobile device, double-tap or stretch to zoom in and pinch to zoom out. Maps may take a moment to load based on connection speed and device. Select 'Interactive Map' on the navigation bar to view map with selectable layers.

Big Ideas

The framework for Implementing a regional active transportation plan over a long planning period involves a series of short and mid-term steps. Priorities are guided by the guiding principles, goals and objectives to achieve the long-term plan. But how does one get started? How does the region develop actionable strategies to take in unison? This plan offers six (6) big regional ideas or major recommendations around which to start implementing the plan in the immediate term. Each big idea addresses key benefits, goal alignment, and actions required.



1) Establish the Virginia Capital Trail and the Fall Line Trail as main regional arterials.

Use the two long-distance cross regional shared use paths, the existing Virginia Capital Trail and the proposed Fall Line Trail, to create a “major arterial” system of the Regional

Spines around which all other active transportation improvements will be based. Connections to these regional transportation trails tying communities and neighborhoods to access of long-distance non-motorized infrastructure will further a truly regional network to serve the regional population with connections to employment, schools, community facilities for daily living. The regional trail network will attract tourists from outside the region leading to a greater return on investment for the region's localities.

2) Prioritize equitable completion of spur networks that tie into regional arterials.

Complete sub-regional/spur networks that can immediately tie into the Regional Spine System serving the most vulnerable neighborhoods as the highest priority. The central portion of the region stretching south of the James River into Chesterfield County has some of the highest concentrations of environmental justice populations with relatively low health outcomes. This is also true of outlying areas in Charles City and New Kent counties to the east and extreme western Goochland County. The best way to illustrate the opportunities that are possible to build on for creating connections to active transportation is to focus in more detail on the East End and Southside.

3) Reach common regional acceptance of high standards for active transportation.

Reach common acceptance of a higher level of standards for bicycle and pedestrian facilities with industry recognized standards for varying context such as urban, suburban and rural.

4) Utilize bike boulevards and safe neighborhood streets for local connections.

Tie neighborhoods together to expand reach and use of bike boulevards—start with safe routes to schools and parks, cul-de-sac neighborhoods where “ribbons” of residential that can be strung together with zipper connections, neighborhood byway signage.

5) Work with private sector developers to capitalize on projects that incorporate high quality active transportation infrastructure into the regional network.

Work with private sector developers to capitalize on economic development projects which are building new or redeveloped centers of activity that can be enhanced with high quality active transportation infrastructure within and connecting to the existing surrounding community fabric to create strong sense of place.

6) Focus on aligning connections at jurisdictional boundaries.

There are a number of opportunities for the localities to align their own efforts to provide better active transportation connections across jurisdictional boundaries which is absolutely essential for creating a regional network that serves as a transportation mode, provides connections between multiple destinations, and makes travel across the region on foot or bike more possible and safer. The starting point for alignment is best achieved by coordinating locality comprehensive plans, small area plans, and corridor studies.

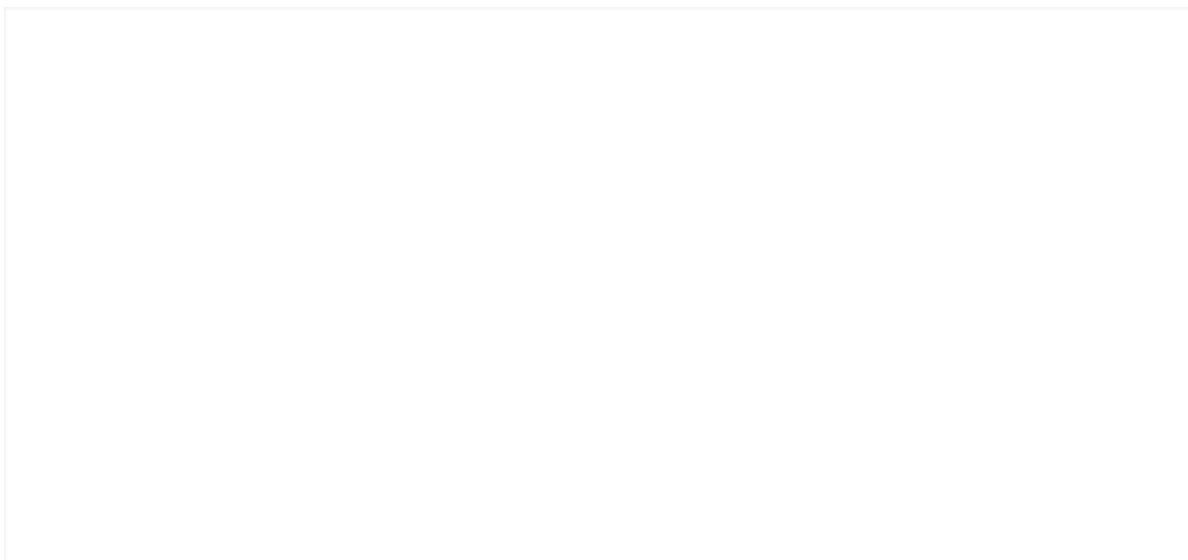
Interactive Map

A fully interactive map showing bicycle and pedestrian (active transportation) facilities can be [found here](#). This web map includes selectable layers that can be turned on/off in order to display specific active transportation routes.

Examining demographics, health, and transportation facilities in different contexts can help provide insight into where and how to focus new investment. This map can assist in identifying major gaps in regional networks and development patterns that can be utilized to strengthen a regional bicycle and pedestrian network.

In order to access layer selection, please click on "Content" in the map interface (circled below) and select the boxes for the layers you wish to view. Clicking "Legend" will then revert the details back to the legend view.

[Interactive Regional Map](#) (*may take a few moments to load*)



The web map allows layers to be turned on/off through the "Content" tab.

Contact

Please contact [Phil Riggan](#) with any questions or comments about the Bicycle and Pedestrian Plan update.

Visit [ConnectRVA2045.org](https://connectrva2045.org) to learn more about the most recent update to the long-range transportation plan.

For more information about this process or other transportation initiatives in the Richmond Region, please visit

the [Richmond Regional Transportation Planning Organization](#) website.

Thanks to Louise Lockett Gordon and Tara FitzPatrick for photo contributions.



A bus at the Pulse Science Museum Station

Resources

Tools for Walkable and Bikeable Communities

- [Bike Share](#)
- [Bus Rapid Transit \(BRT\) - GRTC Pulse](#)
- [Open Streets](#)
- [Parklets](#)
- [Road Safety Audits](#)
- [Street Trees](#)
- [Urban Growth Boundaries](#)
- [Walkability Study \(Ex. 1 | Ex. 2 | Ex. 3\)](#)

Concepts

- [Curbside Management](#)
- [Desire Lines](#)

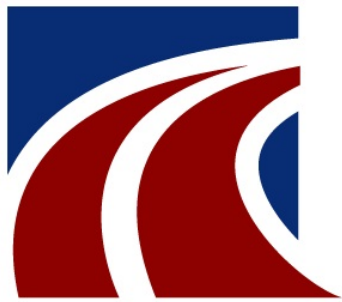
- Induced Demand
- Functional Classification
- Level of Service
- Location Efficiency
- Roadway Reconfiguration/Road Diets

References

- NACTO - Urban Bikeway Design Guide
- NACTO - Urban Street Design Guide
- NACTO - Urban Street Stormwater Guide
- NACTO - Equitable Bike Share Means Building Better Places for People to Ride
- AASHTO, Guide for the Development of Bicycle Facilities
- FHWA - Bikeway Selection Guide
- FHWA - Small Town and Rural Multimodal Networks
- ITE - Curbside Management Practitioner's Guide
- Mineta Transportation Institute - Low-Stress Bicycling and Network Connectivity

Books

- Building the Cycling City - Chris Brunlett & Melissa Brunlett
- Cycling for Sustainable Cities - Ralph Buehler & John Pucher
- Right of Way - Angie Schmitt
- Strong Towns - Charles L Marohn Jr
- Walkable City & Walkable City Rules - Jeff Speck



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