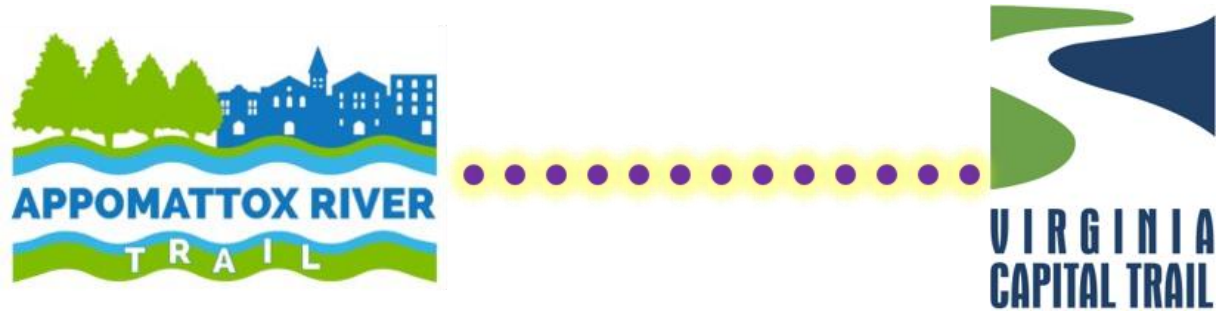
Appomattox River Trail to Capital Trail Study
Technical Document

Table of Contents

Vision

This study's vision is to provide active transportation users a safe and efficient connection between the Appomattox River Trail and the Virginia Capital Trail.



Introduction

When complete, the Appomattox River Trail (ART) will extend over 20 miles from Lake Chesdin to City Point in Hopewell. On the opposite side of the James River, the Virginia Capital Trail, completed in October 2015 and seeing upwards of 370 trail counts per day, runs 52 miles from Richmond to historic Jamestown.[1] Although these trails are only separated by a few miles, there is no safe and/or efficient way for active transportation users to cross the James River and travel between Hopewell and the Virginia Capital Trail (Figure 1).[2] The one-mile long Benjamin Harrison Bridge is currently the only option in the region, however, it carries 4,500 vehicles per day, has minimal shoulders (if present at all) and lacks sidewalks, forcing cyclists and pedestrians into the same lane as fast-moving motor vehicles.

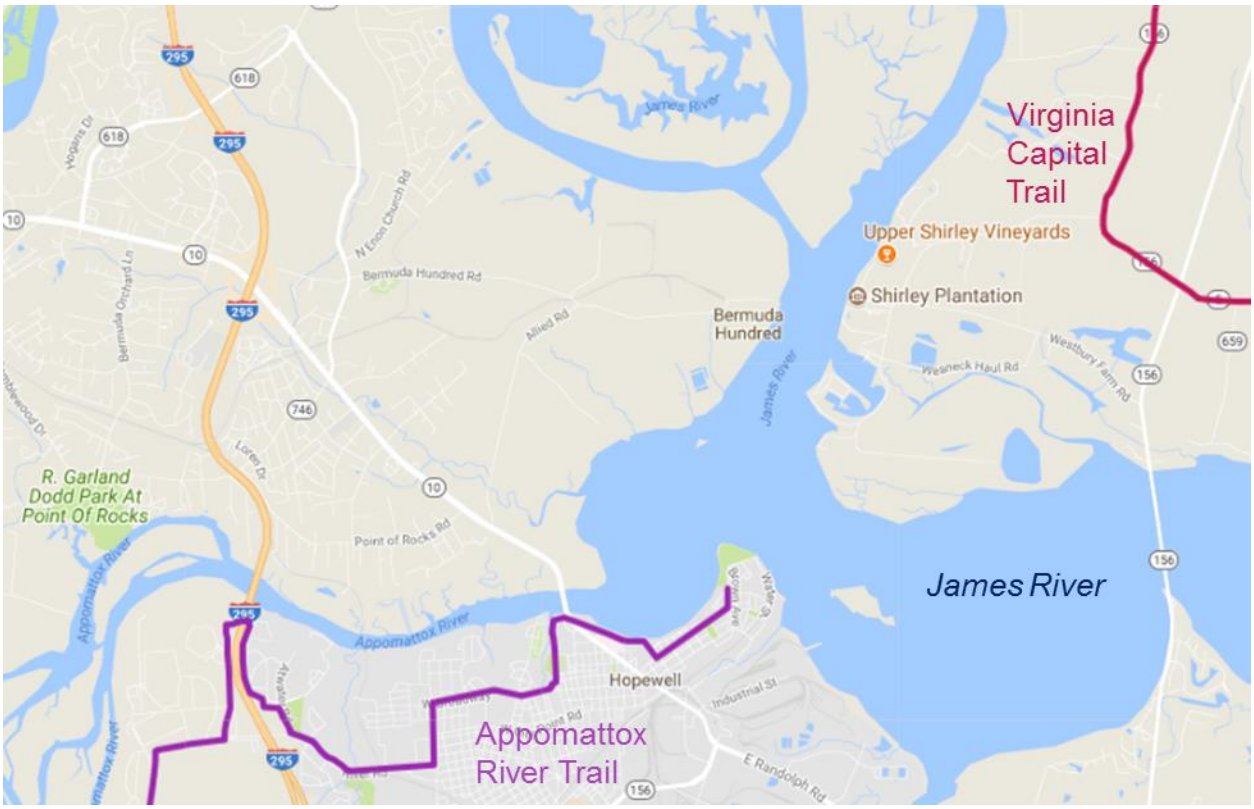
Connecting the ART to the Virginia Capital Trail would create a continuous 75-mile network, offering tremendous recreational, commuting, and tourism opportunities for the region. Hopewell's strategic position between the two trails could help bring additional spending and investment to the community, who currently sits in the bottom 10th percentile in the national Distressed Communities Index, a source used by VDOT to evaluate potential SMART SCALE projects.

While various alternatives were considered as part of this planning process, *this study recommends connecting the two trails using a conventional bus/van shuttle service or a bicycle/pedestrian ferry.* These options are recommended because they are financially feasible in the short-term and have the potential to provide a near-immediate benefit for the region.[3]

In addition, *it is strongly recommended that the Benjamin Harrison Bridge, when replaced, include a shared-use path* like that found on the Judith Stewart Dresser Memorial Bridge, which carries Route 5 and the Virginia Capital Trail across the Chickahominy River. Stakeholders and members of the public reiterated this need throughout the planning process.

[1] The VDOT Almond Creek trail counter records an average of 369 counts per day. Source: http://www.eco-public.com/ParcPublic/?id=4161
[2] Click here to see a map of the ART and the Virginia Capital Trail
[3] Two alternatives were selected to maximize flexibility and provide opportunities for additional discussion. The shuttle is more affordable and easier to implement, while the bicycle/pedestrian ferry received more public support (Spring 2018 Survey) and has the potential for non-transportation uses (e.g. educational programs, tourism).

FIGURE 1: THE APPOMATTOX RIVER TRAIL AND THE VIRGINIA CAPITAL TRAIL



This study is a collaborative effort on behalf of the Virginia Department of Transportation and the Crater Planning District Commission. The study's recommendations and alternatives are preliminary and will be subject to additional analysis as required by the National Environmental Policy Act (NEPA) and related environmental statutes and regulations. In order to account for unforeseen challenges, this study considers various alternatives that could be utilized if barriers, such as environmental concerns or right-of-way limitations, are encountered in subsequent phases of project development.

Please visit the Project Story Map for a graphical and streamlined summary of the study and its recommendations.

Virginia Capital Trail. Source: Mobility Lab

Public Input

Public input was critical in developing and evaluating alternatives for crossing the James River and connecting the two trail systems. The public provided input through two online surveys, held in Fall 2017 and Spring 2018, the results of which are summarized below. In addition, the draft documents were available for a one-month public review period, beginning in June 2018. **Appendix A** documents the individual public comments.

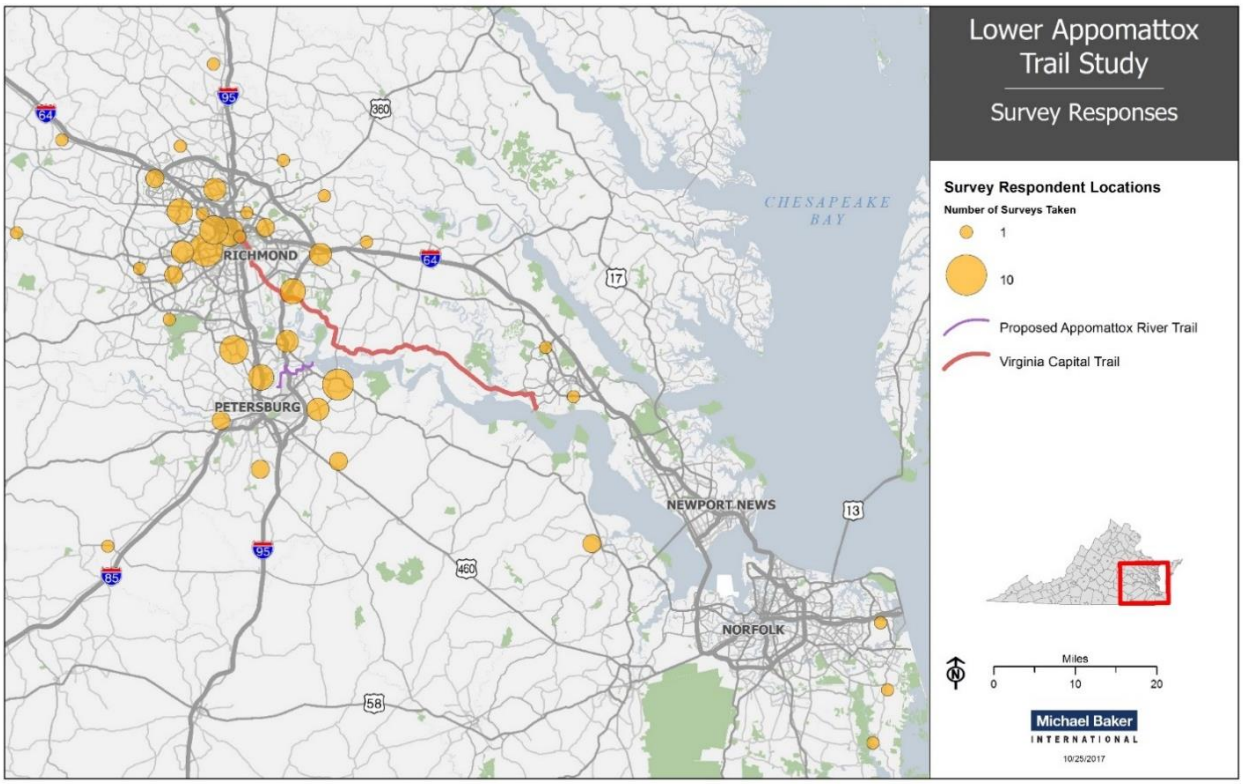
Fall 2017 Survey

The public participated in a web survey in Fall 2017, providing input on opportunities and concerns for regional trail connectivity. The survey was open for several weeks and received 120 responses. The summary below provides and overview of the public input received.

Survey Participants

- 100% of respondents agree that connecting the Appomattox River Trail and the Virginia Capital Trail would benefit the region
- 89% identify as white, 4% Black/African American, 3% Hispanic/Latino, 4% other
- 75% are between 30 and 70 years old
- Respondents are from all over the Richmond, Tri-Cities, and Hampton Roads regions (Figure 2)

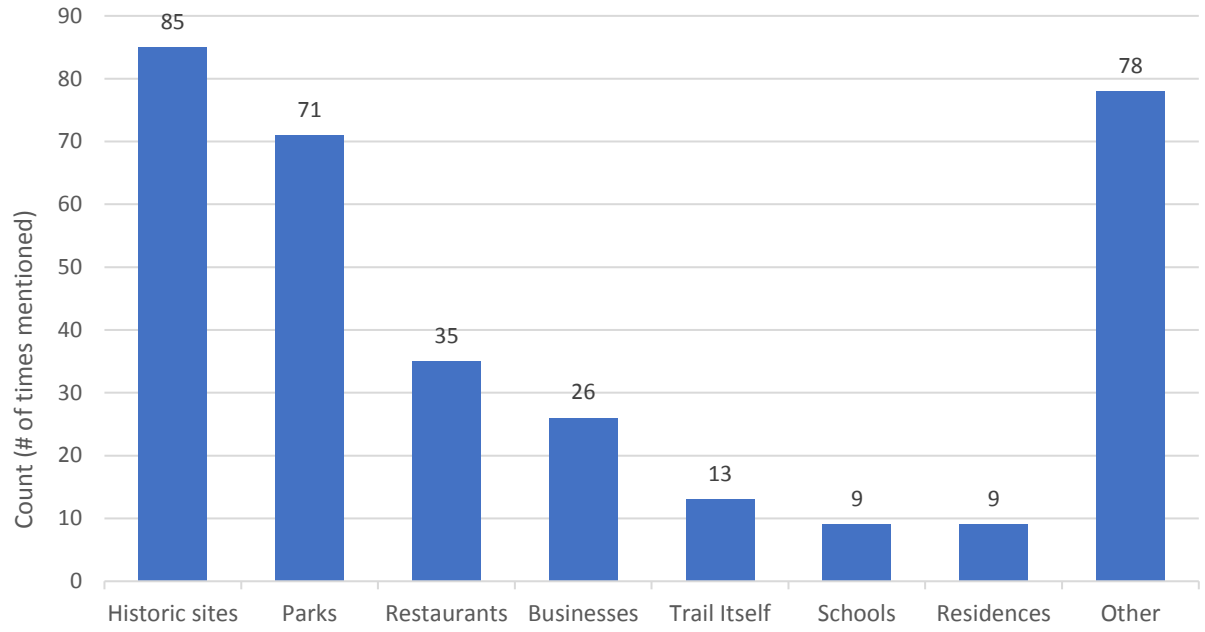
FIGURE 2: SURVEY RESPONDENT HOME LOCATIONS



The survey also asked participants to identify the most important regional destinations for trail users. Historic sites, followed by parks, restaurants, and businesses were the top four destinations (Figure 3). In the process, many survey respondents identified specific priority destinations in the region (Figure 4). City

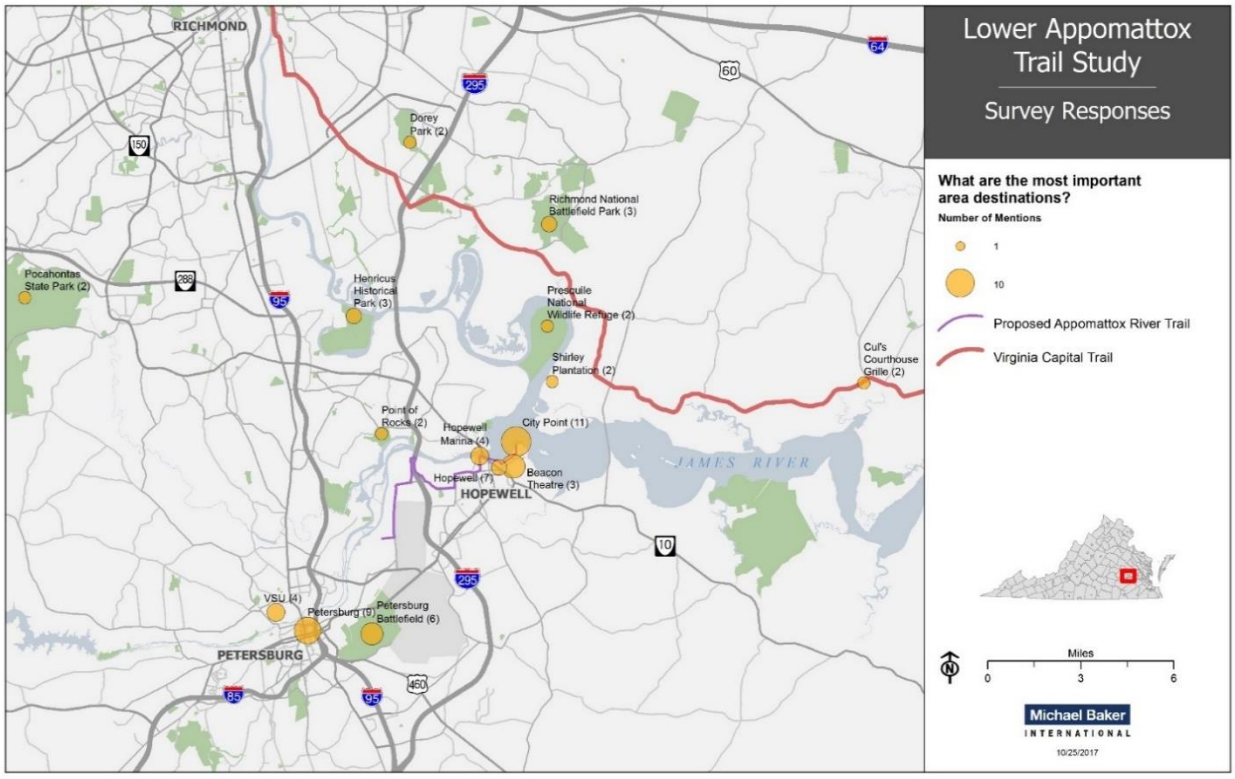
Point was mentioned 11 times, making it the most frequently cited destination. Petersburg was mentioned 9 times, while Hopewell was mentioned 7 times.

FIGURE 3: DESIRED DESTINATIONS



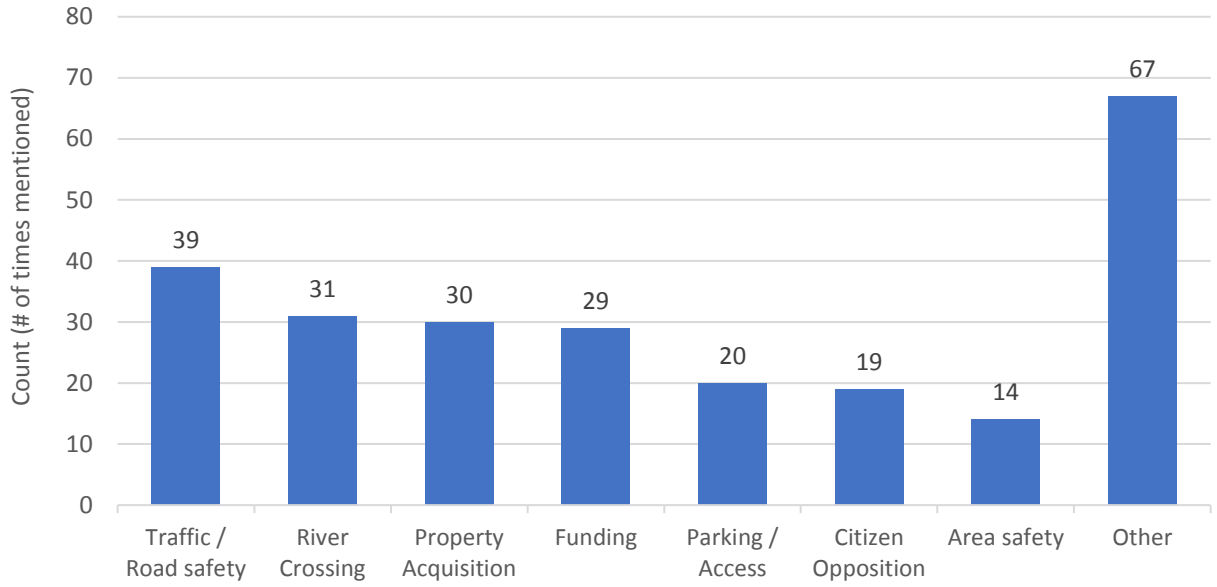
"Other" destinations include: camping/picnic areas, bike shops, places of employment, lodging, restrooms

FIGURE 4: DESIRED DESTINATIONS (SPECIFIC LOCATIONS)



The survey asked respondents to identify the most significant barriers or concerns to regional trail development. While respondents were concerned with a range of issues, the most prevalent concerns include traffic/road safety, crossing the James River, property acquisition, and funding (Figure 5).

FIGURE 5: PERCEIVED BARRIERS



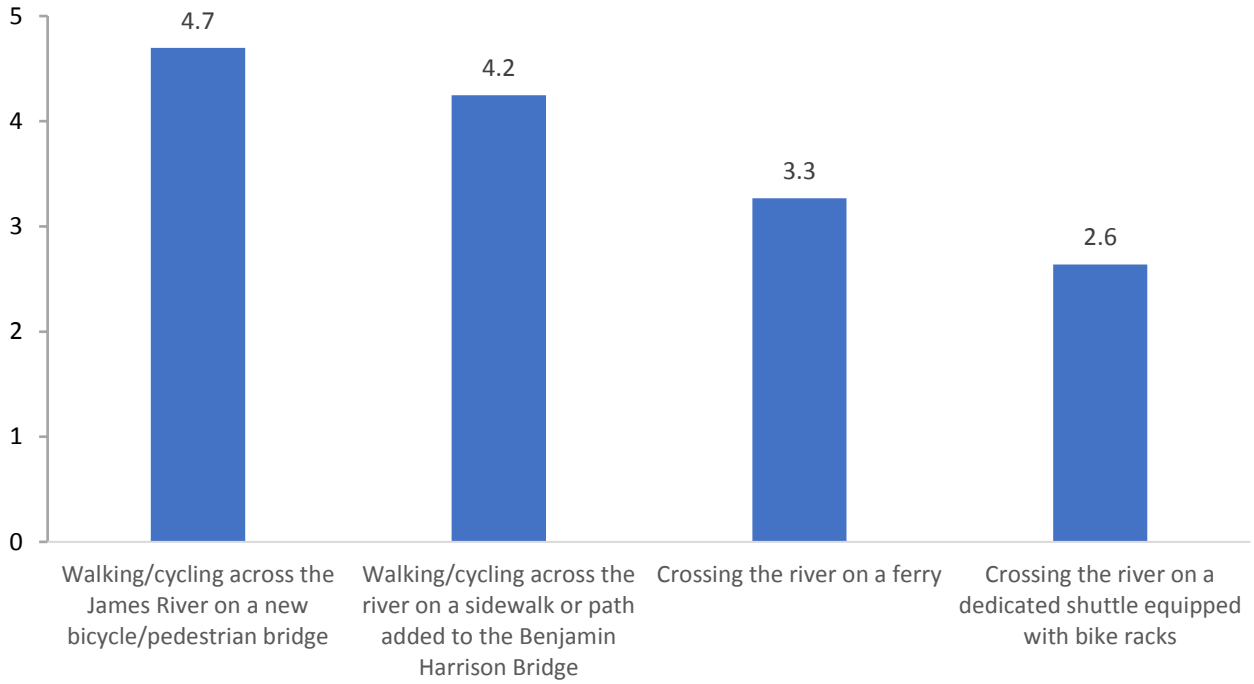
"Other" barriers include: politics, bathrooms/water, permitting, maintenance, weather, terrain

The survey also asked respondents to identify types of places in the study area that need to be protected. Respondents identified a range of places, the majority of which included historic sites, sacred grounds, sensitive habitats, and wetlands (Figure 6).

FIGURE 6: ENVIRONMENTAL, HISTORIC, AND CULTURAL RESOURCES

The survey asked participants to rate, on a scale of 1-5 (with "5" being the highest), the likelihood that they would walk or bicycle from Hopewell to the Virginia Capital Trail by four different alternatives. A new bicycle/pedestrian bridge was the most preferred option, while shuttle service was the least preferred option (Figure 7). Note: the question did *not* ask respondents to consider costs or ease of implementation when selecting their preferences.

FIGURE 7: PREFERRED MODE OF CROSSING THE JAMES RIVER (SCALE OF 1-5, "5" BEING THE HIGHEST)



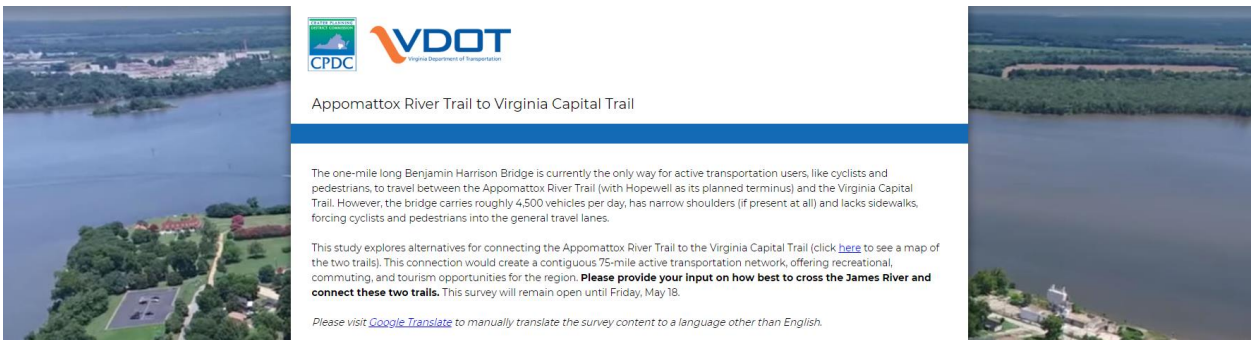
Note: subsequent analysis identified tremendous challenges with adding a sidewalk or path to the existing Benjamin Harrison Bridge. Further study also introduced two additional alternatives, including an autonomous (driverless shuttle) and a new bicycle/pedestrian path along Route 10 to the Jamestown-Scotland Ferry.

Finally, the survey offered participants the opportunity to provide open-ended feedback. A full catalog of comments can be found in **Appendix A**. Some of recurring comments included:

- There is a need for safe bicycle and pedestrian trails in the region
- The trail could serve as a tourism catalyst for Hopewell and the region
- There are opportunities to connect to other regionally/nationally significant trails
- Design trails for all ages and abilities
- Consider incorporating shaded rest areas

Spring 2018 Survey

The public also participated in a Spring 2018 survey, providing input on how best to cross the James River and connect the two trails. The survey included an introductory infographic, whose purpose was to quickly (and visually) summarize each alternative's opportunities, constraints, cost, and estimated time to implement. The survey, available from April 19 to May 19, was distributed through the PDC's email listservs and was also published in VDOT's May 2018 Statewide Bicycle and Pedestrian Program Newsletter.



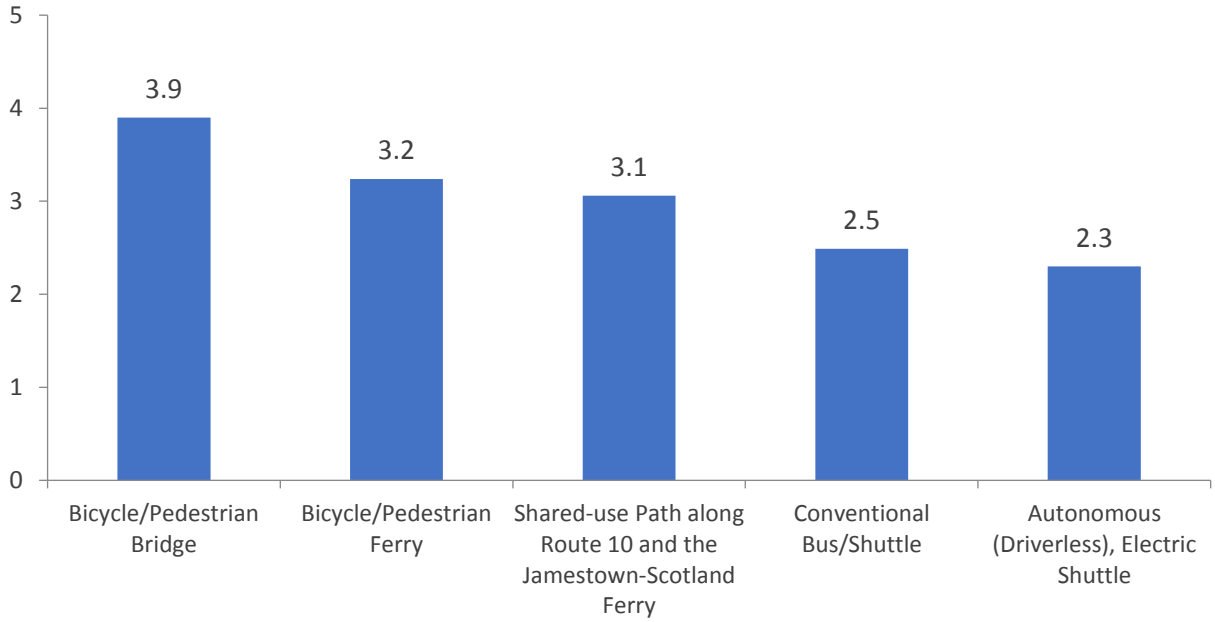
Welcome screen for the Spring 2018 survey

Survey Participants

- 98% of respondents agree that connecting the Appomattox River Trail and the Virginia Capital Trail would benefit the region
- 91% identify as white, 3% Black/African American, 5% other
- 90% are between 30 and 70 years old
- Respondents are from all over the Richmond, Tri-Cities, and Hampton Roads regions

The survey's primary question asked participants to rank their preferences for crossing the James River and connecting the two trails, while considering the alternatives' costs and expected ease of implementation. A new bicycle/pedestrian bridge was the most preferred option, while an autonomous (driverless) shuttle service was the least preferred option (Figure 8). Many of those respondents who selected a new bicycle/pedestrian bridge as their preferred crossing also commented that any future bridge replacement should include bicycle/pedestrian accommodations.

FIGURE 8: PREFERRED ALTERNATIVE FOR CROSSING THE JAMES RIVER (SCALE OF 1-5, "5" BEING THE HIGHEST)



Stakeholder Outreach

The Friends of the Lower Appomattox River (FOLAR), having recently completed a Master Plan for the Appomattox River Trail, was an important stakeholder and resource for this study. FOLAR attended the study's kickoff meeting in Summer 2017 and provided input on potential trailhead locations, like the Hunter House at City Point. FOLAR also assisted in distributing the public surveys.

The region's jurisdictions provided valuable insights throughout the planning process, particularly with respect to potential ferry landing locations. In addition, the study included outreach to Federal and State agencies and institutions, like the U.S. Fish and Wildlife Service, the U.S. Coast Guard, the National Park Service, and the Virginia Commonwealth University (VCU) Rice Center. These discussions, summarized below, helped identify opportunities, constraints, and in some cases, "fatal flaws" with potential alternatives. Additional stakeholder input is summarized in **Appendix A**.

U.S. Fish and Wildlife Service (FWS)

Mr. Cyrus Brane, Wildlife Refuge Specialist, U.S. Fish and Wildlife Service

Presquile, James River

In 1933, the U.S. Army Corps of Engineers made a cut in the peninsula so that ships and barges would no longer need to make the a 6-mile detour around today's Presquile National Wildlife Refuge at Turkey Island. The U.S. Army Corps of Engineers still manages the Turkey Island Cutoff.

The 1,329-acre Presquile National Wildlife Refuge, formed in 1953, is a stop on the Atlantic Flyway, a migratory highway for birds, which explains why the area is operated by the federal government.

The FWS suggests that a bicycle/pedestrian trail connection through Presquile may not be suitable or feasible based on the following considerations.

- It is a sensitive wildlife habitat for many species, including Bald Eagles.
- It can only be visited with advanced reservations and permits or during sponsored events.
- There is no public right-of-way between Bermuda Hundred Road and Presquile. The FWS has a unique easement with Phillip Morris, allowing FWS exclusive access.
- The cable ferry system, providing a connection between the mainland and the island, is unreliable.

James River National Wildlife Refuge

The study also explored the possibility of a ferry or bridge connection from the James River National Wildlife Refuge in Prince George County to Charles City County. The James River National Wildlife Refuge, founded in 1991 and located 8 miles east of Hopewell, encompasses 4,200 acres of forest and wetland habitats along the James River. The FWS indicated that the area is a habitat for many species, including Bald Eagles, and that any bridge or ferry alternative could disrupt the local ecosystem.

U.S. Coast Guard (USCG)

Lt. Catherine Lawson, Port Safety and Security Branch Chief,
USCG Sector Hampton Roads
Mr. Hal Pitts, Chief, Bridge Branch, Fifth Coast Guard District

The study included several conversations with the U.S. Coast Guard, who is responsible for vessel safety and waterway control along this section of the James River.

The U.S. Coast Guard Port Safety and Security Branch provided insights regarding vessel requirements for bicycle/pedestrian ferries. Preliminary conversations suggest that a bicycle/pedestrian ferry would likely fall under Sub Chapter T – Small Passenger Vessels under 100 Gross Tons. Several of the Sub Chapter T requirements are summarized below; visit the Government Publishing Office Section on Sub Chapter T for detailed information.[4]

- Maximum of 149 passengers
- Less than 100 gross tons
- Typically include one deck hand and one pilot
- Rescue boats are required if over 65 feet
- Requires initial certification of inspection, which is valid for five years (although annual inspections are also required)
- Dry docking may be required every five years (if in fresh water) or every two years (if in salt water)
- State agencies, like VDOT, may be exempt from $300 annual user fees
- Vessels must be documented through the National Documentation Center, which is $100 for the first year and $20 for renewal
- Pre-certified vessels are recommended

In addition, the Fifth Coast Guard District indicated that any new bridge would likely need a minimum vertical clearance of 145', equivalent to the maximum height of the Benjamin Harrison Bridge (with vertical lift enabled).

Finally, bridge (re)construction over the James River is considered a "Federal action", mandating an environmental document describing the potential environmental impacts under the National Environmental Policy Act (NEPA) (42 USC 4321, et seq.).

[4] https://www.gpo.gov/fdsys/pkg/CFR-2012-title46-vol7/pdf/CFR-2012-title46-vol7-chapI-subchapT.pdf

National Park Service (NPS)

Mr. Lewis Rogers, Superintendent, Petersburg National Battlefield Park
Ms. Alexis Morris, Archeologist, Petersburg National Battlefield Park

The National Park Service is excited about the potential opportunities for connecting the two trails and offered preliminary input on the potential for City Point to serve as a ferry terminal for cyclists and pedestrians who wish to connect from Hopewell to the Virginia Capital Trail.

City Point, Hopewell, Virginia

City Point Waterfront Park, located on the northeast side of City Point, was formerly the site of the 1860s wharf that was used to supply Union troops. The park is currently a partnership between the NPS and the City of Hopewell and includes a small dock that is used by visitors and fishermen. The NPS is uncertain about the water depths and remarked that there could be potential underwater artifacts near the park. Prior to making any commitments regarding ferry or water taxi service, the NPS would need additional information including, but not limited to:

- Vessel dimensions and docking requirements
- Draft (or depth) of the vessel hull
- Information on the vessel's engine to ensure that the vessel does not disturb sediment and negatively impact potential artifacts
- Any additional facilities required, such as dock extensions

The NPS is also engaged in several noteworthy efforts to improve non-motorized access to their regional facilities, some of which are summarized below.

- **Shoreline restoration project** – the NPS is working to reduce further erosion along the northern and western coast of City Point. The effort will allow year-round visitors to use the trails above the riverbank, which have been subject to flooding.

- **Hunter House partnership** – the Hunter House, located at Cedar Lane and Maplewood Avenue, is not considered a historically significant structure to the NPS at City Point. As such, the NPS is considering the potential sale or lease of the house to the City of Hopewell. The Friends of the Lower Appomattox River (FOLAR) has expressed interest in using the house for offices and as a visitor or welcome center for the proposed Appomattox River Trail. It is possible that this house could serve as a visitor center for both proposed trail systems.
- **Regional trail connectivity** – the NPS is considering trail connections between their historic and cultural sites in the region, including Dinwiddie. There could be opportunities for this work to be reflected in any updates to the Tri Cities MPO Long-Range Transportation Plan (LRTP).

VCU Rice Rivers Center

Dr. Greg Garman, Director VCU Rice Rivers Center

The VCU Rice Rivers Center, located one mile south of the Virginia Capital Trail in Charles City County, is a university field station dedicated to environmental research, teaching, and public service. The site is approximately 350 acres with one kilometer of water frontage, including a large dock and boat house that is shared with the Virginia Department of Game and Inland Fisheries. The Rice Center offers outdoor educational programs and monthly open houses.

The VCU Rice Center expressed interest in the potential for a bicycle/pedestrian ferry service to/from the facility, but voiced concern about site access, security, and liability issues. Specifically, Dr. Garman was concerned that the facility may not have sufficient staff to ensure the safety and security of ferry passengers, while also protecting the facility's ecological research projects. While additional conversations are needed, Dr. Garman suggested that a limited ferry service (e.g. on weekends in the summer) may be more feasible than daily passenger service.

In addition, the site's access road, which provides a direct connection to the Virginia Capital Trail, is dirt and may be a concern for bicycles with thinner tires.

VCU Rice Center. Source: VCU

Alternatives

This study considered various alternatives for crossing the James River and connecting the Appomattox River Trail and the Virginia Capital Trail. Each alternative was evaluated based on its estimated costs, anticipated feasibility, and potential benefits (opportunities) and concerns (constraints) to trail users, the region, and the environment. Public and stakeholder input were invaluable in identifying regional needs and barriers.

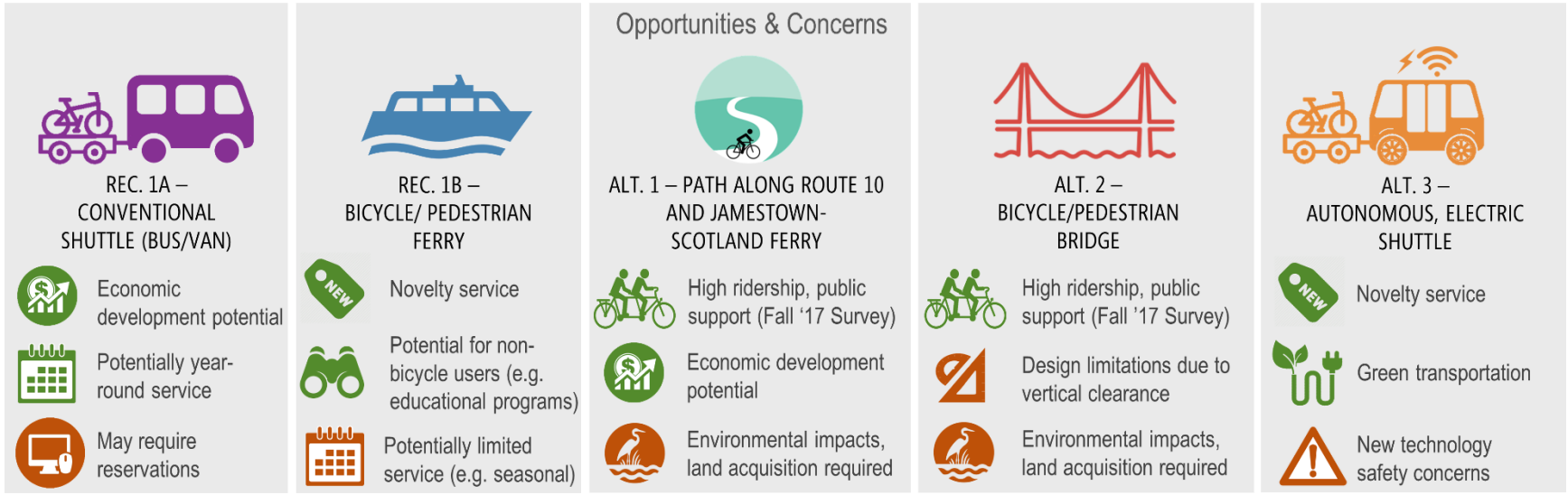
Each alternative is unique – several consider shorter-term shuttle or ferry connections, while others recommend longer-term trails or bicycle/pedestrian bridges (Figure 9). While each alternative has distinct advantages, *the study recommends a conventional bus/van shuttle (Recommended 1A) or a bicycle/pedestrian ferry (Recommended 1B).*[5] Given today's funding constraints, it was determined that these two alternatives are practical, relatively affordable, and can address an immediate need for improved regional trail connectivity. Additionally, this study strongly recommends that the Benjamin Harrison Bridge, when replaced, include a protected bicycle/pedestrian path along with any trail connections to/from the bridge (e.g. to/from Hopewell and to/from the Virginia Capital Trail).

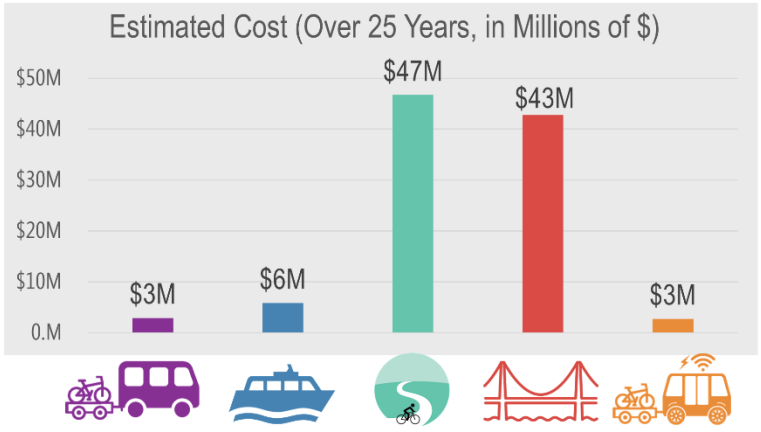
The two recommended alternatives are summarized shortly and are followed by discussions of the other three alternatives. All five (5) options are discussed in the context of capital and operating costs (in 2017 dollars), as well as net present value (NPV). Net present value, for the purposes of this planning study, refers to the current dollar value of future investments. NPV enables us to compare an alternative's capital and operating costs over 25 years, giving us an "apples to apples" comparison of the alternatives, which vary in their initial capital investment costs, as well as their long-term operating and maintenance costs.

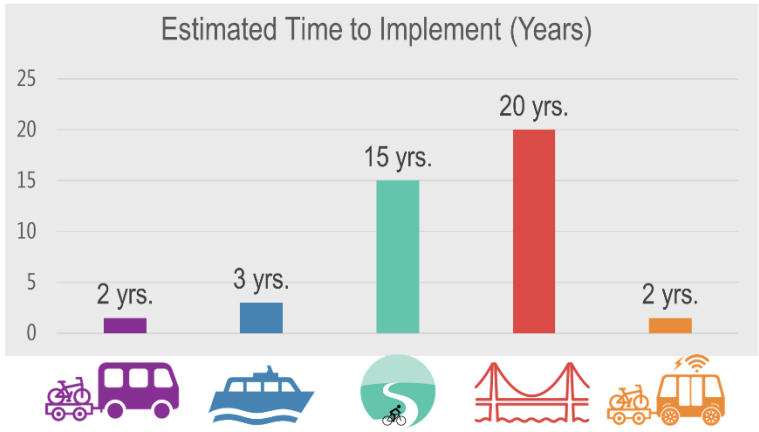
Study alternatives. A full summary is provided on the next page.

[5] Two alternatives were selected to maximize flexibility (the two may be eligible for different funding sources) and provide opportunities for additional discussion. The shuttle is more affordable and arguably easier to implement, while the bicycle/pedestrian ferry received more public support (Spring 2018 Survey) and has the potential for non-transportation uses (e.g. educational programs, tourism).

FIGURE 9: EVALUATING ALTERNATIVES







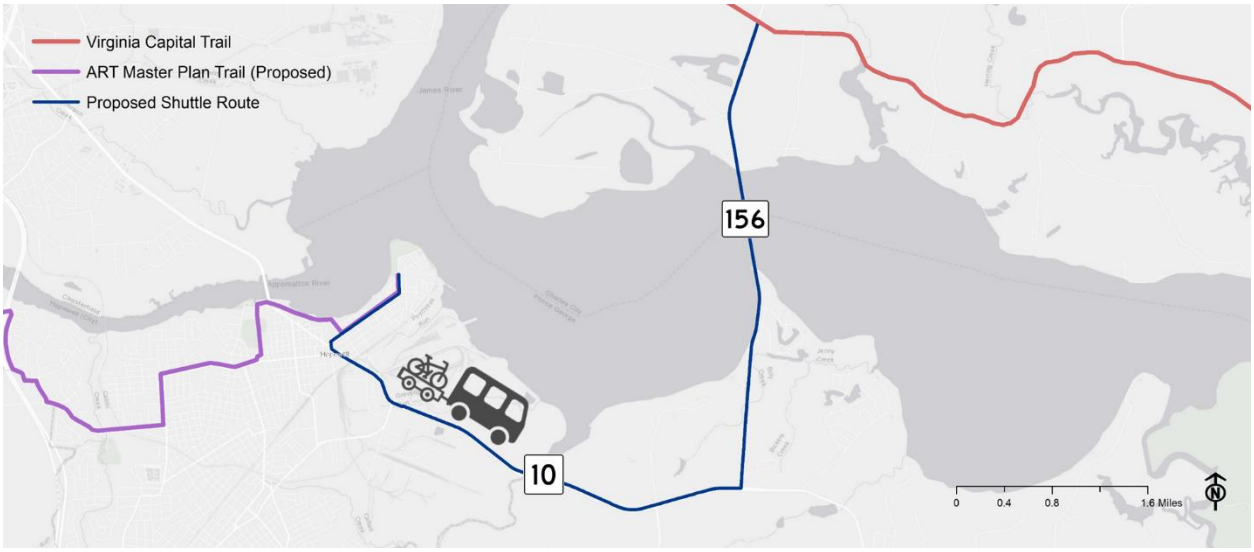
Recommended 1A – Conventional Shuttle (Bus/Van)

One option for connecting the two trails is by a conventional shuttle bus/van equipped with bicycle racks or a trailer, similar to the Cap Trail Bike Shuttle, which currently services the Virginia Capital Trail. The route begins at City Point and travels south on Cedar Lane and Appomattox Street before turning southeast on Randolph Road (Route 10). The route then travels north on Route 156 across the Benjamin Harrison Bridge before intersecting Route 5 and the Virginia Capital Trail (Figure 10). The shuttle could have a set schedule, be by request only, or be some combination of the two.

This alternative is recommended because of its relative affordability, feasibility and its capacity to quickly address an immediate regional need for a safe and efficient bicycle/pedestrian connection to the Virginia Capital Trail. The discussion below summarizes the shuttle's anticipated costs, implementation, opportunities, and concerns.

Cap Trail Shuttle and trailer. Source: Cap Trail Bike Shuttle

FIGURE 10: PROPOSED SHUTTLE ROUTE



Costs

- **Capital costs** – $44,000. Assumes one shuttle at approximately $35,000 plus additional costs for trailer and accessories.
- **Annual operating costs** – $173,400. Assumes wages for shuttle drivers and costs for insurance and fuel.
- **Net present value** – $2.9 million over a 25-year period.

Implementation

It is anticipated that conventional bus/shuttles could be deployed within two (2) years from the day of funding. The shuttle could be owned and operated by a public agency, a nonprofit, or a private entity.

Opportunities

- **Affordability** – a conventional bus/shuttle service is much more affordable than constructing a new bridge or shared-use path.
- **Ease of implementation** – the service could be quickly implemented in several ways. It could serve as an extension of the Petersburg Area Transit, it could be developed through a public-private partnership, or it could be a privately funded and operated service, like the Cap. Trail Shuttle.
- **Year-round potential** – the shuttles could operate throughout the year.
- **Opportunities for fare collection** – there could be opportunities to integrate the shuttles into the Petersburg Area Transit system.
- **Eligible for SMART SCALE** – the shuttles could be eligible for SMART SCALE funding since they provide surface transportation and intermodal connections.

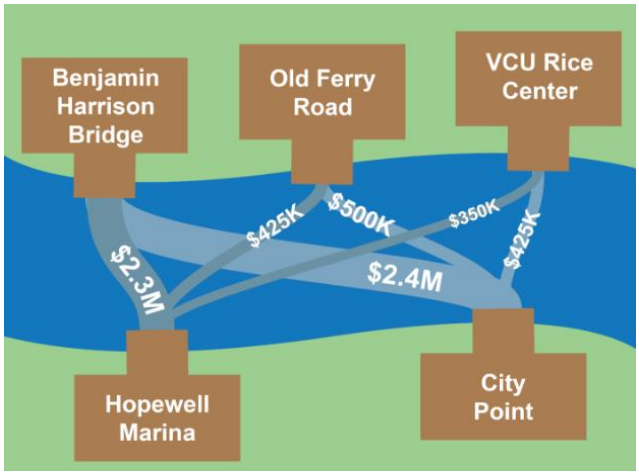
Constraints

- **Limited service** – the service may require advanced reservations if managed and operated by a private vendor.
- **Potentially lower ridership** – the service would likely have lower ridership than several of the other alternatives, such as a new path or bridge.

Recommended 1B – Bicycle/Pedestrian Ferry

The study considered prospective bicycle/pedestrian ferry or water taxi alternatives to connect trail users from Hopewell to the north bank of the James River and ultimately, the Virginia Capital Trail. The alternative, which relied on jurisdiction input, identified five potential ferry landings: two on the southside of the river and three on the northside (Figure 11).[6] From the Appomattox River Trail, users would travel a short distance to one of the southside landings, whereupon a ferry would transport passengers (and bicycles) through a deep-water channel to

FIGURE 11: POTENTIAL FERRY CROSSINGS



[6] Other potential ferry landings were eliminated due to feasibility concerns. For example, Chesterfield County proposed a park at Bermuda Hundred in 2007, but did not pursue due to local opposition. It is anticipated that a ferry landing would receive similar opposition. Potential ferry landings were also proposed at Shirley Plantation and Upper Shirley Winery, but were not supported by the land owners at this time.

Jordan Point before crossing to one of the northside landings.[7] From there, a one-mile shared-use path or on-road facility (depending on the selected ferry landing) would connect users to the Virginia Capital Trail (Figure 12). It is anticipated that the ferry would be similar in style and size to that used by the James River Association for its "Ecology School" at Presquile National Wildlife Refuge (right).

James River Association's "Ecology School".

This alternative is recommended because it is easy to implement and has the potential to be used by cyclists, tourists, commuters, and for special events, like educational programs. The bicycle/pedestrian ferry ranked second among along alternatives in the Spring 2018 Survey.

A summary of general opportunities and constraints is provided below and is followed by summary tables for each ferry landing.

FIGURE 12: POTENTIAL FERRY ROUTES

The Hopewell to northside route follows the James River's deep-water channel past City Point (it does not stop) before stopping at Jordan Point and continuing across the river.

[7] The James River forms in the Appalachian Mountains and flows 348 miles to the Chesapeake Bay. The James River is tidal in Hopewell, with a tidal range of approximately 3 feet (between high tide and low tide). The river's deep-water channel, extending from Richmond to Hampton Roads, allows for the passage of large marine vessels. The channel is approximately 25 feet deep and 300 feet wide from Hampton Roads to Hopewell and 25 feet deep and 200 feet wide from Hopewell to the Richmond Deepwater Terminal (U.S. Army Corps of Engineers). There are several shallow areas, or shoals, located off City Point, which are documented in nautical charts from National Oceanic and Atmospheric Administration.

Island Line Ferry, Burlington, Vermont. Source: Local Motion

Costs

- **Capital costs** – $350,000-$2.4 million depending on the crossing (Figure 11). Assumes two (2) vessels at approximately $175,000 each plus additional costs for floating docks (if required) and trail connections to ferry landings (if required).[8]
- **Annual operating costs** – $145,000-$149,000 depending on the crossing. Assumes wages for shuttle drivers and costs for insurance and fuel.
- **Net present value** – $3.8 million-$5.8 million (depending on the crossing) over a 25-year period.

Implementation

It is anticipated that a bicycle/pedestrian ferry service could be implemented within three (3) years from the day of funding.

Opportunities

- **Affordability** – the bicycle/pedestrian ferry service promises to be significantly less expensive than the shared-use path and bicycle/pedestrian bridge alternatives.
- **City Point** – there is potential for the ferry service to depart from City Point, which was identified as the most important regional trail destination in the Fall 2017 survey.
- **Novelty service** – the ferry service would be a novelty for the region and the state.

[8] Preliminary ferry costs derived from the Volpe Center Ferry Lifecycle Model.

- **Potential for non-bicycle users** – the service could attract a wider user group, including people who simply want to be out on the river. The service could host special events, like educational programs for students traveling to the VCU Rice Center.
- **Limited environmental impacts** – other than dock construction and the potential development of connector paths to the docks, the ferry service should have minimal environmental impacts on the natural and built environment. Further study should evaluate the impacts of dock construction and/or boat activity around City Point as there could be sensitive underwater artifacts.
- **Opportunities for fare collection** – while this study does not make passenger revenue assumptions, there could be opportunities for fare collection.

Constraints

- **Limited service** – the service would likely operate on a limited schedule, particularly if the VCU Rice Center was used as the northside dock location (limited staffing at the Rice Center).
- **Potentially lower ridership** – the service would likely have lower ridership than new paths or bridges.
- **Historic preservation** – there are potential underwater archaeological concerns at City Point.
- **Funding** – the service would not be eligible for SMART SCALE surface transportation funding.

Potential Ferry Landings

The opportunities and constraints for each ferry landing are highlighted below. While this study does *not* attempt to select a "preferred" ferry landing, it provides an objective evaluation of each option. All ferry alternatives recommend a stop at Jordan Point Yacht Haven. The stop could help expand connectivity, increase ridership, and benefit the marina (through concessions, fuel).

While the ferry landings generally rely on Federal and State-owned lands, there may be opportunities for municipalities or state agencies, like VDOT or the Department of Conservation and Recreation (DCR), to purchase waterfront land for the purposes of providing public water access. For example, preliminary conversations with the U.S. Fish and Wildlife Service (FWS) indicate that there may be land available at Windmill Point, just east of the James River National Wildlife Refuge.

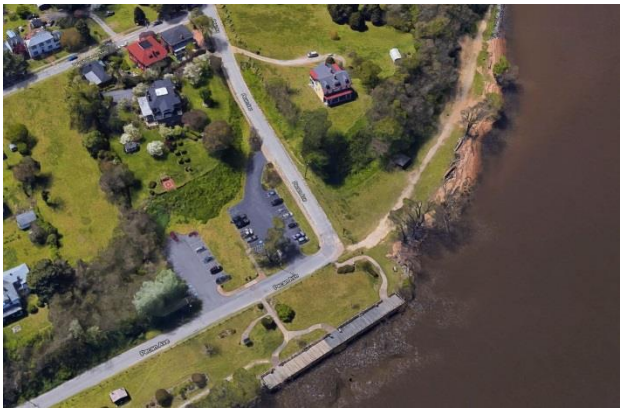
Hopewell City Marina

Opportunities	Constraints
• Municipal marina	• No fuel services
• Existing dock space	• Longer distance to north side of the James River
• Existing parking lot	• Potential competition for dock space
• Deep water	
• Convenient access to Route 10	
• Open year round	
• Limited environmental impacts	
• Located along proposed Appomattox River Trail	

Hopewell City Marina. Image source: YouTube, user: heliflyer7

City Point

Opportunities	Constraints
• Historic site	• No fuel services
• Scenic beauty	• Dock construction may be required
• Collaboration with National Park Service (NPS)	• Potential archeological concerns
• Potential increase in visitors to City Point	
• Deep water (served large vessels during the Civil War)	
• Shorter distance to the north side of the James River	



City Point Waterfront Park. Image source: City of Hopewell.

Benjamin Harrison Bridge

Opportunities	Constraints
• Available right-of-way for dock and shared-use path	• Dock and float construction required
• Shared-use path could benefit local neighborhood and strengthen the argument to include a bicycle/ pedestrian path if/when the bridge is replaced	• Shared-use path requires additional costs
	• Limited parking (unless land is acquired)
	• No fuel services
	• Traffic on Route 156

Benjamin Harrison Bridge. Photo source: VDOT.

Old Ferry Road

Opportunities	Constraints
• State-owned land/vacant parcel	• Dock construction required
• Former VDOT ferry landing	• Potential concerns from adjacent landowners
• Deep water	• Potential costs to remove remnant pilings
• Low traffic volume (approx. 100 ADT) on Old Ferry Road (shared-us path not required)	• No fuel services
• Initial support from Charles City County	

Terminus of Old Ferry Road (Route 659).

VCU Rice Center

Opportunities	Constraints
• Educational opportunities associated with the VCU Rice Center	• No fuel services
• Potential restroom and water station where the Capital Trail intersects the Rice Center access road (preliminary discussions underway)	• Potentially limited service (e.g. seasonal or weekends) due to limited staffing/security at the Rice Center (see Stakeholder Outreach)
• Low traffic roadway (shared-use path not required)	• Unsuitable road conditions for road cyclists with thin tires

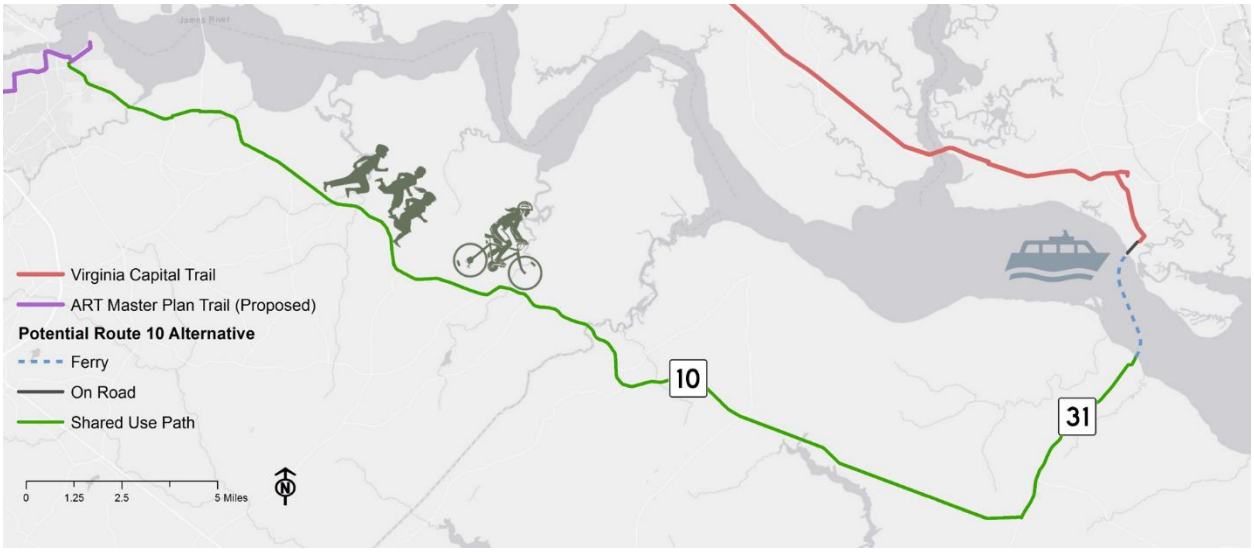
VCU Rice Center. Photo source: VCU.

Alternative 1 – Path along Route 10 and the Jamestown-Scotland Ferry

This alternative proposes to construct a shared-use path from Hopewell to the Jamestown-Scotland Ferry (Figure 13).[9] The proposed route begins at Hopewell City Park, where the proposed Lower Appomattox River Trail meets Appomattox Street. It travels south on Appomattox Street, past the Appomattox Regional Library and Beacon Theatre to Route 10 (West Randolph Road). Following Route 10 for nearly 30 miles, the route passes the James River National Wildlife Refuge and the rural communities of Burrowsville and Spring Grove before turning north on Route 31 in Surry County. From the historic town of Surry, the route continues north, following the proposed Birthplace of America Trail, before ultimately meeting the Jamestown-Scotland Ferry landing where trail users can board the VDOT-operated ferry and connect to Jamestown and the Virginia Capital Trail.

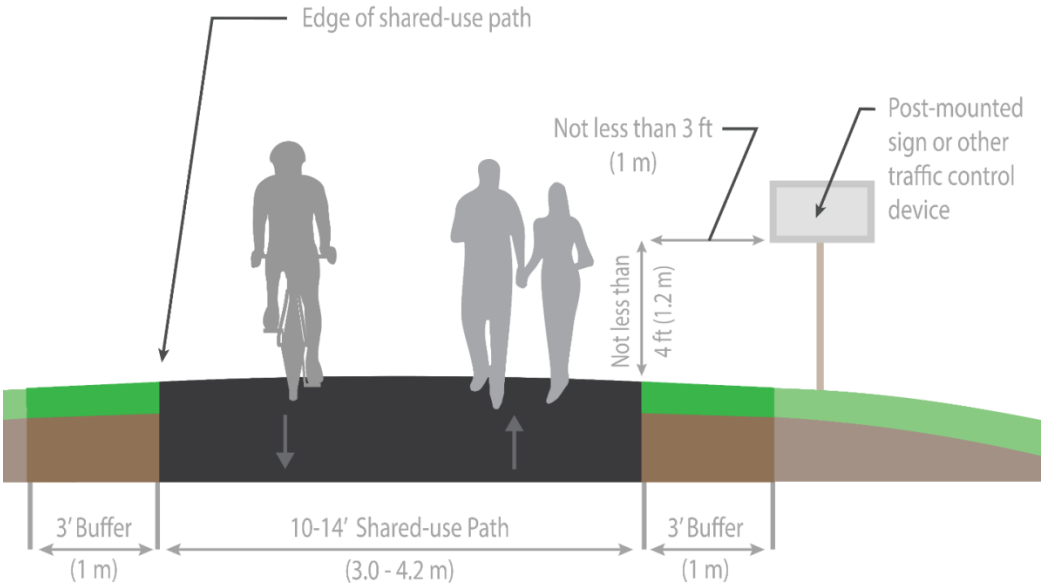
This alternative is *not* recommended now due to its high cost and feasibility concerns. The discussion below provides detail on the costs, anticipated timeline for implementation, and opportunities and constraints. Planning-level cost estimates are provided for the individual trail segments (see Route Details section).

FIGURE 13: PROPOSED SHARED-USE PATH ROUTE



[9] A shared-use path (Figure 14) is a path or trail that is physically separated from motor vehicle traffic and designed to accommodate cyclists, pedestrians, skaters, joggers, users of wheelchairs and other mobility-assisted devices, and other active transportation users. The American Association of Surface Transportation Officials (AASHTO) recommends all-weather pavement surfaces (asphalt, concrete) and widths of 10-14 feet, allowing for two-way travel. VDOT requires a 3' buffer zone adjacent to paths situated along VDOT roadways or right-of-way and recommends wider paths (min. 12 feet) in urban areas or in places where there are high volumes of cyclists and pedestrians. The Virginia Capital Trail, running from Richmond to Jamestown, is a successful example of a shared-use path.

FIGURE 14: SHARED-USE PATH DESIGN GUIDELINES



The guidelines above reflect design standards from AASHTO and VDOT. Source: Michael Baker International

Costs

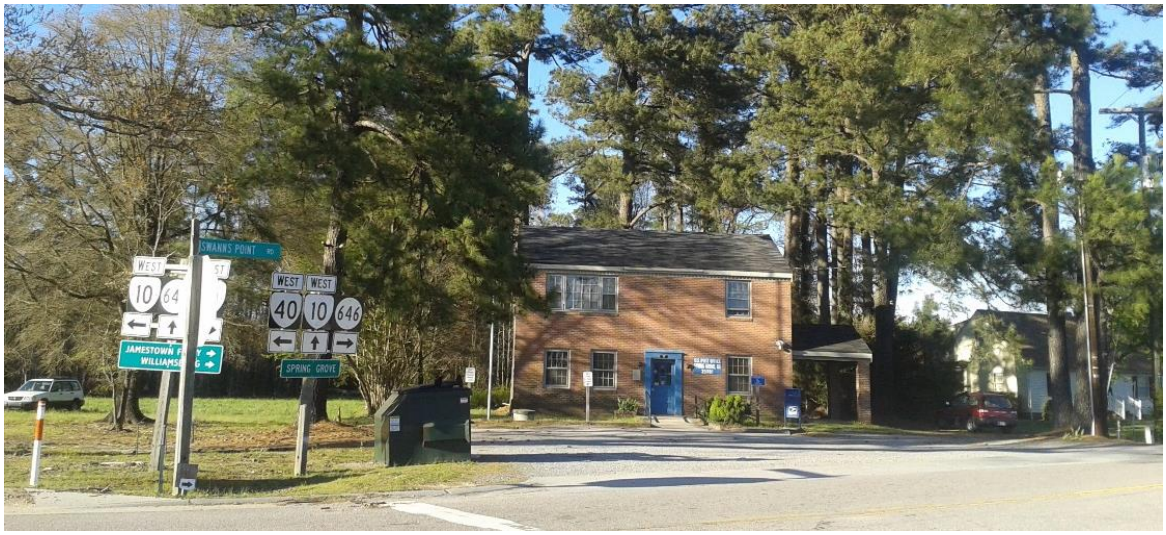
- **Capital costs** – $53.0 million. Assumes 35 miles of trail at approximately $1.5 million per mile. Considers the additional costs required to construct traditional bridges over streams and creeks, as well as boardwalk bridges through wetland areas.
- **Annual operating costs** – $9,200 for evaluation, mowing, cleaning drainage structures, and trail sweeping and clearing.
- **Net present value** – $46.7 million over a 25-year period.

Implementation

A shared-use path along Route 10 could be funded and constructed in approximately 15-20 years.

Opportunities

- **Ridership** – in addition to offering tremendous health and recreation benefits to the region's residents, the trail could attract trail users from across the country.
- **Right of way** – there appears to be sufficient right-of-way along the majority of Route 10 based on a preliminary assessment of VDOT road designs.
- **Regional trail connections** – the trail would connect the Virginia Capital Trail to two proposed trails—the Lower Appomattox Regional Trail and the Birthplace of America Trail (BOAT).
- **Consistency with local plans** –the Surry County Bicycle Plan proposes a shared-use path on Route 31 and shoulders on Route 10.
- **Local connections** – provides a connection to community resources, such as the Surry Recreation Center, Appomattox Regional Library, Beacon Theatre, and various places of worship.
- **Economic development** – the trail could provide economic development opportunities to communities along the trail.



Post Office, Spring Grove, Virginia

Constraints

- **Funding and implementation** – the trail's feasibility will likely depend on regional coordination and the ability to secure and bundle various funding sources. In addition, the trail will likely need to be constructed in pieces or segments over an extended period. For example, the Virginia Capital Trail was aggressively constructed over the course of 12 years using a unique combination of federal enhancement, open-container, and Smithsonian funds.
- **Environmental impacts** – the proposed trail traverses over ½ mile of wetlands and crosses several streams, including the Bailey Creek crossing, which may require bridge widening or a replacement in order to safely accommodate active transportation users.
- **Topography** – there are several steep sections in Prince George County that may be intimidating to new cyclists. For reference, the maximum incline is 2%, roughly half as steep (but the same distance) as the eastbound climb leaving Richmond on the Virginia Capital Trail.
- **Distance** – the 35-mile connection (one way) to the Virginia Capital Trail may be longer than most cyclists are willing to ride. Additionally, there are long distances between communities, often without shade or amenities. Rest areas, equipped with water stations and restrooms, are recommended in the event that this alternative is pursued.

Route Details (Segments)

From	To	Length (Miles)	Part of an Existing Plan?	Planning-level Cost Estimate
Hopewell City Park	Hopewell City Line	1.7	No	$2.7M
Hopewell City Line	Route 156	1.9	No	$3.1M
Route 156	Route 609	4.8	No	$7.4M
Route 609	Surry County Line	8.0	No	$12.0M
Surry County Line	Route 40	5.4	No	$8.1M
Route 40	Town of Surry Line (South)	8.4	Yes	$12.7M
Town of Surry Line (South)	Town of Surry Line (North)	1.0	Yes	$1.4M
Town of Surry Line (North)	Jamestown-Scotland Ferry	3.9	Yes	$5.6M
TOTAL		**35.0 miles**		**$53.0M**

*Total Estimated Maintenance Costs: $9,200 per year

Scotland Wharf and the Jamestown-Scotland Ferry (VDOT)

Alternative 2 – Bicycle/Pedestrian Bridge

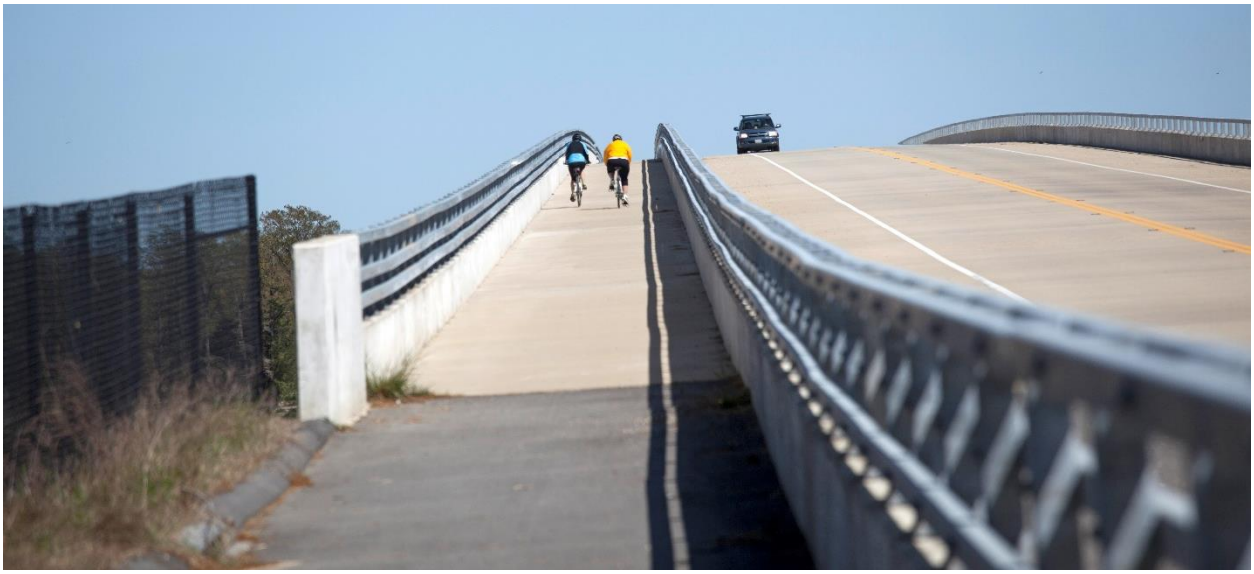
This study considered the feasibility and costs of constructing a bicycle/pedestrian bridge across the James River or adding bicycle/pedestrian accommodations to the Benjamin Harrison Bridge. While specific bridge locations were *not* identified as part of this study, the planning-level bridge costs and considerations are based on the average distance of three potential crossings.[10] Preliminary conversations with the Fifth Coast Guard indicate that any new bridge would need a minimum vertical clearance of 145', equivalent to the maximum height of the Benjamin Harrison Bridge (with its vertical lift enabled).[11]

This alternative is not recommended at this time due to its high cost, technical feasibility concerns and anticipated environmental impacts. While the alternative may not be advisable in the short term, it is strongly recommended that the Benjamin Harrison Bridge, when replaced, include a shared-use path like that found on the Judith Stewart Dresser Memorial Bridge, which carries Route 5 and the Virginia Capital Trail across the Chickahominy River (below).

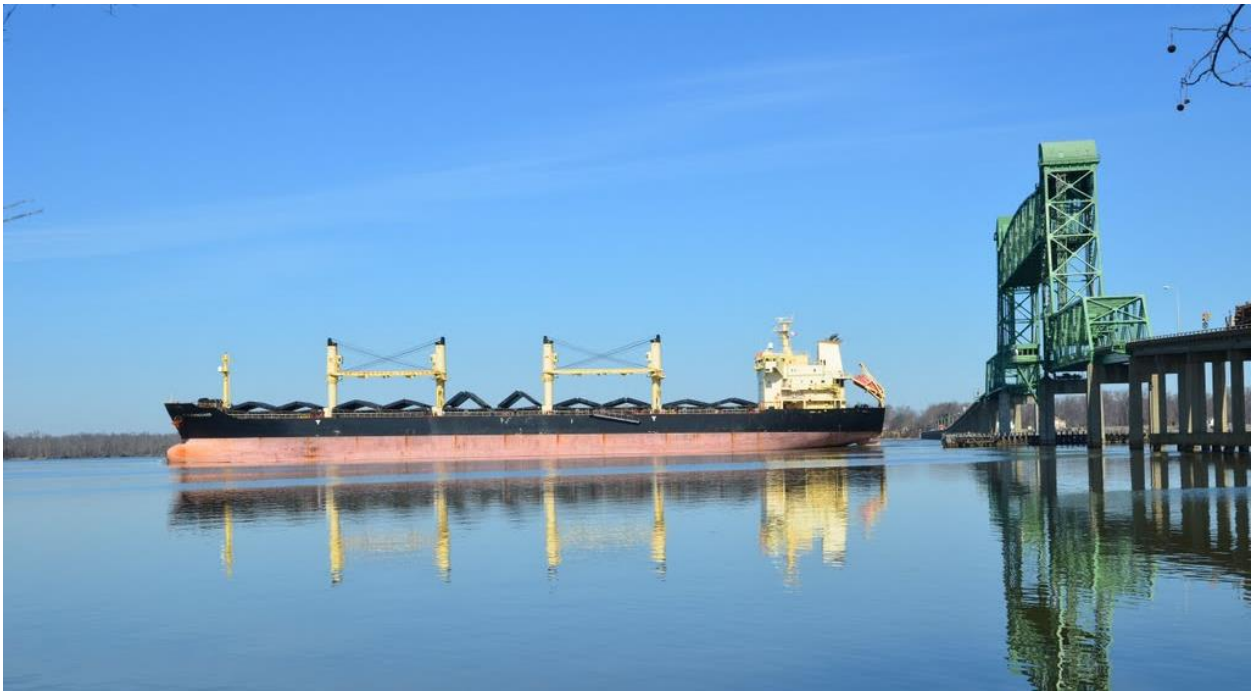
A summary of general opportunities and constraints is provided below and is followed by a discussion of three alternative bridge concepts that could satisfy U.S. Coast Guard requirements. These alternatives are planning-level concepts and are meant to provide examples of structures whose designs could comply with the U.S. Coast Guard's 145-foot vertical clearance navigation requirement.

[10] In the event that this alternative is pursued, further environmental study and in-depth public engagement are needed to identify specific bridge locations.

[11] Several members of the public recommended installing a hanging pedestrian bridge below the 157-foot-tall Varina-Enon Bridge, which carries I-295 across the James River. Unfortunately, the additional structure would violate the U.S. Guard's minimum vertical clearance requirement for large vessels (145 feet).



The Judith Stewart Dresser Memorial Bridge, which carries Route 5 and the Virginia Capital Trail over the Chickahominy River, includes a 10' shared-use path (separated by a barrier)



The Benjamin Harrison Bridge's vertical-lift capabilities allow safe passage for large vessels. Source: Mapio

Cost

- **Capital costs** – $48.5 million. Assumes a vertical height of 145' and a bridge length of 3,700'. Assumes extensive spiral pedestrian ramps on each side of the bridge.
- **Annual operating costs** – $16,700 in annual maintenance costs. These costs are significantly higher for a movable or swing bridge concept.
- **Net present value** – $42.8 million over a 25-year period.

Implementation

It is anticipated that a new bicycle/pedestrian bridge could be constructed in 20+ years.

Opportunities

- **Potentially high ridership** –the study's public survey participants (Fall 2017 and Spring 2018) identified a bicycle/pedestrian bridge as their preferred alternative for crossing the James River and connecting the two trails. Cost and implementation time were not considerations in the Fall 2017 survey.
- **Regional bicycle and pedestrian connectivity** – a new bridge would provide a direct connection between Prince George County and Charles City County.
- **Tourism and economic development** – a new bicycle/pedestrian bridge could contribute to additional tourism and spending in the region. It could also encourage new businesses, such as restaurants and bed and breakfasts, to develop along the trail. In addition, the bridge could offer an alternative commuting option for those living in Charles City County and commuting to Prince George County (or vice versa).
- **Right-of-way** – preliminary review of the VDOT road design plans suggest available right of way along Route 156 (if the new bridge were to parallel the existing Benjamin Harrison Bridge).
- **SMART SCALE** – the improvements could be eligible for SMART SCALE funding, although it is uncertain whether the project would be competitive in the scoring process.

Constraints

- **Funding and implementation** – it is unlikely that a project of this scope, scale and cost could be funded in the short term. There are few national examples of long bicycle/pedestrian bridges and those that are over ½-mile in length are typically in urban areas and collocated on other structures, like retired rail bridges.
- **Technical feasibility** – in addition to the U.S. Coast Guard's vertical height requirements (145' minimum) for a new or existing bridge in this section of the James River, the U.S. Coast Guard requires that Federal, State, and local agencies apply for a permit to construct a new bridge or causeway or reconstruct or modify an existing bridge or causeway across navigable waters, such as the James River. As part of the permitting process, applicants must submit a Navigation Impact Report (NIR) to the U.S. Coast Guard Bridge District Office that has jurisdiction over the area of the proposed bridge site. The Fifth Coast Guard District in Portsmouth, Virginia maintains jurisdiction of the James River in this study area.[12] In addition, bridge (re)construction over the James River is considered a "Federal action", mandating an environmental document describing the potential environmental impacts under the National Environmental Policy Act (NEPA) (42 USC 4321, *et seq*.).
- **Environmental** – a new bridge could have adverse effects, either directly or through habitat modifications on species and/or environmentally sensitive resources.
- **Land acquisition** – a new bridge could require significant land acquisition, particularly for any spiral pedestrian ramps (to ensure 145' vertical clearance above the James River).

[12] The Navigation Impact Report (NIR) is found in Appendix A of the Bridge Permit Application Guide (BPAG). Fifth Coast Guard District Contact Information: Mr. Hal R. Pitts; Chief, Bridge Branch; Fifth Coast Guard District; 431 Crawford Street; Portsmouth, VA; 23704; (757) 398-6222

Potential Bridge Concepts

Alt. 2A: High Bridge with Spiral Ramps

Preliminary research suggests that a high bridge, with spiral, ADA-compliant pedestrian ramps, could be the most cost-effective bridge alternative at $48.5 million.[13] To comply with the American Disabilities Act (ADA), this type of bridge would require lengthy pedestrian ramps – nearly 3,500 feet on each side. It is anticipated that the spiral ramp configurations would require significant land on each side of the river. The Big Four Bridge (below), spanning the Ohio River between Louisville, Kentucky and Jeffersonville, Indiana, provides a case study example of this style bridge.

Big Four Bridge: Louisville, Kentucky	
Year Built	2011
Height	50’
Ramp Length	1,181’ (each side)
Ramp Grade	4.2%
Ramp Cost	$8.5 million

Image source: Louisville Waterfront

Cost source: Courier-Journal

Big Four Bridge: Louisville, Kentucky. Source: Louisville Waterfront

Alt. 2B: Lift or Swing Bridge

A pedestrian lift or swing bridge would require less land than a “high bridge” concept with spiral ramps, but would cost more. Preliminary estimates suggest that construction costs would be approximately $86.8 million ($1,640 per square foot).

[13] Costs in 2017 dollars. Assumes $660 per square foot for the ramps and $315 per square foot for the bridge deck. Cost estimates are based on average distances across the James River and rely on case study insights from the Big Four Bridge in Louisville, Kentucky.

Pedestrian lift bridge in the Netherlands (left) and proposed pedestrian swing bridge in Philadelphia, Pennsylvania (right). Sources: ipvdelft.com and Schuylkill River Development Corporation

Alt. 2C: Retrofitting the Benjamin Harrison Bridge

One preliminary alternative considered adding a cantilevered shared-use path to the side of the Benjamin Harrison Bridge, which carries Route 156 across the James River. The two-lane bridge currently serves 4,500 vehicles per day and does not include shoulders or bicycle/pedestrian accommodations. The bridge is a vertical-lift structure, meaning that its center span rises vertically while remaining parallel with the bridge deck. The vertical lift function, made possible by service elevators within the lift towers, allows safe passage for large vessels or barges. In 2017, the Virginia Department of Transportation invested $3.0 million to replace the aging elevators.

Cantilevered Sidewalk. Source: Kauai.org

A preliminary bridge assessment was conducted and this alternative does *not* appear feasible, primarily due to the additional weight requirements and the challenges associated with a movable (lift) bridge.

- First, the bridge's vertical lift system is not designed to accommodate an additional path and, in all likelihood, an entirely new structure would likely need to be installed so that the path could independently lift when large marine vessels approach the bridge.
- Second, the existing structure may not safely accommodate the additional weight of a 14' cantilevered shared-use path. A 14' concrete path's "dead load" (the structure, itself) and "live load" (the transportation users) *each* contribute to approximately 90 pounds per square foot, which translates to an additional 13.3 million pounds across the bridge's 5,280-foot span. Composite materials, while lighter than concrete, could potentially be used for the path deck, but would still add approximately 8.9 million pounds (dead load and live load) to the existing structure.[14] It is likely that extensive foundations and/or supporting members would need to be installed to accommodate the additional weight. Prior to further design, load testing is recommended to evaluate the structural capacity of the bridge.

[14] Source: Preliminary composite assessment provided by Composite Advantage. Further design requests can be made by VDOT or the Crater PDC.

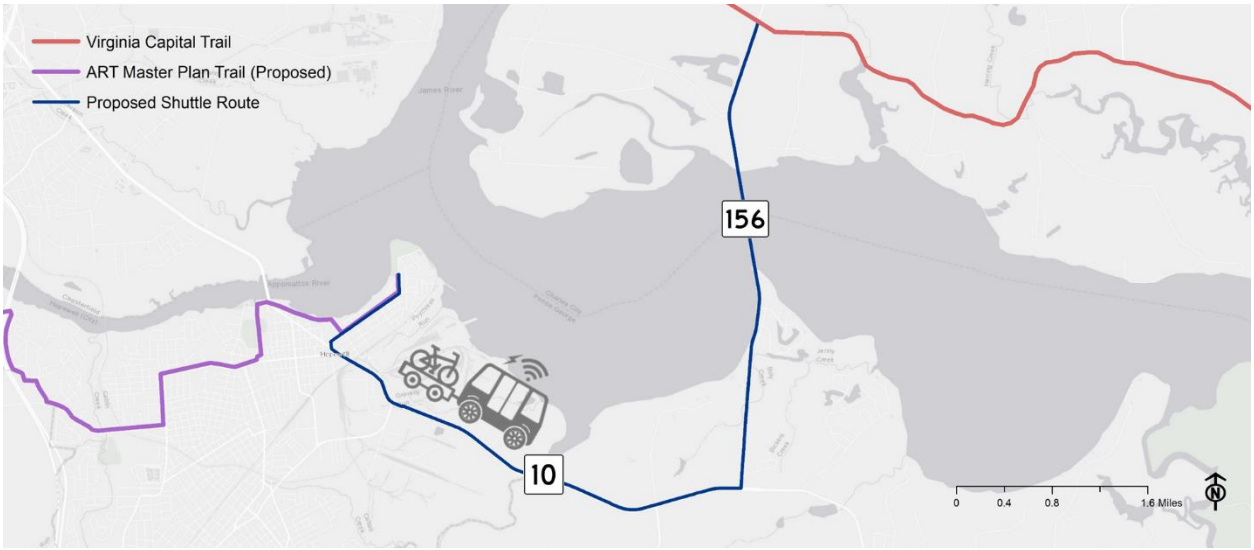
Alternative 3 – Autonomous Shuttle

This alternative proposes connecting the two trails by an electric, autonomous shuttle service. The route begins at City Point and travels south on Cedar Lane and Appomattox Street before turning southwest on Randolph Road (Route 10). The route then travels north on Route 156 across the Benjamin Harrison Bridge before intersecting Route 5 and the Virginia Capital Trail (Figure 15). The shuttle could have a set schedule, be by request only, or be some combination of the two.

While it would be the first driverless shuttle in Virginia, autonomous shuttles have been deployed in other places, like Las Vegas, NV; Ann Arbor, MI; and Arlington, TX. The 2018 autonomous shuttles typically carry 10-15 passengers and require an attendant on board. They rely on a redundant system of GPS, LIDAR, and odometry (motion sensors) to map routes and detect potential obstacles.[15] They operate at low speeds (typically less than 25 mph) and can handle a maximum grade of approximately 12 degrees. The shuttles require charging stations and it is recommended that the shuttles are stored and maintained in a secure structure.

This alternative is *not* recommended at this time due to the uncertainty about autonomous vehicles and the alternative's limited public support (Spring 2018 Survey). In addition, today's approved autonomous shuttles (e.g. photo next page) travel much slower than the speed limits on Route 10/156 (55 mph), which represents an additional safety concern. The following discussion details the alternative's estimated costs, anticipated timeline for implementation, and opportunities and constraints.

FIGURE 15: PROPOSED AUTONOMOUS SHUTTLE ROUTE



[15] LIDAR is a surveying method that measures distance to a target (or environment) by illuminating the target with pulsed laser light and measuring the reflected pulses with a sensor. Differences in laser return times and wavelengths can then be used to map or construct digital 3-D representations of the target or environment.

NAVYA Shuttle operating in Las Vegas, Nevada. Source: Regina Garcia Cano/AP

Costs

- **Capital costs** – $1.3 million. Assumes four (4) shuttles at approximately $335,000 each plus additional costs for bike rack or trailer installation. It is expected that these shuttles could become more affordable as the technology becomes more common.
- **Annual operating costs** – $94,000. Assumes wages for shuttle attendants and routine maintenance costs.
- **Net present value** – $2.7 million over a 25-year period.

Implementation

It is anticipated that autonomous shuttles could be deployed within two (2) years from the day of funding. Prior to deployment, it is recommended that GPS coordinates of potential route(s) are sent to the shuttle manufacturer. In addition, the managing agency should work with the manufacturer to ensure compliance with National Highway Traffic Safety Administration (NHTSA) guidelines.

Opportunities

- **Affordability** – autonomous shuttles, are more expensive than conventional gas-powered shuttles, but are more affordable than constructing a new bridge or shared-use path.
- **Novelty** – these would be the first autonomous shuttles in Virginia, potentially bringing a lot of buzz and excitement to the route.
- **Year-round potential** – the shuttles could operate throughout the year.
- **"Green" transportation alternative** – the vehicles are electric, operating on clean energy.
- **Opportunities for fare collection** – there could be opportunities to integrate the shuttles into the Petersburg Area Transit system.
- **Eligible for SMART SCALE** – the shuttles could possibly be eligible for SMART SCALE funding since they provide surface transportation and intermodal connections.

Constraints

- **Low travel speeds** – today's 2018 shuttles travel a maximum speed of 25 mph, which is significantly below the speed limit on segments of Route 10/156 (55 mph).
- **Emerging technology** – connected and automated vehicles are still in their infancy and have not been tested on public roads in Virginia.
- **Safety and security concerns** – in addition to the public's skepticism of riding in automated vehicles, there are concerns about the vehicles' abilities to properly detect pedestrians and cyclists. There are also concerns about the vehicles' low speeds (mentioned above) and about the threat of cybersecurity and hacking
- **Potentially lower ridership** – autonomous shuttles would likely have lower ridership than other alternatives, such as new paths or bridges. In addition, this alternative ranked last in order of preference in the Spring 2018 survey.
- **Limited funding sources** – while potentially eligible for SMART SCALE, it is uncertain whether the shuttles' capital and operating costs could be covered by other conventional Federal and State funding sources.

Next Steps

This study is a regional effort to identify recommended alternative(s) for crossing the James River and connecting the Appomattox River Trail and the Virginia Capital Trail. While there is no funding set aside for design and construction/implementation, this study's input, analysis, and recommendations can be used to guide future coordination and investments. This section details some of the potential next steps.

Regional Coordination

VDOT, the Crater PDC, FOLAR, the region's municipalities, and Federal agencies should continue working together to ensure that the region's trail network reflects inter-agency input and public support.

The Tri-Cities Metropolitan Planning Organization (Tri-Cities MPO) and the region's municipalities should incorporate this study's recommendations in the region's Long-Range Transportation Plan (or Metropolitan Transportation Plan), as well as in local Comprehensive Plans and any other municipal transportation plans, such as bicycle master plans.

It is also recommended that Prince George County and Charles City County update their comprehensive plans to include the Benjamin Harrison Bridge replacement (*with a shared-use path*) along with any necessary trail connections to/from the bridge.

Further efforts should continue to include conversations with municipalities, federal agencies, and nonprofits (e.g. FOLAR).

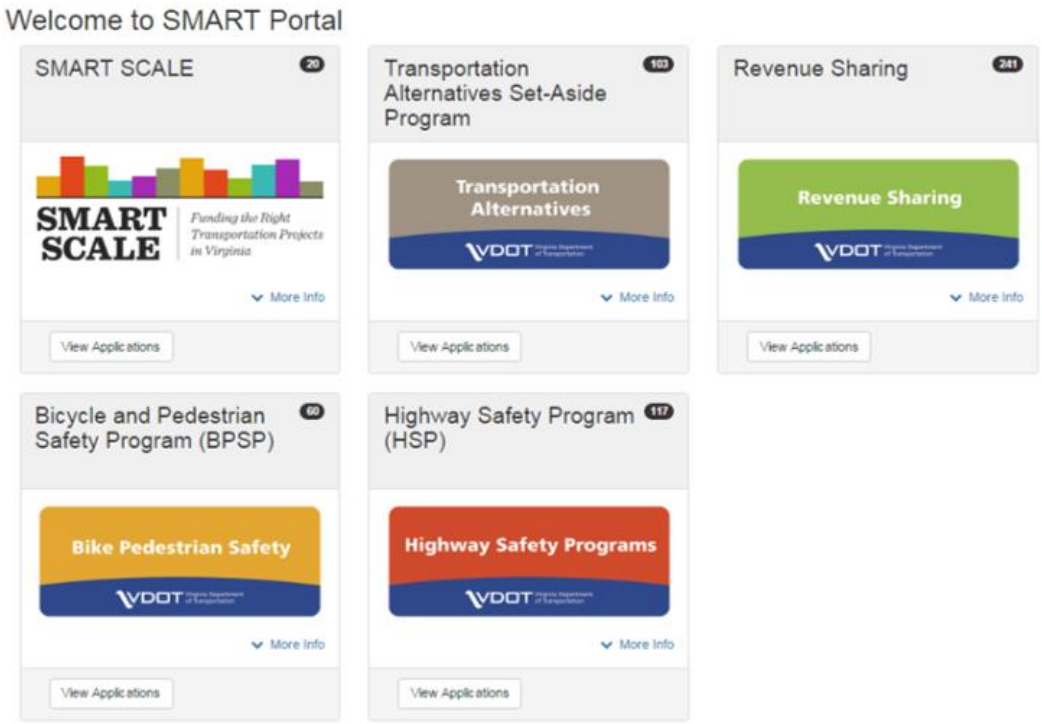
Funding

Local governments can apply for funding through VDOT and the Tri Cities MPO. VDOT's SMART PORTAL is a one-stop shop for information about VDOT funding programs, including: SMART SCALE, the Transportation Alternatives Set-Aside Program, Revenue Sharing, the Bicycle and Pedestrian Safety Program (BPSP) under the Highway Safety Improvement Program (HSIP). More than 900 applications were submitted in 2016 for these programs. The programs are briefly described below.

- The **SMART SCALE** program is a competitive application process and scores projects based on an objective, outcome-based process. Bicycle, pedestrian, and other types of surface transportation improvements are eligible for SMART SCALE funding. VDOT selected 163 projects in FY 2017, accounting for $1.7 billion in funding.[16]
- The **Transportation Alternatives (TA) Set-Asides** are intended to improve non-motorized transportation, enhance the public's traveling experience, revitalize communities, and improve quality of life. The program requires a 20% local match (80% federal). VDOT allocated $23 million in Transportation Alternatives (TA) in FY 2017.
- The **Revenue Sharing Program** provides additional funding for use by a county, city, or town to construct or improve the highway systems within such county, city, or town, with statutory limitations on the amount of state funds authorized per locality. The program requires a 50% local match (50% state) and a portion of the funds must be expended within one year of allocation. Sidewalks and shared-use paths are eligible activates under the Revenue Sharing Program as long as they advance projects in a locality's Capital Improvement Program.

[16] http://vasmartscale.org/projects/fy_2017_projects.asp

- The **Highway Safety Improvement Program (HSIP)'s Bicycle and Pedestrian Safety Program (BPSP)** provides funds for implementing short-term, low-cost bicycle and pedestrian safety projects in Virginia. This initiative is administered by evaluating each project application on a case-by-case basis and does not require a local match.



The VDOT SMART Portal provides a one-stop shop for information about VDOT funding programs.
Visit the Portal at https://smartportal.virginiahb2.org/#/

In addition, municipalities and the Crater PDC should explore other Federal funding programs, many of which vary in terms of eligibilities and guidelines. For example, the Federal Lands Transportation Program (FLTP) includes transportation projects that provide access to, adjacent to, or through Federal lands. While the FLTP program is highly specific to areas in and around Federal lands, the Appomattox River Trail to Capital Trail connection provides access to City Point, a federally-owned National Park Service facility. The tables and information below summarize the variety of Federal programs, which included hyperlinks to the specific programs.

TABLE 1: FUNDING OPPORTUNITIES (USDOT TRANSIT, HIGHWAY, AND SAFETY FUNDS)

Activity or Project Type	BUILD	TIFIA	FTA	ATI	CMAQ	HSIP	NHPP	STBG	TA	RTP	SRTS	PLAN	FLTTP
Access enhancements to public transportation (includes benches, bus pads)	$	$	$	$	$		$	$	$				$
ADA/504 Self Evaluation / Transition Plan								$	$	$		$	$
Bicycle plans			$					$	$		$	$	$
Bicycle helmets (project or training related)								$	$SRTS		$		
Bicycle helmets (safety promotion)								$	$SRTS		$		
Bicycle lanes on road	$	$	$	$	$	$	$	$	$		$		$
Bicycle parking	~$	~$	$	$	$		$	$	$	$	$		$
Bike racks on transit	$	$	$	$	$			$	$				$
Bicycle share (capital and equipment; not operations)	$	$	$	$	$		$	$	$				$
Bicycle storage or service centers at transit hubs	~$	~$	$	$	$			$	$				$
Bridges / overcrossings for pedestrians and/or bicyclists	$	$	$	$	$*	$	$	$	$	$	$		$
Bus shelters and benches	$	$	$	$	$		$	$	$				$
Coordinator positions (State or local)					$ 1 per			$	$SRTS		$		
Crosswalks (new or retrofit)	$	$	$	$	$*	$	$	$	$	$	$		$
Curb cuts and ramps	$	$	$	$	$*	$	$	$	$	$	$		$
Counting equipment			$	$		$	$	$	$	$	$	$*	$
Data collection and monitoring for pedestrians and/or bicyclists			$	$		$	$	$	$	$	$	$*	$
Historic preservation (pedestrian and bicycle and transit facilities)	$	$	$	$				$	$				$
Landscaping, streetscaping (pedestrian and/or bicycle route; transit access); related amenities (benches, water fountains); generally as part of a larger project	~$	~$	$	$			$	$	$				$
Lighting (pedestrian and bicyclist scale associated with pedestrian/bicyclist project)	$	$	$	$		$	$	$	$	$	$		$
Maps (for pedestrians and/or bicyclists)			$	$	$			$	$		$	$*	
Paved shoulders for pedestrian and/or bicyclist use	$	$			$*	$	$	$	$		$		$

Key: *$ = Funds may be used for this activity (restrictions may apply). $* = See program-specific notes for restrictions. ~$ = Eligible, but not competitive unless part of a larger project.*

TABLE 1 (CONT.): FUNDING OPPORTUNITIES (USDOT TRANSIT, HIGHWAY, AND SAFETY FUNDS)

Activity or Project Type	BUILD	TIFIA	FTA	ATI	CMAQ	HSIP	NHPP	STBG	TA	RTP	SRTS	PLAN	FLTTP
Pedestrian plans			$					$	$		$	$	$
Recreational trails	~$	~$						$	$	$			$
Road Diets (pedestrian and bicycle portions)	$	$				$	$	$	$				$
Road Safety Assessment for pedestrians and bicyclists						$		$	$			$	$
Safety education and awareness activities and programs to inform pedestrians, bicyclists, and motorists on ped/bike safety								$SRTS	$SRTS		$	$*	
Safety education positions								$SRTS	$SRTS		$		
Safety enforcement (including police patrols)								$SRTS	$SRTS		$		
Safety program technical assessment (for peds/bicyclists)								$SRTS	$SRTS		$	$*	
Separated bicycle lanes	$	$	$	$	$	$	$	$	$		$		$
Shared use paths / transportation trails	$	$	$	$	$*	$	$	$	$	$	$		$
Sidewalks (new or retrofit)	$	$	$	$	$	$	$	$	$	$	$		$
Signs / signals / signal improvements	$	$	$	$	$	$	$	$	$		$		$
Signed pedestrian or bicycle routes	$	$	$	$	$		$	$	$		$		$
Spot improvement programs	$	$	$			$	$	$	$	$	$		$
Stormwater impacts related to pedestrian and bicycle	$	$	$	$		$	$	$	$	$	$		$
Traffic calming	$	$	$			$	$	$	$		$		$
Trail bridges	$	$			$*	$	$	$	$	$	$		$
Trail construction and maintenance equipment								$RTP	$RTP	$			
Trail/highway intersections	$	$			$*	$	$	$	$	$	$		$
Trailside and trailhead facilities (includes restrooms and water, but not general park amenities; see guidance)	~$*	~$*						$*	$*	$*			$
Training					$	$		$	$	$	$	$*	
Training for law enforcement on ped/bicyclist safety laws								$SRTS	$SRTS		$		
Tunnels / undercrossings for pedestrians and/or bicyclists	$	$	$	$	$*	$	$	$	$	$	$		$

Key: *$ = Funds may be used for this activity (restrictions may apply). $* = See program-specific notes for restrictions. ~$ = Eligible, but not competitive unless part of a larger project.*

Table Abbreviations:

ADA/504: Americans with Disabilities Act of 1990 / Section 504 of the Rehabilitation Act of 1973

BUILD (formerly TIGER): Better Utilizing Investments to Leverage Development, grants program

TIFIA: Transportation Infrastructure Finance and Innovation Act (loans)

FTA: Federal Transit Administration Capital Funds

ATI: Associated Transit Improvement (1% set-aside of FTA)

CMAQ: Congestion Mitigation and Air Quality Improvement Program

HSIP: Highway Safety Improvement Program

NHPP: National Highway Performance Program

STBG: Surface Transportation Block Grant Program

TA: Transportation Alternatives Set-Aside (formerly Transportation Alternatives Program)

RTP: Recreational Trails Program

SRTS: Safe Routes to School Program / Activities

PLAN: Statewide Planning and Research (SPR) or Metropolitan Planning funds

NHTSA 402: State and Community Highway Safety Grant Program

NHTSA 405: National Priority Safety Programs (Nonmotorized safety)

FLTTP: Federal Lands and Tribal Transportation Programs (Federal Lands Access Program, Federal Lands Transportation Program, Tribal Transportation Program, Nationally Significant Federal Lands and Tribal Projects)

Appendix A – Comments and Input

Fall 2017 Public Survey Comments (Open-ended Responses)

Do you have any other comments or suggestions?
A dedicated bike-ped path like the Va Capital Trail is best. A dedicated bike ped facility attached to the Benjamin Harrison Bridge males most sense. Go see bike-ped facilities attached to side of similar bridges in Pittsburgh for good examples.
A specific pedestrian bridge or at least sidewalk would be the best fit. A Ferry or shuttle involves more planning and timing things. Personally, I would rather use the trail at my pace and not worry about making a shuttle or ferry and risk being stuck
Adding a little distance or buffering from roads makes a difference in quality. While the Cap trail is great the traffic alongside it is harsh. The feel and experience of a trail without traffic presence is a rare gift.
Adding a protected bike lane to the 295 bridge over the James would also be a great way to connect the two trails as they are both right next to the highway!
an extension to old town Petersburg would be fantastic
Awesome project and can be such a tourism catalyst for the region
Bike shop along Trail would be helpful.
Build it fast!
Build it.
Consider providing shaded rest areas for people crossing the bridge
Do it!
Do it!
Educate the public about the project and its benefits. People in Chesterfield County booed the speaker during a discussion on a proposed trail. It was extremely disappointing...
Fort Lee is adjacent to Hopewell and has a large transit student population would expect them to cycle....run...the path after class and on the weekends. Float this survey through MWR on post.
Good job trying to provide more connected bike and pedestrian facilities.
Good luck
good luck!!
Have the leadership to actually do this! Transformative to the area!
His would be wonderful. Hurry please, I'm not getting any younger. Also a trail along the river from Goochland to RICHMOND would be well utilized
hope it gets build
Hope this works! Sounds like a great option for current capital trail users!
I live in Prince George and the only current way to the trail is by auto. If there was a connection by Hopewell that would make for a good ride.
I never knew the Appomattox River Trail existed. Will have to check it out! I love that you are considering joining these trails.
I ride the capital trail all the time. I would use and enjoy jumping on the trail near my home in River's Bend
I think the river crossing is the biggest problem. Physical structures are likely to be much too expensive but I'm not sure how you would schedule a ferry or shuttles
I think this is a great way to boost the economy and also health and wellness for the area.

Do you have any other comments or suggestions?
I think this would be a game changer for the region and would enhance the already popular Capitol Trail
I would like to see a bike route through Toano and Williamsburg to Yorktown joining the Capital trail.
I would never consider riding my bike to Hopewell from the fan area. But being able to get on the capital Trail and then catching a connector down to Hopewell is intriguing for me.
Keep making more trails that are safe and connect to others.
Keep up the great work VDOT!
Keep working on these awesome trail connections!!
Keeping it flat, attractive, and safe, is what I think will bring people out and keep them coming out with their friends and family.
Lack of this type of development is what has kept the Tri-cities and Richmond behind most every other developed metro area. The complete lack of ability to safely ride/walk in the area has kept the localities in poor health and growth
Let's get it done. There are not enough places to bike safely in central Virginia. This should be a priority to get it done.
Let's get this going. I have never been to Hopewell... but I am on the Capital Trail every week. This would change that!
Look for opportunities to tie into the East Coast Greenway.
Most worthy project. Think out of the box and design and construct an attached walk/bike way to BHB. Walkers and bicyclist only allowed.
Physically separate the path from vehicular traffic whenever possible. A bike / walking lane is an unsafe alternative to a separate path.
Please build it as soon as possible
Please build more bike trails!
Please do this!! I love the idea of a loop involving these locations. Also consider tying this into some connection to Pocahontas State Park... you know like a loop around Richmond!!!
Provide sufficient trailer width for new trail, plan a maintenance schedule...
Reach out to the Fort Lee community... Lots of outdoorsy Soldiers who also tend to be sports and health enthusiasts who are always seeking "Physical Training" opportunities ... If they live off post they may be interested in biking to work from, say, river's bend
Rt 106 would need a separated trail. The trucks traveling from Hopewell to Rt 60 or I-64 are dangerous. I've had a friend run over by tractor trailer as well as another cyclist riding with him who lost a leg on that road. While this incident took place north of rt 5, the trucks are flying all along that road.
Show success of Capital Trail to concerned citizens
Thank you for exploring this possibility. It makes so much sense to build a connection between the two efforts. Everyone will benefit from this project happening.
Thank you!
Thanks for requesting input and good luck
The Shuttle Van Service could be coordinated between VA Capital Trail and Appomattox River Trail PDC Staff members to make it work there.
The trail connection should occur via the Benjamin Harrison Bridge.

Do you have any other comments or suggestions?
The trails are jewels to the Commonwealth. Connecting them will greatly increase their value and use.
These trails successfully promote wellness and recreational tourism which greatly benefit Communities that they pass through
This connection is an important opportunity to improve the quality of life for residents of the Tri-cities area and for the economy of Virginia.
This could be huge for increasing commerce and recreational tourism
This is a great idea!
Trails are proven to encourage walking and bicycle riding. Good for health and community. When walking and riding you really observe the community closely and feel the human connection
What a wonderful idea!!!! Please do this!!
Yes ~ Master plan = Tie Cap Trail to Appomattox Trail to JRPS trail to Pocahontas State park. There is a current (Outlaw) path from Colonial Heights north towards Richmond ~ It currently extends to Willis Rd and the gate just beyond Drewry's Bluff. With the rebuilding of the original RR crossing from Pocahontas Island in Petersburg to Colonial Heights (Appomattox trail) this would allow a logical connection to the north. With procured / created new trail from Falling Creek, North (Between i 95- and James river across Falling Creek to Deep Water Terminal behind DuPont) you could connect Appomattox Trails in with JRPS trails at Richmond Waste Treatment (IE: Poop Loop Trails). I have ridden 60% of this though much is on private property & right of ways. Topic for another day ~ I have 60% of trails mapped out from this proposed leg to Pocahontas State park as well.

Spring 2018 Public Survey Comments (Open-ended Responses)

Do you have any other comments or suggestions?
Move ahead quickly instead sometime in the next century
Building a new Benjamin Harrison bridge that accommodates both vehicle and pedestrian/bicycle traffic is the best option to connect the trails. The current bridge is old and frequently breaks down.
Ultimately, replacement of the current Benjamin Harrison Bridge by a new B.H. Bridge that accommodates vehicle, bicycle, and pedestrian traffic would be the best alternative to connect the trails and provide an option that is the safest, has the highest ridership, and has the highest economic development potential for the area.
Given the condition of the Benjamin-Harrison Bridge, a renovation/rebuild that includes a bicycle lane would make the most sense.
Allow bikes to cross the bridge
#1 build new B-H bridge w/ped & bike lane; #2 build lane attached to existing bridge
Future replacement of Benjamin Harrison Bridge.
A bike/ped ferry modeled after historic James River boats would not only provide the transport, but would be an attraction for people closer to experience historical river culture, which is particularly significant to this area.
How would the analysis change If the bike/ped bridge was connected to the existing bridge?
Tough connection. I've biked the Benjamin Harrison (and even in wet weather) and it's not a fun crossing.

Do you have any other comments or suggestions?
Although the bridge and shared-use path are the most expensive options, they serve the most riders and will encourage much more ridership
I like the idea of having a shared use path along Route 10, I just don't think that should be the solution to this issue. I think we need something quick/easy that both people who walk and bike could use.
A bus shuttle will be easiest and safest route to go connecting VA Capital Trail to North Prince George County to Hopewell.
You guys rock.
Look at joining other trails foot or afloat or wheels.
Would love to see a separate cycling/walking platform added to one side of the BH Bridge.
Great infrastructure investment
Capital Trail is a special asset to the area! Anything we can to to enhance should be priority.
Do it quickly and as economically as possibly with longer term more costly solutions later.
Where would such a ferry connect, for example, between City Point and Eppes Island?
Cyclist are always looking for good coffee and snacks... open a shop on either side of the river so the cyclist will "spend money" while waiting
Add bike lane to existing bridge on side.
Make this happen and don't be a weasel about it. This should have been considered in the Enon-Varina bridge as well.
Why would you spend any dollars other than to replace the Benj. Harrison Bridge. The state continues to spend millions making FREQUENT repairs, just build a new bridge like the one that crosses the Chickahominy, which has a bike lane.
The Van/Shuttle service might be accomplished by issuing grant money to private operators providing minimum hours/days of service. Where a PPEA ride sharing provider maintains a presence on the trails around the bridge.
Could a pedestrian/bike bridge be hung from the Varina/Enon Bridge?
Connecting our trail networks will enhance recreation/destination tourism, increase property values, and promote wellness based communities
Connecting the Capital City trail to Downtown Hopewell would assist revitalization efforts creating a regional destination
Realistically, lower cost and availability sooner, good ole shuttle bus. LOVE the ferry idea though!
Would NEVER take a driverless shuttle anywhere.
Continue the dialog! Unconventional options could very well generated media attention, curiosity seekers, adventurers -- all increasing trail use.

Additional Public Comments

There were several comments on the draft documents. This input is summarized below.

Comment #1: "One of the constraints listed for all other potential landings, both northside and southside, was "No fuel services" with the exception of the Ferry Road alternative. I'm not quite sure why that wouldn't be the same for this alternative, as it was for say the VCU Rice Center alternative."
Study team response #1: "We truly appreciate your comments on the draft documents (and on the study process, in general) and you raise an excellent point about fuel services. We will be revising the documents to reflect public comments and will indicate that there are "No fuel services" at the Old Ferry Road location."

Comment #2: "Thank you for the opportunity to review this draft report on the potential connection between the Appomattox River Trail (ART) and the Virginia Capital Trail. We appreciate the effort that went into the study and being part of the research and inquiry portion of the project. The report provides a useful and succinct description of study activity, alternatives, and recommendations. We understand that the initial preference of adding a shared-use path to the Benjamin Harrison bridge was not a viable engineering alternative. We are in full agreement with the need for a shared-use path on a replacement bridge for the Benjamin Harrison Bridge and further stress the economic and safety benefits of making the replacement bridge a high priority. We at FOLAR look forward to continuing participation in the regional efforts to implement either of the recommended short-term trail network connection options and further efforts toward inter-agency input and public support as well as long-term planning."
Study team response #2: "Thanks so much for your comments on the draft documents and for your insights throughout this planning process."

Cap Trail Bike Shuttle

Cheyanne Burnham, Co-Founder, Co-Owner, Operator

The Cap Trail Bike Shuttle is a service that transports riders and their bicycles along the 52-mile Virginia Capital Trail to allow users to access various starting points, ride different sections on different days, and make one-way trips along the trail. The service includes a 15-passenger van and a pull-behind trailer that accommodates 17 bicycles. The shuttle operates by request in the winter off-season, but operates on a regular schedule throughout the rest of the year. Regardless of the time of year, advanced reservations are required. Operating costs for the shuttle are roughly $160,000 per year, excluding the driver wages.

Mrs. Burnham expressed interest in the Cap Trail Bike Shuttle's involvement in the Appomattox River Trail connection project, either as a private operator or in conjunction with VDOT or the Crater PDC as a public-private partnership. Hopewell is near the midpoint of the trail and offers tourism and recreational opportunities that complement those of Charles City/County, where the shuttle often picks up riders. Hopewell's dining and lodging opportunities makes the Appomattox River Trail connection an appealing starting point or destination and Virginia Capital Trail users may see Hopewell as an attractive overnight stopover when riding the trail in several days. Mrs. Burnham indicated that it may be possible for the Hopewell service to function as a secondary route on the Cap Trail Bike Shuttle. While this off-shoot or spur service to Hopewell may require an additional shuttle, the vehicle may not require as many seats – a minivan and a pad trailer (as opposed to a pull-behind trailer) may suffice, thus optimizing operations and reducing operating and start-up costs.

Shirley Plantation

Charles Carter, Executive Director, Shirley Plantation
Lauren Carter, General Manager, Shirley Plantation
Susan Dameron, Co-Owner, Upper Shirley Vineyards
Bob White, Owner, Bob's Cycle Barn and Museum

The study team met with land and business owners in the Shirley area, northeast of Hopewell, west of Route 156 (Roxbury Road), and south of the Virginia Capital Trail. The purpose of the meeting was to seek input of the landowners, discuss how the various alternatives may affect their properties and businesses, and to explore opportunities for trail connections to places of interest. The landowners shared local insights into possible contacts with additional stakeholders, potential funding options, possible ferry landing sites, and constraints such as: hunting grounds; truck traffic on properties; and ferry landing issues, like shallow sand bars and shoals. This group of stakeholders did not express interest in the trail traversing their properties or having a ferry dock at the Vineyard's restaurant.