



LOWER SALUDA GREENWAY
FEASIBILITY STUDY

FEASIBILITY REPORT

May 2021



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BACKGROUND



INTRODUCTION

The Central Midlands Council of Governments (CMCOG) in cooperation with the Irmo Chapin Recreation Commission (ICRC) undertook the Lower Saluda Greenway Feasibility Study.

As the formal documentation of the Lower Saluda Greenway Feasibility Study, this Feasibility Report:

- Further defines the greenway's mission, purpose, and need;
- Identifies potential environmental, cultural, and social resources that should have direct access to the greenway;
- Determines natural features or social concerns that will become constraints for greenway construction;
- Informs, educates, and solicits input from the public about the greenway;
- Provides a detailed concept plan and recommended alignment for the greenway; and
- Provides cost estimates for implementing the project.

This Feasibility Report is part of the South Carolina Department of Transportation (SCDOT) Planning (PL) phase and must be approved by CMCOG, acting as the Columbia Area Transportation Study (COATS) Metropolitan Planning Organization (MPO) before the Preliminary Engineering (PE) phase can commence.

Greenway Corridor

A corridor was identified for the study of the Lower Saluda Greenway. This greenway corridor provides a geography to which all planning efforts and technical analyses were tethered. The greenway corridor runs north of and parallel to the Saluda River. As shown in **Figure I-1**, the corridor connects three segments of the existing greenway/bikeway network: 1) the Saluda Riverwalk of the Three Rivers Greenway near I-26 to the east; 2) the Saluda Shoals Trail near the center of the corridor, within Saluda Shoals Park; and 3) the existing Johnny W. Jeffcoat Walkway and on-street bike lanes at the Lake Murray Dam to the west.

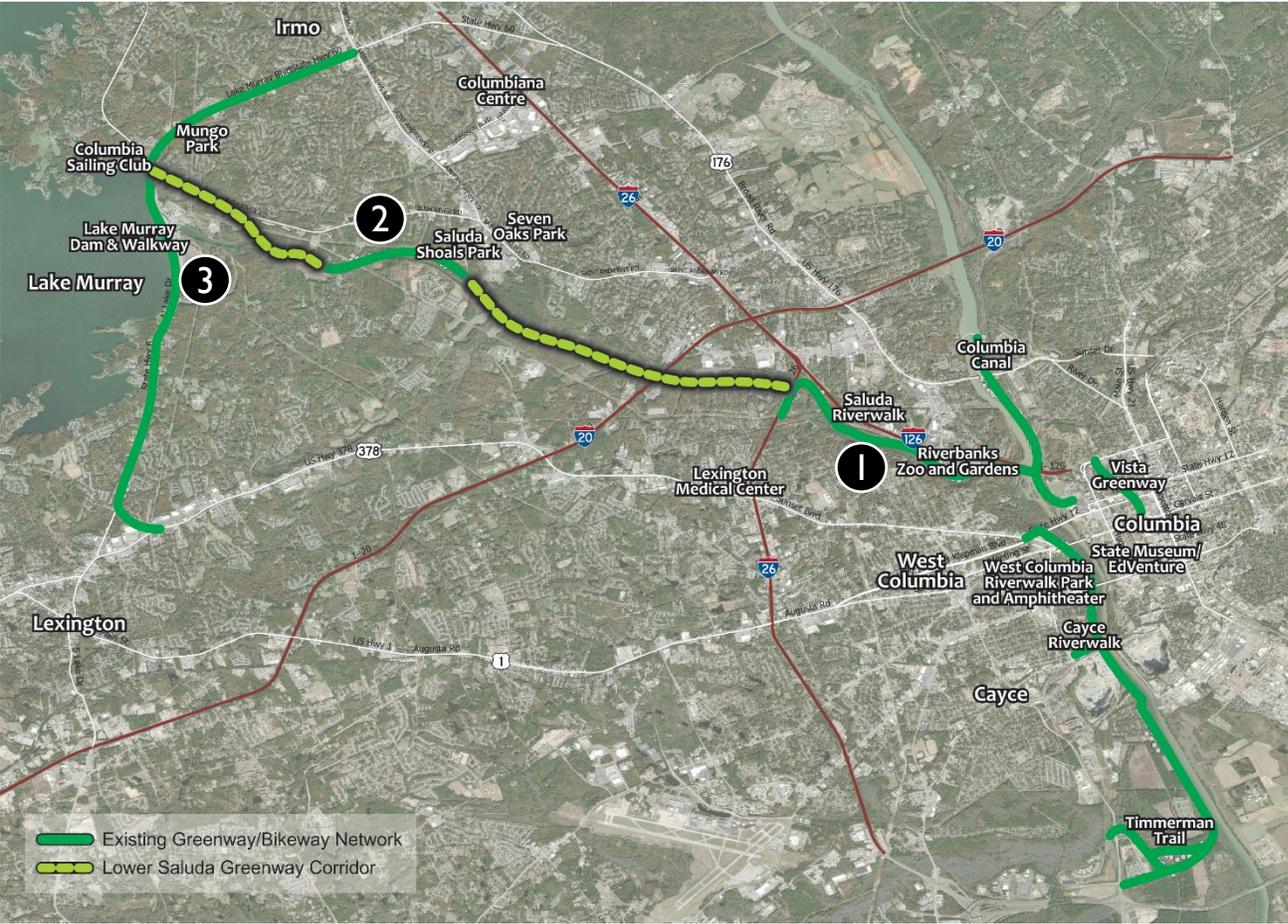


Figure I-1 | Greenway Corridor

PUBLIC ENGAGEMENT

Public participation was an important element of the Lower Saluda Greenway Feasibility Study and assisted with identifying concepts and recommended alignments for the greenway. Many opportunities were made available to obtain input and for the public to stay informed throughout the process.

Despite the COVID-19 pandemic restricting most of the outreach to online activities, participation was robust. Over 3,000 public interactions were achieved between all outreach activities. Strong support for the greenway was expressed throughout the study. The outreach activities conducted were guided by the *CMCOG Public Participation Plan* vision, goals, objectives, and techniques. The CMCOG regulates public participation processes for the development of transportation plans and programs in the region and provides direction for public participation activities.

A specific Public Participation Plan for the study was prepared early in the process to highlight the activities to be conducted and included a description of each activity along with how they would be administered. Having flexibility in what activities were conducted was very important to the process, particularly given the ongoing pandemic. The virtual platforms used to conduct the outreach proved extremely effective. Specific techniques are further described in the sections that follow.

BY THE NUMBERS

Informational Video Views	686
Survey Respondents	1,065
Interactive Map Visitors	266
Pop-up Participants	122
Stakeholder Participants	84
Summary Video Views	741
Final Comment Form	101
TOTAL INTERACTIONS	3,065

Numbers reflect participation through mid-February 2021.

Project Advisory Committee

A Project Advisory Committee (PAC) was established to guide the overall feasibility study development. Members of the PAC included staff from CMCOG, ICRC, Town of Lexington, Town of Irmo, Lexington County, River Alliance, Saluda Shoals Park, Riverbanks Zoo and Botanical Garden, and the SCDOT. The committee met three (3) times at key milestones during the process, including one (1) in-person meeting and two (2) virtual meetings. The committee was tasked with providing input on the identification of needs, reviewing and refining proposed solutions, and sharing study information with their constituents.

Early Activities

A goal of the public participation process was to provide information and opportunities early in the process to ensure public awareness and encourage participation. Multiple tools were implemented simultaneously at the beginning of the study process that were both informational and interactive. Some were online and others provided media and hard copy opportunities to ensure maximum awareness.

- **Branding** – A project logo was created to provide an identity and recognition of the project and was used on all outreach materials. To maintain this identity, the logo is also available for future outreach as the project moves into design and construction.
- **Press Release** – A press release was prepared to introduce the project, highlight the purpose, and identify public participation opportunities. The press release was included in local print media and shared by the CMCOG, ICRC, and PAC members through their online platforms and social media.
- **Informational Video** – At the beginning of the study, an informative video was created to provide an overview of the feasibility study and encourage the public to get involved with the process. The video was posted to YouTube, the project’s web pages on the CMCOG and ICRC websites, and shared with project partners and local governments to post via their online channels.
- **Survey** – An online survey was created to better understand how the public uses existing greenways, connections that are important, and desires for future amenities. The survey was available online and shared with partner organizations and agencies for distribution on their platforms. A total of 1,065 responses were received and highlighted the experiences of the respondents

who use various existing bicycle and pedestrian facilities (see **Figure I-2**), which revealed both walking and bicycling as primary greenway activities (see **Figure I-3** and **Figure I-4**). Also, there is interest in connecting the greenway to area neighborhoods, with 77% of respondents indicating they would be willing to bicycle or walk to the greenway if it is safely connected to their neighborhoods.

- **Interactive Map** - An online interactive map was created to allow participants to geographically pinpoint issues, opportunities, and challenges. The map also allowed participants to view other’s suggestions. Major themes of the comments received on the map were concerns for crossing SC 6, connections to surrounding communities, provision of ample parking and trailhead amenities, and guidance for future connections to areas south of the Saluda River.

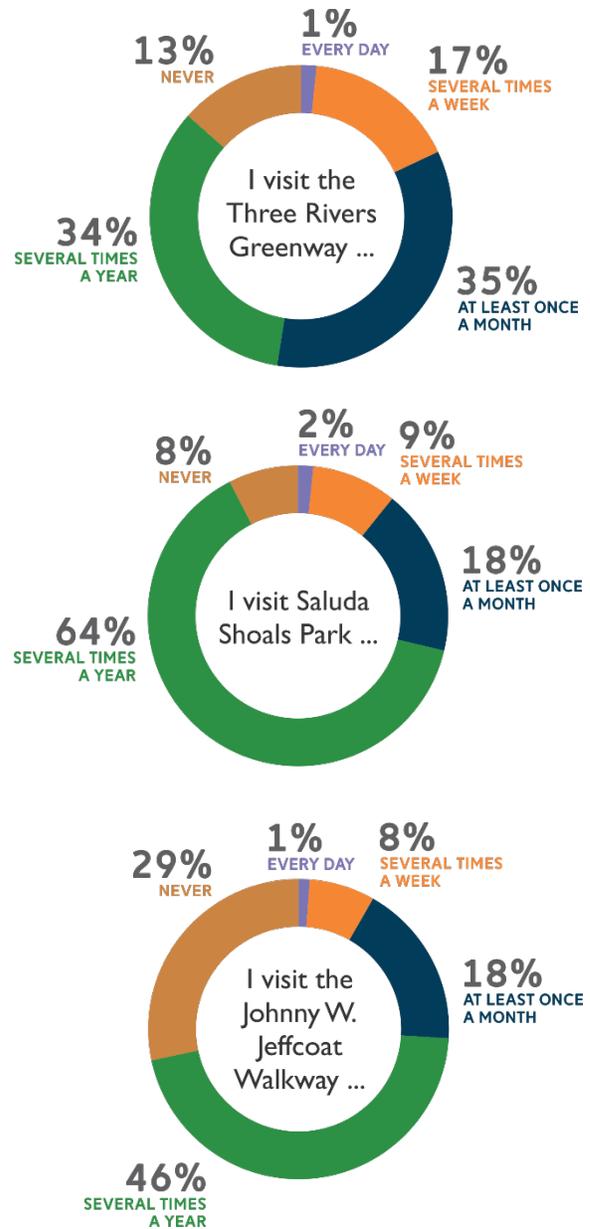


Figure I-2 | Survey Respondents' Use of Existing Facilities

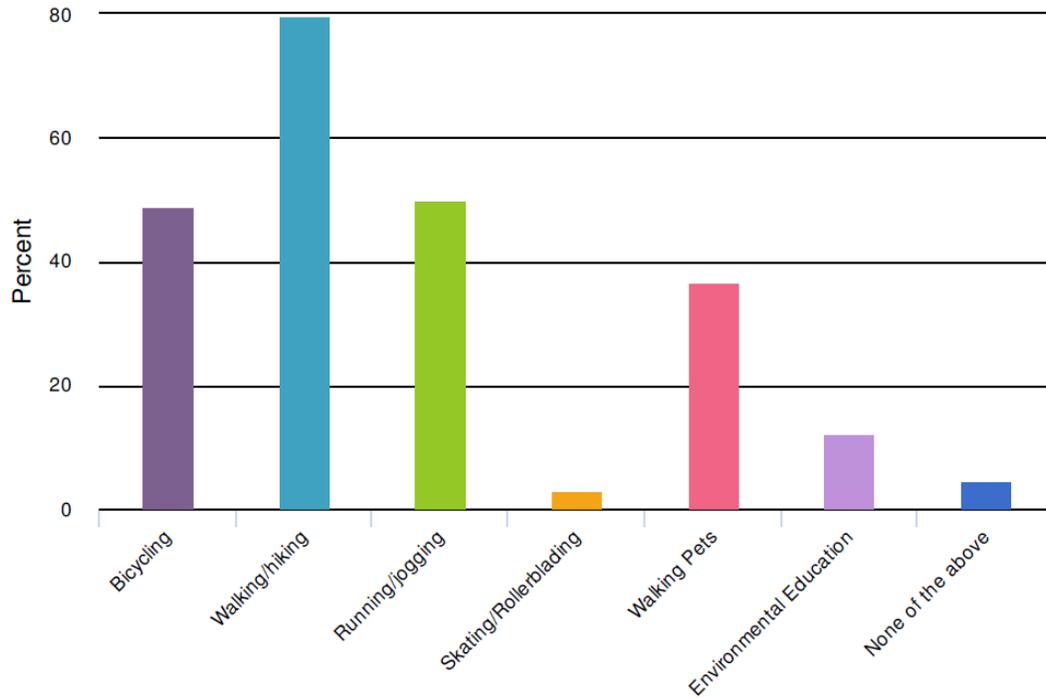


Figure I-3 | Survey Respondents' Activities on the Three Rivers Greenway

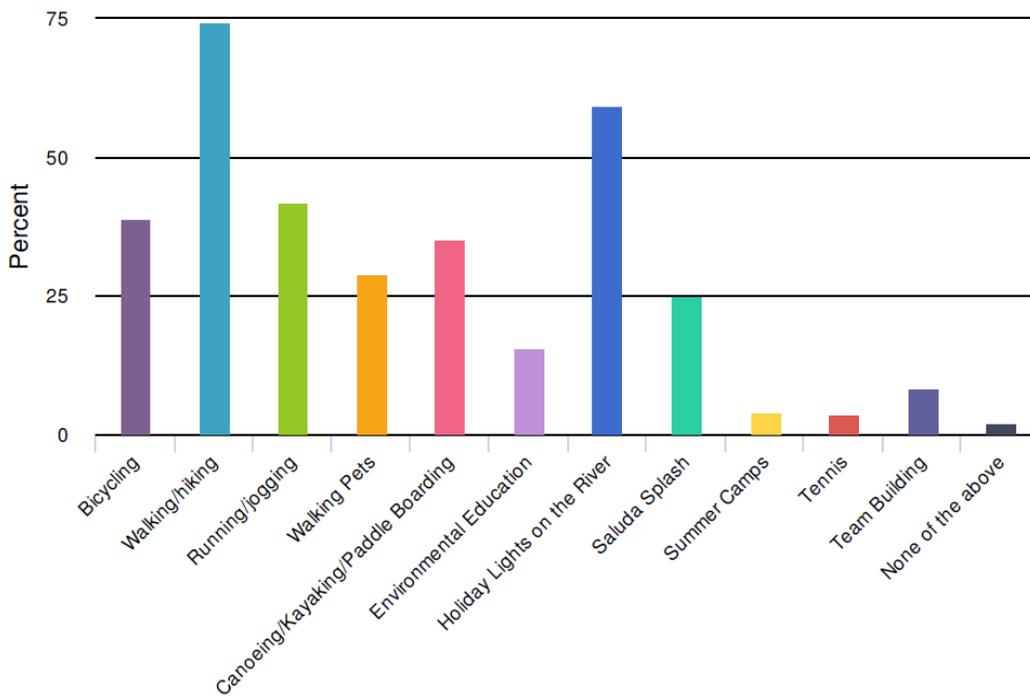


Figure I-4 | Survey Respondents' Activities at Saluda Shoals Park

Study Information

The public was regularly informed about the study in a variety of ways:

- **Online Presence** – Both CMCOG and ICRC hosted project web pages that disseminated project information and provided access to participation opportunities. These pages were regularly updated with study information.
- **Talking Points** – A document containing “talking points” was prepared and shared with CMCOG, ICRC, and PAC members to use to bring awareness to the study. The document was also used as a fact sheet and distributed in public places.
- **Signage** – To bring awareness about the study process to those using existing greenways and recreational facilities, numerous yard signs with QR codes and links to online information and engagement tools were placed throughout the community. Scanning the QR code or using the links provided on the signs directed users to the informational video, survey, interactive map, and website.

Public Events

Due to the pandemic, public, in-person events were limited to ensure the safety and welfare of the public and project team. Several public events were held online, and a few engagement activities were conducted in person in a safe, distanced format.

Pop-up Engagements

Project team members conducted a series of four pop-up engagements at key locations to intercept the public where they were and receive input. Tables were set up at each location with fact sheets, easel boards with interactive questions, and QR code cards that linked to online project resources. During these events, the public was made aware of the study process and encouraged to use the online tools to provide feedback. Over 120 people participated in the pop-up engagements.

The locations for the pop-ups were determined with CMCOG and ICRC staff and included:

- Lake Murray Dam Parking Lot
- Saluda Riverwalk/Three Rivers Greenway access point at Riverbanks Zoo
- West Columbia Amphitheater
- Saluda Shoals Boat Launch

Stakeholder Discussions

Stakeholder discussions were conducted with local governments, business leaders, greenway advocates, and property owners to gain an inventory of opinions and feedback about the study and to bring awareness to the process. Discussions were conducted virtually, and participants were also encouraged to share the public information tools with their constituents. Input focused on coordination with agencies and organizations conducting ongoing and related projects.

Project Summary

Due to pandemic restrictions limiting in-person meetings, a prerecorded presentation of the project summary was prepared and made available on YouTube and via the ICRC and CMCOG websites. It was also shared with project stakeholders.

The video summarized the feasibility study purpose and need, public engagement process, and general findings and recommendations. At the end of the video, viewers were directed to an online comment form that allowed them to answer several multiple-choice questions and leave open-ended comments. To ensure two-way engagement, the comment form also offered the opportunity to speak directly with a member of the project team, if desired.

As of the drafting of this Feasibility Report, there have been over 660 views of the summary video and 85 comment forms completed. Feedback from the summary video confirmed the strong public support received during the study process, with 99% indicating a general excitement about the project.

PURPOSE AND NEED

Purpose and Need statements are essential to defining the “why” of the project, the very foundation on which the project will be built. The Purpose establishes the problem that must be addressed, while the Need defines and justifies the existence of the problem. Purpose and Need statements are presented below; these were refined throughout the feasibility study process.

Purpose

The purpose of the Lower Saluda Greenway, a proposed 10.5-mile multi-use paved path along the north side of the Lower Saluda River, is to increase safe access to nearby parks, trails, and destinations, aid in short-trip multimodal travel, and increase regional connectivity and unity between the Lexington and Irmo areas with the communities of Columbia, West Columbia, and Cayce.

With that purpose in mind, the feasibility study seeks to gain a better understanding of the opportunities and constraints that exist as the proposed greenway moves into design and construction. To that end, this Feasibility Report provides an evaluation of the proposed project based on a variety of technical analyses.

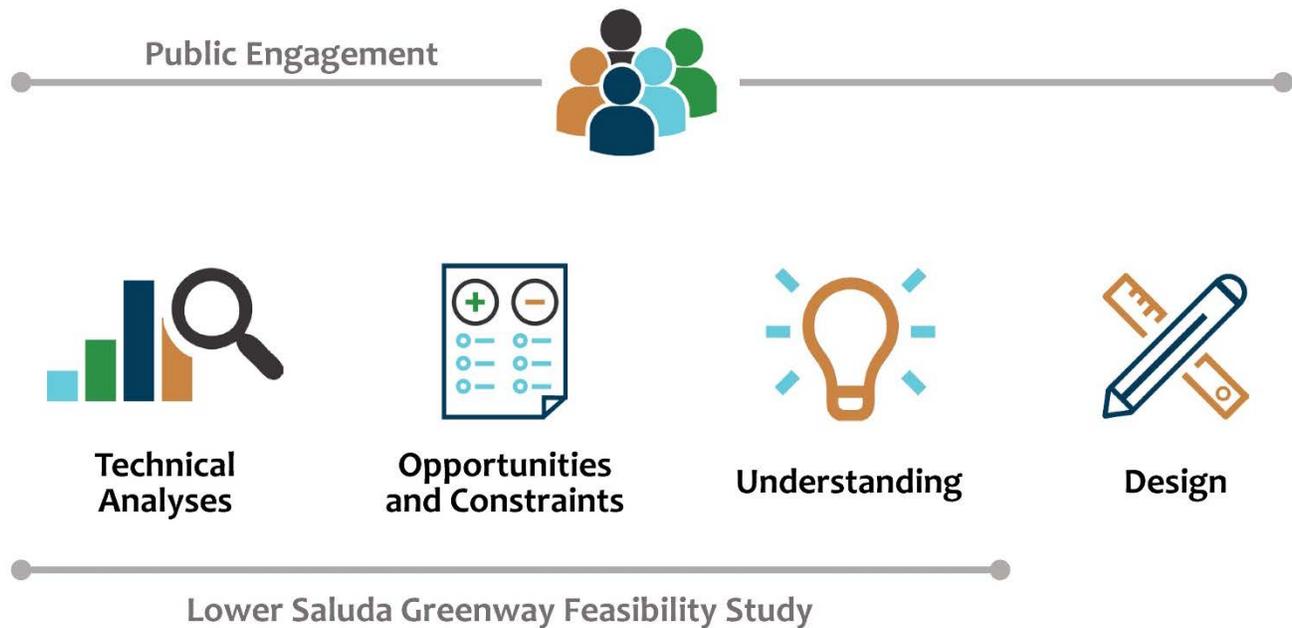


Figure I-5 | Feasibility Study Process

Need

Through high use of existing facilities and advocacy for additional facilities, the community has made it abundantly clear that connected, safe, and comfortable non-motorized transportation and recreational facilities are of paramount importance. The current active transportation network lacks connectivity between communities in Irmo and Lexington and those in Cayce, Columbia, and West Columbia, limiting non-motorized access to critical destinations and recreational amenities. Addressing this lack of connectivity will provide multimodal transportation choices, healthier lifestyles, access to the outdoors, a higher quality of life, and a more vibrant regional character.

While the region has a robust variety of trails, they are not fully interconnected as a network, limiting the attractiveness and utility that a complete active transportation network would offer. This project will be a critical link within the active transportation and recreation facility networks of greater Columbia by providing seamless connectivity with other trails and amenities in the region, including the Three Rivers Greenway, Riverbanks Zoo and Botanical Gardens, and Saluda Shoals Park.

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RECOMMENDED GREENWAY



TECHNICAL ANALYSES

Through technical analyses and walking the entire corridor for the proposed greenway, opportunities and constraints were documented, including identifying numerous points where design decisions needed to be made. For a detailed summary of these analyses, please see **Appendix A**. The analyses revealed areas where challenging topography, barriers to access, sensitive environmental features, and manmade obstacles exist. At each of these decision points, an evaluation of alternative alignments was performed.

EVALUATION CRITERIA

Evaluation criteria were developed, as shown below, with each alternative alignment being weighed against them. While decisions were needed at each of the decision points, some were very straightforward and did not require an evaluation of alternatives. **Appendix B** includes the evaluation of each alternative.

- | | | | |
|----------|--|----------|---|
| 1 | Ability to gain property owner permission, minimize property acquisition | 4 | Ability to avoid/mitigate environmental impacts |
| 2 | Ability to increase visual and/or physical access to the Saluda River | 5 | Ability to simplify construction and maintenance access |
| 3 | Ability to connect surrounding areas/residents to the greenway network | 6 | Ability to reduce overall cost |

GREENWAY ALIGNMENT

Based on the evaluation of alternatives, a planning-level greenway alignment emerged. It includes paved greenway, boardwalks, bridges, trailheads, lighting, call boxes, and other site-specific safety improvements to complete the 10.5-mile Lower Saluda Greenway. The greenway alignment is shown below in **Figure 2-1**.

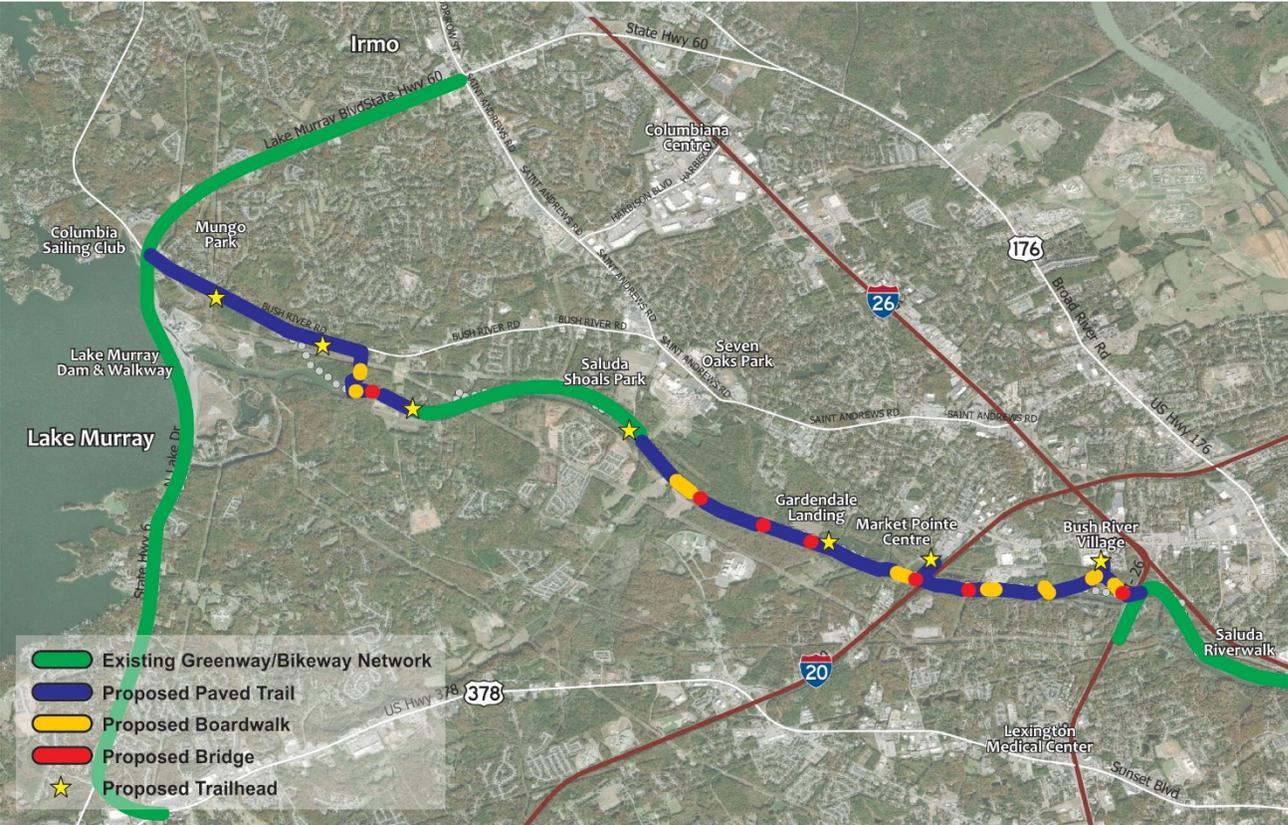


Figure 2-1 | Planning-level Greenway Alignment

CONCEPTUAL DESIGN GUIDANCE

While the scope of the feasibility study did not include detailed design, this Feasibility Report does provide conceptual design guidance. When final design does commence, four key areas of design should be considered, as shown below.



CONTINUITY There should be continuity between greenway sections, making them seamless with no perceived gaps. Users need to know and understand that they are on the greenway network no matter where along the greenway they are located.



COHERENT The greenway must be visually coherent by allowing the user to know where they are supposed to go next, with no opportunity for getting lost or feeling confused.



PRIORITY The greenway should be treated as a priority facility within the transportation system. Safety for greenway users should always be paramount.



SEPARATION Physical separation between greenway users and adjacent roadways will provide safety and comfort. Anywhere separation cannot be provided, the speed of vehicles should be controlled.

GREENWAY CHARACTERISTICS

Greenway Width

The width of the greenway will directly affect user comfort, the necessary right-of-way and cost of construction, as well as ongoing maintenance. Most existing greenways and trails in the Columbia region are eight to ten feet in width. However, it is anticipated that the Lower Saluda Greenway will rely on federal transportation dollars as a significant funding source. Therefore, it is also anticipated that the greenway will need to be built to federal and state standards, which are taken from the American Association of State Highway Transportation Officials (AASHTO) *Guide for the Development of Bicycle Facilities*.

The current 2012 edition of the AASHTO *Guide for the Development of Bicycle Facilities* requires that trails and greenways be 12 feet in width, allowing for 8 feet in constrained areas. The forthcoming new edition, which is expected to be published in late-2021, will recommend wider greenways and trails to encourage safer passing and side-by-side bicycling based upon anticipated user volumes. Not knowing the exact timing of the greenway or the publication of the new standards, this Feasibility Report envisions the greenway to be 12 to 14 feet wide.



Figure 2-2 | Greenway Conceptual Cross Section

Boardwalks

Through wetlands and flood prone areas, wooden boardwalks are recommended. It is anticipated that approximately 3,100 total linear feet of boardwalk will be needed throughout the greenway corridor.



Figure 2-3 | Boardwalk Conceptual Cross Section

Bridges

Bridges will be necessary to cross smaller waterways that flow into the Saluda River and traverse difficult terrain. Approximately 430 total linear feet of bridge will be required. Shorter bridges (i.e., less than 100 feet in length) are recommended to be stick-built, while longer bridges would be prefabricated off-site.



Figure 2-4 | Bridge Conceptual Cross Section

SC 6/SC 60 Intersection

Significant volumes of pedestrians and bicyclists are anticipated at the intersection of SC 6 and SC 60 near the Lake Murray Dam. There are already hundreds of people utilizing the Johnny W. Jeffcoat Walkway on a daily basis, and the implementation of the Lower Saluda Greenway will increase these numbers exponentially.

Improvements are proposed that will slow traffic speeds and increase pedestrian and bicyclist safety. As shown in **Figure 2-5**, key features include the removal of right-turn slip lanes on the northern quadrants of the intersection, the addition of raised crossings across the slip lanes on the southern quadrants, and widened, enhanced crosswalks with pedestrian refuge. A traffic analysis should be performed as part of schematic design, including consideration of a pedestrian-only phase for the signal. Also during schematic and final design, landscaping should be included to enhance this intersection, as it is prominent gateway.

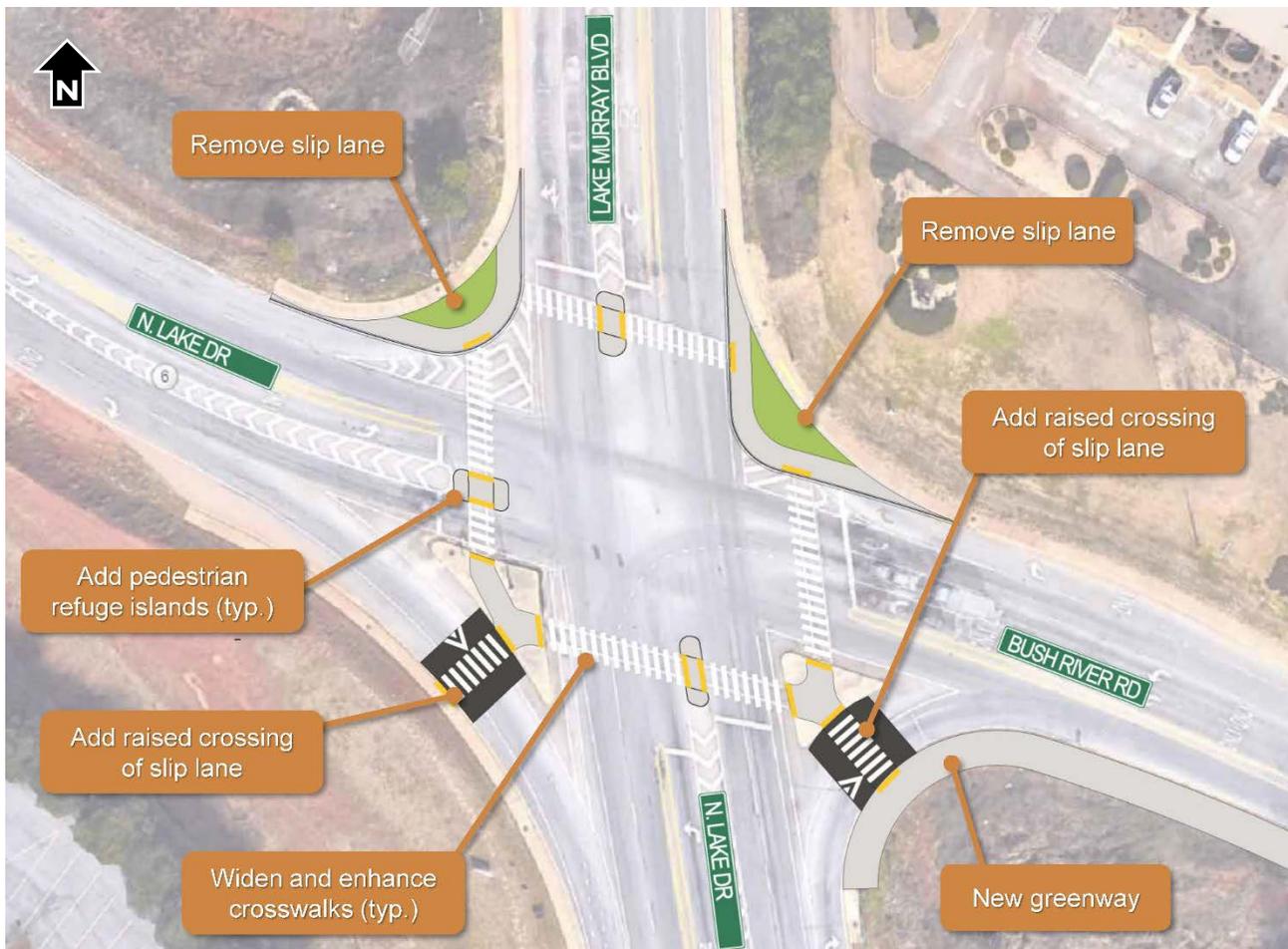


Figure 2-5 | SC 6/SC 60 Intersection Conceptual Improvement

Trailheads and Parking

As discussed in a later section, long-term connectivity to the surrounding area will ultimately be achieved. Trailheads will be essential to provide access to the greenway for local users in the short-term and for regional users who will see the greenway as a destination. As part of the greenway alignment, this Feasibility Report identified seven locations for trailheads (see **Figure 2-1**), all with parking and some with proposed bathrooms and maintenance facilities.

Proposed trailheads and their likely amenities are presented in **Table 2-1**. In each case, agreements would need to be negotiated with property and/or business owners.

Table 2-1 | Proposed Trailheads

TRAILHEAD NAME	LOCATION	AMENITIES	NOTES
Coldstream Trailhead	Near the intersection of Bush River Road and Coldstream Drive	Parking, bathrooms, maintenance building	The existing Lexington County Collection and Recycling Center would be relocated to convert this site into a trailhead.
Bilton Trailhead	Near the intersection of Bush River Road and Bilton Road	Parking	A portion of a laydown yard would be converted into a trailhead.
Saluda Shoals West Trailhead	At the existing Saluda Shoals Boat Launch	Parking, bathrooms, maintenance building	Enhancements would be made to the existing boat launch area to accommodate more users.
Saluda Shoals East Trailhead	At the easternmost end of Saluda Shoals Park	Parking	Enhancements would be made to the area to accommodate more users.
Gardendale Trailhead	At the existing Gardendale Boat Ramp	Parking, bathrooms, maintenance building	Enhancements would be made to the existing boat ramp area to accommodate more users.
Market Pointe Centre Trailhead	In the south parking area of the Market Pointe Centre office/shopping area	Parking	Utilize existing parking for trail users.
Bush River Village Trailhead	In the southeastern corner of the parking area at Bush River Village (i.e., Walmart)	Parking	Utilize existing parking for trail users.

One proposed trailhead location is the existing Lexington County Collection and Recycling Center at Bush River Road and Coldstream Drive. As shown in **Figure 2-6**, relocating the recycling center and retrofitting the site would provide parking, bathroom facilities, and maintenance storage, with a plaza connection to the greenway. In conjunction with this trailhead, consideration should be given to making a connection across Bush River Road and up Coldstream Drive to ultimately link the Lower Saluda Greenway to Mungo Park; this connection is included in the long-term connectivity map (see **Figure 2-8**) presented later in this chapter.

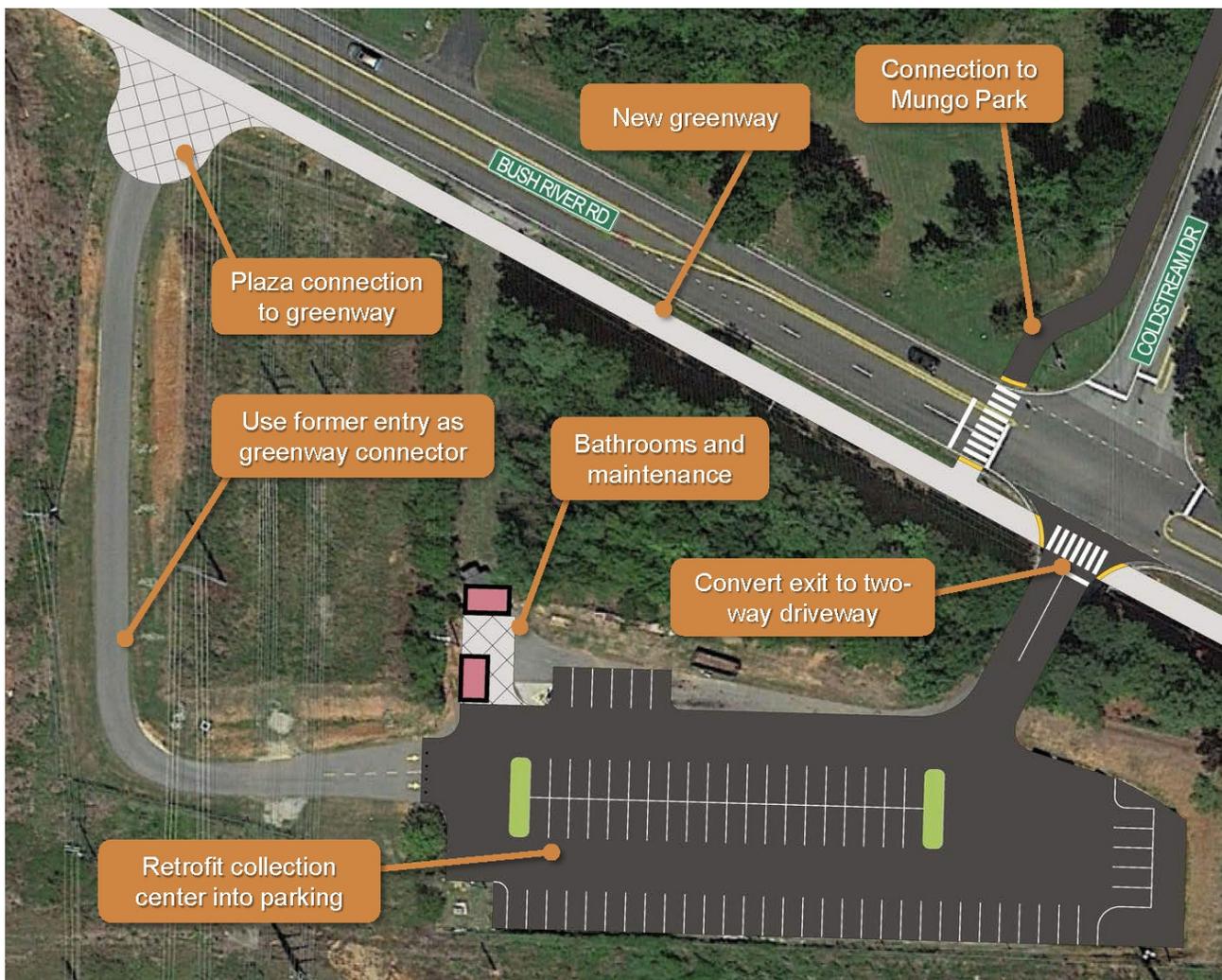


Figure 2-6 | Coldstream Trailhead Conceptual Improvement

At-grade Railroad Crossings

It is anticipated that three at-grade railroad crossings will be necessary as part of the Lower Saluda Greenway. All crossings would be of CSX Transportation (CSXT) rail and are listed in **Table 2-2**. **Figure 2-7** depicts an at-grade crossing conceptual improvement.

Table 2-2 | Anticipated At-grade Railroad Crossings

OWNER	DIVISION	SUBDIVISION	BRANCH	NOTES
CSXT	Florence	Columbia, Newberry, and Laurens (CN&L)	SCE&G Spur	The mainline greenway would cross the railroad near Bush River Road east of Bilton Road.
CSXT	Florence	CN&L	-	The connection to the Market Pointe Centre trailhead would cross the railroad west of I-20.
CSXT	Florence	CN&L	-	The connection to the Bush River Village trailhead would cross the railroad west of I-26.

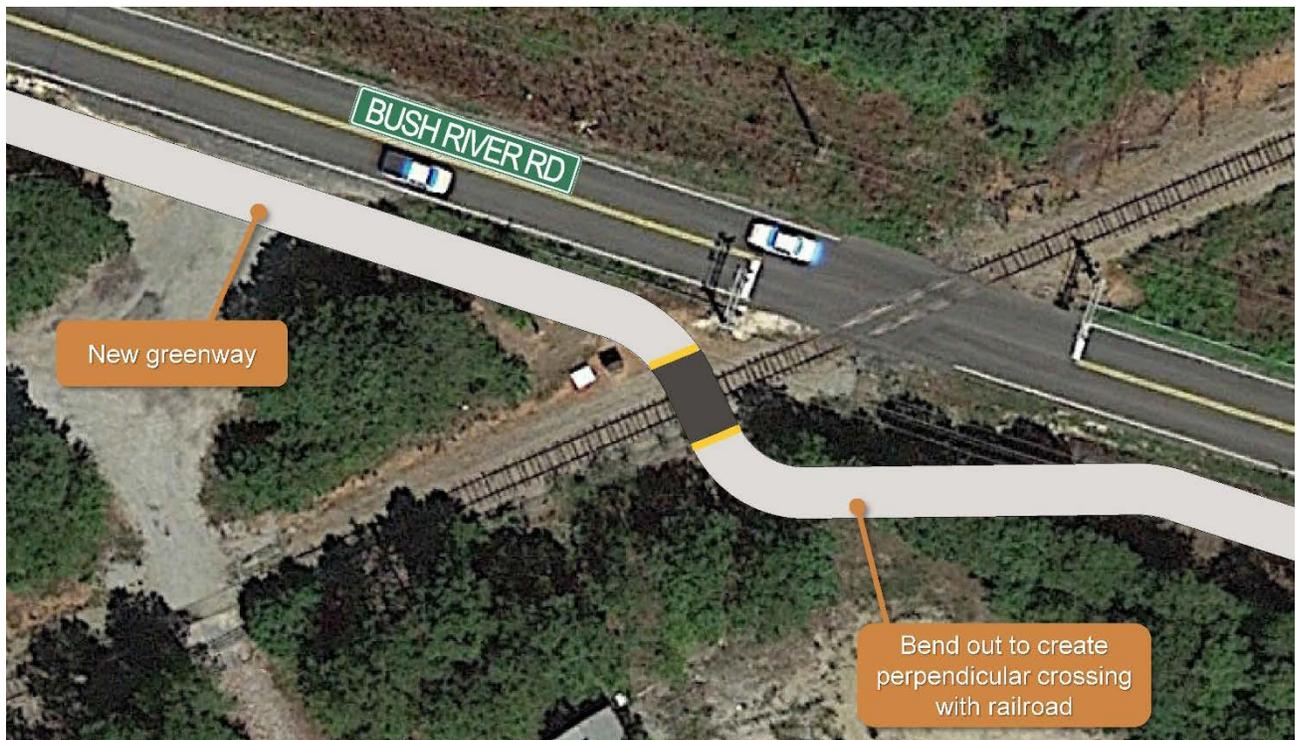


Figure 2-7 | At-grade Railroad Crossing Conceptual Improvement

Long-Term Connectivity

While the Lower Saluda Greenway is anticipated to be well-used by people from throughout the region, those who live closest to it will receive the greatest transportation, recreation, health, and quality of life benefits. To that end, it is important to consider connectivity to surrounding neighborhoods and destinations.

Figure 2-8 presents a plan for long-term connectivity to the Lower Saluda Greenway. In addition to one bicycle and pedestrian bridge to the south side of the Saluda River, three types of facilities are recommended:

- **Neighborhood Bikeway**
Neighborhood bikeways are established on quiet streets, often through residential neighborhoods. These facilities are designed to prioritize bicycle through-travel, while maintaining relatively low motor vehicle speeds. Treatments vary depending on context, but often include elements of traffic calming. Neighborhood bikeways are also known as neighborhood greenways and bicycle boulevards, among other locally preferred terms.
- **Shared Lane**
Shared lanes are where bicyclists and motor vehicles share the same lane. These can be delineated by “Share the Road” signage and/or “sharrow” pavement markings. Shared lanes are most appropriate where there are three or fewer lanes of travel, the posted speed limit is 25 mph or lower, and average traffic volumes are below 3,000 vehicles per day. Streets within parks work well with shared lanes.



- Shared Use Path**

Shared use paths are two-way facilities physically separated from motor vehicle traffic and used by bicyclists, pedestrians, and other non-motorized users. Shared use paths, referred to as trails or greenways, are often located in an independent alignment, such as a greenbelt, utility easement, or abandoned railroad. However, they are also regularly constructed adjacent to roadways where users will have increased interactions with motor vehicles at driveways and intersections on these “sidepaths.”

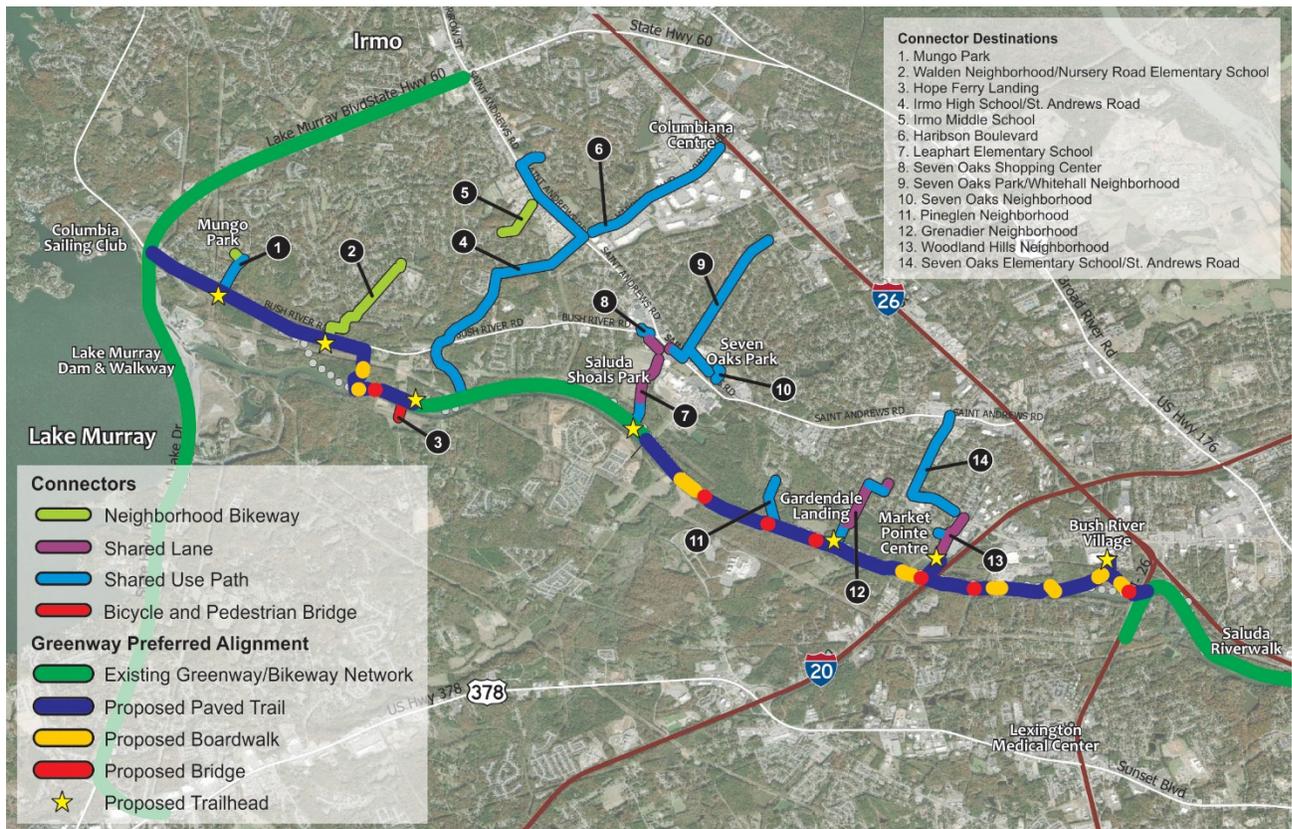


Figure 2-8 | Long-term Connectivity

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IMPLEMENTATION



This Feasibility Report is a critical step in advancing the Lower Saluda Greenway. The process which crafted this document has set the foundation for implementation. To assist in moving recommendations to reality, an Implementation Matrix has been created and is presented **Table 3-3**. The Implementation Matrix summarizes recommendations, anticipated phasing, and order-of-magnitude opinions of probable cost.

OPINIONS OF PROBABLE COST

An estimated order-of-magnitude opinion of probable cost is presented for each recommendation in the Implementation Matrix. Costs included in the matrix assume a 12-foot wide greenway. As the required width could be increased to 14 feet depending on the timing and funding source(s) utilized, **Appendix C** includes detailed costs for both a 12-foot and 14-foot greenway width.

As the Lower Saluda Greenway Feasibility Study is a planning study, costs have been developed based on current understanding of each recommendation and should provide a good baseline for planning-level, capital improvement decision-making. Costs were estimated based on professional judgment and experience with similar projects.

Cost Considerations

When reviewing and utilizing the opinions of probable cost presented in this Feasibility Report, several areas should be considered.

Greenway Width

As mentioned above, the costs presented assume a 12-foot wide greenway, as it is anticipated that federal funds that flow through SCDOT will be used to construct the greenway (i.e., AASHTO design standards, which SCDOT utilizes, currently require a 12-foot width). Previous greenways constructed in the Midlands region have been eight to 10 feet in width; therefore, they may have been constructed for less dollars per linear foot of greenway length. Should a funding plan be realized that does not require federal funding, it could then be assumed that the greenway might be constructed at a narrower width, realizing cost savings.

While it is beyond the scope of this feasibility study to estimate the cost of narrower widths, it is reasonable to assume that for every two feet of width the greenway is narrowed approximately 6-8% in cost savings might be realized. However, it should be cautioned that funding source and cost should not be the deciding factors in determining greenway width; rather, the volumes, types, and mix of users should determine the appropriate width of the facility.

Efficiencies

With most construction projects, certain efficiencies can be achieved by increasing the size of the project. Therefore, it is reasonable to assume that, if the entire Lower Saluda Greenway were constructed at one time, the total cost would be lower than if it is constructed in separate phases. A single construction project would most likely realize savings in survey, permitting and design fees, contractor mobilization, larger quantity materials discounts, and other areas.

Cyclical Cost Changes

Construction costs are greatly affected by economic conditions (i.e., past, current, projected, and future conditions). Therefore, particular project types can be more or less expensive at certain times. At the writing of this Feasibility Report, construction costs are elevated. In 2019, construction costs saw a 2% increase nationally, and costs continued to rise throughout 2020. This was attributed to rising material prices and labor shortages.¹ The pandemic has impacted prices as well, with lumber prices at an all-time high in early 2021. This is due to home building and remodeling as people move out of cities, take advantage of low interest rates, and stay at home more. This has been further exacerbated by mills not being able to ramp up production.² Should economic and health conditions change (i.e., for better or worse), it is possible that associated cost effects could change as well.

¹ <https://www.cpexecutive.com/post/construction-costs-continue-to-rise-in-2020/>

² <https://tradingeconomics.com/commodity/lumber#:~:text=Lumber%20is%20expected%20to%20trade,763.72%20in%2012%20months%20time.>

POTENTIAL PROJECT PHASING

If the entire project cannot be reasonably accomplished at one time, three potential phases have been identified:

- **PHASE 1 | Short-term (2-5 years)** – These portions of the greenway should be implemented first. Based on public input and connectivity to existing facilities, it is anticipated that these portions of the greenway would be highly successful, help to establish early momentum, and set the foundation for future phases.
- **PHASE 2 | Medium-term (6-10 years)** – While these are important portions of the greenway, these recommendations build on Phase 1 recommendations. Establishment of support and identification of funding sources should begin now for these projects, so they are on track for implementation within this period.
- **PHASE 3 | Long-term (10+ years)** – These recommendations will complete the Lower Saluda Greenway. Similar to Phase 2 recommendations, building of support and funding identification should begin as soon as possible.

Although phases have been established, these designations are for planning purposes only; greenway phases should be implemented as soon as opportunities arise. If circumstances provide an opportunity to complete a Phase 3 recommendation three years after the Lower Saluda Greenway Feasibility Study is adopted, the improvement should be made, regardless of its designation as “Phase 3” (e.g., combining greenway improvements with planned utility improvements).

Table 3-1 provides a summary of baseline construction costs by phase; a 30% contingency is also shown to account for unknowns that exist at the current level of study. **Table 3-2** takes the contingency-burdened construction costs and associates them with costs for preliminary engineering (PE) and right-of-way acquisition (ROW), resulting in total costs by phase and for the entire project (i.e., efficiencies may be realized to lower total costs if all phases are implemented as a single project).

Table 3-1 | Construction Cost by Phase

PHASE	ESTIMATED CONSTRUCTION COST	WITH 30% CONTINGENCY
PHASE 1 – Short-term (2-5 years)	\$4,286,000	\$5,572,000
PHASE 2 – Medium-term (6-10 years)	\$6,309,000	\$8,202,000
PHASE 3 – Long-term (10+ years)	\$4,614,000	\$5,998,000
TOTAL[^]	\$15,209,000	\$19,772,000

[^] Efficiencies may be realized to lower total costs if all phases are implemented as a single project.

Table 3-2 | Cost by Category and Phase for Total Project

PHASE	PE @ 10%	ROW @ 5%	CONSTR	TOTAL
PHASE 1	\$557,000	\$279,000	\$5,572,000	\$6,408,000
PHASE 2	\$820,000	\$410,000	\$8,202,000	\$9,432,000
PHASE 3	\$600,000	\$300,000	\$5,998,000	\$6,898,000
TOTAL[^]	\$1,977,000	\$989,000	\$19,772,000	\$22,738,000

[^] Efficiencies may be realized to lower total costs if all phases are implemented as a single project.

Table 3-3 | Implementation Matrix

RECOMMENDATION	NOTES	ESTIMATED CONSTRUCTION COST
PHASE I Short-term (2-5 years)		\$4,286,000
Greenway Phase I (Lake Murray Dam to Saluda Shoals Park)	<ul style="list-style-type: none"> • Construct greenway from Lake Murray Dam to Saluda Shoals Park. • Saluda Shoals Park and the Johnny W. Jeffcoat Walkway at the dam are already well-utilized. • Survey respondents ranked this segment as their number one priority. • Existing parking at the Lake Murray Dam and Saluda Shoals Park will help to reduce the need for additional trailheads immediately. 	\$3,408,000
SC 6/SC 60 Intersection	<ul style="list-style-type: none"> • Improve intersection to increase bicycle/pedestrian capacity and safety. • Remove slip-lanes on northern quadrants. • Add raised crossings to slip-lanes on southern quadrants • Widen and enhance crosswalks and add refuge islands. • Landscape where possible to provide gateway character. 	\$234,000
Coldstream Trailhead	<ul style="list-style-type: none"> • Relocate Lexington County Collection and Recycling Center. • Retrofit site to provide trailhead with parking, bathrooms, and maintenance building; provide signage, wayfinding, trash receptacle, call box, and lighting. • Trailhead will provide needed relief to Lake Murray Dam parking area. • Could be implemented in conjunction with Greenway Phase I or follow. 	\$469,000
Saluda Shoals West Trailhead	<ul style="list-style-type: none"> • Expand parking area at Upper Boat Launch, and provide signage, wayfinding, trash receptacle, call box, and lighting. • Could be implemented in conjunction with Greenway Phase I or follow. 	\$175,000

RECOMMENDATION	NOTES	ESTIMATED CONSTRUCTION COST
PHASE 2 Medium-term (6-10 years)		\$6,309,000
Greenway Phase 2 (Saluda Shoals Park to I-20)	<ul style="list-style-type: none"> • Construct greenway from Saluda Shoals Park to I-20. • Saluda Shoals Park is already well-utilized. • Survey respondents ranked this segment as their number two priority. • Existing parking at Saluda Shoals Park will help to reduce the need for additional trailheads immediately. 	\$5,490,000
Saluda Shoals East Trailhead	<ul style="list-style-type: none"> • Expand parking area at Lower Boat Launch, and provide signage, wayfinding, trash receptacle, call box, and lighting. • Could be implemented in conjunction with Greenway Phase 2 or follow. 	\$175,000
Market Pointe Center Trailhead	<ul style="list-style-type: none"> • Develop an agreement with Market Pointe Center to allow trail users to park in the south parking area of the office/shopping area. • Improve parking area, and provide signage, wayfinding, trash receptacle, call box, and lighting. • Could be implemented in conjunction with Greenway Phase 2 or follow. 	\$175,000
Gardendale Trailhead	<ul style="list-style-type: none"> • Improve existing boat ramp area to accommodate more users, including paved parking, bathrooms, and maintenance building; provide signage, wayfinding, trash receptacle, call box, and lighting. • Could be implemented in conjunction with Greenway Phase 2 or follow. 	\$469,000

RECOMMENDATION	NOTES	ESTIMATED CONSTRUCTION COST
PHASE 3 – Long-term (10+ years)		\$4,614,000
Greenway Phase 3 (I-20 to I-26)	<ul style="list-style-type: none"> • Construct greenway from I-20 to I-26, connecting to Saluda Riverwalk. • Survey respondents ranked this segment as their number three priority. 	\$4,089,000
Bush River Village Trailhead	<ul style="list-style-type: none"> • Develop an agreement with Bush River Village (i.e., Walmart) to allow trail users to park in the southeastern corner of the parking area of the shopping center. • Improve parking area, and provide signage, wayfinding, trash receptacle, call box, and lighting. • Could be implemented in conjunction with Greenway Phase 3 or follow. 	\$175,000
Bilton Road Trailhead	<ul style="list-style-type: none"> • Develop an agreement with Dominion Energy to utilize a portion of a laydown yard as a trailhead. • Construct parking area, and provide signage, wayfinding, trash receptacle, call box, and lighting. • Could be implemented in conjunction with Greenway Phase 3 or follow. • Cost estimate doubles 30 space “Type 2” estimate to assume 60 spaces. 	\$350,000

MAINTENANCE

Maintenance refers to the routine and remedial tasks performed to ensure that greenways are kept in safe and usable condition for users over the short- and long-term life of the facility. Effective maintenance begins with proper planning, design, and construction. A comprehensive greenway maintenance plan should include all known and anticipated routine and remedial tasks required to provide a safe and positive user experience. The plan should identify personnel and equipment costs needed for each task. Quick and timely responses to maintenance issues by greenway managers can help build the public's confidence that the Lower Saluda Greenway will result in a positive user experience.

Guiding Principles of Sustainable Greenway Maintenance

The Lower Saluda Greenway should be viewed as a public resource that will help establish Lexington County and the greater Columbia metropolitan area as a regional recreation destination. The most important factor for developing sustainable greenways is to plan, design, and construct the greenway with a clear understanding of the desired user groups and a thorough understanding of trail building techniques that minimize adverse impacts. The following guiding principles, organized around key themes, will help greenway managers maintain and preserve a world-class system.

Prioritize Public Safety and Limit Liability

- The most important goal of a greenway maintenance program is to provide a safe, comfortable, and attractive greenway experience.
- Establish written protocols for inspection, maintenance, and reporting.
- Develop a relationship with local law enforcement and identify strategies that allow officers to monitor the use and activities along the greenway.

Provide a High-Quality User Experience

- Provide a high-quality experience for a variety of greenway users of all ages and abilities.
- Where possible, weave the unique historic, cultural, and recreational aspects of a community into the greenway experience.

Cultivate Partnerships

- Encourage cooperative partnerships with volunteer organizations, adjacent landowners, local communities, law enforcement, and other government agencies.
- Keep the lines of communication open, especially for adjacent residents and businesses.
- Conduct periodic community meetings to discuss and address concerns.
- Leverage public-private partnerships to assist with funding and maintenance.
- Creatively use social media to engage the community and seek volunteers (i.e., Facebook, Instagram, Twitter, etc.).

Define a Maintenance and Inspection Schedule

Maintenance tasks can be designated as routine or remedial. Routine tasks take place on a regular basis whether daily, monthly, seasonally, or less frequently. The more rigorously the routine greenway maintenance schedule is followed, the less likely remedial maintenance issues will occur.

Remedial maintenance responds to a specific unplanned activity such as repairing a broken fence or removing a fallen tree limb. Greenway maintenance supported by an inspection program is also important for risk management. When a maintenance issue occurs, it is important to address the issue and document having done so. If it cannot be immediately addressed, it is important to document steps taken to minimize liability.

Routine Maintenance Operations

Routine maintenance refers to the regularly scheduled maintenance activities that help greenway managers:

- Provide a safe environment for trail users;
- Reduce long-term costs by addressing minor maintenance needs before they grow into major issues; and
- Create predictability for users and volunteers.

A routine maintenance regimen can include litter pick-up, trash and debris removal, weed and dust control, trail sweeping, sign replacement, tree and shrub trimming, and other regularly scheduled activities. Routine maintenance may also include minor

repairs and replacements such as fixing cracks and potholes or repairing a broken hand railing.

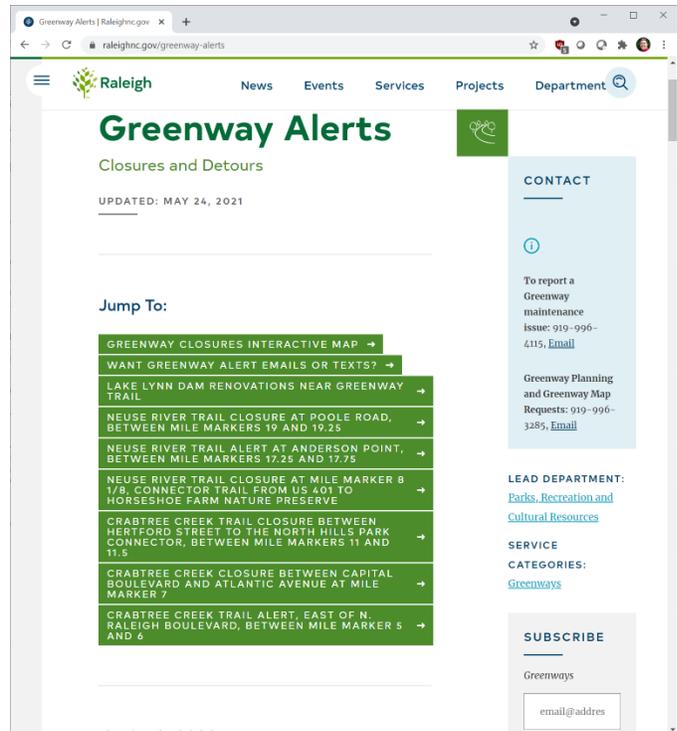
Routine greenway inspections are an important element to a maintenance program. Inspections allow for the documentation of issues and provide a baseline for determining future maintenance costs. Inspections can also help track maintenance response rates, which can lead to a more efficient maintenance system.

The type of facility, concentration of users, seasonal impacts, and vegetation growth rate will impact routine maintenance schedules. Some maintenance activities may need to occur weekly, while other activities are only necessary on a monthly, seasonal, or annual basis.

The frequency of required maintenance tasks should be established as new facilities are implemented and should be reviewed and updated annually to reflect any changes in usage, safety issues, etc. Greenway managers can use methods such as pedestrian and bicycle counts, sketch plan analysis methods for estimating pedestrian and bicycle demand, public survey results, and public meeting comments to determine which resources are the most heavily used and may require the most attention.

Often it can be very helpful to have a system in place for greenway users to provide input, feedback, or report issues. Social media platforms can be one way for greenway users to flag maintenance issues.

Routine maintenance operations can be categorized into two major areas: 1) Facility Maintenance; and 2) Vegetation Management. These are described below and summarized in **Table 3-4**.



The City of Raleigh, NC provides greenway alerts and contact methods for users to report maintenance issues.

Facility Maintenance

Basic housekeeping of greenway facilities will ensure that the network is clean and functional and will also improve the life of each facility. Clearing greenways of trash, glass, branches, and other forms of debris improves safety for users and maintains facility aesthetics. Swiftly responding to graffiti will help discourage the broken window effect, where signs of neglect can encourage further vandalism. Volunteer efforts should be utilized where practicable in the performance of this maintenance task. Typical facility maintenance items are:

- Sweeping/blowing
- Trash and debris removal
- Graffiti removal
- Preventative maintenance for paved greenways



Spartanburg Area Conservancy has a volunteer trail cleanup program where groups can host litter clean up to support the trail network and receive positive press for their efforts.

Vegetation Management

Vegetation encroaching onto (or under) greenway facilities can impede users and reduce visibility. For paved surfaces, roots should be controlled to prevent surface defects that lead to hazardous conditions. Adequate clearances and sight distances should be maintained. Greenway users should be visible to approaching motorists in locations where this is possible. Overgrown shrubs and low-hanging branches can also obscure wayfinding signs.

When conducting vegetation management, greenway managers should pay close attention to the important role that vegetation plays in contributing to the character of a facility, as well as user experience. Routine trimming, mowing, and pruning of vegetation can contribute to greenway aesthetics and user safety, but an overly aggressive approach can degrade the natural features that attract users in the first place.

Typical vegetation management tasks include:

- Tree and shrub trimming and pruning
- Mowing of vegetation
- Invasive species control
- Mulching and edging
- Root pruning or removal
- Weed suppression
- Leaf litter removal from drainage facilities

Table 3-4 | Routine Maintenance Operations

ISSUE	FREQUENCY (By Facility Type)			RECOMMENDATIONS
	Greenways	Accessible Trails	On-Road Facilities	
Facility Maintenance				
Sweeping/Blowing	Weekly	Weekly	Bi-weekly	<ul style="list-style-type: none"> • Hard surface trails can be swept by machine • Spot sweeping of some trail areas may be swept by hand or blowers. • For unpaved facilities, remove loose rocks. • For on-road facilities, coordination with local agencies may be required.
Trash Removal	Bi-weekly	Bi-weekly	Bi-weekly	<ul style="list-style-type: none"> • Includes removal of ground debris and emptying of litter and/or recycling cans. • Consider using volunteers for this task
Vegetation Management				
Tree/Shrub Trimming and Pruning	Spring and Fall; and as needed to maintain clear zones			<ul style="list-style-type: none"> • Trim vegetation that encroaches on vertical and horizontal clear zones to maintain user safety. Remove low-hanging limbs. • Maintain proper sight distances at trail intersections and around curves. • Ensure vegetation is not blocking signage.
Mowing	Bi-weekly during Spring, Summer and Fall			<ul style="list-style-type: none"> • Mow vegetation along trail corridors where appropriate to maintain minimum horizontal clear zones. • For on-road facilities, coordination with local agencies may be required.
Weed Control	One time each during Spring, Summer and Fall			<ul style="list-style-type: none"> • Cut or spray weeds encroaching on/growing through the trail with approved herbicide by licensed applicator. Cutting is preferred whenever possible, and is the only acceptable method in ecologically sensitive areas
Invasive Species Control	One time each during Spring, Summer and Fall			<ul style="list-style-type: none"> • Manually remove or spot spray invasive species that harm local ecosystems. Pest management plans should be developed and enacted to protect and preserve areas of special value, such as wetlands, riparian buffers, etc.

Remedial Maintenance Operations

Remedial maintenance responds to specific unplanned tasks. Remedial maintenance activities can range from minor items, such as removing fallen tree limbs, to correcting significant defects in the network. Remedial maintenance also includes repairing, replacing, or restoring major components that have been destroyed, damaged, or significantly deteriorated from normal usage and age. Some items may occur on a five- to ten-year cycle such as repainting, seal coating asphalt pavement, or replacing signage. Major reconstruction items will occur over a longer period or after an event such as a flood. Examples of major remedial issues include stabilization of a severely eroded hillside, repaving a trail surface or a street used for biking, or replacing a footbridge. Remedial maintenance should be part of a long-term capital improvement plan.



Flood damage is a remedial maintenance issue that many greenways must address.

Table 3-5 depicts the average life of various facility types, as well as general materials, with normal wear and tear. The repair or replacement of existing facilities should be reflected in a projected budget for future maintenance costs. The remedial maintenance tasks included in **Table 3-6** should be performed on an as needed basis to keep network facilities in good, usable condition.

Table 3-5 | Facility/Material Longevity

FACILITY/MATERIAL	LONGEVITY
Mulch	2-3 Years
Granular Stone / Natural Surface	7-10 Years
Asphalt	7-15 Years
Concrete	20+ Years
Boardwalk	20+ Years
Bridge / Underpass / Tunnel	50-100 Years

Table 3-6 | Remedial Maintenance Operations

ISSUE	FREQUENCY (By Facility Type)			RECOMMENDATIONS
	Greenways	Accessible Trails	On-Road Facilities	
Facility Repair/Replacement				
Bridges Underpasses Tunnels	Annual inspection by licensed engineer			<ul style="list-style-type: none"> • Repair as needed • Expected lifespan of 50-100 years
Boardwalks	Annual inspection by licensed engineer			<ul style="list-style-type: none"> • Repair as needed • Expected lifespan of 20+ years
Amenities (benches, litter receptacles, waysides, restrooms)		Annually or as needed		<ul style="list-style-type: none"> • Repair and repaint benches, litter receptacles, and other facilities. • Remove graffiti as soon as possible. • Ensure restrooms are in good working order. • Inspection should be done on a regular basis to discourage the “broken windows effect.”
Signage		Annually or as needed		<ul style="list-style-type: none"> • Ensure signs are clean and in good repair.
Drainage and Erosion Control		As needed; inspect facilities after storm and flood event		<ul style="list-style-type: none"> • Identify extent of repairs, risk of environmental degradation, and volume of trail users.
Trail Widening		Inspect annually		<ul style="list-style-type: none"> • May be necessary if evidence exists that trail users are using clear zones due to high volume of users. • Consider user types, ecological impacts of trail widening and adjust facility design accordingly.
Habitat Enhancement				
Tree/Shrub Trimming and Pruning	Spring and Fall; and as needed to maintain clear zones			<ul style="list-style-type: none"> • Trim vegetation that encroaches on vertical and horizontal clear zones to maintain user safety. Remove low-hanging limbs. • Maintain proper sight distances at trail intersections and around curves. • Ensure vegetation is not blocking signage.
Mowing		Bi-weekly during Spring, Summer, and Fall		<ul style="list-style-type: none"> • Mow vegetation along trail corridors where appropriate to maintain minimum horizontal clear zones. • For on-road facilities, coordination with local agencies may be required.

ISSUE	FREQUENCY (By Facility Type)			RECOMMENDATIONS
	Greenways	Accessible Trails	On-Road Facilities	
Weed Control	One time each during Spring, Summer, and Fall			<ul style="list-style-type: none"> Cut or spray weeds encroaching on/growing through the trail with approved herbicide by licensed applicator. Cutting is preferred whenever possible and is the only acceptable method in ecologically sensitive areas.
Invasive Species Control	One time each during Spring, Summer, and Fall			<ul style="list-style-type: none"> Manually remove or spot spray invasive species that harm local ecosystems. Pest management plans should be developed and enacted to protect and preserve areas of special value, such as wetlands, riparian buffers, etc.
Pavement Preservation				
Surface Treatments	Every 3-5 years			<ul style="list-style-type: none"> Treatments for asphalt surfaces include fog seal, chip seal, microsurfacing. Consider trade-offs between durability of treatment, curing time, and initial cost vs. maintenance costs.
Crack Treatments	Within first 5 years of construction, then as needed after			<ul style="list-style-type: none"> Necessary to prevent moisture infiltration, which can accelerate pavement distress.
Pothole Depressions and Repairs	Seasonally or annually			<ul style="list-style-type: none"> For paved asphalt facilities, consider trade-offs of hot-mix vs. cold-mix asphalt patching. Generally hot-mix patches are more durable.
Resurfacing	Every 10-20 years			<ul style="list-style-type: none"> Appropriate when asphalt trail has reached the end of its useful life. Methods include asphalt overlay over the existing surface and mill and overlay, which removes existing asphalt prior to application of a new layer. Take care to ensure resurfacing maintains the originally designed slopes and grades and that it is flush around surface utilities such as gutters, manholes, inlet grates, etc.

ISSUE	FREQUENCY (By Facility Type)			RECOMMENDATIONS
	Greenways	Accessible Trails	On-Road Facilities	
Pavement Markings				
Paint	Lifespan of approximately 3-24 months, depending on environmental factors and trail usage			<ul style="list-style-type: none"> • Generally, least expensive to install but also less durable than other materials. • Very sensitive to high humidity.
Epoxy Paint	Lifespan of approximately 24-48 months, depending on environmental factors and trail usage			<ul style="list-style-type: none"> • More durable than latex paint but also more expensive to install. • Requires specialized equipment to ensure proper blending of its bonding components.
Thermoplastic	Lifespan of approximately 48-72 months, depending on environmental factors and trail usage			<ul style="list-style-type: none"> • Durable; ideal for high traffic areas. • More expensive than paint and epoxy paint.
Preformed Tape	Lifespan of approximately 36-96 months, depending on environmental factors and trail usage			<ul style="list-style-type: none"> • Most durable option and most expensive to install. • Can be used for lane lines, legends, symbols.

Establishing a Priority Process for Remedial Maintenance

Major maintenance items will need to be prioritized to determine which are addressed first. While a robust routine maintenance program will reduce major needs, some remedial work will be necessary. Greenway managers should consider establishing a maintenance prioritization process to determine which needs are addressed first. When prioritizing tasks, greenway managers should evaluate the underlying issues behind the maintenance need. For example, a major repair on a little-used section of greenway may not be as high a priority as a less expensive project on a more heavily used segment. Once maintenance issues and needs are prioritized, they can be translated into a list of projects for construction.

Facility Repair / Replacement

All greenway facilities will require repair or replacement at one time or another. Facility repairs can include relatively minor items, such as signage cleaning and repainting benches, to major items, such as structural repairs to bridges and boardwalks and greenway widening projects. In some situations, existing trails to be converted to a different use or needing repair, it will be necessary to decommission, realign, or reconstruct a trail with adherence to the guidance in this document. The time between observation and repair/replacement will depend on whether the

needed repair is deemed a hazard, to what degree the needed repair will affect the safety of the user, and whether the needed repair can be performed by an in-house maintenance crew or if it is so extensive that the needed repair must be done by outside entities or replaced completely. For further guidance, refer to **Table 3-6** presented previously.

Habitat Enhancement or Control

Habitat enhancement and control can improve aesthetics, help prevent erosion, and provide for wildlife habitat. Habitat control involves mitigation of damage caused by wildlife.

- Plant vegetation, such as trees and shrubs
- Take preventative measures to protect landscape features from wildlife, such as installing fencing around sensitive or newly planted plant materials
- Apply herbicide to eliminate any problem plant species, such as poison ivy or kudzu, etc.
- Apply herbicide to maintain facility edges and prevent encroaching vegetation, such as along trails and sidewalks.
- Deter interaction between facility users and facility inhabitants, such as feeding the wildlife, etc.

Widening

For high-volume routes, trails with a change in use, or adding an emergency access route, widening may be needed as part of the remedial maintenance. Close attention should be paid to avoid settlement, compaction, or surface variance between the existing and new sections of trail.

Typical Maintenance Costs

Table 3-7 and **Table 3-8** present planning-level estimates of annual maintenance costs for several common maintenance activities. The data on greenway maintenance costs was collected from several sources, including published guidance and literature on trail maintenance, trail and greenway plans from other municipalities across the United States, and professional experience with greenway design and maintenance.

Table 3-7 | Average Annual Maintenance Costs for Trail Facilities

TRAIL TYPOLOGY	COST PER MILE: LOW	COST PER MILE: HIGH
Rails to Trails	\$1,000	\$2,000
Shared Use Path	\$6,000	\$9,000
Bike Lanes	\$1,000	\$2,000

Table 3-8 | Average Annual Cost Per Mile for Common Maintenance Activities

ISSUE	COST PER MILE: LOW	COST PER MILE: HIGH	FREQUENCY: LOW	FREQUENCY: HIGH
Sweeping	\$1,200	\$2,000	16-24 times/year	52 times/year
Trash Removal	\$1,200	\$2,000	16-24 times/year	52 times/year
Mowing	\$1,200	\$2,000	8-24 times/year	52 times/year
Tree and Shrub Pruning	\$1,000	\$1,200	8-10 times/year	12 times/year
Weed Control	\$1,300	N/A	10 times/year	N/A
Drainage Control, Erosion, Stabilization	\$1,200	\$2,000	8-24 times/year	52 times/year

APPENDIX A



TECHNICAL ANALYSES

PLANNING CONTEXT

Over the past 20 years, several plans, studies, and concept designs have been developed that relate directly or indirectly to the Lower Saluda Greenway Feasibility Study. To ensure that previous planning is considered and built upon throughout the feasibility study process, a review of prior work was conducted and is summarized in **Table A.1-1**. To provide an understanding of how prior efforts dovetail with the analyses being conducted as part of this feasibility study, **Table A.1-2** shows the areas of emphasis of each previous planning effort.

Table A.1-1 | Previous Planning Summary

PLAN	YEAR COMPLETED	OWNER	SUMMARY
Saluda Riverwalk Planning and Design	1996-Present	The River Alliance	The Saluda Riverwalk is a three-mile extension of the Three Rivers Greenway. This section ties to the existing Columbia Riverfront Canal and the City of West Columbia.
Boyd Island Master Plan	2006-Present	The River Alliance	The Boyd Island Master Plan provided a conceptual plan for a spur to the Saluda Riverwalk, located on a four-acre island at the confluence of the Saluda, Broad, and Congaree Rivers. The plan includes two-thirds of a mile of trails and overlooks.
The Lower Saluda Greenway Study	2012-2013	The River Alliance	The Lower Saluda Greenway Study reviewed the possible connection between the Saluda Riverwalk and the Lake Murray Dam. Plans and a proposed cost estimate were completed with the hope of including them in the proposed Lexington County capital sales tax. The sales tax referendum failed to pass, so no funding source was identified to advance the project.
The Lower Saluda Greenway Initiative	2017	Mungo Foundation and Lexington County	The study focused on defining the Lower Saluda Greenway district by considering gateways, assets, and major roadway corridors. Improvements focused on road diets and intersection improvements.

PLAN	YEAR COMPLETED	OWNER	SUMMARY
ICRC 2020-2030 Strategic Plan	2018-2019	Irmo Chapin Recreation Commission	The 2020-2030 Strategic Plan was designed to provide a conceptual framework for ICRC operations and capital improvements for a 10-year period. Goals include expanding programs and activities and promoting walkable infrastructure for encouraging healthy and active lifestyles. Strategic facility objectives and priorities include the expansion of the Saluda River Greenway.
Midlands Regional Competitiveness Report	2019-2020	Engenuity SC	The report looks at the indicators of competitive communities through talent, innovative capacity, entrepreneurial and business environment, industry clusters, and livability.

Table A.1-2 | Previous Planning Areas of Emphasis

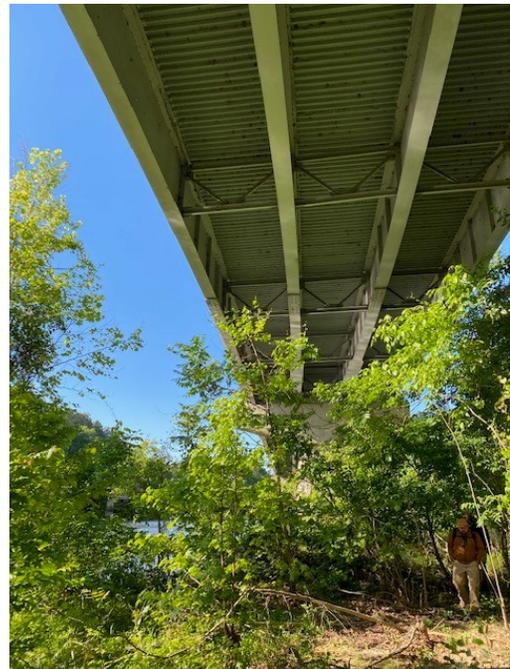
PLAN	PUBLIC OUTREACH	DEMOGRAPHICS	SOCIO-ECONOMICS	ENVIRONMENTAL	CULTURAL	DEMAND	CONNECTIVITY	SAFETY	TRANSPORTATION	RECREATION
Saluda Riverwalk Planning and Design				✓	✓		✓			✓
Boyd Island Master Plan				✓	✓		✓			✓
The Lower Saluda Greenway Study	✓				✓		✓			✓
The Lower Saluda Greenway Initiative	✓						✓	✓	✓	✓
ICRC 2020-2030 Strategic Plan	✓	✓	✓	✓	✓					✓
Midlands Regional Competitiveness Report		✓	✓		✓					✓

FIELD ANALYSIS

Members of the project team met and walked the majority of the project area on April 27-28, 2020; the remainder of the project area was walked on August 19, 2020. Over these three days, the team walked the entire length of the project scope (i.e., I-26 to the Lake Murray Dam), reviewing and analyzing the current conditions of the project area, as well as recording opportunities and constraints to implementation. Key observations are documented in the sections that follow, grouped by geographic area along the project limits.

I-26 to CR Jackson Property (~5,000LF)

The walk began at the I-26 overpass (SCDOT property) and continued northwest onto and through the Dominion Energy property, avoiding the property owned by Synergy Utilities. This area is a mix of low and upper topography. The majority of the property from the open ditch at I-26 is marginal wetlands. As you get closer to the access drive, you come to high ground where the area is heavily wooded with a mix of pine and hardwood trees. There will need to be a crossing of the access road to the water plant owned by Synergy Utilities. After crossing this access road there will need to be some small ductile pipes installed, as the ground has some rolling topography. Overall, this area appears to be devoid of wetlands. However, there is a wetlands area just north of the Synergy property, so the path would most likely need to go around this area. Two small creeks will need to be crossed; both would be less than a 30-foot crossing. There are protected wetlands that Dominion Energy has delineated.



I-26 over greenway corridor

The walk continued in a southwest direction, heading directly to the edge of the river. From here, the project team headed west along the river. The proposed greenway should be able to be within 20 to 30 feet of the riverbank, as the elevation appears to be high enough to avoid routine flooding. The walk continued west until

reaching Stoops Creek. The team travelled up and down the creek looking for the best crossing, which appears to be approximately 130 feet from the bank of the Saluda River. This will be a substantial crossing of approximately 50 to 75 feet in length. The greenway would continue along the bank of the Saluda River until it reaches the CR Jackson property. There is also a small creek at the property line that would need to be crossed, approximately 30 feet in length.



River views from greenway corridor

CR Jackson to I-20 (~1,800LF)

This section of the walk began at the southern end of the CR Jackson property at the existing creek bed. The area at this location will require a boardwalk due to the existing side slope. There are large rocks and broken up concrete on the slope as well, requiring the boardwalk to continue approximately 300 to 400 feet. Beyond this, the land transitions and the woods widen out, allowing for at-grade pavement. The area is heavily wooded and thick with underbrush and briars. Near the end of the CR Jackson property there is a Dominion Energy power line easement, which is void of trees but heavy in low brush and weeds. This area should be easily passable and is high enough to install at-grade pavement.

As you leave the power line easement and enter the woods again on Dominion Energy property, the woods are very dense. Briars and invasive plantings, along with a mix of hardwoods, will make for some tough construction in roughly the first 100 feet. The greenway will follow the river approximately 30 feet from shore. The woods begin to open up with some mature pines and larger hardwoods present. The greenway will have a few crossings of low areas, meandering along ridge lines that are adjacent to large low areas. As the greenway corridor gets closer to I-20, the woods begin to get thick with invasive plants and briars. Here, the ground is level, and construction should be fairly straightforward. The majority of this section should be an at-grade surface with a few boardwalk sections.

I-20 to Shaw Industries (~6,300LF)

This section of the walk began at the drainage ditch along the west side of I-20. This area contained a double ridge of high ground that was relatively flat and wide enough for the proposed greenway. The first approximately 900 linear feet would be on property owned by Palmetto Wastewater Reclamation. The next property is owned by Dominion Energy. This area is heavily wooded and a mix of pine trees and hardwoods. There are minor wetland areas that will need to be avoided with the proposed greenway alignments. The walk continued along the edge of the Saluda River for approximately 600 feet until crossing the Dominion Energy gas line. At this point, there is an existing cleared trail along the top of the bank that will be perfect for the proposed greenway. There are little to no areas of wetlands throughout this section. The existing trail ends at the old boat ramp at the end of Garden Valley Lane.



Existing cleared trail

There are some topography changes through the next sections, including areas of wetlands that may need to be avoided. A small creek crossing of approximately 25 to 30 feet will need to be crossed. The woods were very thick with lots of invasive plantings and briars. Traveling approximately another 2,700 linear feet, you reach the edge of Kinley Creek and the Shaw Industries property line.

Shaw Industries Property (~5,700LF)

The walk continued on the Shaw Industries property. Beginning at the property line at Kinley Creek, there will need to be a substantial bridge to cross the creek. There is a good crossing location approximately 50 feet from the mouth of the Saluda River that lines up with the existing sewer line. Once across the creek, the proposed greenway can follow the existing cleared 50-foot wide sewer easement. There are minor changes in topography, but this should be one of the easiest sections to construct of the entire project. A fence will need to be installed on the north side of the sewer easement to protect Shaw Industries' property.

After approximately 2,300 feet, there is a large drainage ditch. The proposed greenway will need to turn and travel north approximately 175 feet to an existing piped section. The previously mentioned new fence will need to follow this section and tie to the existing fencing around these piped sections. The greenway will then turn south back to the edge of the Saluda River and back to the sewer easement. The remaining 3,300 linear feet will continue along the existing sewer easement and will need to turn up and cross the existing asphalt access road to the existing pump station. There will need to be double vehicular gates on either side of the proposed greenway as it crosses the asphalt. The greenway will continue west until it reaches the fence line and ties into the existing Saluda Shoals Trail.

Saluda Shoals Park to Bush River Road (~3,400LF)

Leaving the Saluda Shoals Park property, the walk continued through the Cornerstone Presbyterian Church property, south of the soccer field, and around the Walker property. There is some major topography and heavily wooded areas traveling around the Walker property. A few short boardwalks will need to be installed to cross small creeks. After getting around the Walker property there will need to be a high boardwalk to cross a large creek between the property lines.



Approaching power line easement

The walk continued and entered more Dominion Energy property. This property is heavily wooded and lower in topography than the previous sections. Here, the greenway will need to be farther from the river to avoid areas of wetlands and areas prone to flooding. This section of the greenway will be more difficult to construct because of the topography, existing vegetation, and access. There is also a prevalence of wetlands in this area and large sections of low boardwalks will most likely be required. The greenway will continue to follow the river before turning north along the Ruth property line.

From here, the greenway will leave the river and travel north along the Ruth property line approximately 950 linear feet to the Dominion Energy power line easement. There are minimal areas of wetlands that will need to be avoided. There is

what appears to be an old logging road in this section, which could be used as for greenway access. The power line easement will need to be crossed at 90 degrees and back into the woods. At this point, there is substantial topography to traverse to get up to Bush River Road. There is about a 50-foot difference in elevation between the power line easement and the old CSX rail crossing. It will be necessary to traverse the hill side at an angle traveling northwest to assist in meeting ADA requirements. Additionally, switchbacks and some significant grading will be needed to make this section work. The greenway will need to cross the “semi-abandoned” rail line at Bush River Road.

Bush River Road to Lake Murray Dam (8,600LF)

This area of the corridor did not show any signs of wetlands and is mostly owned by Dominion Energy. There is an entrance to a Dominion laydown yard where the greenway will need to cross and continue into the wood line along Bush River Road. Once at Bush River Road, the greenway can follow the road right-of-way within the wood line; the greenway should meander so that there are lines of sight from the roadway for visibility and security.

The topography along this section of the proposed greenway will be the most challenging. Topography ranges from an elevation of 270 down to 208 and back up to 260. The greenway’s actual length will need to be a lot longer than anticipated to accommodate ADA access.



Hardwood tree within corridor

The section just west of the Dominion laydown yard will traverse along the contours down into a ravine and back up to the edge of the roadway until it reaches the Dominion McMeekin Station entrance. In the areas along the right-of-way, an existing fence will need to be relocated or extensive grading in SCDOT right-of-way will be required. Either way, the greenway will follow the road right-of-way until after passing a seven-acre parcel owned by EB Atkins. This area may need to have an easement or a Dominion fence relocated.

The greenway will continue west within the wood line to the Lexington County recycling center at the intersection with Coldstream Drive. The greenway will again have to traverse some significant topography, as there is an approximately 16-foot change in elevation. Once at the exit of the recycling center, the greenway will again need to possibly have some switchbacks to address the changes in elevation and meet ADA guidelines. At the entrance to the recycling center there is an opportunity to relocate some existing Dominion fencing to make it easier and safer to cross the entrance driveway.

Once back in the wood line, the topography begins to level off and become more rolling. The greenway should be easier to construct here, as it will be adjacent to the roadway. There are substantial trees of large size that should be showcased but avoided, as to not damage them. As the greenway continues to the Lake Murray Dam and the intersection of SC 6/SC 60, it will most likely transition to an adjacent-to-road shared-use path, eventually tying to the existing concrete sidewalk. Improving the existing sidewalk to a wider, shared-use facility would be ideal. A grade-separated greenway crossing of SC 6 may also be considered.

DEMOGRAPHIC AND SOCIO-ECONOMIC ANALYSIS

The maps, charts, and infographics presented in this section summarize demographic data about residents in proximity to the greenway corridor. Unless otherwise noted, all data comes from the American Community Survey (ACS) 2018 five-year estimate. Numbers may not be exact due to rounding and sampling methods.

Target Area

Figure A.2-1 identifies the target area of the analyses. The area stretches across both Lexington and Richland Counties. This area contains 64 block groups which are either partially or fully located within a two-mile buffer of the proposed Lower Saluda Greenway. Of those 64 block groups, 45 are in Lexington County and 19 are in Richland County. It should be noted that data for two block groups is unavailable as they comprise Lake Murray.

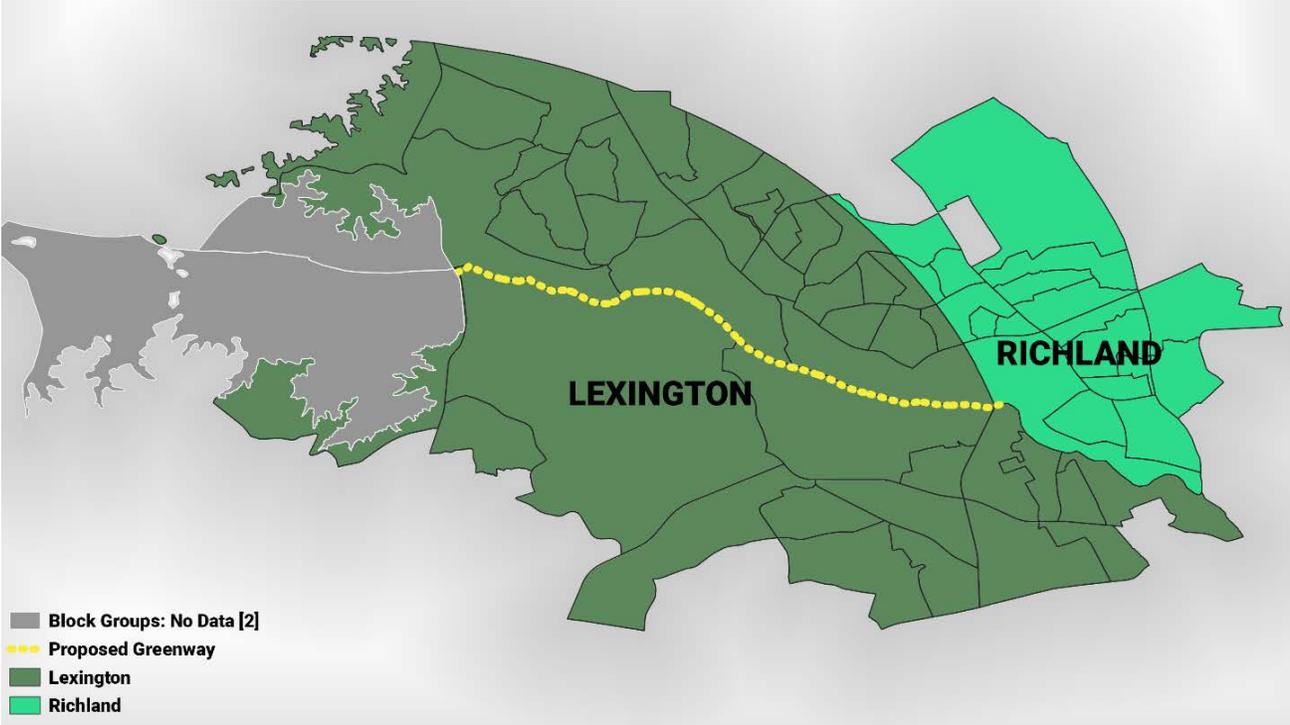


Figure A.2-1 | Target Area

Total Population

The total population of this area is 94,898. **Figure A.2-2** illustrates how the population is distributed, by block group, throughout the target area. Noticeably, bordering the proposed greenway are two of the highest categories of total populations – 1,500 or greater.

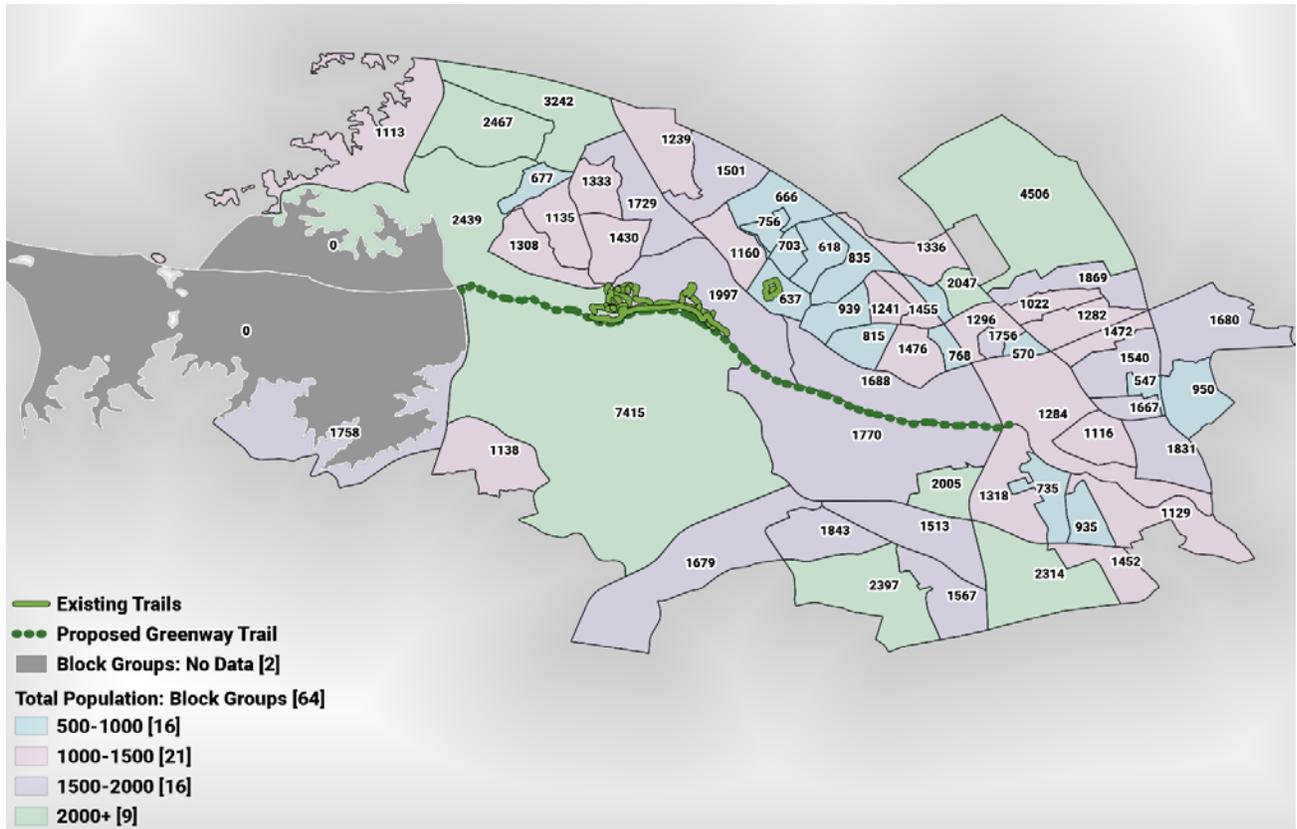


Figure A.2-2 | Population by Block Group

Race

Figure A.2-3 shows that 36 (58%) block groups have a majority composed of individuals that identify as “White Only.” Additionally, 26 (42%) have a majority composed of individuals that identify as “Black/African-American Only.” These are the two largest race groups within a two-mile buffer of the proposed greenway. All areas bordering the proposed greenway are majority white.

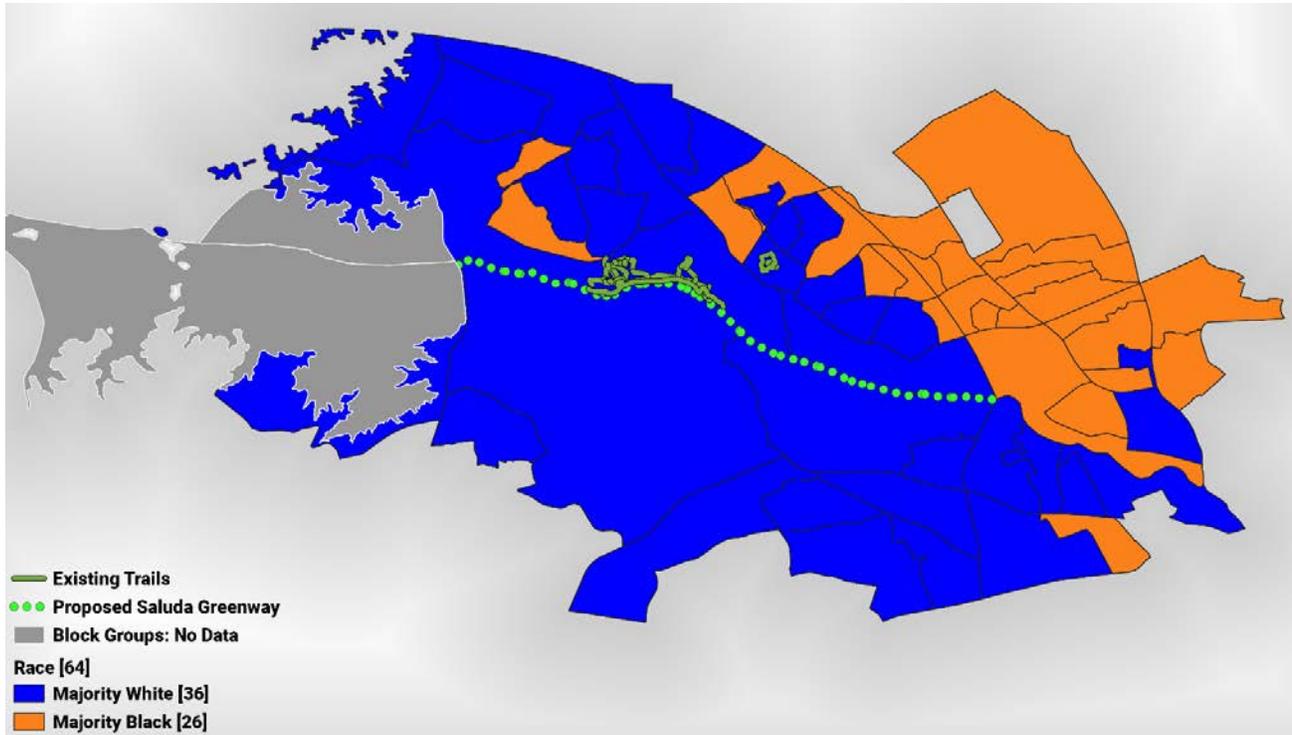


Figure A.2-3 | Race by Block Group

Figure A.2-4 displays the distribution of race throughout the target area. Noticeably, race groups titled “Hawaiian and Other Pacific Islander” and “American Indian/Alaskan Native” represent less than 1% of the population. In total, the largest race group in the area identify as “White Only” (57%) with “Black/African-American Only” being the second largest (30%).

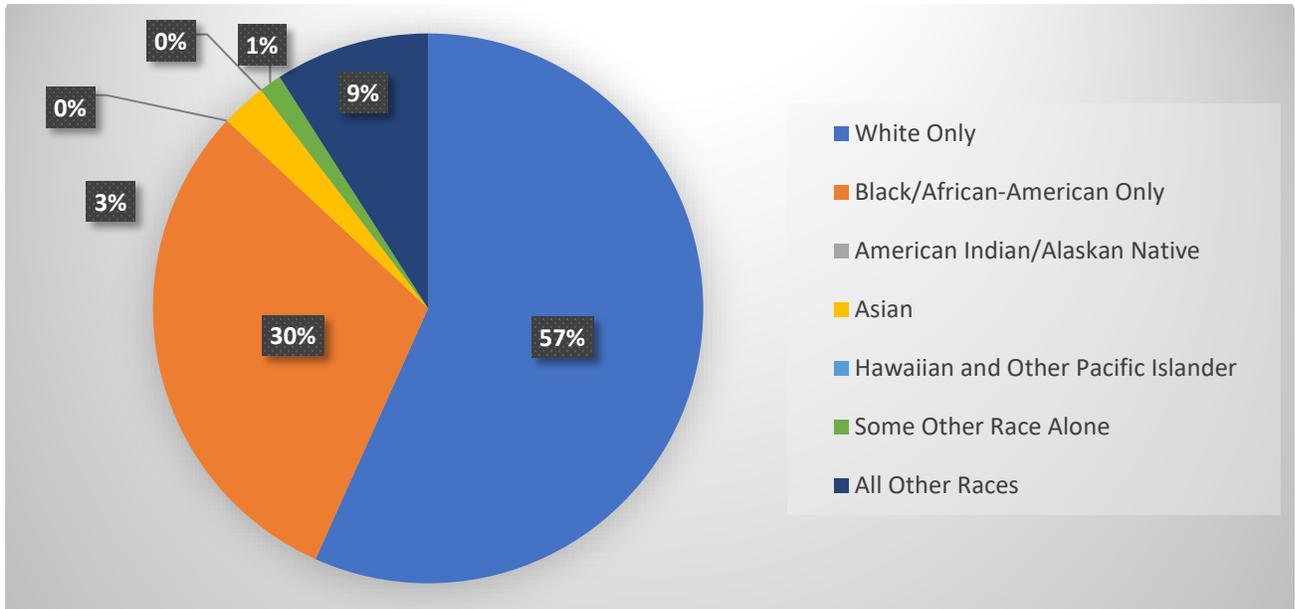


Figure A.2-4 | Race Distribution

Age

As shown in **Figure A.2-5**, individuals age 17 and under make up the majority of 45% of the block groups in this area, making them the largest represented group, in terms of age. Individuals age 65+ represent the majority of 32% of the block groups in this area, making them the second largest. Age groups 18-21 and 60-64 do not make up the majority of any of the block groups.

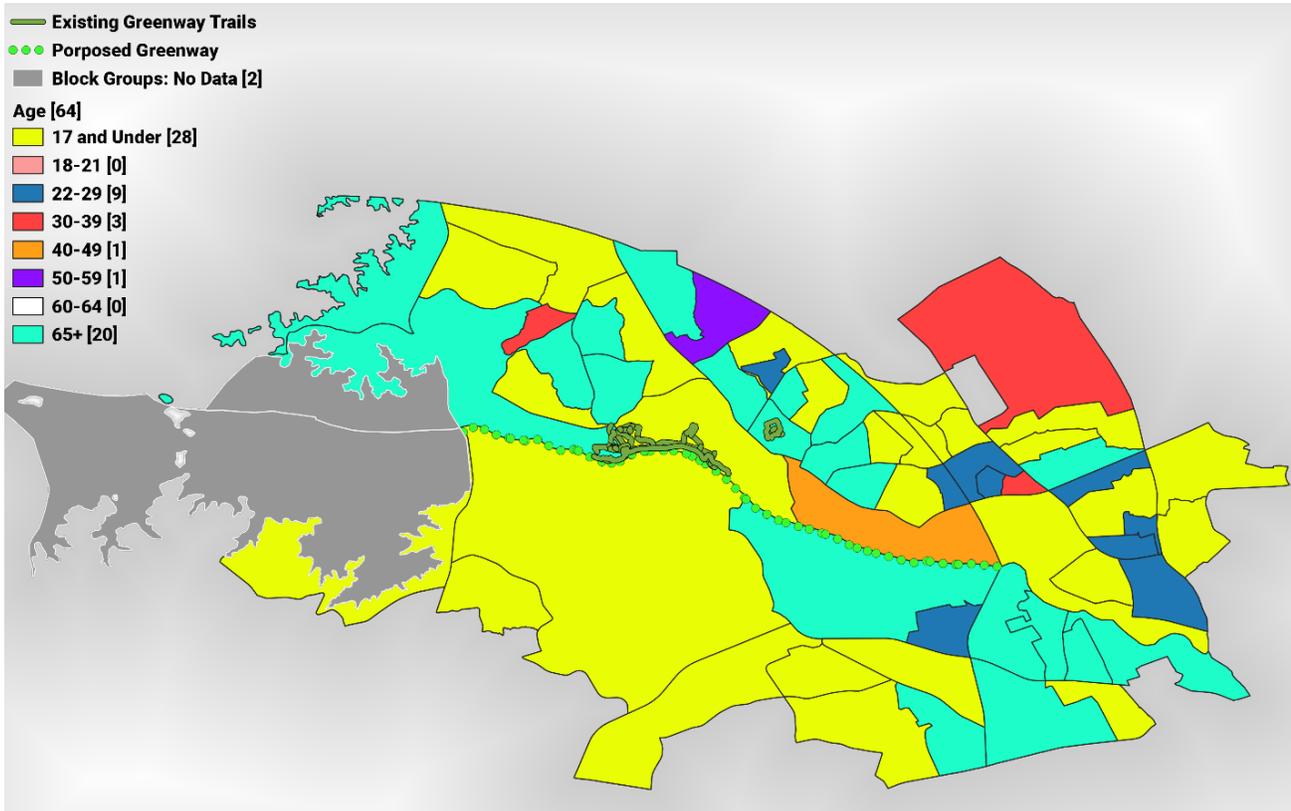


Figure A.2-5 | Age by Block Group

Figure A.2-6 displays the age distribution for the area. The largest age group is 17 and under, with 21% of the population fitting into that category. Those age 65 and older represent the second highest, making up 15.1% of the total population.

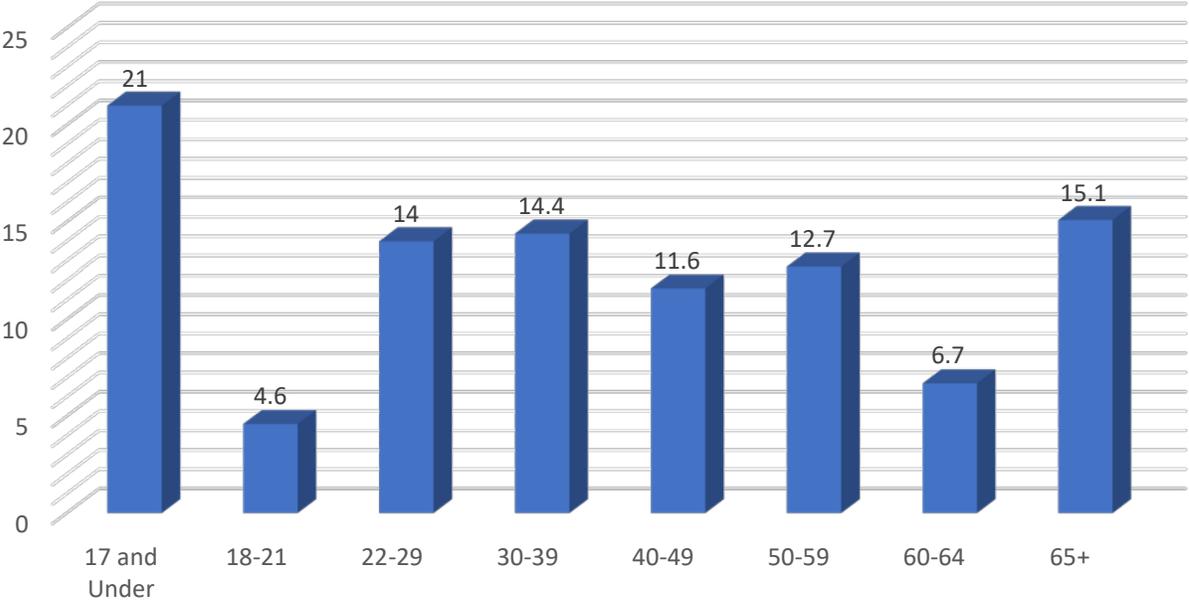


Figure A.2-6 | Age Distribution

Gender

Figure A.2-7 represents the majority gender in the target area as it relates to their individual block groups.

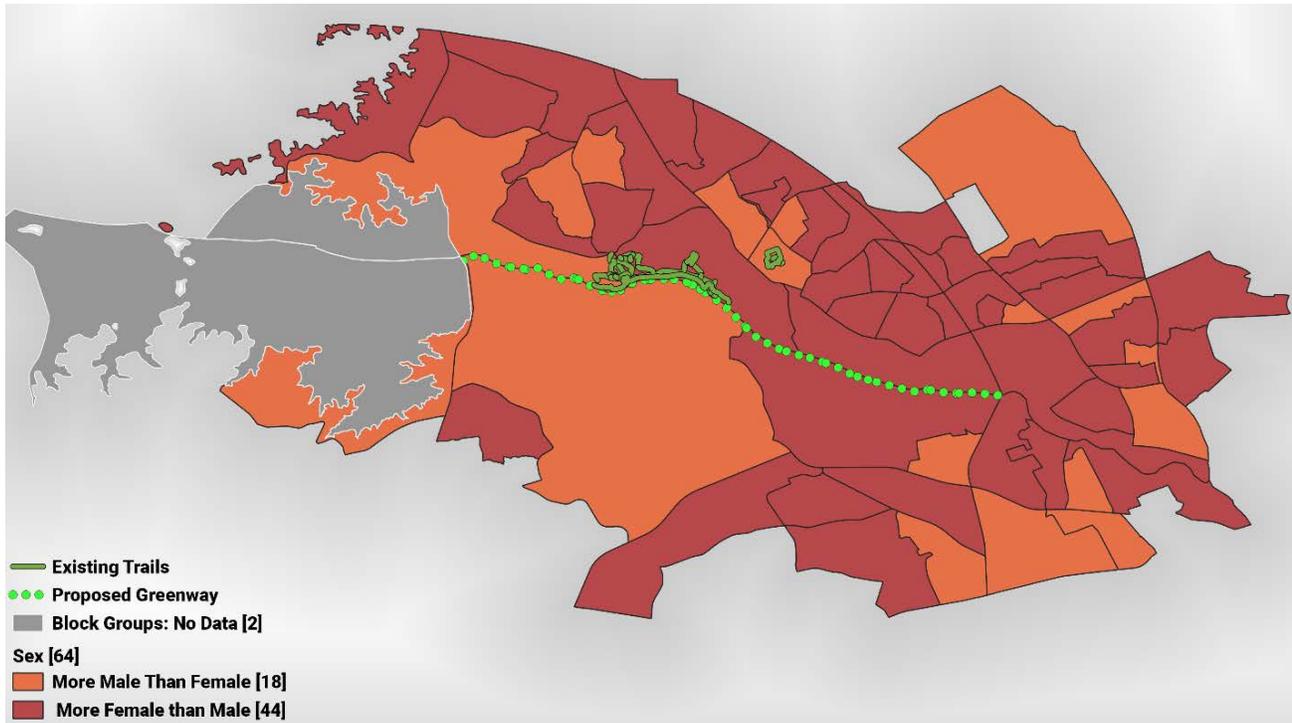


Figure A.2-7 | Gender by Block Group

Figure A.2-8 shows gender distribution. While almost an even split, there are more females than males residing in the two-mile buffer of the proposed greenway. However, if you refer to Figure 2.2-7, you will notice where female-majority only accounts for 14 of the 62 total block groups.

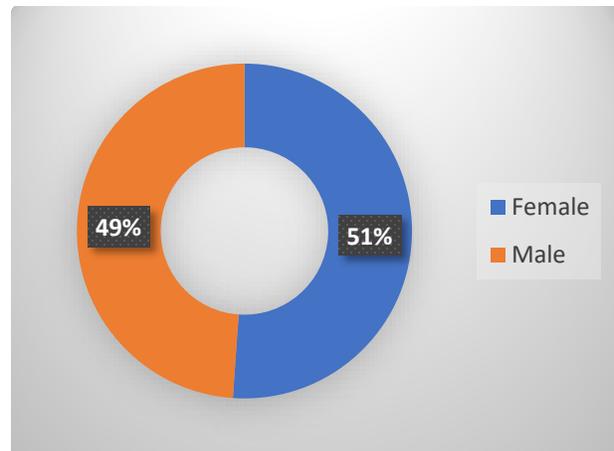


Figure A.2-8 | Gender

Educational Attainment

Figure A.2-9 illustrates the highest level of educational attainment as it relates to the 62 block groups. A majority population of individuals that have acquired “some college” or more is indicative of 68% of the block groups. The largest category between census blocks, for this specific area, are those individuals that have acquired a bachelor’s degree.

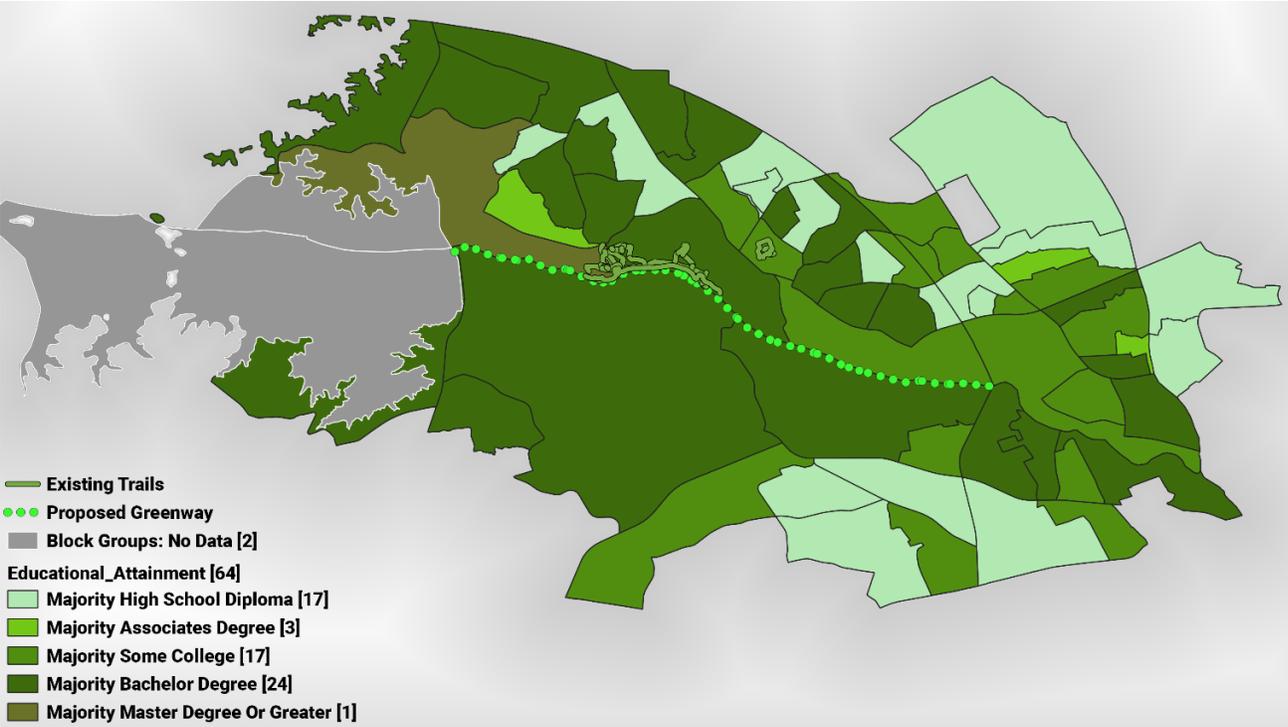
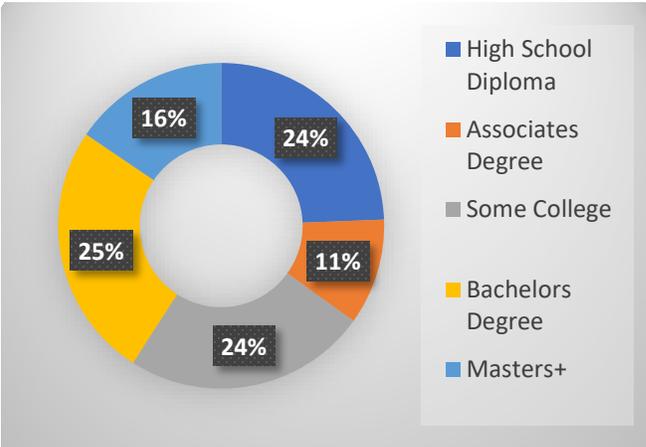


Figure A.2-9 | Educational Attainment by Block Group

Figure A.2-10 illustrates the percentage of individuals based off their highest level of educational attainment. Remarkably, 65% of the population has attended some institution of higher learning, with 25% of those individuals having acquired their bachelors and 16% a master’s degree or greater.

Figure A.2-10 | Educational Attainment



Employment Status

As depicted in **Figure A.2-11**, 84% of block groups have a majority population of 20% or more individuals currently not in the labor force. There are many reasons why an individual may not be in the labor force, including active students, retirement, disability, and unemployment.

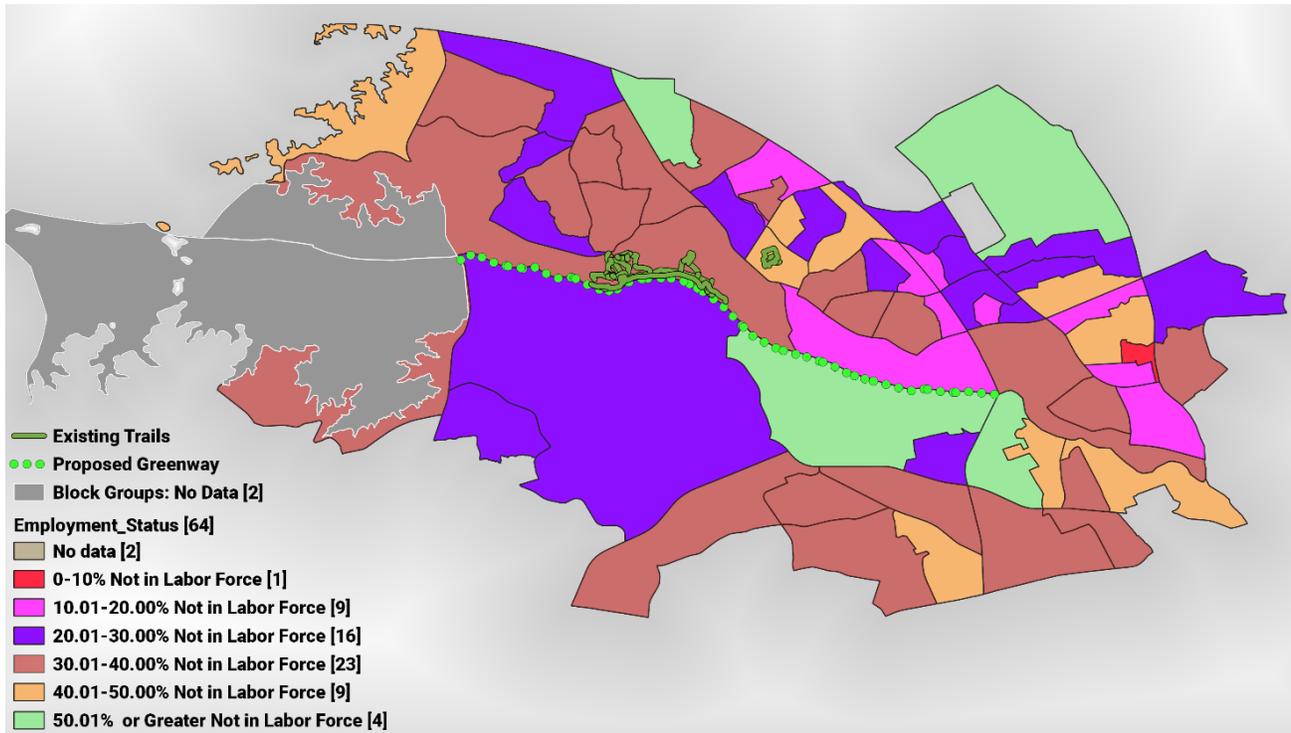


Figure A.2-11 | Employment Status by Block Group

Figure A.2-12 shows the overall employment status of all individuals in the labor force. Noticeably, 36% of individuals residing in the study area are not in the labor force.

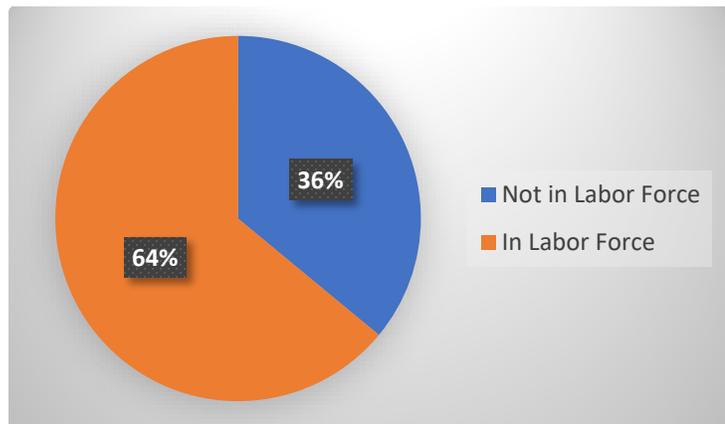


Figure A.2-12 | Employment Status

Household Income

As shown in **Figure A.2-13**, more than half of the census blocks have households earning more than \$75,000 a year; 77% of census blocks have reported majority earnings of \$50,000 and greater. Additionally, all census blocks that border the proposed greenway have household incomes greater than \$50,000.

Map 8: Household Income

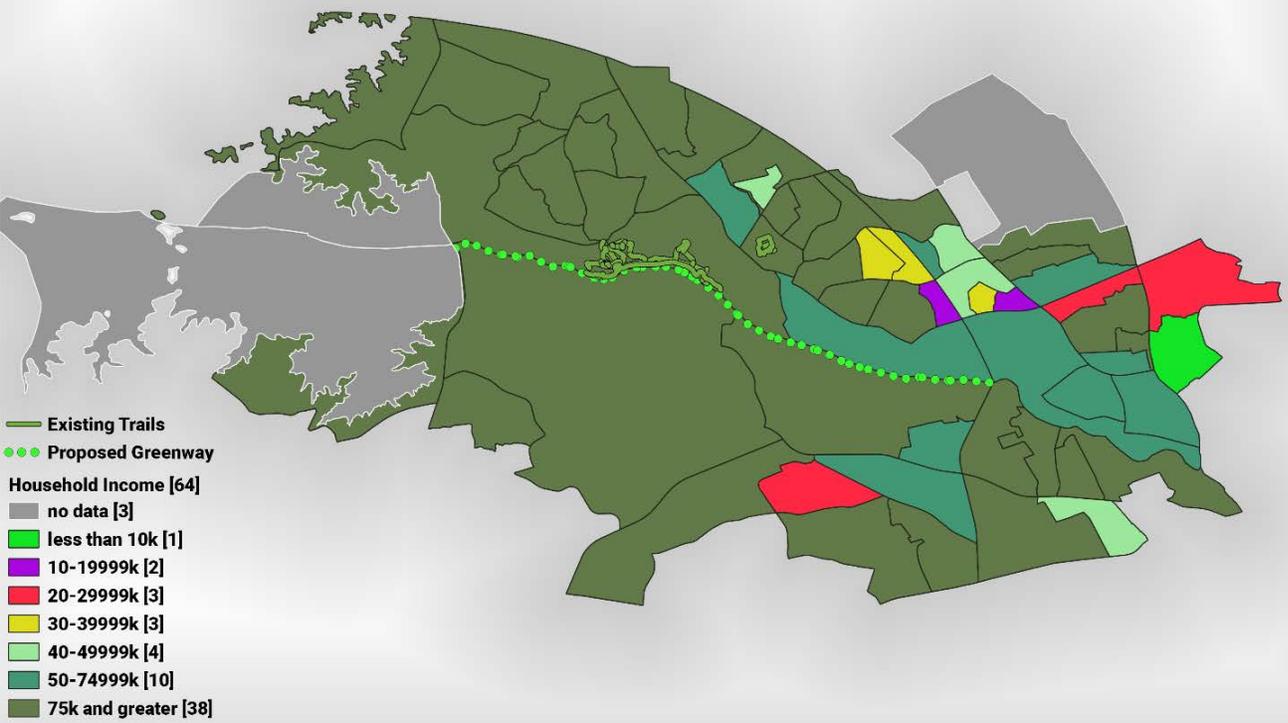


Figure A.2-13 | Household Income by Block Group

Figure A.2-14 illustrates the distribution of household income throughout the study area. The highest earning category in the study area are households earning \$75,000 or more (34%), followed by households earning \$50,000 or more (20%).



Figure A.2-14 | Household Income

Zero and One Vehicle Households

Figure A.2-15 illustrates the percent of households with access to either zero or one vehicle. Notably, more than half (34) of the 62 block groups have more than 40% of their households with access to zero and one vehicle. Areas with a low rate of vehicle accessibility may require other forms of transportation. These areas may need to be connected directly to the greenway, while homes with more cars can be serviced by trailheads with parking.

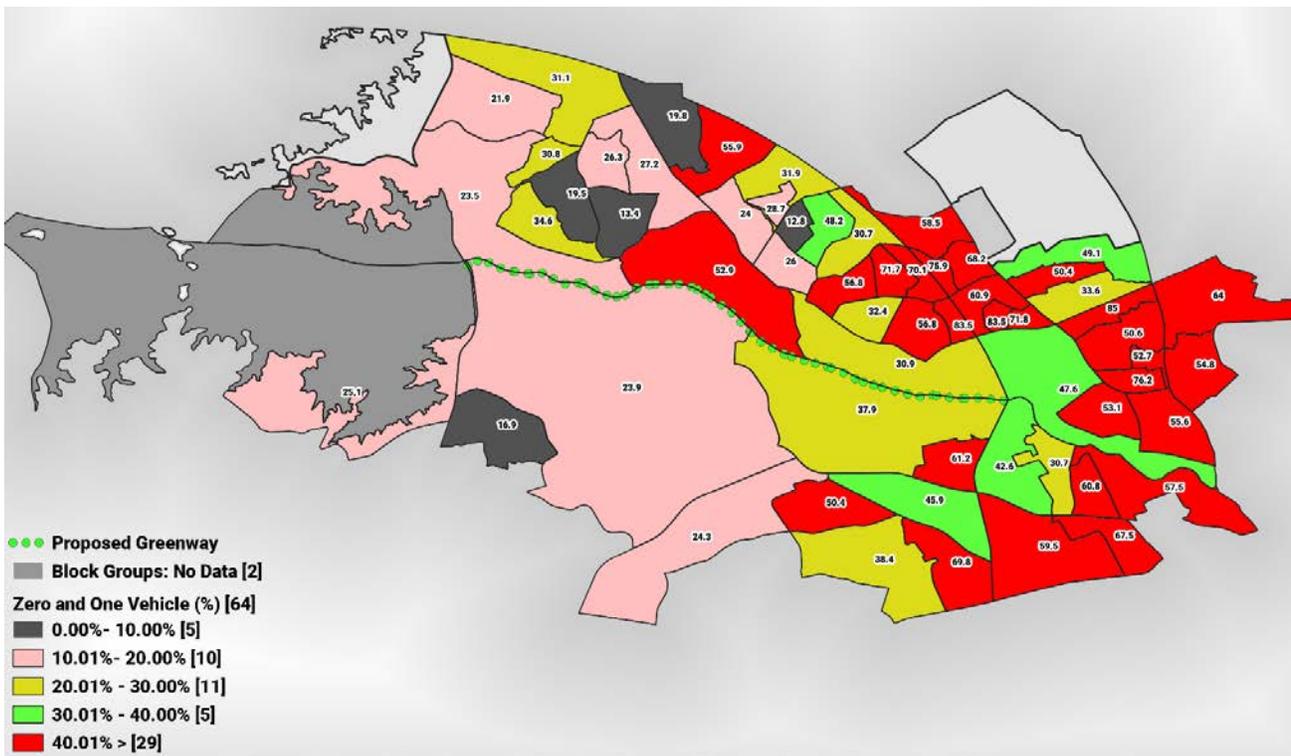


Figure A.2-15 | Zero-One Vehicle Households by Block Group

As displayed in **Figure 2.2-16**, 46% of total households have access to zero or one vehicle.

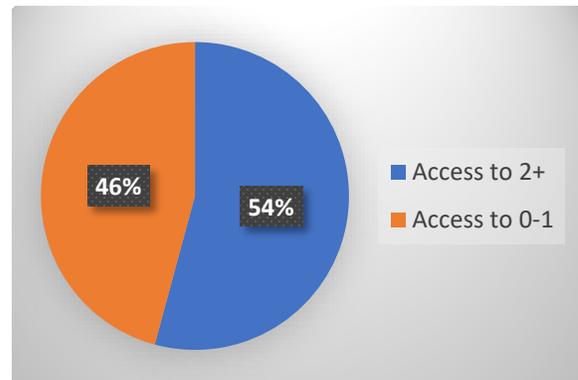
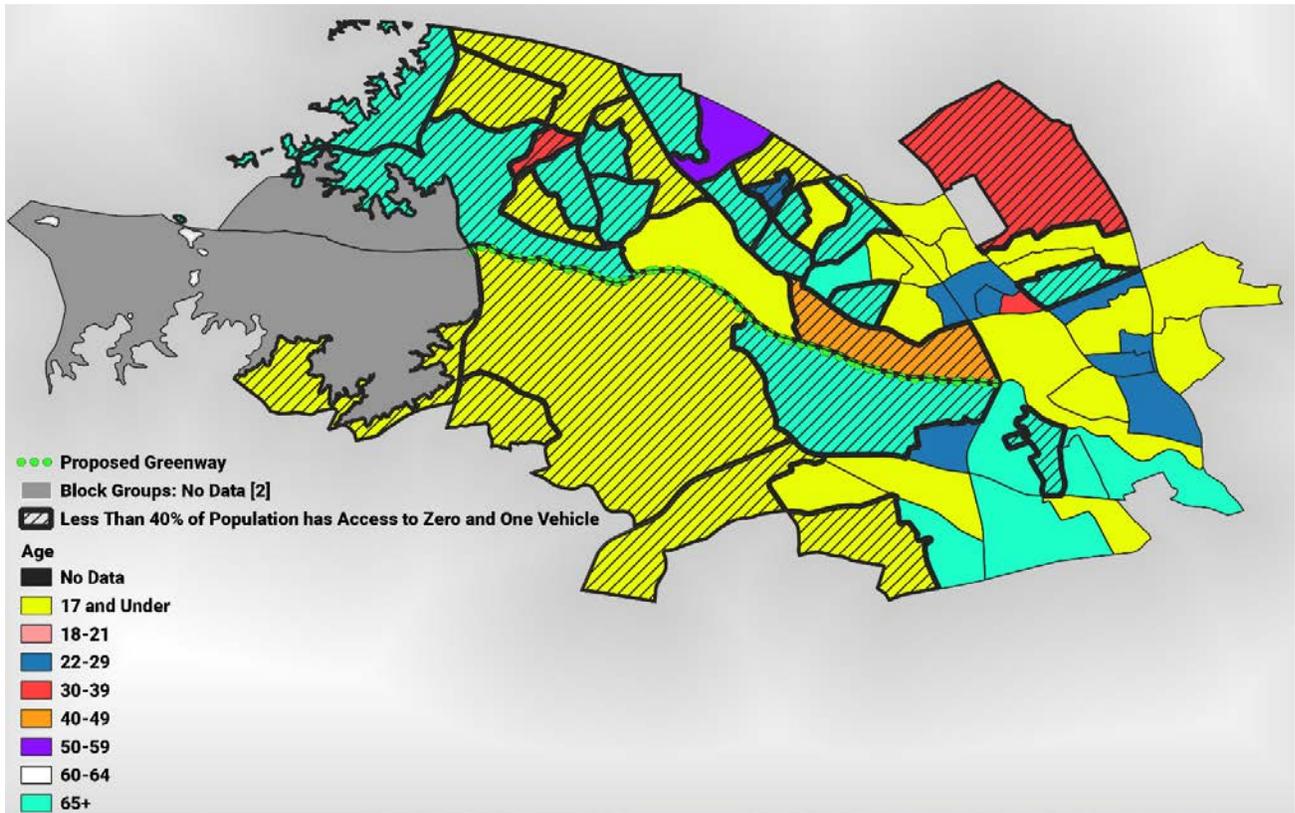


Figure A.2-16 | Zero-One Vehicle Households

Age and Vehicle Accessibility

Figure A.2-17 displays the block groups, based on the age of the majority population, which have less than 40% access to zero and one vehicle. All but one of the areas bordering the proposed greenway has limited access to more than one vehicle.



* This map provides two key indicators by block group: age and vehicle accessibility. Where both indicators exist, there is not necessarily a direct correlation between the indicators, but it does show that more than one key indicator is present.

Figure A.2-17 | Age and Vehicle Accessibility

Travel Time to Work

As shown in **Figure A.2-18**, most people (66%) residing in the target area, spend about 10-29 mins commuting to work.

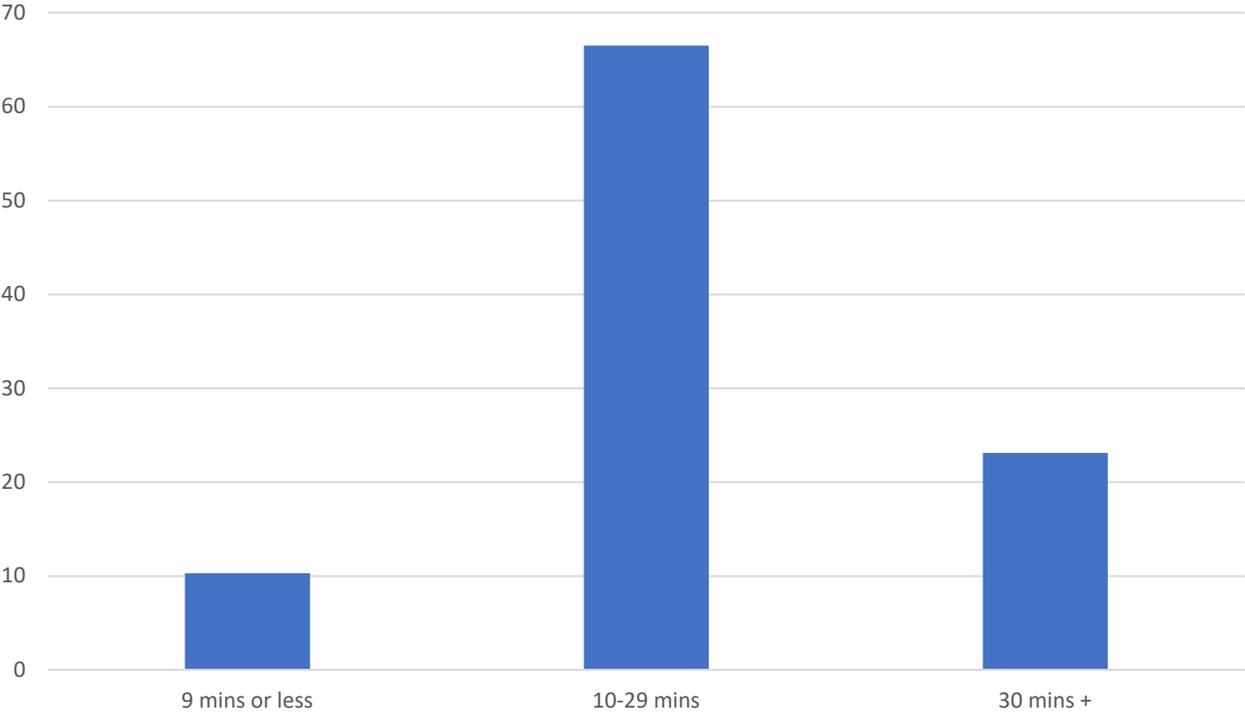


Figure A.2-18 | Travel Time to Work

Means to Work

As shown in **Figure A.2-19**, 90% of commuters utilize a private automobile as their primary means of transportation. Noticeably, zero residents report using a bicycle. The second largest category of commuters are those who telecommute.

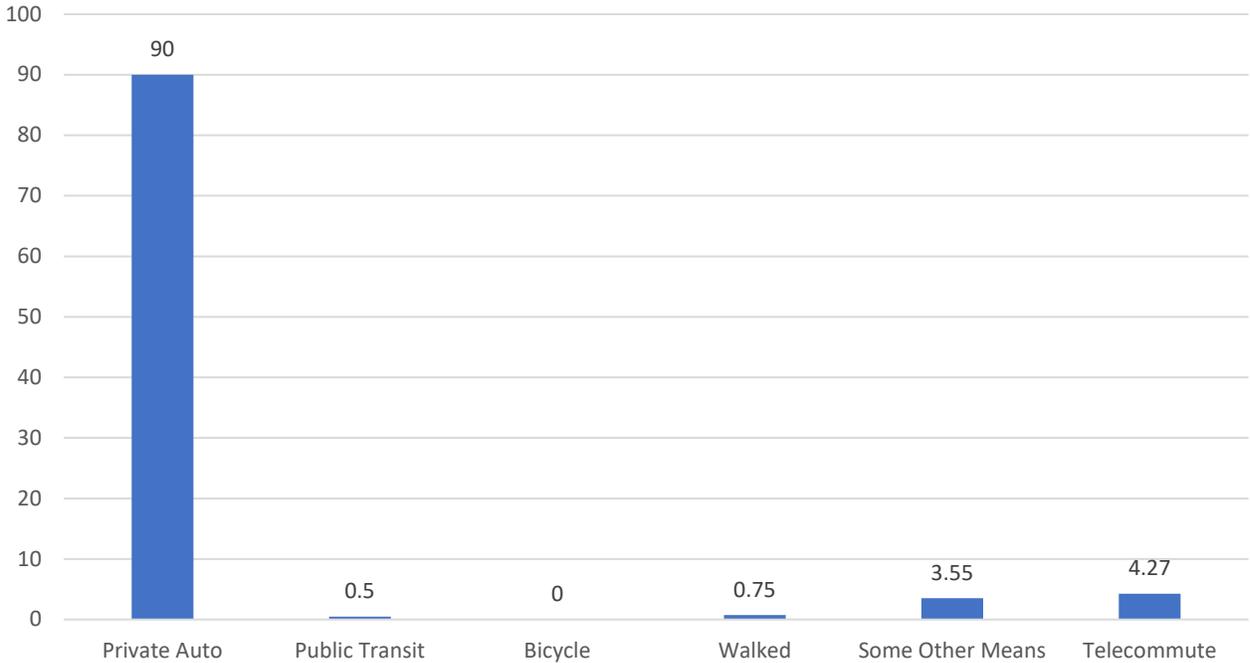


Figure A.2-19 | Means to Work

Poverty

Poverty Rate

According to the U.S. Census Bureau, as of 2017, the nation's official poverty rate was 11.8% and the State of South Carolina's was 15.3%. The target area has an overall poverty rate of 13.2%, which is 2.1% less than the state average.

Figure A.2-20 illustrates the distribution of poverty rates. Twenty-eight (45%) of the 62 block groups have a poverty rate higher than the national average, and 20 (32%) have rates higher than the state's average. There are no census blocks with a poverty rate higher than 11.7%, bordering the proposed greenway.

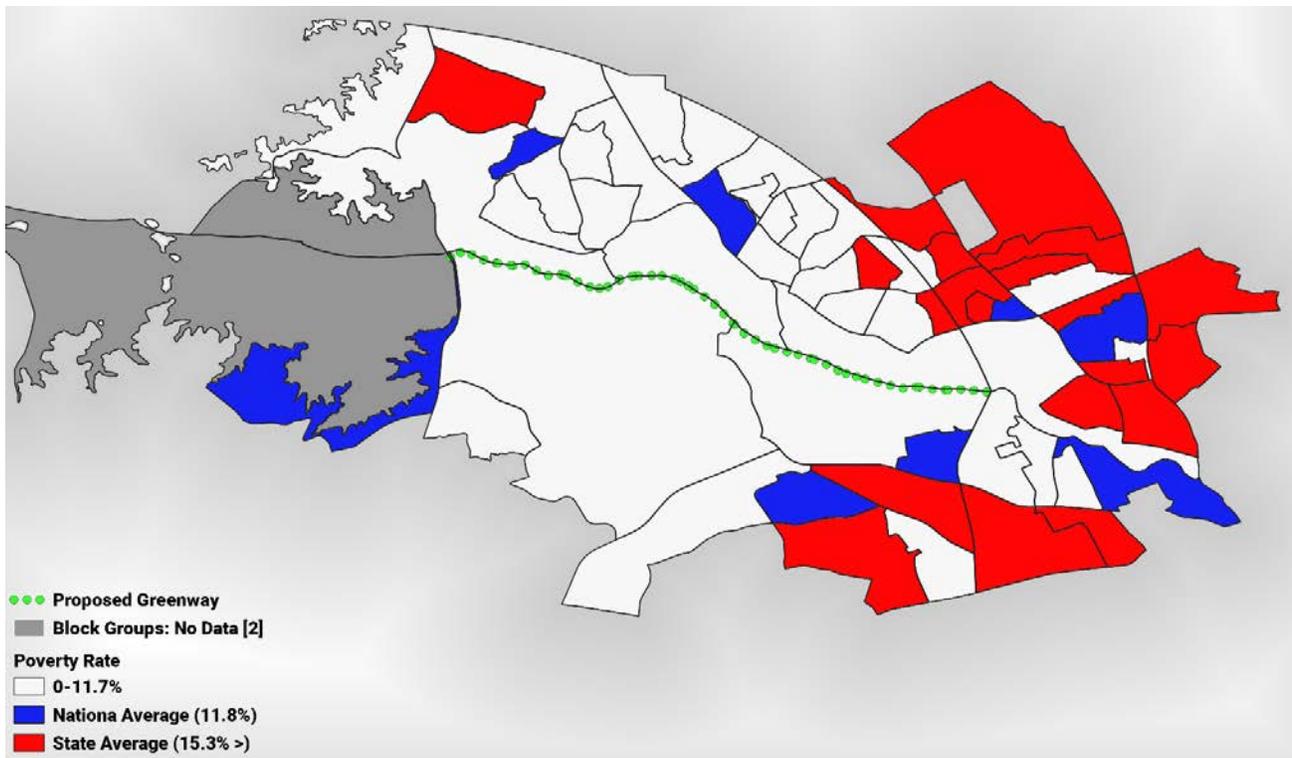
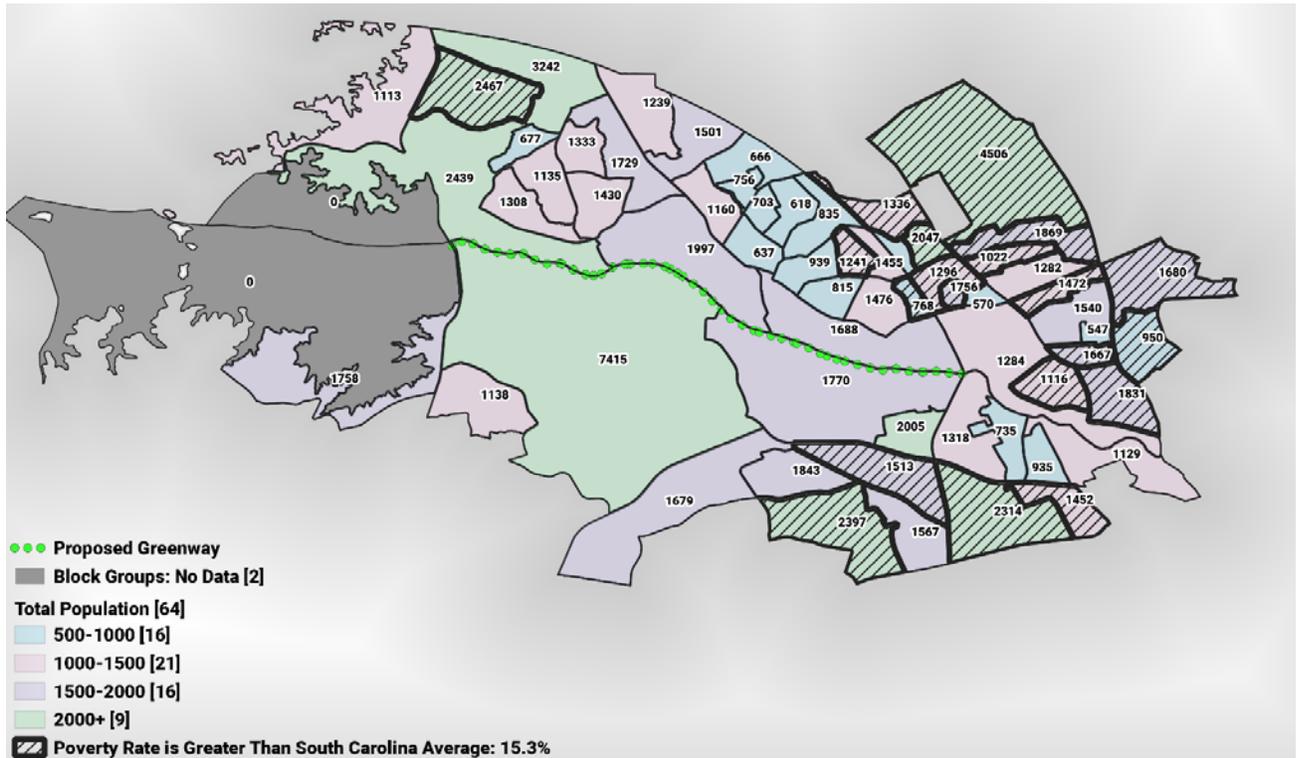


Figure A.2-20 | Poverty Rate by Block Group

Poverty and Total Population

Figure A.2-21 shows block groups, based on the total population, which have a poverty rate greater than the state's average of 15.3%. Of the 20 impoverished areas, four (20%) have a total population greater than 2,000.

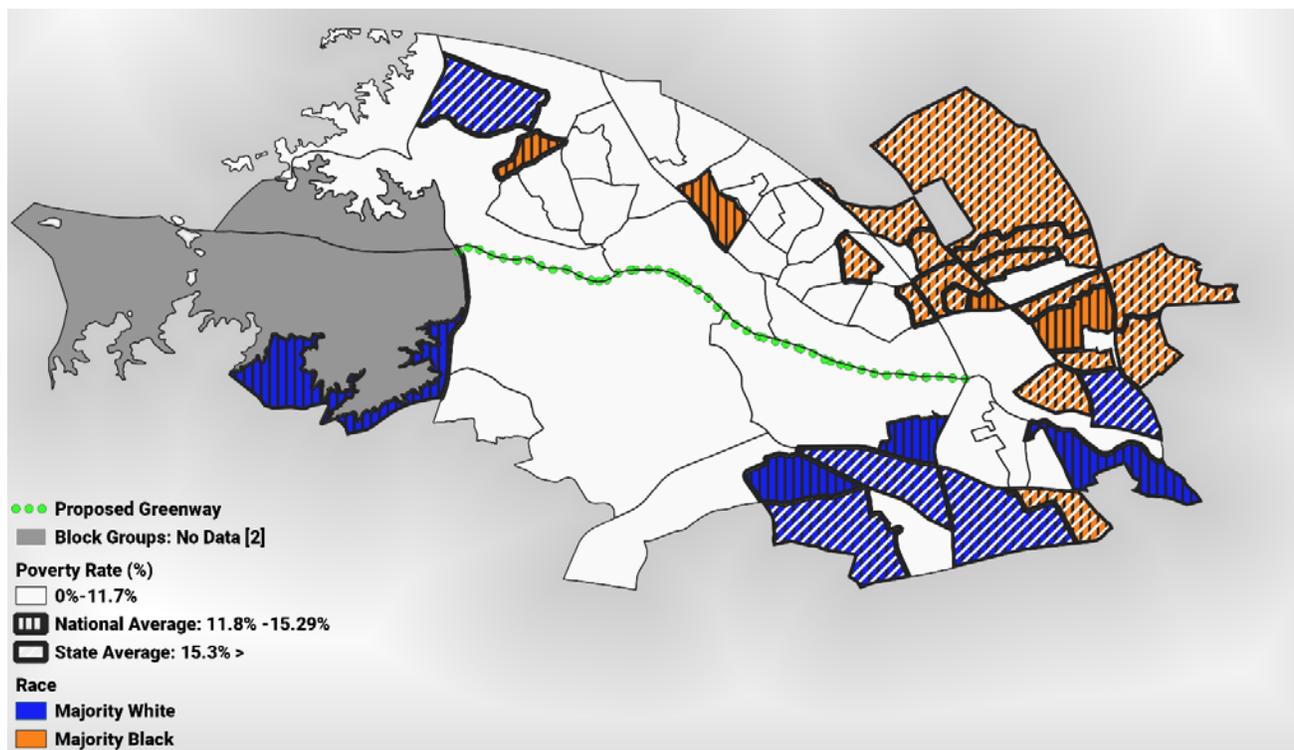


* This map provides two key indicators by block group: poverty and total population. Where both indicators exist, there is not necessarily a direct correlation between the indicators, but it does show that more than one key indicator is present.

Figure A.2-21 | Poverty and Population by Block Group

Poverty and Race

Figure A.2-22 displays the block groups, based on the race of the majority population, with a poverty rate greater than the national and state average. Of the 26 impoverished areas, 9 (35%) are majority “White Only” and 17 (65%) are majority “Black/African-American Only.” Additionally, five (19%) of the census blocks with a poverty rate that either equals or exceeds 11.8%, contain a majority “White Only” population; 13 (50%) of the census blocks, based on the same criteria, are “Black/African-American Only.”

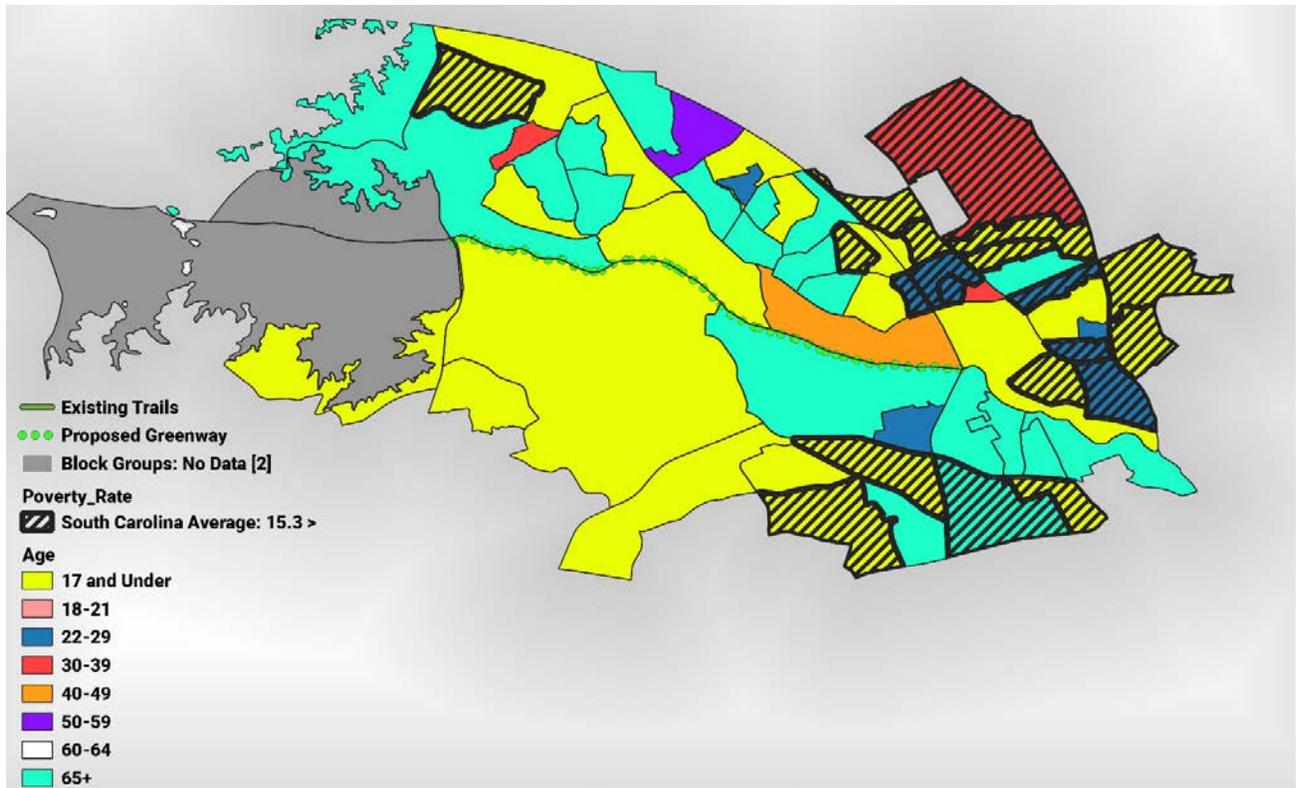


* This map provides two key indicators by block group: poverty and race. Where both indicators exist, there is not necessarily a direct correlation between the indicators, but it does show that more than one key indicator is present.

Figure A.2-22 | Poverty and Race by Block Group

Poverty and Age

Figure A.2-23 displays the block groups, based on the age of the majority population, which has a poverty rate greater than the state's average of 15.3%. Noticeably, of the 20 areas that fit the criteria, 12 (60%) have a majority population that is 17 years and under. Areas, that have a majority population that is 65 years and older represent only one block group with a poverty rate equal to or exceeding the state's average.

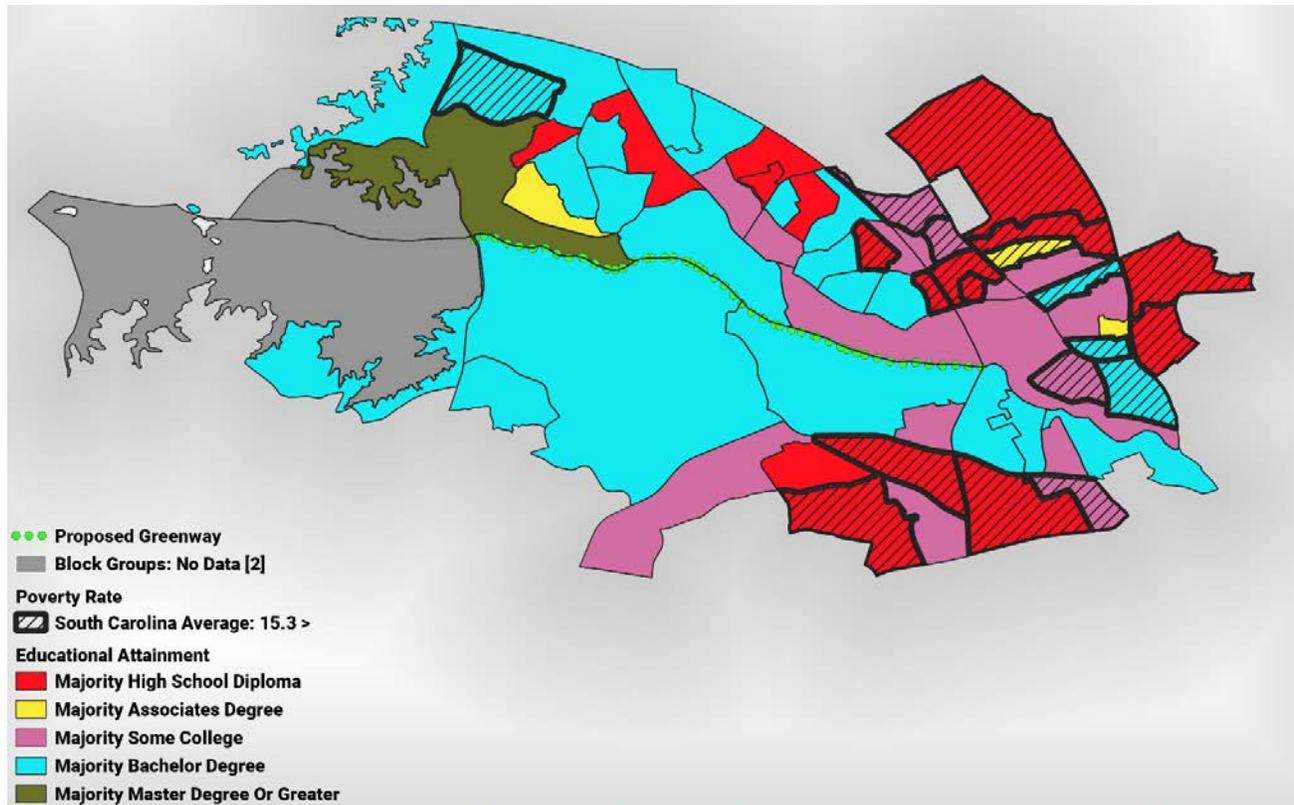


* This map provides two key indicators by block group: poverty and age. Where both indicators exist, there is not necessarily a direct correlation between the indicators, but it does show that more than one key indicator is present.

Figure A.2-23 | Poverty and Age by Block Group

Poverty and Educational Attainment

Figure A.2-24 shows the block groups, based on the level of educational attainment of the majority population, which have a poverty rate greater than the state's average of 15.3%. Of the 20 impoverished areas, 4 (20%) have a majority population of individuals that have earned no more than a bachelor's degree, and 16 (80%) have a majority population of individuals that have earned no more than either a high school diploma or associates degree.

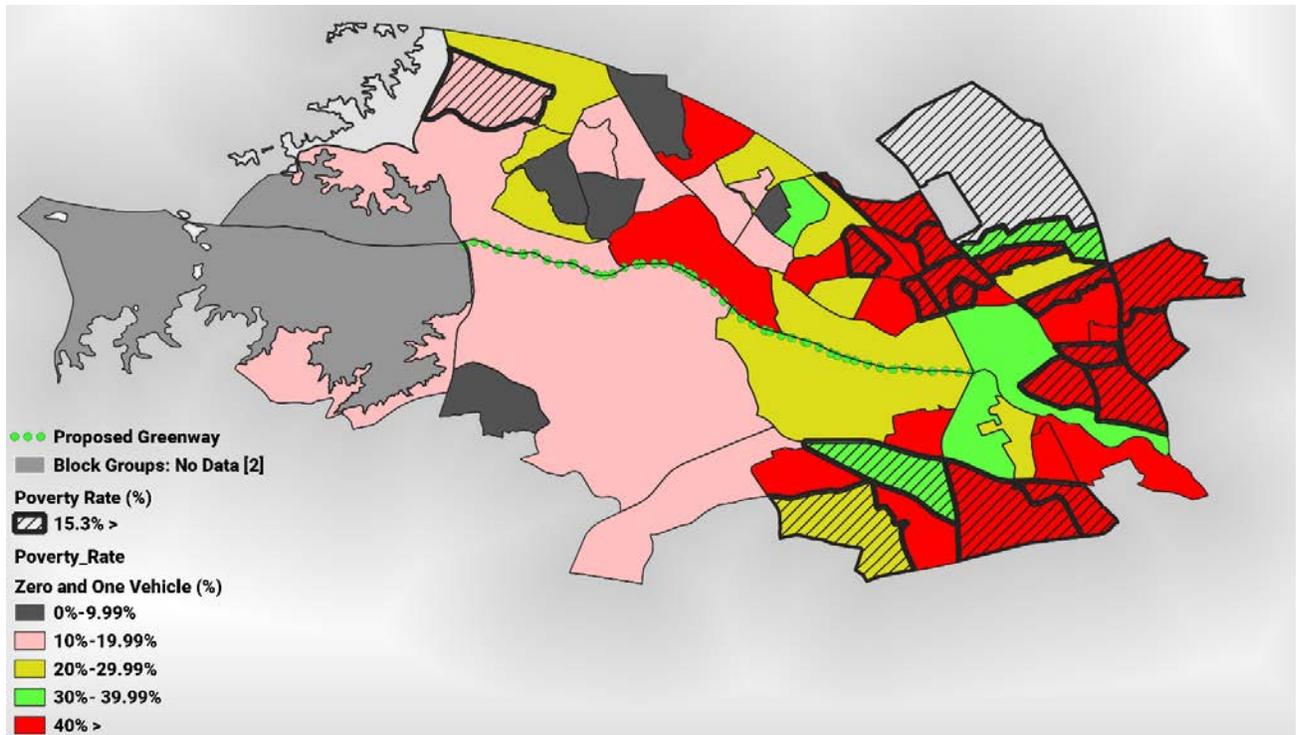


* This map provides two key indicators by block group: poverty and educational attainment. Where both indicators exist, there is not necessarily a direct correlation between the indicators, but it does show that more than one key indicator is present.

Figure A.2-24 | Poverty and Educational Attainment by Block Group

Poverty and Vehicle Accessibility

Figure A.2-25 displays the block groups, based on access to zero or one vehicle, with majority population having a poverty rate greater than the state's average of 15.3%. Of the 20 census blocks in this area, with a poverty rate higher than the 15.3%, 15 (75%) have limited access (0-39.99%) to a vehicle and 5 (25%) have increased access (40% and greater) to a vehicle. Notably, none of these areas border the proposed greenway.



* This map provides two key indicators by block group: poverty and vehicle accessibility. Where both indicators exist, there is not necessarily a direct correlation between the indicators, but it does show that more than one key indicator is present.

Figure A.2-25 | Poverty and Vehicle Accessibility by Block Group

CULTURAL RESOURCES SCREENING

Construction of the Lower Saluda Greenway may involve federal funds and will require federal and state permits related to stormwater management, water quality, and use of navigable waterways. Therefore, it is necessary to consider the effect that the permitted action may have on historic properties (i.e., sites, buildings, structures, objects, and districts eligible for or listed on the National Register of Historic Places (NRHP)) and significant historical or archaeological sites. A summary of the known cultural resources (i.e., historic properties, archaeological sites, historical above-ground resources) along and near the greenway corridor follows.

The ArchSite online database of archaeological and historical sites maintained by the SC Department of Archives and History (SCDAH) and the University of South Carolina's SC Institute of Archaeology and Anthropology (SCIAA) were reviewed to determine if known historical and archaeological resources lie within and near the alignment of the proposed greenway. This review also identified areas that witnessed previous cultural resources survey. Historical maps of the region were also reviewed to identify potential historic sites. Aerial photographs (through Google Earth) were inspected and the GIS systems of Lexington and Richland Counties were used to obtain information related to current terrain and local conditions that may affect the integrity of archaeological or historical sites. Photographs taken during the April 2020 field analysis of the proposed greenway alignment were also reviewed.

There is one archaeological site (38LXI 16) through which the greenway corridor traverses. This site is not eligible for the NRHP. There are two historic sites (i.e., the Saluda Dam and Powerhouse Resource 243 0127 and Selwood Resource 243 0126) near the western terminus of the proposed greenway. The SC State Historic Preservation Office (SHPO) determined these resources eligible for the NRHP. There are several areas along the corridor where buried archaeological deposits may be present as well. Given the shallow nature of the ground disturbance associated with the construction of the proposed greenway and its recreational use, it is unlikely that the greenway will affect any historic properties adversely.

ENVIRONMENTAL SCREENING

This section provides a planning level of detail for the following resource areas: NEPA documentation; endangered species; acquisitions/displacements; streams/wetlands and associated mitigation; 4(f)/6(f); scenic rivers; environmental justice; water quality; floodplains; hazardous materials; farmlands; air quality; noise; and environmental permitting. The level of detail is intended to identify areas where further study would likely be necessary during the design and construction phases of the project.

Endangered Species

The purpose of the Endangered Species Act (ESA) is to protect and recover imperiled species and the ecosystems upon which they depend. The U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) administer the ESA. The USFWS has primary responsibility for terrestrial and freshwater organisms, while the responsibilities of NMFS are mainly marine wildlife. Under the ESA, species may be listed as threatened or endangered. Threatened (T) means a species is likely to become endangered within the foreseeable future. Endangered (E) means a species is in danger of extinction throughout all or a significant portion of its range. Under the ESA, individual species and their habitat are protected. Although protection under the ESA is no longer needed for the Bald Eagle, federal protection still exists for it under the Bald and Golden Eagle Protection Act (BGEPA).

A list of the threatened, endangered, and proposed species, and designated critical habitat that could occur on the project site was obtained from the USFWS Information for Planning and Conservation (IPaC) online planning tool on April 26, 2020. **Table A.4-1** depicts the species listed as potentially occurring within counties that the project is in, along with their designated federal status.

Following the review of the potential suitable habitat requirements, field observations were made on April 27-29, 2020 and August 19, 2020 for suitable habitat of federally listed species. During the field walk, plant communities and habitats were observed and noted to determine if they matched habitat types where the listed species have the potential to occur.

Effect determinations based on USFWS standard language implemented for Section 7 Consultation are listed below in order of priority from least to most severe.

- No Effect – will not affect a listed species or designated critical habitat.
- May affect, not likely to adversely affect – effects on listed species are expected to be discountable, insignificant, or completely beneficial.
- May Effect, likely to adversely affect – may pose any effects on listed species or designated critical habitat.

**Table A.4-1 | Species List based on IPaC
(Species list verified on IPaC October 2020)**

LISTED SPECIES	HABITAT DESCRIPTION	ANTICIPATED BIOLOGICAL CONCLUSION	FEDERAL STATUS
American wood stork (<i>Mycteria americana</i>)	Open water and freshwater and estuarine wetlands which are inundated throughout nesting season (February through September).	No Effect	Threatened
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Nests in large, mature live pine or cypress trees near water.	N/A*	BGEPA
Shortnose sturgeon (<i>Acipenser brevirostrum</i>)	Occur in 41 bays and rivers along the East Coast, reproducing in 19 of them. They are born in freshwater, then live in their birth river, make short feeding or migratory trips into salt water, and then return to freshwater to feed and escape predation.	No Effect	Endangered
Red-cockaded woodpecker (<i>Picoides borealis</i>)	Old growth pine forest with open understory.	No Effect	Endangered
Smooth Coneflower (<i>Echinacea laevigata</i>)	Cedar barrens, clearcuts, open woods, glades, roadsides, dry limestone bluffs, and right-of-ways with soils that are rich in calcium and magnesium and are associated with diabase and/or marble.	No Effect	Endangered
Canby's dropwort (<i>Oxypolis canbyi</i>)	Pond cypress savannas, shallows and edges of cypress/pond pine sloughs, and wet pine savannas on the Coastal Plain.	No Effect	Endangered
Rough-leaved loosestrife (<i>Lysimachia asperulaefolia</i>)	Ecotones or edges between fire-maintained longleaf pine uplands and pond pine pocosins	No Effect	Endangered

*No project effect determination required as the species does not require Section 7 consultation.

SC Department of Natural Resource's Heritage Trust Database identifies an occurrence of a Bald Eagle nest approximately one mile south of the Lake Murray Dam. This occurrence was documented in 2004. However, recent studies¹ indicate that this nest may no longer be active. These findings are preliminary in nature and surveys may need to be conducted during appropriate survey windows in the National Environmental Policy Act (NEPA) phase.

Acquisitions/Displacements

Acquisition of property or an easement is anticipated for the project corridor. The acquisition would not result in the relocation or displacement of any commercial or residential establishments. The project corridor would be acquired in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

Streams/Wetlands

The greenway corridor was evaluated for the presence of potential jurisdictional streams and wetlands during site walks on April 27-29, 2020 and August 19, 2020. One goal of the greenway route includes avoiding and minimizing stream and wetland impacts to the greatest degree practicable. The site walk revealed nine potential stream crossings and 10 potential wetland areas (see **Figures A.4-1, A.4-2, and A.4-3**). These findings have not been verified by the U.S. Army Corps of Engineers (USACE). A USACE Jurisdictional Determination Request will be completed and the extent of USACE jurisdiction verified during the NEPA phase of this project.

¹ Carolina Crossroads Final Environmental Impact Statement, Appendix L – Natural Resources Technical Report, 5/2019



Figure A.4-1 | Wetland and Stream Crossings (Upper)

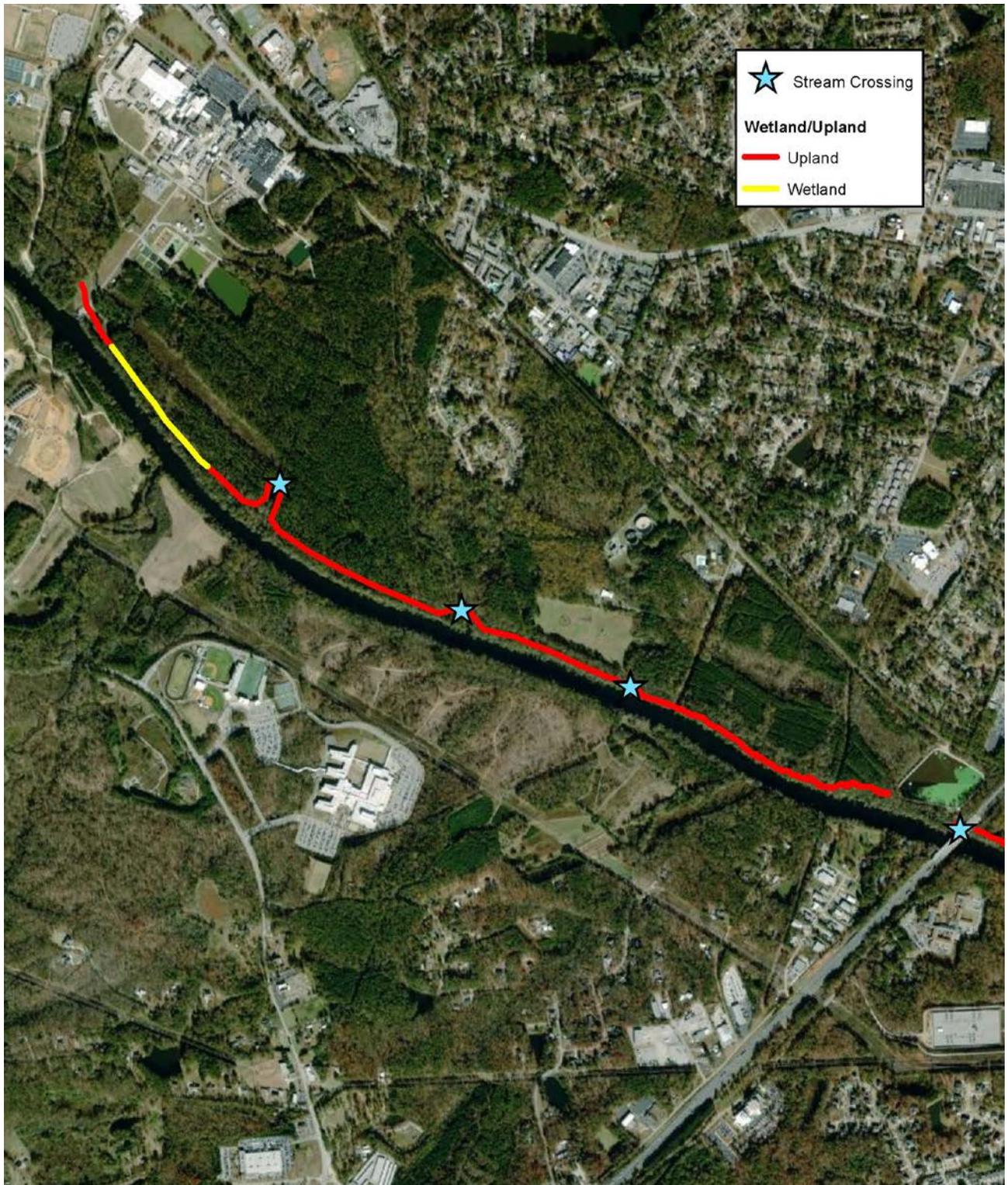


Figure A.4-2 | Wetland and Stream Crossings (Middle)



Figure A.4-3 | Wetland and Stream Crossings (Lower)

Section 4(f)/6(f)

Section 4(f) of the Department of Transportation Act of 1966 specifies that the use of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites cannot be approved by the Federal Highway Administration unless: 1) there are no existing feasible and prudent alternatives to the use of the land; and 2) the proposed action includes all possible planning to minimize harm to the property.²

For the statute to apply to a proposed project the following four conditions must all be true:³

1. The project must require an approval from FHWA in order to proceed;
2. The project must be a transportation project;
3. The project must require the use of land from a property protected by Section 4(f) (See 23 U.S.C. § 138(a) and 49 U.S.C. § 303(a)); and
4. None of the regulatory applicability rules or exceptions applies (See 23 CFR 774.11 and 13).

Examples of the types of proposed situations where Section 4(f) would not apply include, but are not limited to:

1. A transportation project being constructed solely using State or local funds and not requiring FHWA approval.
2. A project intended to address a purpose that is unrelated to the movement of people, goods, and services from one place to another (i.e., a purpose that is not a transportation purpose).
3. A project to be located adjacent to a Section 4(f) property, causing only minor proximity impacts to the Section 4(f) property (i.e., no constructive use).
4. A project that will use land from a privately owned park, recreation area, or refuge.

² U.S. Federal Highway Administration, *Environmental Review Toolkit, Section 4(f)*, Accessed March 2019 from <https://www.environment.fhwa.dot.gov/legislation/section4f.aspx>

³ <https://www.environment.fhwa.dot.gov/legislation/section4f/4fpolicy.aspx#apply>

If funding is planned from FHWA, Section 4(f) of the Department of Transportation Act may be applicable. Saluda Shoals Park, operated by Irmo Chapin Recreation Commission and located on property owned by Dominion Energy South Carolina, is a 4(f) resource. Additionally, construction of this project should result in establishment of a facility which may receive 4(f) considerations.

Section 6(f) of the Land and Water Conservation Fund (LWCF) Act of 1965 was established to provide funding to government agencies for the purchase of land and water resources as well as related easements. A provision of Section 6(f) prohibits the conversion of property acquired or developed with LWCF funding to non-recreational purposes without approval from the National Park Service.

In 1994, Irmo Chapin Recreation Commission (ICRC) received \$219,320 from the LWCF for the Saluda Shoals Park and \$79,750 in 2001 for the Saluda Shoals Greenway Trail. This proposed project travels through, to, and from the park and it is likely that it ties into the previous greenway grant project. However, there is no conversion, acquisition, or change in the use of the property – it will remain in recreation use. This could be interpreted as no 6(f) issue. If it is interpreted as ‘use’ of a 6(f) property, coordination with the National Parks Service will be necessary.

Scenic Rivers

The Lower Saluda River is not listed as a National Wild and Scenic River. The reach from one mile below Lake Murray Dam to the confluence with the Broad River is listed on the Nationwide Rivers Inventory (i.e., an NRI River) and is listed as a State Scenic River (1991). The attributes that qualified the Lower Saluda River as a State Scenic River (i.e., trout and striped bass fisheries, whitewater boating, and wilderness experience in close proximity to an urban area) would not be negatively affected by the proposed greenway.

Environmental Justice

In accordance with Executive Order 12898, disproportionate impacts to low-income or minority communities must be identified and addressed by federally funded projects. EPA’s EJSCREEN: Environmental Justice Screening and Online Mapping Tool was utilized to assess potential impacts from the project. Demographic data describing the project vicinity are provided below in **Table A.4-2**. Due to the undeveloped nature of the potential project corridor and the nature of the project

itself, it is not anticipated that there will be significantly disproportionate impacts to low-income or minority communities resulting from the proposed project.

Table A.4-2 | Demographic Data for the Project Corridor
(Source EJSscreen, accessed October 2020)

DEMOGRAPHIC INDICATORS	VALUE	STATE		EPA REGION		USA	
		Avg.	%tile	Avg.	%tile	Avg.	%tile
Demographic Index	30%	37%	43	38%	43	36%	49
Minority Population	35%	36%	57	38%	54	39%	55
Low Income Population	24%	37%	29	37%	30	33%	41
Linguistically Isolated Population	1%	2%	68	3%	55	4%	49
Population with Less Than High School Education	5%	13%	23	13%	23	13%	29
Population under Age 5	5%	6%	51	6%	52	6%	50
Population over Age 64	19%	16%	73	16%	72	15%	75

Water Quality

The 303(d) list is a list of impaired waters that do not meet State water quality standards. Once a water has been added to the 303(d) list, it will remain on the list until the water quality standard has been attained or a total maximum daily load (TMDL) plan has been developed to attain the standard.

The project is within the Lower Saluda River Watershed, Twelvemile Creek - Saluda River Sub-Basin (HUC 03050109-14). The western half of the project is within a Fecal TMDL watershed. Waters are impaired and on the 303(d) list with aquatic life use impairment based on biological diversity data; recreational uses are impaired due to the presence of E. coli bacteria in the water. As well, there is a fish consumption advisory for the Saluda River.

Floodplains

The project starts in Zone X (Other Areas outside of the 0.2% annual chance floodplain) and crosses into Zone A Special Flood Hazard Area (subject to inundation by the 1% annual chance flood, no base flood elevation determined) of the Saluda River. Closer to the Saluda River, the project pathway traverses along the river's Regulatory Floodway (Zone AE).

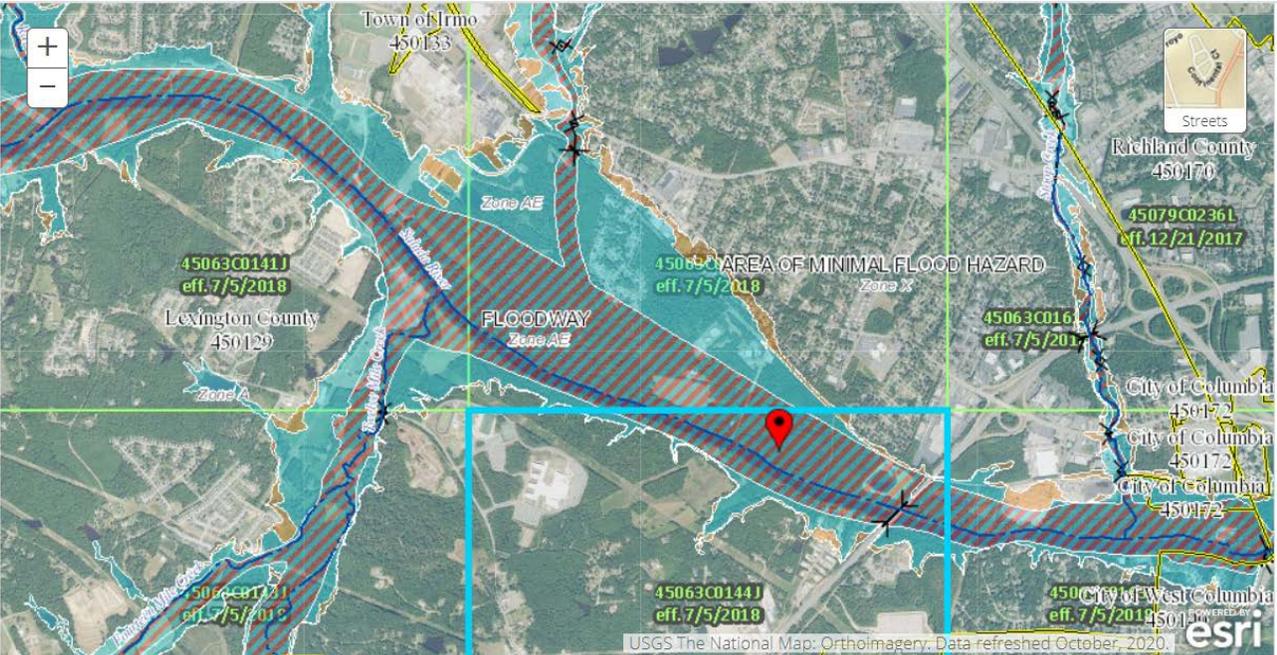


Figure A.4-4 | FEMA Flood Maps

It is anticipated that the pathway and boardwalks will be designed and constructed so as not to cause any impact to the base flood elevation. The project Engineer of Record will send a set of final plans and request for floodplain management compliance to the appropriate Local National Flood Insurance Program Community administrator.

The project is within the tailwaters and project boundary of the upstream Saluda Hydroelectric Project. Normal tailwater elevation is 177 feet. At flood stage, with the spillway fully open, the tailwater could rise to an elevation of 202 feet or higher.⁴ This is a similar condition to the existing Saluda Shoals Park path. Coordination with Dominion Energy and the Federal Energy Regulatory Commission will be required.

Hazardous Materials

The EPA's NEPASSIT online mapper was utilized to conduct a screening analysis for hazardous materials sites within the project vicinity. A total of seven facilities were identified within one-half-mile of the proposed project. None of these sites are directly adjacent to the project and do not appear to affect the proposed work.

SCE&G McMeekin Station
2000 North Lake Dr.
Columbia, SC 29212

CVS Pharmacy 4156
100 Outlet Point Blvd.
Columbia, SC 29210

Walmart Supercenter 4379
1326 Bush River Rd.
Columbia, SC 29210

SEFA Group
6055 Bush River Rd.
Columbia, SC 29212

Exxon Co. USA #40421
1900 Bush River Rd.
Columbia, SC 29210

Cottman Transmission Center
6226 Bush River Rd. Ste A
Columbia, SC 29212

Stone Container Corp.
128 Crews Dr.
Columbia, SC 29210

A Phase I Environmental Site Assessment should be conducted of any future easements, right-of-way, or property to be acquired for the proposed work.

⁴ Initial Consultation Document, Saluda Hydroelectric Project Relicensing FERC No. 516, 4/05

Farmlands

Areas of the proposed greenway east of Saluda Shoals Park are located within an Urbanized Area as defined by the U.S. Census Bureau, and analysis of farmland impacts is not required.

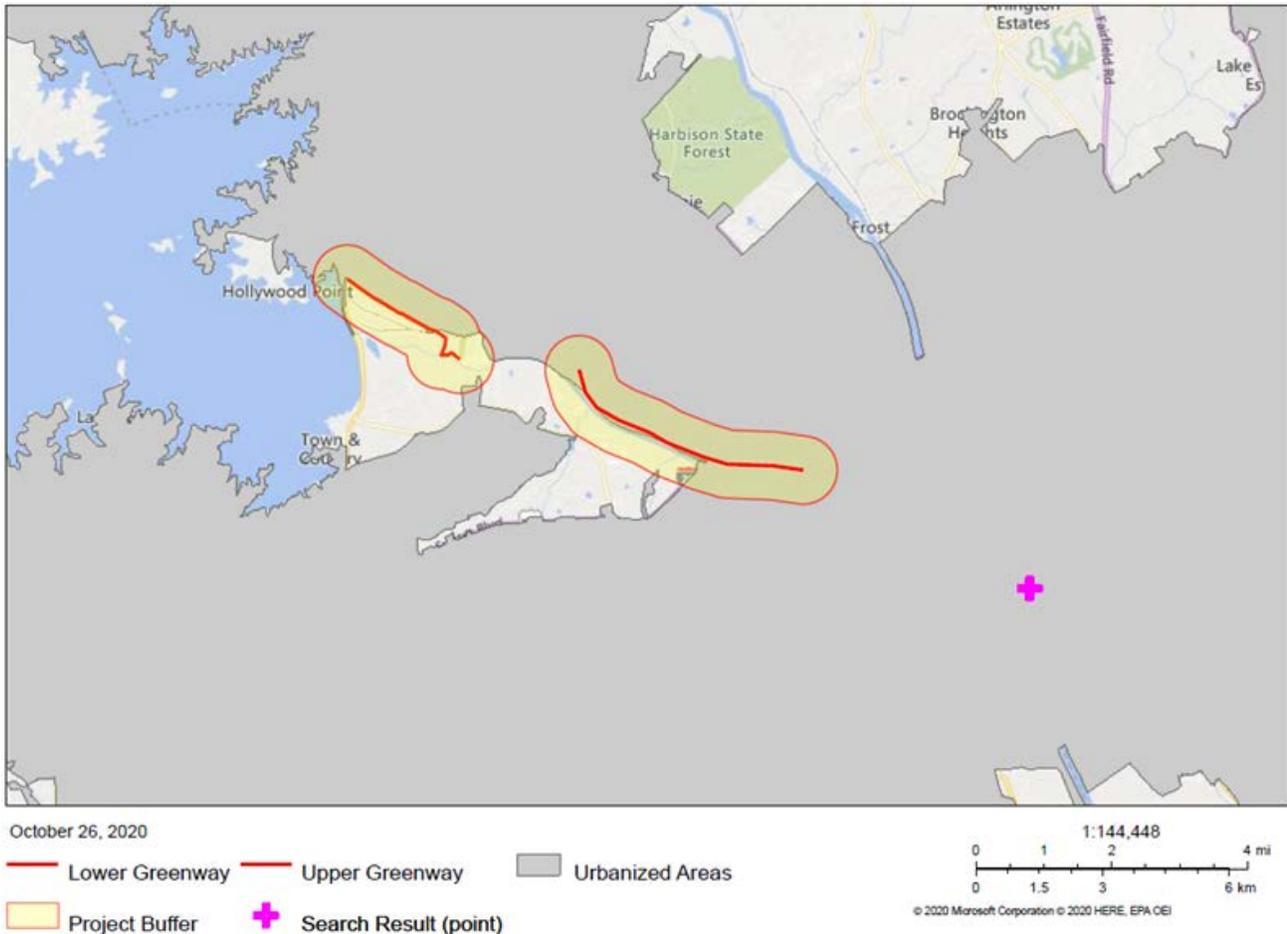


Figure A.4-5 | Urbanized Areas in Greenway Vicinity

West of Saluda Shoals Park, the greenway corridor crosses several areas that are considered Prime Farmland or Farmland of Statewide Importance (see **Figure A.4-6**). Projects with a federal permit license or funding, must consider impacts to these farmland types and consult with the Natural Resource Conservation Service (NRCS) for completion of a Farmland Conversion Impact Rating analysis using Form NRCS-CPA-106 for corridors. If the Farmland Conversion Impact Rating analysis scores less than 160, potential effects to important farmland will not require further consideration (7 CFR § 685.4[c][2]); however, if the site receives a score of 160 or

greater, analysis will have to be completed to determine the availability of alternatives for reducing potential adverse effects to important farmland.

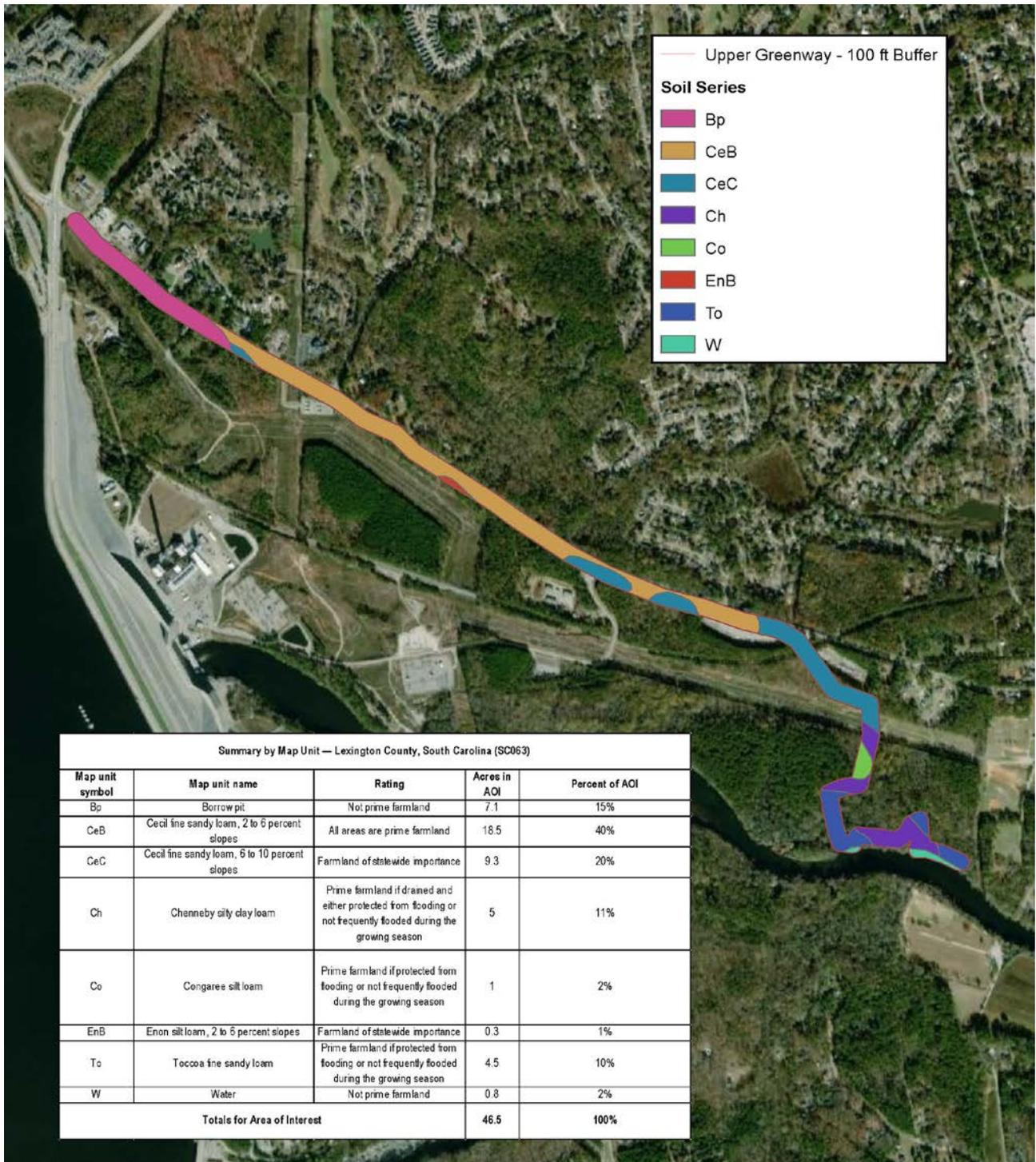


Figure A.4-6 | NRCS Soils Map

Air Quality

Lexington County is in an attainment area for National Ambient Air Quality Standards (NAAQS). As a result, Lexington County meets or exceeds the standards established by the Environmental Protection Agency (EPA) for criteria pollutants and air quality. Although the project is not expected to substitute transportation via motorized vehicles on highways, the anticipated recreational and non-motorized transportation uses of the project are not of an air-quality pollutant generating nature. No qualitative or quantitative analyses are anticipated to be required as part of the NEPA phase.

Noise

The SCDOT Traffic Noise Abatement Policy⁵ describes the policies and procedures that the Department follows to be consistent with 23 CFR Part 772 as well as supporting FHWA noise guidance and policy documents.

A noise analysis is required for all Type I projects, including:

1. The construction of a highway on new location; or
2. The physical alteration of an existing highway where there is either:
 - a. Substantial Horizontal Alteration. A project that halves the distance between the traffic noise source and the closest receptor between the existing condition to the future build condition; or
 - b. Substantial Vertical Alteration. A project that removes shielding therefore exposing the line-of-sight between the receptor and the traffic noise source. This is done by either altering the vertical alignment of the highway or by altering the topography between the highway traffic noise source and the receptor; or
3. The addition of a through-traffic lane(s). This includes the addition of a through-traffic lane that functions as a HOV lane, High-Occupancy Toll (HOT) lane, bus lane, or truck climbing lane; or

⁵ South Carolina Department of Transportation Traffic Noise Abatement Policy (10/10/19)

4. The addition of an auxiliary lane of at least 2,500 feet, except for when the auxiliary lane is a turn lane; or
5. The addition or relocation of interchange lanes or ramps added to a quadrant to complete an existing partial interchange; or
6. Restriping existing pavement for the purpose of adding a through-traffic lane or an auxiliary lane of at least 2,500 feet; or
7. The addition of a new or substantial alteration of a weigh station, rest stop, ride-share lot or toll plaza.

This project is not a Type I project nor expected to be of a noise generating nature. No noise analyses are anticipated to be required during NEPA.

NEPA Documentation

Funding for this project will be provided through Federal, State, and local transportation/transit funding sources with the required match provided by Central Midlands Council of Government or other local or State sources. Therefore, the National Environmental Policy Act applies and a NEPA document will be prepared assessing the human and environmental impacts of the project. It is anticipated that a Programmatic Categorical Exclusion (PCE) level of NEPA will be sufficient for project documentation. PCE's cover actions that FHWA has determined do not individually or cumulatively have a significant effect on the environment. The action qualifies for CE listed in 23 CFR 771.117 (c) (3) *Construction of bicycle and pedestrian lanes, paths, and facilities.*

Environmental Permitting

Impacts to jurisdictional wetlands should be minimized by the use of boardwalks in areas of wetland crossing. Likewise, bridges will be utilized to avoid impacts to streams. A Clean Water Act (CWA) Section 404 permit is required for alteration to jurisdictional waters of the U.S., including wetlands. USACE Nationwide Permit 42 exists for Recreational Facilities for minimal impact projects with no more than 1/2 acre of wetlands and 300 linear feet of streambed. In addition to the Section 404 permit, the South Carolina Department of Health and Environmental Control must grant, deny, or waive a Water Quality Certification, in accordance with Section 401 of the CWA.

Limited stream credits are available from three existing mitigation banks and no wetlands credits are available. It will be important during project design to re-evaluate the mitigation bank status or plan for further avoidance of streams and wetlands.

The CWA requires the reduction of water pollution and gave the United States Environmental Protection Agency (EPA) the congressional authority to develop programs to improve the health of navigable waters. EPA in response developed regulations that created a program of discharge permits as part of the National Pollutant Discharge Elimination System (NPDES) to regulate point source discharges. The 1987 amendments to the CWA extended NPDES permits to industrial discharges, including stormwater runoff associated with land disturbing activity. The 1987 CWA Amendments also require NPDES permitting for stormwater runoff from urbanized areas. A municipal separate storm sewer system (MS4) NPDES permit is required based on population. Authority to administer the NPDES permit program was delegated to state agencies, such as SCDHEC, by the EPA.

This project crosses regulatory boundaries for different agencies with MS4 programs. Entities who implement the stormwater programs include Lexington County and the City of Columbia. Since the majority of the project is in Lexington County's MS4 area, it is possible that the county may take the lead on all of the stormwater permitting. However, both the City and the County should be engaged during design phases to finalize their preferred permitting method.

TRANSPORTATION ANALYSIS

Trip Potential Analysis

The trip potential analysis highlights: 1) places where people are likely to bike and walk; and 2) where people are already walking and biking (i.e., areas with high demand). Places with high levels of existing/potential demand are also places where bicycle and pedestrian infrastructure can be the most impactful. High demand areas will be one data point that is used to shape proposed connectivity to the Lower Saluda Greenway.

The factors shown in **Table A.5-1** were used to identify demand. Data was aggregated from a variety of sources, including CMCOG, Lexington County, Census, SCDOT, and field reconnaissance. To normalize the different units of measure of the factors below, a grid of half-mile wide hexagons was overlaid across the project area and each hexagon was assigned its own score.

The results of the trip potential analysis, shown in **Figure A.5-1**, indicate that the trip drivers are mostly present north of the project area where there is more population density and an existing park and greenway. The area near where I-26 passes over the Lower Saluda River is also a hot spot of demand. This information will be used to direct where the optimal locations for greenway access points and connectors should be located.

Table A.5-1 | Demand Factors

FACTOR	RATIONALE	POINTS
<p>Population Density <i>population per census block group (scored based on highest density in unit of analysis area)</i></p>	<p>Enhancing infrastructure in densely populated areas impacts the most users per given area</p>	<ul style="list-style-type: none"> • High: 20 points • Mid: 10 points • Low: 5 points
<p>Attractors <i>includes parks, schools, client suggested locations, and universities</i></p>	<p>These common attractors are often destinations for people walking and people on bicycles</p>	<ul style="list-style-type: none"> • Each attractor: 10 points
<p>Concentrations of residential uses <i>scored based on presence of land use in unit of analysis</i></p>	<p>Higher density residential land use means more users per a given area.</p>	<ul style="list-style-type: none"> • Multifamily and Multifamily/Single Family housing: 20 points • Single Family housing: 10 points
<p>Intersection Density <i>number of intersections in an area.</i></p>	<p>The connectivity of an area’s street network has a major impact on the ability of pedestrians and cyclists to travel efficiently to nearby destinations. More intersections can lead to safer travel conditions for pedestrians and cyclists.</p>	<ul style="list-style-type: none"> • High: 20 points • Mid: 10 points • Low: 5 points
<p>Transit <i>includes bus routes and bus stops</i></p>	<p>Active transportation and transit functionality go hand-in-hand; it is important that active transportation around transit stops and routes is safe and connected for users</p>	<ul style="list-style-type: none"> • More than one stop: 10 points • One stop: 5 points
<p>Existing Greenways and Trails <i>includes all existing greenways and trails within the study area</i></p>	<p>Existing bicycle and pedestrian facilities attract users.</p>	<ul style="list-style-type: none"> • Trail through an area: 10 points

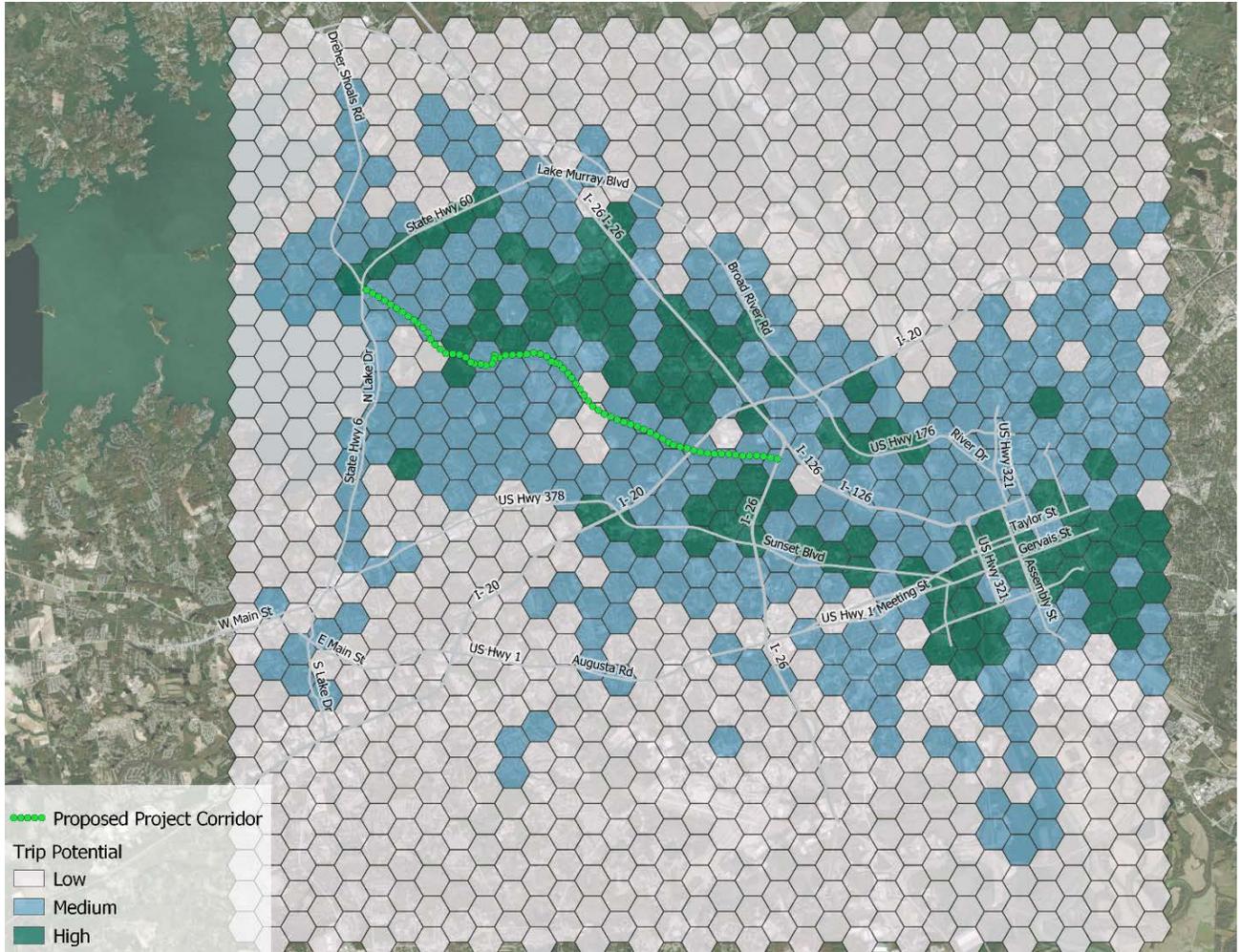


Figure A.5-1 | Trip Potential

Crash Analysis

While the ease of travel in terms of distance from a potential users' house to a proposed access point is vital, the perceived safety of that route is of equal if not greater importance. One measure of how safe a route may be is to look at crash history along those corridors. All data was provided by SCDOT.

Along the roads and at intersections in the project area, there were 2,897 crashes between January 2014 and September 2019. **Figure A.5-2** shows the breakdown by year. The most common crash type was rear-end crashes, with those making up 55% of all crashes.

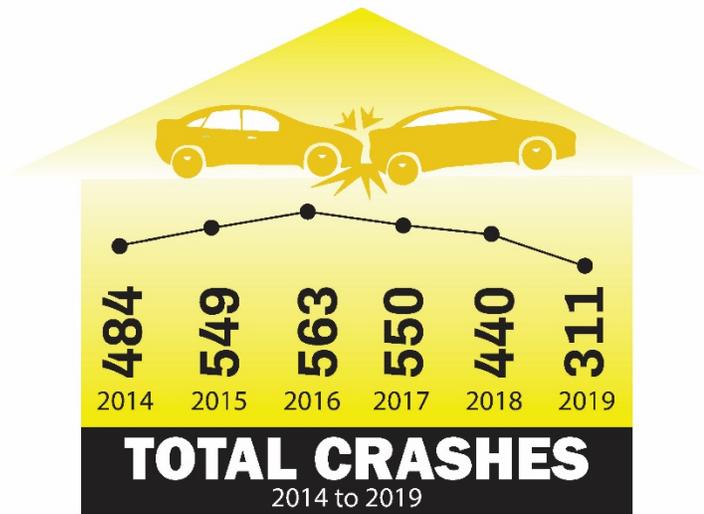


Figure A.5-2 | Crashes by Year 2014-2019

The locations and number of those crashes are shown in **Figure A.5-4**. To create the groupings shown, the reported roads were split into quarter-mile segments with particular care taken to make sure that major intersections or interchanges were counted as catchment points.

While the total number of crashes is very large (2,897), the amount of crashes that resulted in injuries makes up approximately 20% of the total; however, even property damage (without injury) contributes to the perceived safety of a street and its surrounding environment. For instance, if someone travels a road often and frequently sees crashes, they will deem the road unsafe regardless of whether injuries occurred. **Figure A.5-3** shows the breakdown of crashes by severity of injury.

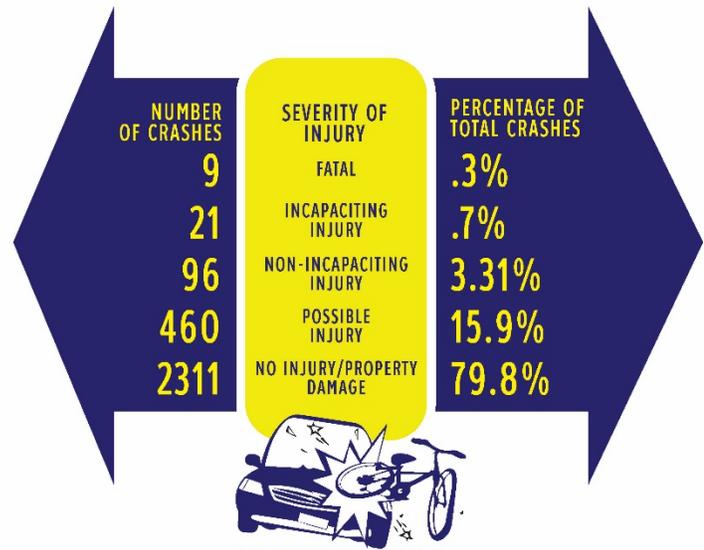


Figure A.5-3 | Crash Severity 2014-2019

The data included in Figure A.5-3 shows how many injuries or fatalities were caused by each crash type. These values were added together for each crash, then again for each of the quarter-mile intervals. The results are shown in **Figure A.5-5**.

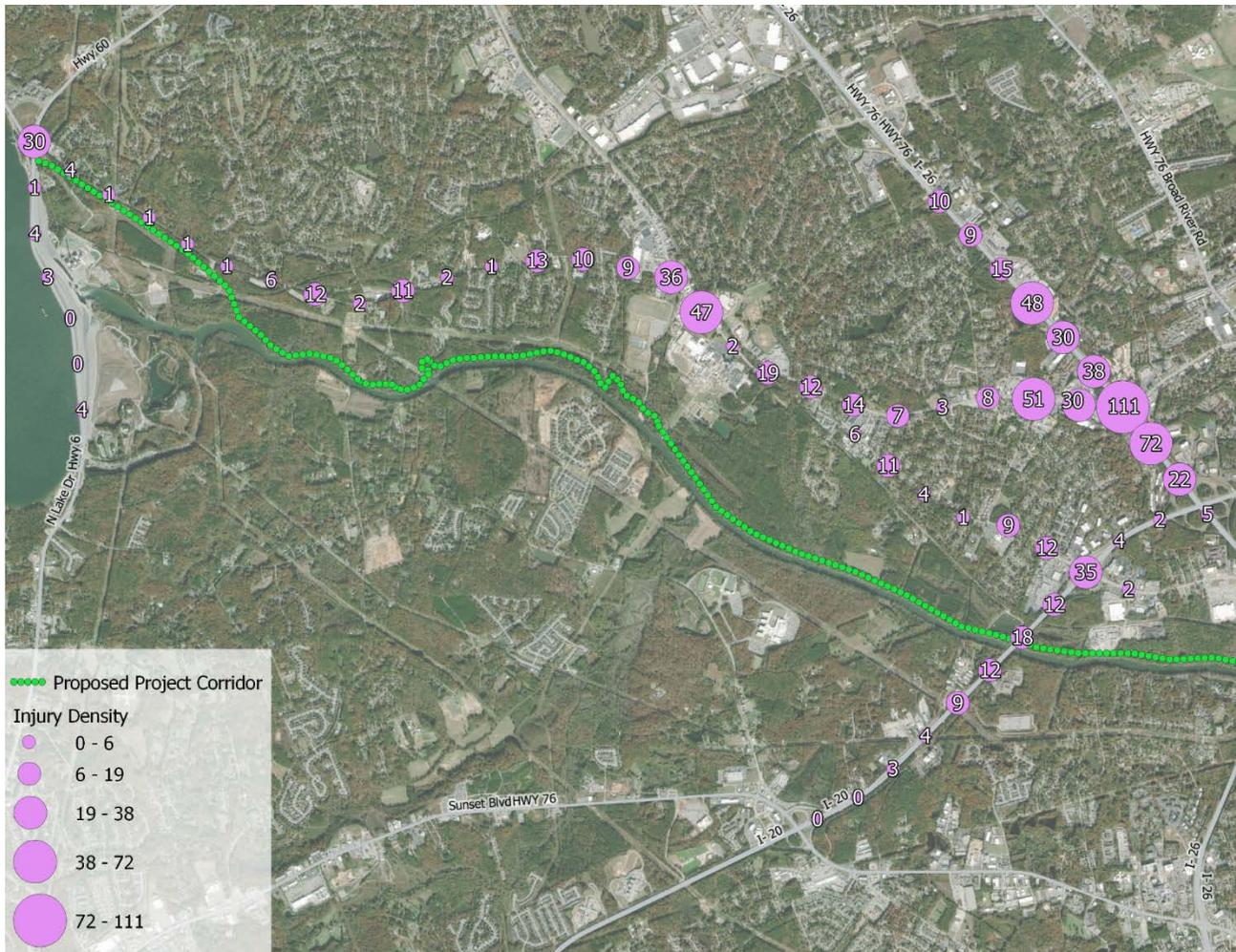


Figure A.5-5 | Injury Density 2014-2019

Figure A.5-6 depicts the locations of pedestrian and bicycle crashes, which totaled 11 out of the 2,897 crashes. The 11 crashes included 3 bicycle crashes and 8 pedestrian crashes.

While that is not many crashes, all of them resulted in injuries or death. There was one fatality and two incapacitating injuries in the group, both from crashes between motor vehicles and pedestrians.

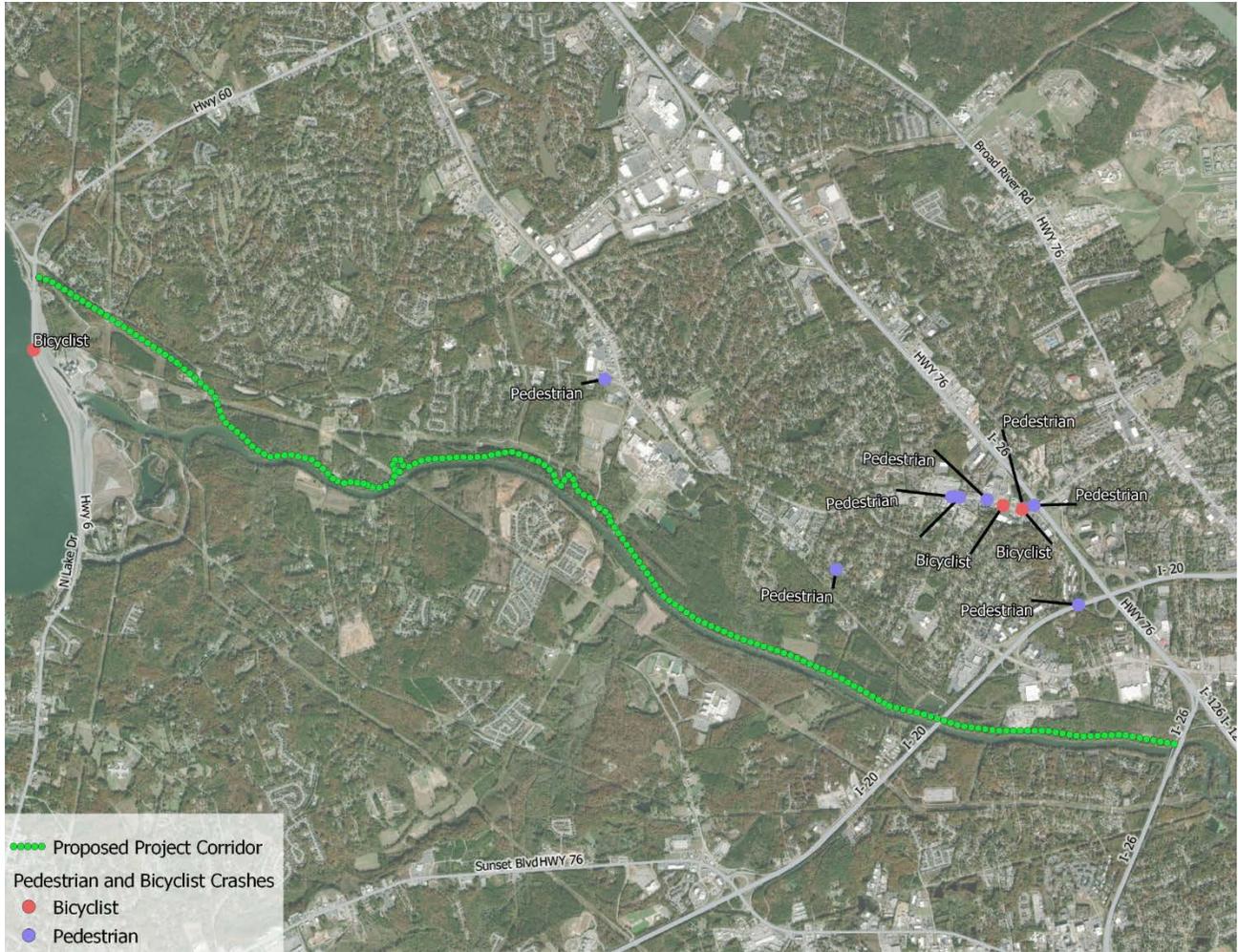


Figure A.5-6 | Bicycle and Pedestrian Crashes 2014-2019

Connectivity Analysis

Understanding how people from surrounding neighborhoods, corridors, businesses, and major destinations will access the proposed greenway is important to the ultimate success of the greenway. Existing infrastructure will play a critical role in achieving connectivity. The connectivity analysis considers the connectedness of the existing transportation network and its ability to facilitate connectivity to the greenway. Data was aggregated from a variety of sources, including CMCOG, Lexington County, Census, SCDOT, and field reconnaissance.

Measure of Connectivity

The connectivity analysis builds upon the trip potential analysis. The trip potential analysis evaluated a grid of half-mile wide hexagons overlaid across the project area, encompassed every census block within a 2-mile radius, and assigned each hexagon its own score. Somewhat similar, potential connectivity is measured by using two of the factors from the trip potential analysis: 1) population density; and 2) concentrations of residential uses (see **Table A.5-2**). Only hexagons that received a score of 10 or greater or a “yes” for the presence of high-density residential areas will be used. The connectivity analysis demonstrates how well the transportation network connects important destinations to residents and visitors. **Table A.5-3** lists the three levels of connectivity that were identified to better normalize the results of the analysis.

Table A.5-2 | Connectivity Analysis Variables

CATEGORIES	RATIONALE
Population Density	Densely populated areas that impact the most users per given area.
High Concentration of Residential Land Use	Higher density residential land use means more users per a given area.

Table A.5-3 | Measures of Connectivity

CATEGORY	LEVEL OF CONNECTIVITY
High-Connectivity	Must be within BOTH categories.
Medium-Connectivity	Must be within ONE category.
Low-Connectivity	Must be within NO categories

Figure A.5-7 illustrates levels of connectivity, with the high connectivity (i.e., light areas) on the map indicating areas that have a high-density population and high concentrations of residential uses. Whereas, medium connectivity (i.e., gray/darker blue areas) indicates areas that have either a high-density population or a high concentration of residential uses. While areas not represented by a hexagon have low connectivity.

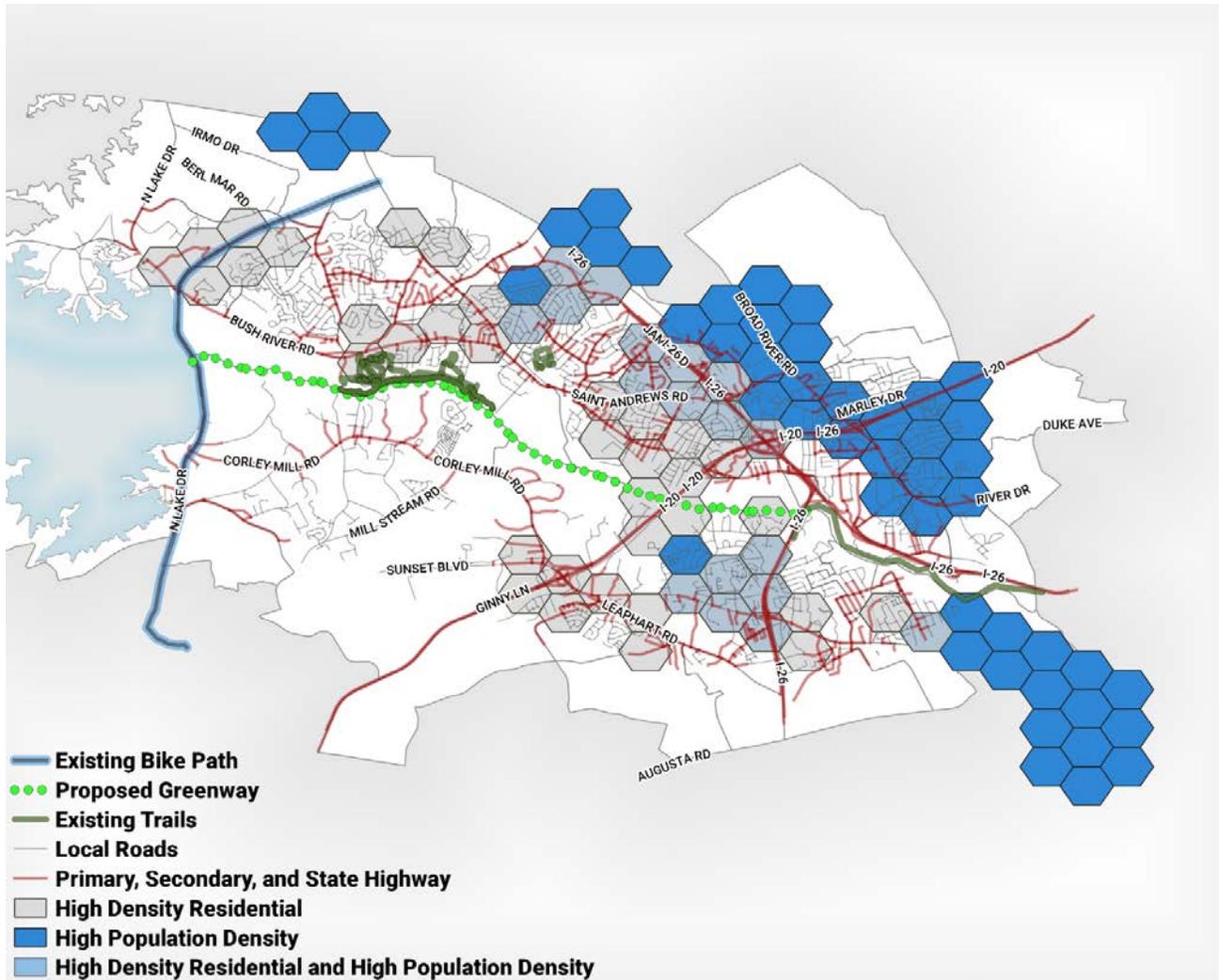


Figure A.5-7 | Connectivity Analysis

Street Network

This section focuses on how the street network will connect surrounding neighborhoods, corridors, businesses, and major destinations to the proposed greenway. Within a two-mile radius of the proposed Lower Saluda Greenway there is a connected and continuous street network stretching approximately 412 miles in length, that increases mobility and accessibility for residents and visitors.

The existing street network was analyzed and divided into two categories based on overall connectivity: 1) state highways along with primary or secondary roads (161 miles in length); and 2) local roads (251 miles in length). Local streets may serve nearby neighborhoods in terms of overall connectivity within the target area; however, due to the absence of sidewalk data, it could not be determined if local streets would be adequate for nearby residents to bicycle or walk to the proposed greenway. Additionally, individuals not living/working within a direct connection to the proposed greenway via a local street would ultimately resort to the use of primary and secondary streets or state highways, due to their ability to carry larger traffic volumes for longer distances.

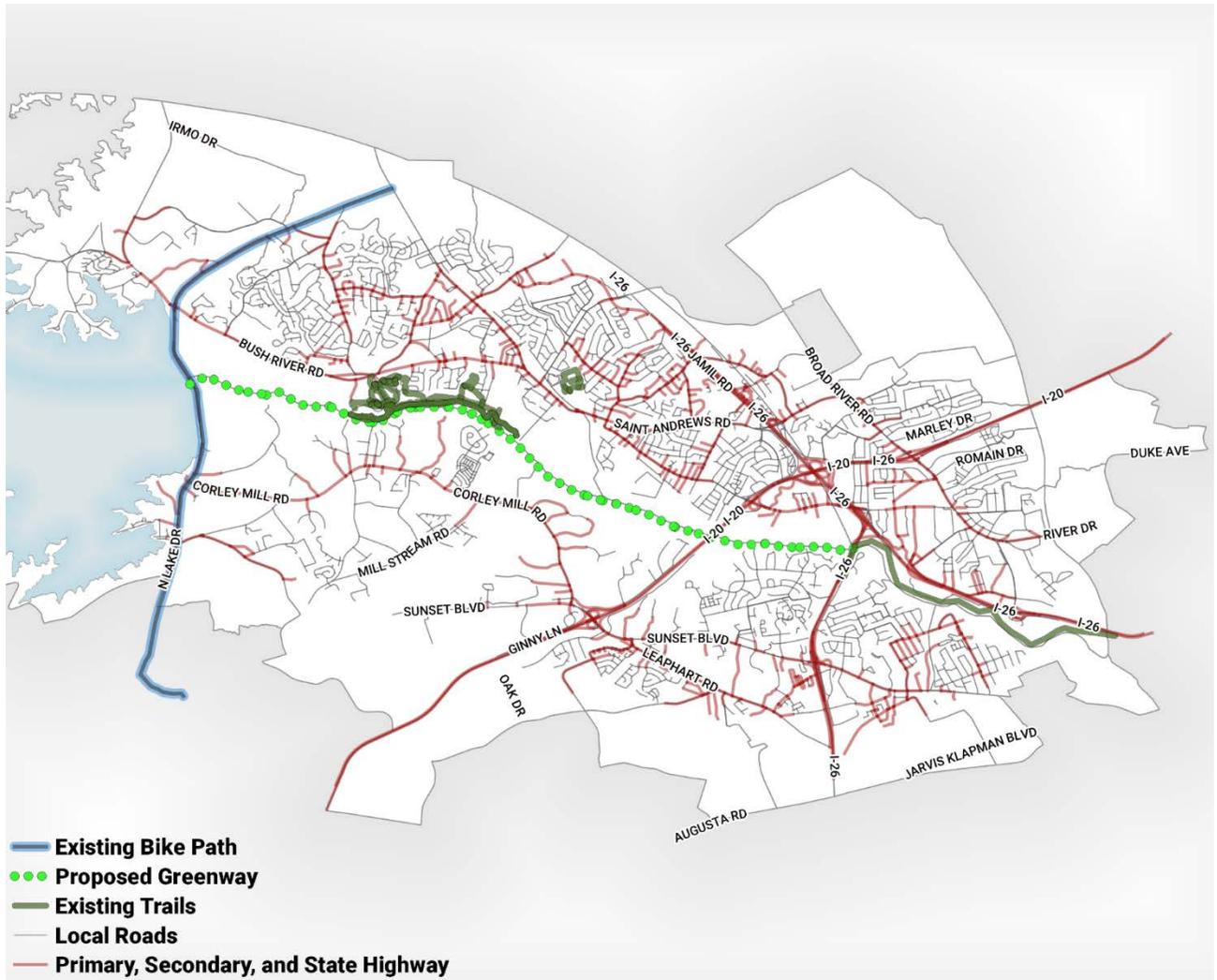


Figure A.5-8 | Transportation Network

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Bicycle Network

Connected bicycle networks have emerged as one of the most important ways to encourage, support, and expand bicycling for people of all ages and abilities. For people to choose to ride a bicycle, they must feel comfortable at each step of their trip.

One dedicated bicycle facility exists within two miles of the greenway corridor; it consists of painted bike lanes along SC 6/SC 60 from the Town of Lexington to the Town of Irmo. The greenway corridor's western end intersects with this bike facility near the Lake Murray Dam. Of its approximate 8 miles in length, the bike lane runs through 1.3 miles of areas identified as having medium connectivity.

Pedestrian Network

Short block lengths (i.e., generally less than 200 feet), buffered, wide sidewalks, and other dedicated areas for pedestrians to travel help users feel safe and comfortable. Greenways support those who are already walking and encourage others to walk for trips, exercise, and recreation. Currently, in proximity to the Lower Saluda Greenway corridor, there are several greenways stretching over 15 miles in length. Approximately 12 miles of existing greenway are in medium connectivity areas.

Additional observations include:

- All existing greenways, except for the Seven Oaks Greenway, intersect with the Lower Saluda Greenway corridor;
- Three parks are in proximity to existing greenways;
- Saluda Shoals Boat Launch is located along the greenway corridor; and
- Only the Seven Oaks Greenway has a transit stop within 0.5 mile of an existing or proposed greenway.

Key Intersections

The connectivity of an area’s street network has a major impact on the ability of pedestrians and bicyclists to travel efficiently to nearby destinations. Intersections provide critical crossing locations. Fifteen key intersections were identified in this analysis; **Table A.5-4** and **Figure A.5-9** respectively list and show these intersections and their relationship to existing connectivity.

Table A.5-4 | Key Intersection Connectivity

INTERSECTION	EXISTING CONNECTIVITY LEVEL
Bush River Rd @ Ashland Rd	Medium
Bush River Rd @ Bilton Rd	Low
Bush River Rd @ Coldstream Dr	Low
Bush River Rd @ Greendale Dr	Medium
Bush River Rd @ Greenpines Rd	Medium
Bush River Rd @ I-20	Medium
Bush River Rd @ Lake Murray Blvd	Medium
Bush River Rd @ Wescott Rd	Medium
I-26 @ I-20	High
Piney Grove Rd @ I-26	High
St Andrew Rd @ Ashland Rd	High
St Andrew Rd @ Bush River Rd	Medium
St Andrew Rd @ I-26	High
St Andrew Rd @ Tram Rd	Low
Sunset Blvd (US 378) @ I-20	Medium

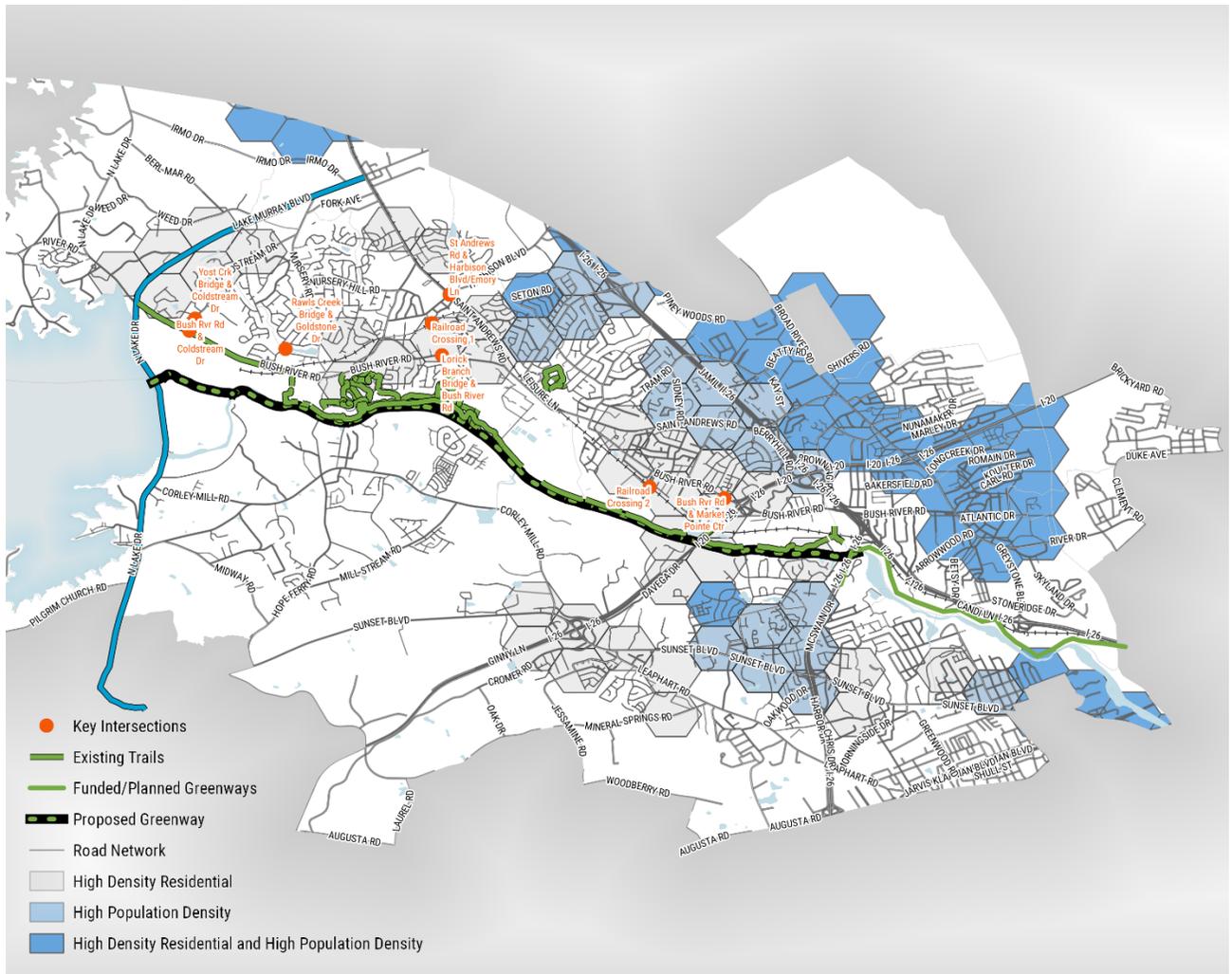


Figure A.5-9 | Key Intersections' Relationship to Existing Connectivity

Transit

The COMET transit system provides public bus service throughout the Midlands. While service is predominately in Richland County, the St. Andrews Local (Route 83L), runs parallel to the proposed greenway corridor on Bush River Road and St. Andrews Road. The St. Andrews Local connects to Harbison, Dutch Square, and Downtown Columbia. Active transportation and transit go hand-in-hand; it is important that active transportation around transit stops and routes are safe and connected for users. **Table A.5-5** lists bus stops in proximity to the proposed greenway corridor and their level of connectivity; bus stops are represented geographically in **Figure A.5-10**.

Table A.5-5 | Bus Stop Connectivity

BUS STOP	EXISTING CONNECTIVITY LEVEL
Bush River & Ashland WB	High
St Andrews & Tram WB	Low
St Andrews & Leisure WB	Low
St Andrews & Piney Grove WB	Low
St Andrews & Harbison WB	Low
St Andrews & Avery EB	Low
St Andrews & Ashland EB	High

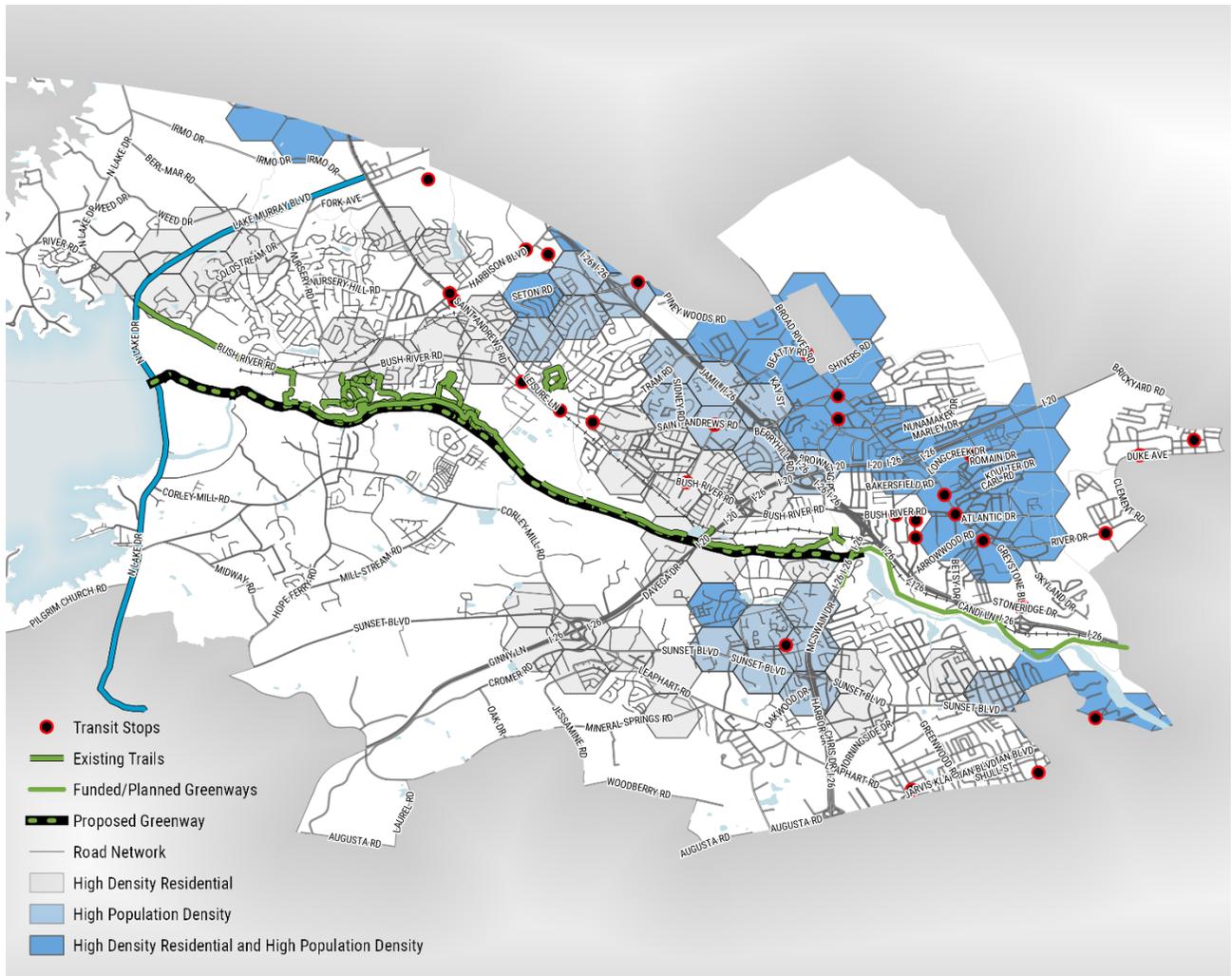


Figure A.5-10 | Transit Stops' Relationship to Existing Connectivity

Major Attractors

Parks, public access points, and schools serve as major attractors for people who either walk or bike. It is important to understand how well these attractors will connect to the proposed greenway. **Figure A.5-11** shows major attractors and their relationship to existing connectivity.

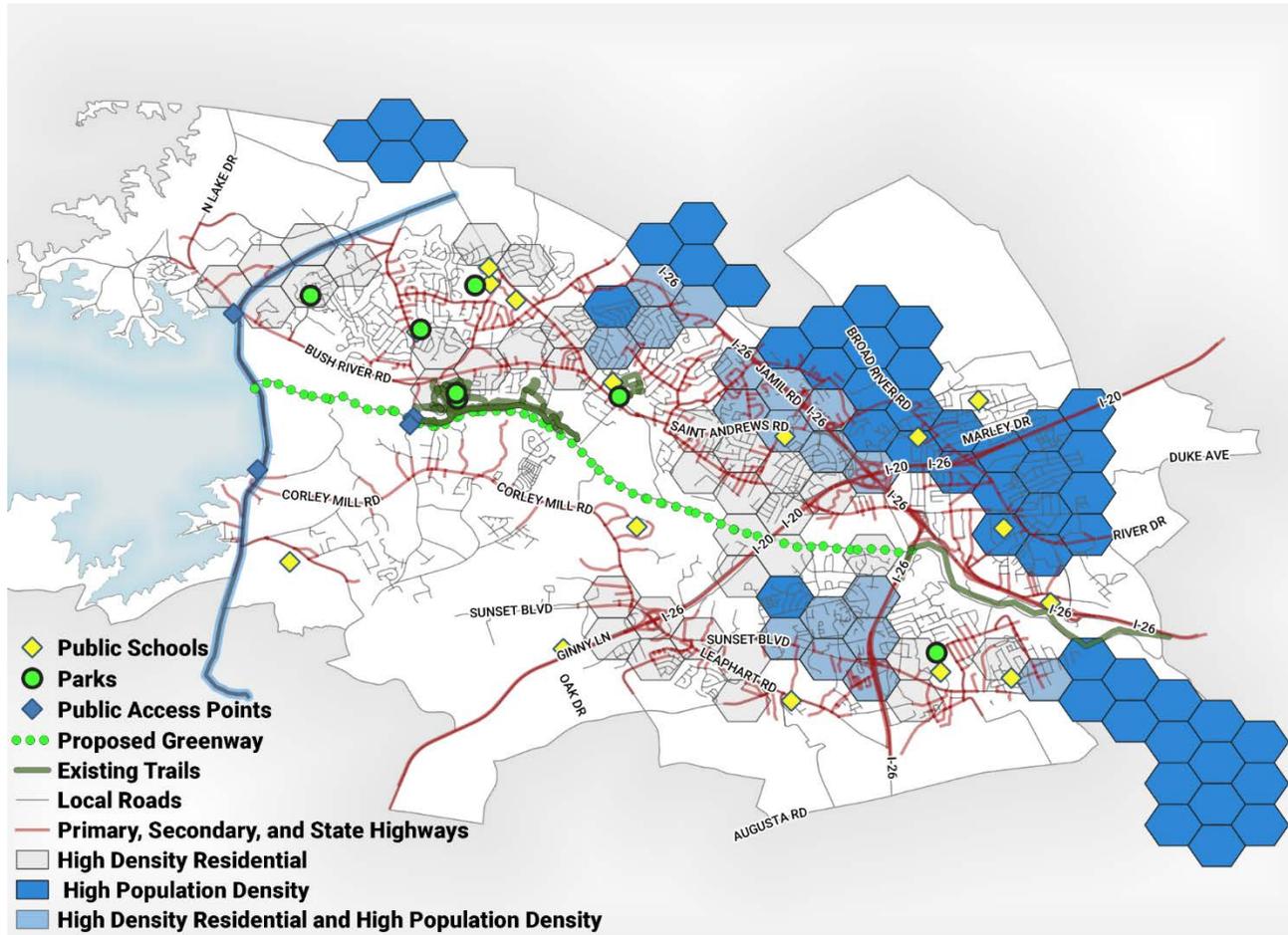


Figure A.5-11 | Major Attractors' Relationship to Existing Connectivity

Parks

As shown in **Table A.5-6**, there are seven parks within a two-mile radius of the proposed greenway. Five of those parks are in high density residential neighborhoods, offering increased connectivity, while two parks are in low-density residential neighborhoods with less connectivity. No parks are in high-density populated areas.

Table A.5-6 | Park Connectivity

PARK	EXISTING CONNECTIVITY LEVEL
Beverly Brandes Park	Medium
Howard Sports Complex	Medium
ICRC Administration Center	Medium
Irmo Middle Complex	Low
Nursery Road Complex	Low
Saluda Shoals Park	Medium
Seven Oaks Park	Low

Public Access Points

Table A.5-7 lists the four waterway public access points in proximity to the greenway corridor. While the Saluda Shoals Boat Launch currently has a low level of connectivity, it is on the proposed greenway corridor and should have a higher level of connectivity once the Lower Saluda Greenway is constructed. The two Lake Murray Access Points are located on the SC 6 bike path, with the Lake Murray Dam North Recreational Area/Boat Ramp having a medium existing level of connectivity.

Table A.5-7 | Public Access Point Connectivity

PUBLIC ACCESS POINT	PROVIDES ACCESS TO	EXISTING CONNECTIVITY LEVEL
Hope Ferry Landing	Saluda River	Low
Lake Murray Dam North Recreational Area/Boat Ramp	Lake Murray	Medium
Lake Murray Public Park/ Dreher Shoals Dam Parking Lot	Lake Murray	Low
Saluda Shoals Boat Launch	Saluda River	Low

Public Schools

There are 16 public schools located within 2 miles of the proposed greenway corridor. Only one school, Seven Oaks Elementary, is in both a high-density populated area and within a high-density residential land use area. A vast majority of schools have a low level of existing connectivity, as shown in **Table A.5-8**.

Table A.5-8 | Public School Connectivity

PUBLIC SCHOOL	EXISTING CONNECTIVITY LEVEL
Columbia High	Low
CrossRoads Intermediate	Low
HB Rhame Elementary	Medium
Irmo High	Low
Irmo Middle	Low
Leaphart Elementary	Low
Meadow Glen Middle	Low
Midway Elementary	Low
Northside Middle	Low
Nursery Road Elementary	Low
Pineview Elementary	Low
River Bluff High	Low
Saluda River Academy for the Arts	Medium
SC Connections Academy	Low
Seven Oaks Elementary	High
St Andrews Middle	Medium
William S. Sandel Elementary	Medium

APPENDIX B



ALTERNATIVE EVALUATION

ALTERNATIVE EVALUATION

The greenway corridor was examined both through in-field observation and desktop analysis. The corridor presented a number of points where decisions were needed to determine the most appropriate alignment. While decisions were needed at each of the decision points, some were very straightforward and did not require an evaluation of alternatives. Where multiple, viable alternatives were present, an evaluation was performed using the evaluation criteria presented below.

1. Ability to gain property owner permission, minimize property acquisition
2. Ability to increase visual and/or physical access to the Saluda River
3. Ability to connect surrounding areas/residents to the greenway network
4. Ability to avoid/mitigate environmental impacts
5. Ability to simplify construction and maintenance access
6. Ability to reduce overall cost

Figures B.1-1, B.1-2, and B.1-3 present the three segments of the greenway corridor and the various decision points. Following that, alternatives are evaluated for decisions points that required such.

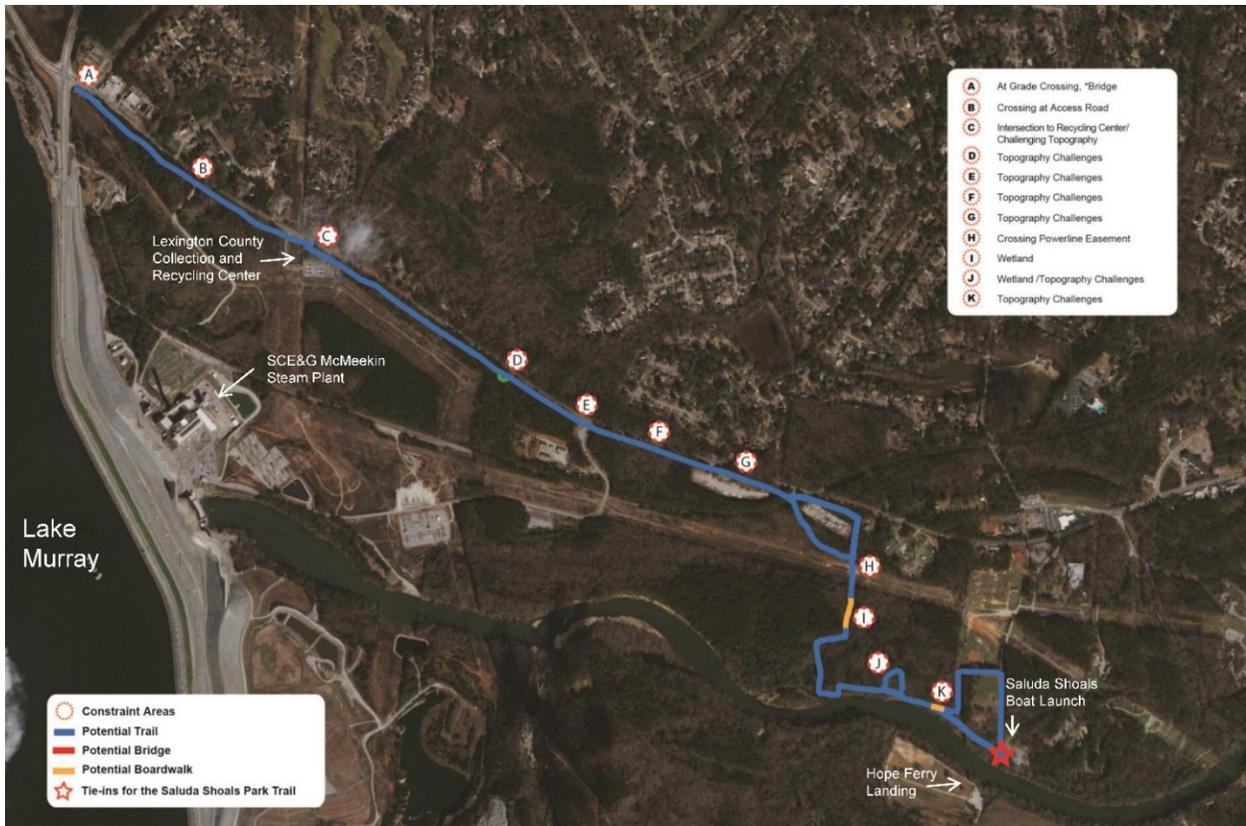


Figure B.1-1 | Alignment Segment One



Figure B.1-2 | Alignment Segment Two

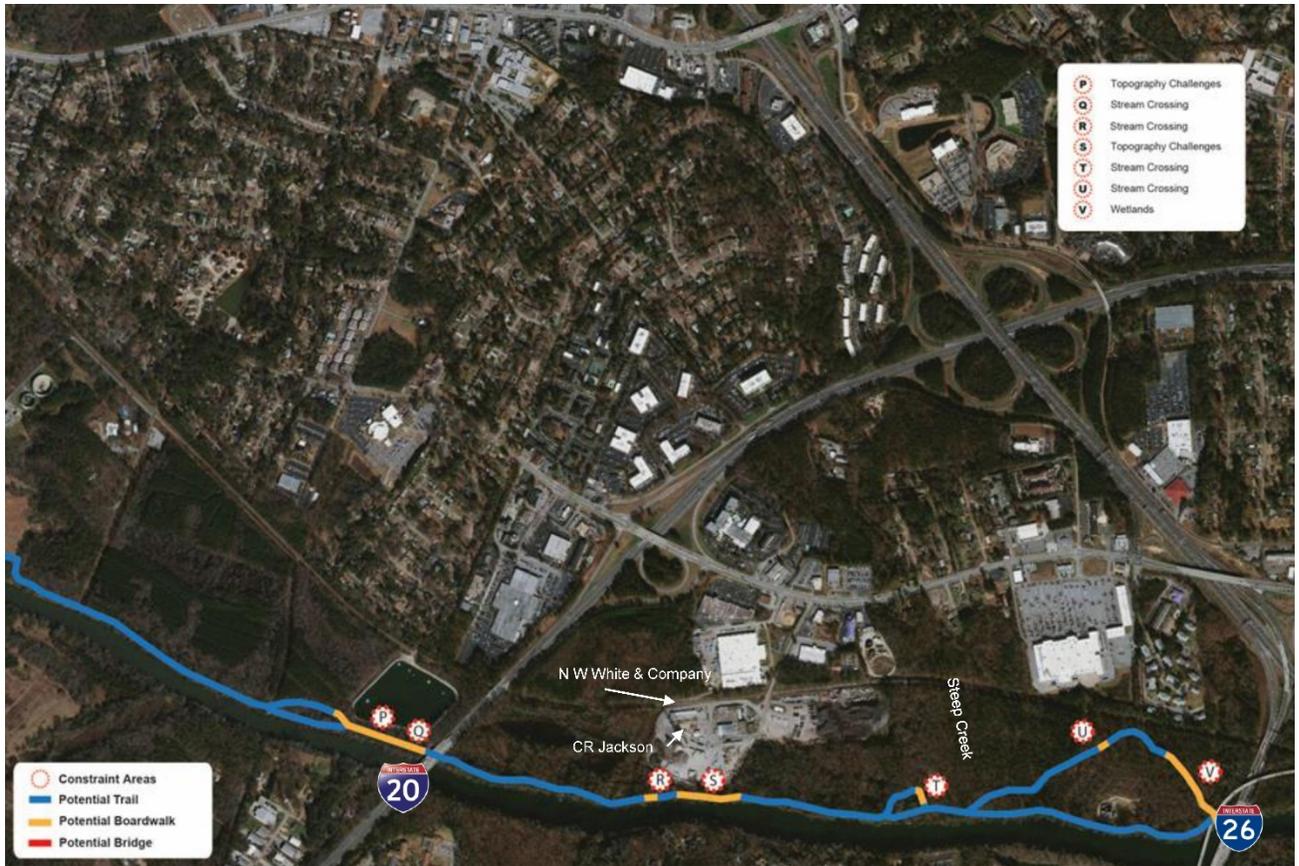


Figure B.1-3 | Alignment Segment Three

Decision Point A

The proposed crossing at the intersection of North Lake Drive (SC 6), Lake Murray Boulevard (SC 60), and Bush River Road (S-107) presents three (3) different alternatives. The proposed crossing occurs at an intersection where all roadways are under the jurisdiction and maintenance of the South Carolina Department of Transportation (SCDOT) and will require agency approval.

Alternative A-1 includes an at-grade crossing on North Lake Drive (SC 6) at the intersection. It would appear that all permissions and right-of-way necessary to achieve this crossing could be obtained from SCDOT. Further, construction and access maintenance would be available due to the existing in-place crossing. Environmental impacts appear minimal due to the existing crossing providing in-place infrastructure and a footprint that could be expanded upon.

Alternative A-2 includes a tunnel crossing under North Lake Drive (SC 6). It does not appear any additional environmental impacts would be necessary due to tunneling under the existing roadway. However, A-2 presents many limitations as it is undetermined if SCDOT would allow a tunnel under their roadway. The costs to design, engineer, and construct the tunnel would likely be very high. Construction access would also be difficult due to the complexity of tunnel construction and the traffic volume associated with the intersection and surrounding roadways. Additional property and/or right-of-way acquisitions would likely be necessary and increase the project cost. Finally, tunnels are often perceived as dangerous, so greenway visitors may be reluctant to use the tunnel.

Alternative A-3 includes a pedestrian bridge that would aerially cross North Lake Drive (SC 6). The bridge crossing would appear to allow all permissions and right-of-way necessary to construct the crossing to be obtained from SCDOT. Environmental impacts would appear minimal with construction and maintenance access better than A-2 but not A-1. The costs to design, engineer, and construct the pedestrian bridge would likely be high. Similar to A-2, greenway users may be reticent to use a bridge, as it would require a significant additional travel distance to meet ADA requirements for ramps and switchbacks.

All three Alternatives (A-1, A-2, & A-3) present limitations in the distance they would be from the Saluda River both visually and physically, as no direct access is achievable. Also, due to the location of the intersection, the crossing alternatives would meet limited criteria to provide connection to area residents to the greenway network. Considering these shared limitations and the additional criteria presented in the evaluation matrix, Alternative A-1 received the highest chance to meet the overall evaluation criteria.

Figure B.1-4 | Decision Point A



EVALUATION MATRIX

CRITERIA	POTENTIAL ALIGNMENTS		
	A-1	A-2	A-3
Ability to gain property owner permission, minimize property acquisition	H	L	H
Ability to increase visual and/or physical access to the Saluda River	N/A	N/A	N/A
Ability to connect surrounding areas/residents to the greenway network	M	M	M
Ability to avoid/mitigate environmental impacts	H	H	H
Ability to simplify construction and maintenance access	H	L	M
Ability to reduce overall cost	H	L	L
OVERALL	H	L	M

Table B.1-1 | Decision Point A Alternative Evaluation

H = High ability to meet criteria
M = Medium ability to meet criteria
L = Low ability to meet criteria

Decision Point G

The proposed route of the greenway at the Dominion laydown yard directly across from Bilton Road presents two (2) different alternatives. The proposed route of the greenway will occur exclusively on Dominion property and will require their permission.

Alternative G-1 includes a greenway alignment that stays north of the laydown yard. It would appear that all permissions and right-of-way necessary to achieve this routing could be obtained from Dominion. Further, construction and access maintenance would be available due to the access in-place for the existing laydown yard. Environmental impacts appear minimal due to the trail being low impact construction all at ground level. The location of the northern alignment would also be closer to Bush River Road (S-107) and allow possible connections to the surrounding neighborhoods and residential areas. It would appear that project costs would be lesser due to no special construction practices being needed.

Alternative G-2 includes a greenway alignment that stays south of the laydown yard. It would appear that all permissions and right-of-way necessary to achieve this routing could be obtained from Dominion but may be more difficult to obtain than G-1. Environmental impacts would be minimal as with G-1 due to low impact construction at ground level. The location of G-2 being further away from the existing laydown yard would likely increase construction and maintenance costs. The ability to connect to the surrounding neighborhoods would also be hindered due to the increased distance from Bush River Road (S-107).

Both Alternatives (G-1 & G-2) present limitations in the distance they would be from the Saluda River both visually and physically, as no direct access is achievable. Considering these shared limitations and the additional criteria presented in the evaluation matrix, Alternative G-1 appears to receive the highest chance to meet the overall evaluation criteria.

Figure B.1-5 | Decision Point G



EVALUATION MATRIX

CRITERIA	POTENTIAL ALIGNMENTS	
	G-1	G-2
Ability to gain property owner permission, minimize property acquisition	H	M
Ability to increase visual and/or physical access to the Saluda River	N/A	N/A
Ability to connect surrounding areas/residents to the greenway network	H	M
Ability to avoid/mitigate environmental impacts	H	H
Ability to simplify construction and maintenance access	H	M
Ability to reduce overall cost	H	H
OVERALL	H	M

Table B.1-2 | Decision Point G Alternative Evaluation

*H = High ability to meet criteria
M = Medium ability to meet criteria
L = Low ability to meet criteria*

Decision Point J

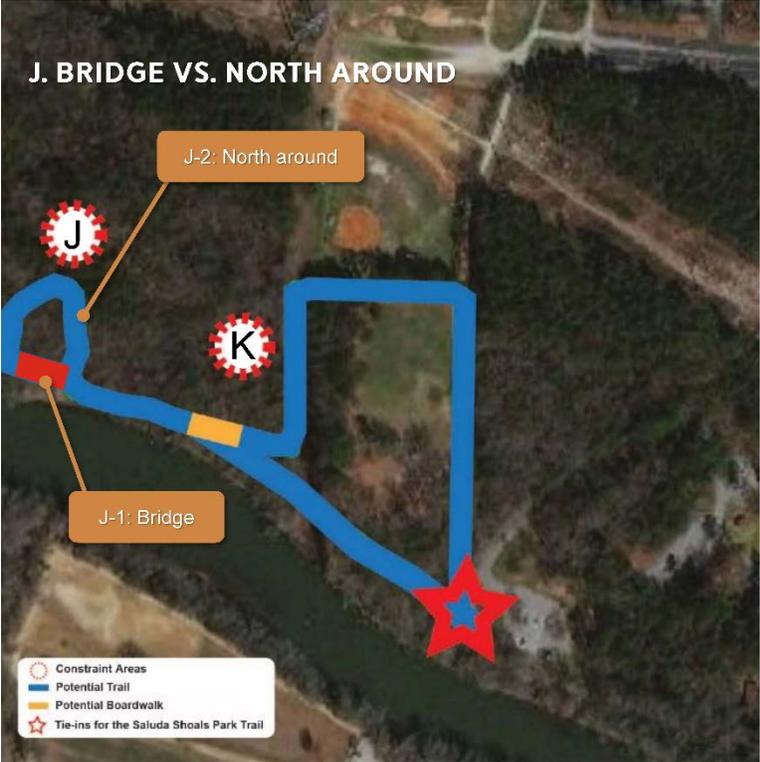
The proposed route of the greenway to the west of the Cornerstone Church property presents two (2) different alternatives. The proposed route of the greenway will occur exclusively on Dominion property and will require their permission.

Alternative J-1 includes a greenway alignment that stays near the Saluda River and utilizes a bridge crossing over a difficult terrain area. It would appear that all permissions and right-of-way necessary to achieve this routing could be obtained from Dominion. The construction and access maintenance would be available due to the existing topography in this area being manageable. Environmental impacts appear minimal due to the trail bridge being relatively low impact construction. The location of the bridge alignment would allow possible connections to the surrounding neighborhoods and residential areas via the church property. J-1 will also be physically and visually close to the Saluda River. However, the project costs would be higher due to special construction practices being required to construct/place the bridge.

Alternative J-2 includes a north around greenway alignment that lengthens the greenway by moving around the area of difficult terrain. It would appear that all permissions and right-of-way necessary to achieve this routing could be obtained from Dominion. Environmental impacts would be minimal as with J-1 due to low impact construction at ground level. The location and increased length of J-2 would likely increase construction and maintenance costs. The ability to connect to the surrounding neighborhoods would be similar as with J-1. Visual and physical access to the Saluda River would also be lesser than with J-1 due to the increased distance from the river. The overall costs would likely be lesser than J-1 since no bridge would be needed.

Alternative J-2 presents several lesser criteria ratings than J-1. Considering these ratings with the additional criteria presented in the evaluation matrix, Alternative J-1 appears to receive the highest chance to meet the overall evaluation criteria despite the likelihood it is the more costly alternative.

Figure B.1-6 | Decision Point J



EVALUATION MATRIX

CRITERIA	POTENTIAL ALIGNMENTS	
	J-1	J-2
Ability to gain property owner permission, minimize property acquisition	H	H
Ability to increase visual and/or physical access to the Saluda River	H	M
Ability to connect surrounding areas/residents to the greenway network	H	H
Ability to avoid/mitigate environmental impacts	H	H
Ability to simplify construction and maintenance access	H	M
Ability to reduce overall cost	L	M
OVERALL	H	M

Table B.1-3 | Decision Point J Alternative Evaluation

H = High ability to meet criteria
M = Medium ability to meet criteria
L = Low ability to meet criteria

Decision Point K

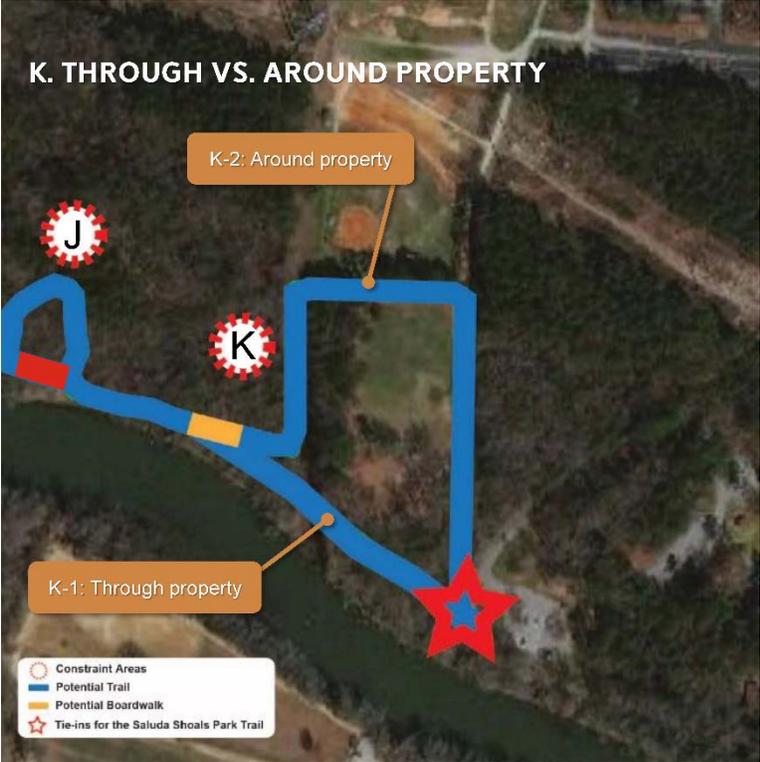
The proposed route of the greenway to the south of the Cornerstone Church property along Bush River Road (S-107) presents two (2) different alternatives. The alternatives presented will involve two (2) property owners, with each alternative occurring on a singular property.

Alternative K-1 includes a greenway alignment that stays near the Saluda River. It would appear that all permissions and right-of-way necessary to achieve this routing could be obtained from a private property owner. Typically, private property owners are less likely to participate. The construction and access maintenance would be available through the existing church property. Environmental impacts appear minimal as being relatively low impact construction. The location of the alignment would allow possible connections to the surrounding neighborhoods and residential areas via the church property. K-1 will also be physically and visually close to the Saluda River. The project costs would be lower due to significantly less trail length than what would be required for K-2.

Alternative K-2 includes a north around property greenway alignment that lengthens the greenway by routing around a potentially unattainable property easement. It would appear that all permissions and right-of-way necessary to achieve this routing could be obtained from Cornerstone Church. Environmental impacts would be minimal as with K-1 due to low impact construction at ground level. The location and increased length of K-2 would likely increase construction and maintenance costs. The ability to connect to the surrounding neighborhoods would be similar as with K-1. Visual and physical access to the Saluda River would also be lesser than with K-1 due to the increased distance from the river. The overall costs would likely be increased due to the additional length of trail required to go around the property.

Alternative K-1 presents higher criteria ratings than K-2. Considering these ratings with the additional criteria presented in the evaluation matrix, Alternative K-1 receives the highest chance to meet the overall evaluation criteria despite potential difficulty in property and right-of-way acquisition.

Figure B.I-7 | Decision Point K



EVALUATION MATRIX

Table B.I-4 | Decision Point K Alternative Evaluation

CRITERIA	POTENTIAL ALIGNMENTS	
	K-1	K-2
Ability to gain property owner permission, minimize property acquisition	L	H
Ability to increase visual and/or physical access to the Saluda River	H	L
Ability to connect surrounding areas/residents to the greenway network	H	H
Ability to avoid/mitigate environmental impacts	H	H
Ability to simplify construction and maintenance access	H	M
Ability to reduce overall cost	H	M
OVERALL	H	M

H = High ability to meet criteria
M = Medium ability to meet criteria
L = Low ability to meet criteria

Decision Point L

The proposed route of the greenway to the southeast of the existing Saluda Shoals Park presents two (2) different alternatives. The alternatives presented will involve a single corporate property owner.

Alternative L-1 includes a greenway alignment that stays near the Saluda River. It would appear that all permissions and right-of-way necessary to achieve this routing could be obtained from one corporate property owner. Going through the fence is less desirable than L-2. The construction and access maintenance would be available through an existing roadway. Environmental impacts appear minimal as being relatively low impact construction. The location of the alignment would allow possible connections to the surrounding neighborhoods and residential area. L-1 will also be physically and visually close to the Saluda River. The project costs would be lower due to significantly less trail length required for L-1.

Alternative L-2 includes a north around fence alignment that lengthens the greenway. It would appear that all permissions and right-of-way necessary to achieve this routing could be obtained from one corporate owner. Environmental impacts would be minimal as with L-1 due to low impact construction at ground level. The location and increased length of L-2 would likely increase construction and maintenance costs. The ability to connect to the surrounding neighborhoods would be similar as with L-1. Visual and physical access to the Saluda River would also be lesser than with L-1 due to the increased distance from the river. The overall costs would likely be increased due to the additional length of trail required to go around the property.

Alternative L-1 presents higher criteria ratings than L-2. Considering these ratings with the additional criteria presented in the evaluation matrix, Alternative L-1 appears to receive the highest chance to meet the overall evaluation criteria.



Figure B.1-8 | Decision Point L

EVALUATION MATRIX

CRITERIA	POTENTIAL ALIGNMENTS	
	L-1	L-2
Ability to gain property owner permission, minimize property acquisition	M	H
Ability to increase visual and/or physical access to the Saluda River	H	M
Ability to connect surrounding areas/residents to the greenway network	H	H
Ability to avoid/mitigate environmental impacts	H	H
Ability to simplify construction and maintenance access	H	M
Ability to reduce overall cost	H	M
OVERALL	H	M

Table B.1-5 | Decision Point L Alternative Evaluation

H = High ability to meet criteria
M = Medium ability to meet criteria
L = Low ability to meet criteria

Decision Point N

The proposed route of the greenway to the south of the Shaw Industries property presents two (2) different alternatives. The alternatives presented will involve a single corporate property owner.

Alternative N-1 includes a greenway alignment that turns to the north and crosses an area of difficult terrain via a short bridge. It would appear that all permissions and right-of-way necessary to achieve this routing could be obtained from one corporate property owner. The construction and access maintenance would be difficult due to the terrain. Environmental impacts appear minimal being relatively low impact construction. The location of the alignment would allow possible connections to the surrounding neighborhoods and residential area. N-1 will not be physically and visually close to the Saluda River. The project costs would be lower due to the alignment requiring a shorter bridge than N-2.

Alternative N-2 includes a greenway alignment that runs along the Saluda River and crosses an area of difficult terrain via a long bridge. It would appear that all permissions and right-of-way necessary to achieve this routing could be obtained from one corporate owner. Environmental impacts would be minimal as with N-1 due to low impact construction at ground level. The location and increased bridge length of N-2 would likely increase construction and maintenance costs. The ability to connect to the surrounding neighborhoods would be similar as with N-1. Visual and physical access to the Saluda River would also be greater than with N-1 due to its location adjacent to the Saluda River. The overall costs would likely be increased due to the longer bridge required, even though the actual trail length required would be lesser.

Alternative N-2 presents higher criteria ratings than N-1. Considering these ratings with the additional criteria presented in the evaluation matrix, Alternative N-2 appears to receive the highest chance to meet the overall evaluation criteria despite possibly being the more expensive option.



Figure B.I-9 | Decision Point N

EVALUATION MATRIX

CRITERIA	POTENTIAL ALIGNMENTS	
	N-1	N-2
Ability to gain property owner permission, minimize property acquisition	H	H
Ability to increase visual and/or physical access to the Saluda River	M	H
Ability to connect surrounding areas/residents to the greenway network	H	H
Ability to avoid/mitigate environmental impacts	H	H
Ability to simplify construction and maintenance access	M	H
Ability to reduce overall cost	H	M
OVERALL	M	H

**Table B.I-6 | Decision Point N
Alternative Evaluation**

H = High ability to meet criteria
M = Medium ability to meet criteria
L = Low ability to meet criteria

Decision Point O

The proposed greenway route near the southeastern corner of the Shaw Industries property presents three (3) different alternatives. The three (3) alternatives will all involve Shaw and Dominion properties.

Alternative O-1 includes a greenway alignment that turns to the north and crosses an area of difficult terrain via a short bridge. It would appear that all permissions and right-of-way necessary to achieve this routing could be obtained from Shaw and Dominion. The construction and access maintenance would be difficult due to the terrain. Environmental impacts appear minimal being low impact construction. The location of the alignment would allow possible connections to the surrounding neighborhoods and residential area. O-1 will not be physically and visually close to the Saluda River. The project costs would be lower than O-2 due to the shorter bridge length.

Alternative O-2 includes a greenway alignment that turns slightly less to the north than O-1 and crosses an area of difficult terrain via a long bridge. It would appear that all permissions and right-of-way necessary to achieve this routing could be obtained from Shaw and Dominion. The construction and access maintenance would be difficult as with O-1. Similar to O-1, environmental impacts appear minimal. The location of the alignment would allow possible connections to the surrounding neighborhoods and residential area. O-2 will not be physically and visually close to the Saluda River. The project costs would be higher than O-2 due to the longer bridge length.

Alternative O-3 includes a greenway alignment that runs along the Saluda River. It would appear that all permissions and right-of-way necessary to achieve this routing could be obtained from Shaw and Dominion. Environmental impacts would be minimal as with all alternatives due to low impact construction at ground level. The construction and maintenance costs will decrease due to no bridges specified. The ability to connect to the surrounding neighborhoods would be consistent with other alternatives. Visual and physical access to the Saluda River would also be greater than O-1 and O-2 due to its location adjacent to the Saluda River. The overall costs would likely be decreased due to having lesser length of trail and no bridge present.

Alternatives O-1 & O-2 present varying limitations but are similar overall. Considering the lack of limitations associated with O-3 and the additional criteria presented in the evaluation matrix, Alternative O-3 appears to receive the highest chance to meet the overall evaluation criteria.



Figure B.1-10 | Decision Point O

EVALUATION MATRIX

CRITERIA	POTENTIAL ALIGNMENTS		
	O-1	O-2	O-3
Ability to gain property owner permission, minimize property acquisition	H	H	H
Ability to increase visual and/or physical access to the Saluda River	M	M	H
Ability to connect surrounding areas/residents to the greenway network	H	H	H
Ability to avoid/mitigate environmental impacts	H	H	H
Ability to simplify construction and maintenance access	M	M	H
Ability to reduce overall cost	M	L	H
OVERALL	M	M	H

Table B.1-7 | Decision Point O
Alternative Evaluation

H = High ability to meet criteria
M = Medium ability to meet criteria
L = Low ability to meet criteria

Decision Point P

The proposed route of the greenway to the southeast of the existing Saluda Shoals Park presents two (2) different alternatives. The alternatives presented will involve property owned by Dominion and Palmetto Wastewater Reclamation, LLC respectively.

Alternative P-1 includes a greenway alignment that stays near the Saluda River while going through wetlands. It would appear that all permissions and right-of-way necessary to achieve this routing could be obtained from Dominion and Palmetto Wastewater Reclamation. The construction and maintenance would be difficult due to the wetlands. Environmental impacts appear a minor concern as the trail location is located in jurisdictional wetlands. The location of the alignment would allow possible connections to the surrounding neighborhoods and residential area. P-1 will also be physically and visually close to the Saluda River. The project costs would be higher due to the special construction practices and mitigation necessary to construct in the wetlands.

Alternative P-2 includes a greenway alignment slightly further north that avoids the wetlands. It would appear that all permissions and right-of-way necessary to achieve this routing could be obtained from Dominion and Palmetto Wastewater. Environmental impacts would be minimal as there are no wetlands present. The location of P-2 outside of the wetlands will likely increase construction and maintenance access. The ability to connect to the surrounding neighborhoods would be similar as with P-1. Visual and physical access to the Saluda River would also be lesser than with P-1 due to the increased distance from the river. The overall costs would likely be decreased due to the absence of the wetland costs associated with P-1.

Alternative P-2 presents higher criteria ratings than P-1. Considering the ratings of P-1 with the additional criteria presented in the evaluation matrix, Alternative P-2 appears to receive the highest chance to meet the overall evaluation criteria.

Figure B.1-11 | Decision Point P



EVALUATION MATRIX

CRITERIA	POTENTIAL ALIGNMENTS	
	P-1	P-2
Ability to gain property owner permission, minimize property acquisition	H	H
Ability to increase visual and/or physical access to the Saluda River	H	M
Ability to connect surrounding areas/residents to the greenway network	H	H
Ability to avoid/mitigate environmental impacts	M	H
Ability to simplify construction and maintenance access	M	H
Ability to reduce overall cost	M	H
OVERALL	M	H

Table B.1-8 | Decision Point P Alternative Evaluation

H = High ability to meet criteria
M = Medium ability to meet criteria
L = Low ability to meet criteria

Decision Point T

The proposed route of the greenway to the south of the C.R. Jackson property presents two (2) different alternatives. The proposed route of the greenway will occur exclusively on Dominion property and will require their permission.

Alternative T-1 includes a greenway alignment that stays near the Saluda River while going through wetlands. It would appear that all permissions and right-of-way necessary to achieve this routing could be obtained from Dominion. The construction and access maintenance would be difficult due to the wetlands. Environmental impacts appear a minor concern as the trail location is located in jurisdictional wetlands. The location of the alignment would allow possible connections to the surrounding neighborhoods and residential area. T-1 will also be physically and visually close to the Saluda River. The project costs would be higher due to the special construction practices and mitigation necessary to construct in the wetlands.

Alternative T-2 includes a greenway alignment slight further north that avoids the wetlands. It would appear that all permissions and right-of-way necessary to achieve this routing could be obtained from Dominion. Environmental impacts would be minimal, as there are no wetlands present. The location of T-2 outside of the wetlands will likely increase construction and maintenance access. The ability to connect to the surrounding neighborhoods would be similar as with T-1. Visual and physical access to the Saluda River would also be lesser than with T-1 due to the increased distance from the river. The overall costs would likely be similar as T-1 due to the potential need for a low boardwalk.

Alternative T-1 presents several lesser criteria ratings than T-2. Considering these limitations and the additional criteria presented in the evaluation matrix, Alternative T-2 appears to receive the highest chance to meet the overall evaluation criteria despite the likelihood both alternatives are similar in overall costs.



Figure B.1-12 | Decision Point T

EVALUATION MATRIX

CRITERIA	POTENTIAL ALIGNMENTS	
	T-1	T-2
Ability to gain property owner permission, minimize property acquisition	H	H
Ability to increase visual and/or physical access to the Saluda River	H	M
Ability to connect surrounding areas/residents to the greenway network	H	H
Ability to avoid/mitigate environmental impacts	M	H
Ability to simplify construction and maintenance access	M	H
Ability to reduce overall cost	M	M
OVERALL	M	H

Table B.1-9 | Decision Point T Alternative Evaluation

H = High ability to meet criteria
M = Medium ability to meet criteria
L = Low ability to meet criteria

Decision Point U

The proposed route of the greenway to the south of the Walmart and CSX property presents two (2) different alternatives. The proposed route of the greenway may involve Dominion or Synergy, LLP owned properties.

Alternative U-1 includes a greenway alignment that positions to the north of the wastewater treatment plant. It would appear that all permissions and right-of-way necessary to achieve this routing could be obtained from Dominion. The construction and access maintenance would be less cost inhibitive due to the existing access roadway. Environmental impacts would appear minimal, as all construction is low impact. The location of the alignment would allow possible connections to the surrounding neighborhoods and residential area. U-1 will not be physically and visually close to the Saluda River. The project costs would be higher due to longer length of trail and possible low boardwalk required to traverse the terrain.

Alternative U-2 includes a greenway alignment that stays near the Saluda River. It would appear that all permissions and right-of-way necessary to achieve this routing could be obtained from Dominion and Synergy, LLP. However, Synergy, LLP is unlikely to cooperate. Environmental impacts would be similar to U-1. The location of U-2 will likely decrease construction and maintenance access due to its location further away from the access roadway. The ability to connect to the surrounding neighborhoods would be lower as the topography significantly drops to this proposed alignment from the surround residential areas. Visual and physical access to the Saluda River would be high due to the riverside location of U-2. The overall costs would likely be decreased due to not needing low boardwalk and extra trail length.

Alternative U-1 presents several higher criteria ratings than U-2. Considering these ratings with the additional criteria presented in the evaluation matrix, Alternative U-1 appears to receive the highest chance to meet the overall evaluation criteria despite the likelihood it will be the more costly alternative.

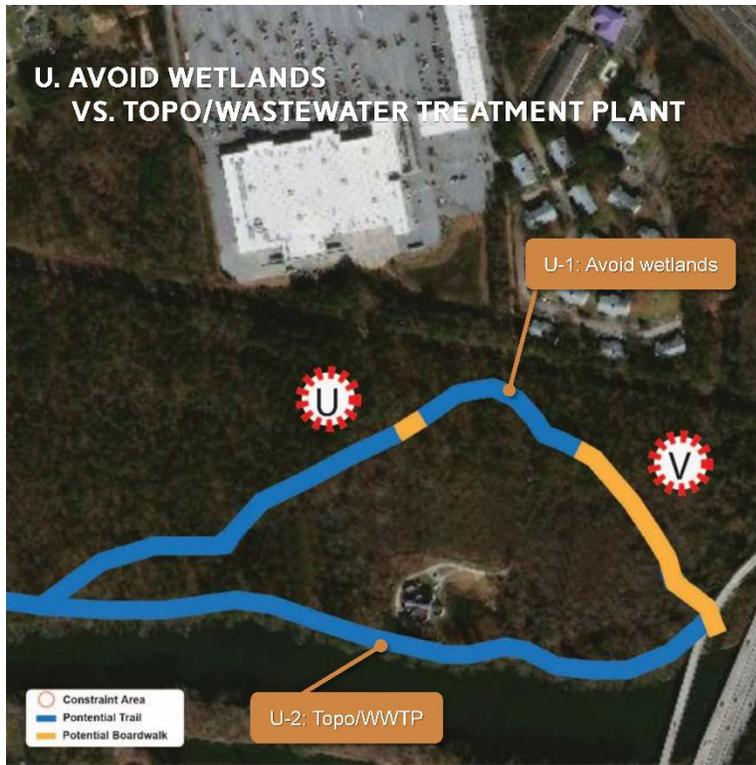


Figure B.I-13 | Decision Point U

EVALUATION MATRIX

CRITERIA	POTENTIAL ALIGNMENTS	
	U-1	U-2
Ability to gain property owner permission, minimize property acquisition	H	L
Ability to increase visual and/or physical access to the Saluda River	L	H
Ability to connect surrounding areas/residents to the greenway network	H	L
Ability to avoid/mitigate environmental impacts	H	H
Ability to simplify construction and maintenance access	H	M
Ability to reduce overall cost	M	H
OVERALL	H	M

Table B.I-10 | Decision Point U Alternative Evaluation

H = High ability to meet criteria
M = Medium ability to meet criteria
L = Low ability to meet criteria

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APPENDIX C



OPINIONS OF PROBABLE COST

OPINIONS OF PROBABLE COST
12-Foot Wide Trail



**ENGINEER'S OPINION OF PROBABLE COST -
PRELIMINARY DESIGN ESTIMATE**

DESCRIPTION: PRELIMINARY COST FOR PHASE 1 12' TRAIL
PHASE 1 LOCATION: LAKE MURRAY DAM TO SALUDA SHOALS PARK

LOCATION: Lexington Co
ESTIMATE BY: SRL
DATE: 2/11/2021
REVISED:
CHECKED BY: TN

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
A-1	Mobilization	1	LS	\$310,000	\$310,000
A-2	Clearing & Grubbing - Includes all Demolition	1	LS	\$173,500	\$173,500
A-3	Erosion Control	1	LS	\$35,000	\$35,000
B-1	Grading Complete	1	LS	\$1,289,500	\$1,289,500
B-2	12' Concrete Trail	12895	LF	\$81	\$1,044,495
B-3	12' Low Boardwalk	225	LF	\$720	\$162,000
B-4	12' Wood Bridge	40	LF	\$1,620	\$64,800
C-1	4" Topsoil Placement	2200	SY	\$15	\$33,000
C-2	Landscape	19400	SF	\$4	\$77,600
D-1	8" DIP	160	LF	\$90	\$14,400
E-1	Furnish and Install Wayfinding Sign with Support	23	EA	\$810	\$18,630
E-2	Furnish and Install Interpretive Sign with Support	19	EA	\$2,700	\$51,300
E-3	Picnic Table	18	EA	\$2,160	\$38,880
E-4	Bench	23	EA	\$1,350	\$31,050
E-5	Trash Receptacle	27	EA	\$1,350	\$36,450
E-6	Electrical Service	4	LS	\$6,750	\$27,000
Subtotal Items					\$3,407,605
CONSTRUCTION CONTINGENCY				0%	\$0
Total Cost Estimate					\$3,408,000

NOTES:

1. This cost estimate is based on 2019-2020 material/equipment/labor costs and should be adjusted to fit current year if needed.
2. Striping is assumed to be thermoplastic.
3. Estimate does not include construction surveying, engineering, or right-of-way acquisition.
4. Trail lengths calculated using professional judgement during site walks
5. Trailheads to include parking, signage, trash receptacles, potential restrooms & maintenance sheds
6. Estimate does not include stormwater treatment or permitting.
7. Typical trail road crossing includes traffic control, signal modifications, curb ramps, signs and pavement marking.
8. Trail, Boardwalk and Bridge estimates include materials and clearing and grubbing through installation.
9. Assume lighting to be leased by Dominion Energy and is not included in estimate.

DISCLAIMER:

Cost estimates were developed by identifying pay items and establishing rough quantities. Please note that the estimates include approximate costs for asphalt, concrete, drainage improvements, limited utility relocation, pavement markings, signs and traffic signal adjustments. The estimate does not include easement, right-of-way acquisition, construction management, surveying, geotechnical investigation, environmental documentation, special site remediation or the cost for ongoing maintenance. A cost range has been assigned to some general categories such as utility relocations; however, these costs can vary widely depending on the exact details and nature of the work. The overall estimates are intended to be general and used for planning purposes. Construction costs will vary based on the ultimate project scope (i.e. potential combination of projects), schedule, and economic conditions at the time of construction.



**ENGINEER'S OPINION OF PROBABLE COST -
PRELIMINARY DESIGN ESTIMATE**

DESCRIPTION: PRELIMINARY COST FOR PHASE 2 12' TRAIL
PHASE 2 LOCATION: SALUDA SHOALS PARK TO I-20

LOCATION: Lexington Co
ESTIMATE BY: SRL
DATE: 2/11/2021
REVISED:
CHECKED BY: TN

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
A-1	Mobilization	1	LS	\$499,500	\$499,500
A-2	Clearing & Grubbing - Includes all Demolition	1	LS	\$279,500	\$279,500
A-3	Erosion Control	1	LS	\$56,000	\$56,000
B-1	Grading Complete	1	LS	\$1,154,000	\$1,154,000
B-2	12' Concrete Trail	11540	LF	\$81	\$934,740
B-3	12' Low Boardwalk	850	LF	\$720	\$612,000
B-4	12' High Boardwalk	930	LF	\$900	\$837,000
B-5	12' Wood Bridge	100	LF	\$1,620	\$162,000
B-6	105' Contech-style prefab Bridge	1	LS	\$720,000	\$720,000
C-1	4" Topsoil Placement	230	SY	\$15	\$3,450
C-2	Landscape	2100	SF	\$4	\$8,400
D-1	8" DIP	165	LF	\$90	\$14,850
E-1	Furnish and Install Wayfinding Sign with Support	24	EA	\$810	\$19,440
E-2	Furnish and Install Interpretive Sign with Support	20	EA	\$2,700	\$54,000
E-3	Picnic Table	18	EA	\$2,160	\$38,880
E-4	Bench	24	EA	\$1,350	\$32,400
E-5	Trash Receptacle	27	EA	\$1,350	\$36,450
E-6	Electrical Service	4	LS	\$6,750	\$27,000
Subtotal Items					\$5,489,610
CONSTRUCTION CONTINGENCY				0%	\$0
Total Cost Estimate					\$5,490,000

NOTES:

1. This cost estimate is based on 2019-2020 material/equipment/labor costs and should be adjusted to fit current year if needed.
2. Striping is assumed to be thermoplastic.
3. Estimate does not include construction surveying, engineering, or right-of-way acquisition.
4. Trail lengths calculated using professional judgement during site walks
5. Trailheads to include parking, signage, trash receptacles, potential restrooms & maintenance sheds
6. Estimate does not include stormwater treatment or permitting.
7. Typical trail road crossing includes traffic control, signal modifications, curb ramps, signs and pavement marking.
8. Trail, Boardwalk and Bridge estimates include materials and clearing and grubbing through installation.
9. Assume lighting to be leased by Dominion Energy and is not included in estimate.

DISCLAIMER:

Cost estimates were developed by identifying pay items and establishing rough quantities. Please note that the estimates include approximate costs for asphalt, concrete, drainage improvements, limited utility relocation, pavement markings, signs and traffic signal adjustments. The estimate does not include easement, right-of-way acquisition, construction management, surveying, geotechnical investigation, environmental documentation, special site remediation or the cost for ongoing maintenance. A cost range has been assigned to some general categories such as utility relocations; however, these costs can vary widely depending on the exact details and nature of the work. The overall estimates are intended to be general and used for planning purposes. Construction costs will vary based on the ultimate project scope (i.e. potential combination of projects), schedule, and economic conditions at the time of construction.



**ENGINEER'S OPINION OF PROBABLE COST -
PRELIMINARY DESIGN ESTIMATE**

DESCRIPTION: PRELIMINARY COST FOR PHASE 3 12' TRAIL
PHASE 3 LOCATION: I-20 TO I-26

LOCATION: Lexington Co
ESTIMATE BY: SRL
DATE: 2/11/2021
REVISED:
CHECKED BY: TN

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
A-1	Mobilization	1	LS	\$372,000	\$372,000
A-2	Clearing & Grubbing - Includes all Demolition	1	LS	\$208,000	\$208,000
A-3	Erosion Control	1	LS	\$42,000	\$42,000
B-1	Grading Complete	1	LS	\$851,500	\$851,500
B-2	8' Concrete Trail	600	LF	\$70	\$42,000
B-3	12' Concrete Trail	7915	LF	\$81	\$641,115
B-4	12' Low Boardwalk	600	LF	\$720	\$432,000
B-5	12' High Boardwalk	530	LF	\$900	\$477,000
B-6	12' Wood Bridge	80	LF	\$1,620	\$129,600
B-7	105' Contech-style prefab Bridge	1	LS	\$720,000	\$720,000
C-1	4" Topsoil Placement	130	SY	\$15	\$1,950
C-2	Landscape	1200	SF	\$4	\$4,800
D-1	8" DIP	112	LF	\$90	\$10,080
E-1	Furnish and Install Wayfinding Sign with Support	17	EA	\$810	\$13,770
E-2	Furnish and Install Interpretive Sign with Support	14	EA	\$2,700	\$37,800
E-3	Picnic Table	13	EA	\$2,160	\$28,080
E-4	Bench	17	EA	\$1,350	\$22,950
E-5	Trash Receptacle	20	EA	\$1,350	\$27,000
E-7	Electrical Service	4	LS	\$6,750	\$27,000
Subtotal Items					\$4,088,645
CONSTRUCTION CONTINGENCY				0%	\$0
Total Cost Estimate					\$4,089,000

NOTES:

1. This cost estimate is based on 2019-2020 material/equipment/labor costs and should be adjusted to fit current year if needed.
2. Striping is assumed to be thermoplastic.
3. Estimate does not include construction surveying, engineering, or right-of-way acquisition.
4. Trail lengths calculated using professional judgement during site walks.
5. Trailheads to include parking, signage, trash receptacles, potential restrooms & maintenance sheds.
6. Estimate does not include stormwater treatment or permitting.
7. Typical trail road crossing includes traffic control, signal modifications, curb ramps, signs and pavement marking.
8. Trail, Boardwalk and Bridge estimates include materials and clearing and grubbing through installation.
9. Assume lighting to be leased by Dominion Energy and is not included in estimate.

DISCLAIMER:

Cost estimates were developed by identifying pay items and establishing rough quantities. Please note that the estimates include approximate costs for asphalt, concrete, drainage improvements, limited utility relocation, pavement markings, signs and traffic signal adjustments. The estimate does not include easement, right-of-way acquisition, construction management, surveying, geotechnical investigation, environmental documentation, special site remediation or the cost for ongoing maintenance. A cost range has been assigned to some general categories such as utility relocations; however, these costs can vary widely depending on the exact details and nature of the work. The overall estimates are intended to be general and used for planning purposes. Construction costs will vary based on the ultimate project scope (i.e. potential combination of projects), schedule, and economic conditions at the time of construction.



**ENGINEER'S OPINION OF PROBABLE COST -
PRELIMINARY DESIGN ESTIMATE**

DESCRIPTION: PRELIMINARY COST FOR TYPICAL TYPE 1 TRAILHEAD

LOCATION: Lexington Co
ESTIMATE BY: SRL

TYPE 1 INCLUDES: 60 PARKING SPACES, RESTROOMS,
MAINTENANCE ROOM, TRASH RECEPTACLES,

DATE: 2/11/2021

REVISED:

CHECKED BY: TN

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
	Mobilization	1	LS	\$43,000	\$43,000
	Traffic Control	1	LS	\$10,000	\$10,000
	Clearing & Grubbing	1	LS	\$10,500	\$10,500
	Erosion Control	1	LS	\$2,500	\$2,500
	R&D Asphalt Pavement	250	SY	\$5	\$1,250
	Remove Thermoplastic Striping	75	LF	\$2	\$150
	Remove Pavement Markings	4	EA	\$50	\$200
	Grading Complete	1	LS	\$10,000	\$10,000
	Concrete Curb	200	LF	\$20	\$4,000
	Curb Ramps + Warning Strip	2	EA	\$3,500	\$7,000
	Stamped Concrete	3300	SF	\$20	\$66,000
	12' Concrete Trail	20	LF	\$81	\$1,620
	Concrete Wheel Stop	60	EA	\$45	\$2,700
	Pavement Mill & Overlay	4170	SY	\$30	\$125,100
	Accessible Parking Stall Pavement Marking	3	EA	\$30	\$90
	Thermoplastic Pavement Marking, White (24")	120	LF	\$15	\$1,800
	Thermoplastic Pavement Marking, White (4")	2000	LF	\$2	\$4,000
	4" Topsoil Placement	100	SY	\$15	\$1,500
	Landscape	650	SF	\$4	\$2,600
	Utility Allowance	1	LS	\$10,000	\$10,000
	Signal Modifications	1	LS	\$80,000	\$80,000
	Bollard	4	EA	\$250	\$1,000
	Furnish and Install Interpretative Sign with Support	1	EA	\$2,700	\$2,700
	Furnish and Install Wayfinding Sign with Support	2	EA	\$810	\$1,620
	Furnish and Install Standard Sign with Support	4	EA	\$270	\$1,080
	Picnic Table	2	EA	\$2,160	\$4,320
	Bench	2	EA	\$1,350	\$2,700
	Trash Receptacle	2	EA	\$1,350	\$2,700
	Call Box	1	EA	\$8,100	\$8,100
	Restroom Facility	1	EA	\$50,000	\$50,000
	Maintenance Shed	1	EA	\$10,000	\$10,000
Subtotal Items					\$468,230
CONSTRUCTION CONTINGENCY				0%	\$0
Total Cost Estimate					\$469,000

NOTES:

1. This cost estimate is based on 2019-2020 material/equipment/labor costs and should be adjusted to fit current year if needed.
2. Striping is assumed to be thermoplastic.
3. Estimate does not include construction surveying, engineering, or right-of-way acquisition.
4. Assumption of curbs to be constructed without a pavement sawcut.
5. Estimate does not include stormwater treatment or permitting.
6. Trail, Boardwalk and Bridge estimates include materials and clearing and grubbing through installation.
7. Assume lighting to be leased by Dominion Energy and is not included in estimate.

DISCLAIMER:

Cost estimates were developed by identifying pay items and establishing rough quantities. Please note that the estimates include approximate costs for asphalt, concrete, drainage improvements, limited utility relocation, pavement markings, signs and traffic signal adjustments. The estimate does not include easement, right-of-way acquisition, construction management, surveying, geotechnical investigation, environmental documentation, special site remediation or the cost for ongoing maintenance. A cost range has been assigned to some general categories such as utility relocations; however, these costs can vary widely depending on the exact details and nature of the work. The overall estimates are intended to be general and used for planning purposes. Construction costs will vary based on the ultimate project scope (i.e. potential combination of projects), schedule, and economic conditions at the time of construction.



**ENGINEER'S OPINION OF PROBABLE COST -
PRELIMINARY DESIGN ESTIMATE**

DESCRIPTION: PRELIMINARY COST FOR TYPICAL TYPE 2 TRAILHEAD

LOCATION: Lexington Co

ESTIMATE BY: SRL

TYPE 2 INCLUDES: 30 PARKING SPACES, TRASH RECEPTACLES,

DATE: 2/11/2021

REVISED:

CHECKED BY: TN

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
	Mobilization	1	LS	\$16,000	\$16,000
	Traffic Control	1	LS	\$4,000	\$4,000
	Clearing & Grubbing - Includes all Demolition	1	LS	\$4,000	\$4,000
	Erosion Control	1	LS	\$1,000	\$1,000
	Grading Complete	1	LS	\$5,000	\$5,000
	Curb Ramps + Warning Strip	2	EA	\$3,500	\$7,000
	12' Concrete Trail	20	LF	\$81	\$1,620
	Concrete Wheel Stop	30	EA	\$50	\$1,500
	Pavement Mill & Overlay	2620	SY	\$30	\$78,600
	Accessible Parking Stall Pavement Marking	2	EA	\$30	\$60
	8" DIP	0	LF	\$90	\$0
	Utility Allowance	1	LS	\$5,000	\$5,000
	Signal Modifications	1	LS	\$40,000	\$40,000
	Furnish and Install Wayfinding Sign with Support	1	EA	\$810	\$810
	Furnish and Install Standard Sign with Support	3	EA	\$270	\$810
	Trash Receptacle	1	EA	\$1,350	\$1,350
	Call Box	1	EA	\$8,100	\$8,100
Subtotal Items					\$174,850
CONSTRUCTION CONTINGENCY				0%	\$0
Total Cost Estimate					\$175,000

NOTES:

1. This cost estimate is based on 2019-2020 material/equipment/labor costs and should be adjusted to fit current year if needed.
2. Striping is assumed to be thermoplastic.
3. Estimate does not include construction surveying, engineering, or right-of-way acquisition.
4. Assumption of curbs to be constructed without a pavement sawcut.
5. Estimate does not include stormwater treatment or permitting.
6. Trail, Boardwalk and Bridge estimates include materials and clearing and grubbing through installation.
7. Assume lighting to be leased by Dominion Energy and is not included in estimate.

DISCLAIMER:

Cost estimates were developed by identifying pay items and establishing rough quantities. Please note that the estimates include approximate costs for asphalt, concrete, drainage improvements, limited utility relocation, pavement markings, signs and traffic signal adjustments. The estimate does not include easement, right-of-way acquisition, construction management, surveying, geotechnical investigation, environmental documentation, special site remediation or the cost for ongoing maintenance. A cost range has been assigned to some general categories such as utility relocations; however, these costs can vary widely depending on the exact details and nature of the work. The overall estimates are intended to be general and used for planning purposes. Construction costs will vary based on the ultimate project scope (i.e. potential combination of projects), schedule, and economic conditions at the time of construction.



**ENGINEER'S OPINION OF PROBABLE COST -
PRELIMINARY DESIGN ESTIMATE**

DESCRIPTION: PRELIMINARY COST FOR THE AT GRADE CROSSINGS AT SC 6 AND SC 60

LOCATION: Lexington Co
ESTIMATE BY: SRL
DATE: 2/11/2021
REVISED:
CHECKED BY: TN

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
A-1	Mobilization	1	LS	\$21,500	\$21,500
A-2	Traffic Control	1	LS	\$10,000	\$10,000
A-3	Clearing & Grubbing	1	LS	\$5,000	\$5,000
A-4	Erosion Control	1	LS	\$1,000	\$1,000
B-1	R&D Asphalt Pavement	500	SY	\$5	\$2,500
B-2	R&D Existing Curb and Gutter	300	LF	\$5	\$1,500
B-3	R&D Concrete Walks	900	SF	\$2	\$1,800
B-4	Adjust Utility Box and Cover to Grade	4	EA	\$600	\$2,400
B-5	Remove Thermoplastic Striping	400	LF	\$2	\$800
B-6	Remove Pavement Markings	2	EA	\$50	\$100
C-1	Concrete Curb & Gutter (1'-6") Vertical Face	350	LF	\$25	\$8,750
C-2	Concrete Curb	210	LF	\$20	\$4,200
C-3	Raised Crosswalk	2	EA	\$20,000	\$40,000
C-4	Detectable Warning	150	SF	\$30	\$4,500
C-5	Concrete Sidewalk (4" Uniform)	500	SY	\$65	\$32,500
C-6	Curb Ramps + Warning Strip	12	EA	\$2,000	\$24,000
C-7	Thermoplastic Pavement Marking (ARROW)	1	EA	\$350	\$350
C-8	Thermoplastic Pavement Marking, White (24")	1000	LF	\$15	\$15,000
D-1	Furnish and Install Sign with Support	5	EA	\$300	\$1,500
D-2	Remove & Reset Existing Sign	5	EA	\$125	\$625
D-3	Landscape	1250	SF	\$4	\$5,000
D-4	Utility Allowance	1	LS	\$10,000	\$10,000
D-5	Signal Modifications	1	LS	\$40,000	\$40,000
Subtotal Items					\$233,025
CONSTRUCTION CONTINGENCY				0%	\$0
Total Cost Estimate					\$234,000

NOTES:

1. This cost estimate is based on 2019-2020 material/equipment/labor costs and should be adjusted to fit current year if needed.
2. Striping is assumed to be thermoplastic.
3. Estimate does not include construction surveying, engineering, or right-of-way acquisition.
4. Raised crossing includes pavement, markings & associated drainage.
5. Assumption of curbs to be constructed without a pavement sawcut.
6. Estimate does not include stormwater treatment or permitting.
7. Signal modifications expected to include pedestrian signals with push buttons that meet accessibility guidelines.
8. Assume lighting to be leased by Dominion Energy and is not included in estimate.

DISCLAIMER:

Cost estimates were developed by identifying pay items and establishing rough quantities. Please note that the estimates include approximate costs for asphalt, concrete, drainage improvements, limited utility relocation, pavement markings, signs and traffic signal adjustments. The estimate does not include easement, right-of-way acquisition, construction management, surveying, geotechnical investigation, environmental documentation, special site remediation or the cost for ongoing maintenance. A cost range has been assigned to some general categories such as utility relocations; however, these costs can vary widely depending on the exact details and nature of the work. The overall estimates are intended to be general and used for planning purposes. Construction costs will vary based on the ultimate project scope (i.e. potential combination of projects), schedule, and economic conditions at the time of construction



**ENGINEER'S OPINION OF PROBABLE COST -
PRELIMINARY DESIGN ESTIMATE**

DESCRIPTION: PRELIMINARY COST FOR TYPICAL UNCONTROLLED RAILROAD CROSSING

LOCATION: Lexington Co.
ESTIMATE BY: SRL
DATE: 2/11/2021
REVISED:
CHECKED BY: TN

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
A-1	Mobilization	1	LS	\$5,500	\$5,500
A-2	Clearing & Grubbing - Includes all Demolition	1	LS	\$3,000	\$3,000
A-3	Erosion Control	1	LS	\$1,000	\$1,000
B-1	Grading Complete	1	LS	\$15,000	\$15,000
B-2	Curb Ramps + Warning Strip	2	EA	\$3,500	\$7,000
B-3	Rail Concrete Panel and Crossing Improvements	20	TF	\$500	\$10,000
B-4	12' Asphalt Trail	50	LF	\$68	\$3,375
B-5	12' Concrete Trail	100	LF	\$81	\$8,100
C-1	Furnish and Install Sign with Support	4	EA	\$750	\$3,000
Subtotal Items					\$55,975
CONSTRUCTION CONTINGENCY				0%	\$0
Total Cost Estimate					\$56,000

NOTES:

1. This cost estimate is based on 2019-2020 material/equipment/labor costs and should be adjusted to fit current year if needed.
3. Estimate does not include construction surveying, engineering, or right-of-way acquisition.
4. Assumption of curbs to be constructed without a pavement sawcut.
5. Estimate does not include stormwater treatment or permitting.
6. Estimate does not include utility or drainage work.
7. Estimate does not include railroad coordination or pedestrian scale crossing control.
8. Trail, Boardwalk and Bridge estimates include materials and clearing and grubbing through installation.
9. Assume lighting to be leased by Dominion Energy and is not included in estimate.

DISCLAIMER:

Cost estimates were developed by identifying pay items and establishing rough quantities. Please note that the estimates include approximate costs for asphalt, concrete, drainage improvements, limited utility relocation, pavement markings, signs and traffic signal adjustments. The estimate does not include easement, right-of-way acquisition, construction management, surveying, geotechnical investigation, environmental documentation, special site remediation or the cost for ongoing maintenance. A cost range has been assigned to some general categories such as utility relocations; however, these costs can vary widely depending on the exact details and nature of the work. The overall estimates are intended to be general and used for planning purposes. Construction costs will vary based on the ultimate project scope (i.e. potential combination of projects), schedule, and economic conditions at the time of construction.

OPINIONS OF PROBABLE COST
14-Foot Wide Trail



**ENGINEER'S OPINION OF PROBABLE COST -
PRELIMINARY DESIGN ESTIMATE**

DESCRIPTION: PRELIMINARY COST FOR PHASE 1 14' TRAIL
PHASE 1 LOCATION: LAKE MURRAY DAM TO SALUDA SHOALS PARK

LOCATION: Lexington Co
ESTIMATE BY: SRL
DATE: 2/11/2021
REVISED:
CHECKED BY: TN

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
A-1	Mobilization	1	LS	\$363,500	\$363,500
A-2	Clearing & Grubbing - Includes all Demolition	1	LS	\$203,500	\$203,500
A-3	Erosion Control	1	LS	\$41,000	\$41,000
B-1	Grading Complete	1	LS	\$1,289,500	\$1,289,500
B-2	14' Concrete Trail	12895	LF	\$117	\$1,508,715
B-3	14' Low Boardwalk	225	LF	\$810	\$182,250
B-4	14' Wood Bridge	40	LF	\$1,980	\$79,200
C-1	4" Topsoil Placement	2200	SY	\$15	\$33,000
C-2	Landscape	19400	SF	\$4	\$77,600
D-1	8" DIP	160	LF	\$90	\$14,400
E-1	Furnish and Install Wayfinding Sign with Support	23	EA	\$810	\$18,630
E-2	Furnish and Install Interpretive Sign with Support	19	EA	\$2,700	\$51,300
E-3	Picnic Table	18	EA	\$2,160	\$38,880
E-4	Bench	23	EA	\$1,350	\$31,050
E-5	Trash Receptacle	27	EA	\$1,350	\$36,450
E-6	Electrical Service	4	LS	\$6,750	\$27,000
Subtotal Items					\$3,995,975
CONSTRUCTION CONTINGENCY				0%	\$0
Total Cost Estimate					\$3,996,000

NOTES:

1. This cost estimate is based on 2019-2020 material/equipment/labor costs and should be adjusted to fit current year if needed.
2. Striping is assumed to be thermoplastic.
3. Estimate does not include construction surveying, engineering, or right-of-way acquisition.
4. Trail lengths calculated using professional judgement during site walks
5. Trailheads to include parking, signage, trash receptacles, potential restrooms & maintenance sheds
6. Estimate does not include stormwater treatment or permitting.
7. Typical trail road crossing includes traffic control, signal modifications, curb ramps, signs and pavement marking.
8. Trail, Boardwalk and Bridge estimates include materials and clearing and grubbing through installation.
9. Assume lighting to be leased by Dominion Energy and is not included in estimate.

DISCLAIMER:

Cost estimates were developed by identifying pay items and establishing rough quantities. Please note that the estimates include approximate costs for asphalt, concrete, drainage improvements, limited utility relocation, pavement markings, signs and traffic signal adjustments. The estimate does not include easement, right-of-way acquisition, construction management, surveying, geotechnical investigation, environmental documentation, special site remediation or the cost for ongoing maintenance. A cost range has been assigned to some general categories such as utility relocations; however, these costs can vary widely depending on the exact details and nature of the work. The overall estimates are intended to be general and used for planning purposes. Construction costs will vary based on the ultimate project scope (i.e. potential combination of projects), schedule, and economic conditions at the time of construction.



**ENGINEER'S OPINION OF PROBABLE COST -
PRELIMINARY DESIGN ESTIMATE**

DESCRIPTION: PRELIMINARY COST FOR PHASE 2 14' TRAIL
PHASE 2 LOCATION: SALUDA SHOALS PARK TO I-20

LOCATION: Lexington Co
ESTIMATE BY: SRL
DATE: 2/11/2021
REVISED:
CHECKED BY: TN

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
A-1	Mobilization	1	LS	\$574,000	\$574,000
A-2	Clearing & Grubbing - Includes all Demolition	1	LS	\$321,000	\$321,000
A-3	Erosion Control	1	LS	\$64,500	\$64,500
B-1	Grading Complete	1	LS	\$1,154,000	\$1,154,000
B-2	14' Concrete Trail	11540	LF	\$117	\$1,350,180
B-3	14' Low Boardwalk	850	LF	\$810	\$688,500
B-4	14' High Boardwalk	930	LF	\$1,080	\$1,004,400
B-5	14' Wood Bridge	100	LF	\$1,980	\$198,000
B-6	105' Contech-style prefab Bridge	1	LS	\$720,000	\$720,000
C-1	4" Topsoil Placement	230	SY	\$15	\$3,450
C-2	Landscape	2100	SF	\$4	\$8,400
D-1	8" DIP	165	LF	\$90	\$14,850
E-1	Furnish and Install Wayfinding Sign with Support	24	EA	\$810	\$19,440
E-2	Furnish and Install Interpretive Sign with Support	20	EA	\$2,700	\$54,000
E-3	Picnic Table	18	EA	\$2,160	\$38,880
E-4	Bench	24	EA	\$1,350	\$32,400
E-5	Trash Receptacle	27	EA	\$1,350	\$36,450
E-6	Electrical Service	4	LS	\$6,750	\$27,000
Subtotal Items					\$6,309,450
CONSTRUCTION CONTINGENCY				0%	\$0
Total Cost Estimate					\$6,310,000

NOTES:

1. This cost estimate is based on 2019-2020 material/equipment/labor costs and should be adjusted to fit current year if needed.
2. Striping is assumed to be thermoplastic.
3. Estimate does not include construction surveying, engineering, or right-of-way acquisition.
4. Trail lengths calculated using professional judgement during site walks
5. Trailheads to include parking, signage, trash receptacles, potential restrooms & maintenance sheds
6. Estimate does not include stormwater treatment or permitting.
7. Typical trail road crossing includes traffic control, signal modifications, curb ramps, signs and pavement marking.
8. Trail, Boardwalk and Bridge estimates include materials and clearing and grubbing through installation.
9. Assume lighting to be leased by Dominion Energy and is not included in estimate.

DISCLAIMER:

Cost estimates were developed by identifying pay items and establishing rough quantities. Please note that the estimates include approximate costs for asphalt, concrete, drainage improvements, limited utility relocation, pavement markings, signs and traffic signal adjustments. The estimate does not include easement, right-of-way acquisition, construction management, surveying, geotechnical investigation, environmental documentation, special site remediation or the cost for ongoing maintenance. A cost range has been assigned to some general categories such as utility relocations; however, these costs can vary widely depending on the exact details and nature of the work. The overall estimates are intended to be general and used for planning purposes. Construction costs will vary based on the ultimate project scope (i.e. potential combination of projects), schedule, and economic conditions at the time of construction.



**ENGINEER'S OPINION OF PROBABLE COST -
PRELIMINARY DESIGN ESTIMATE**

DESCRIPTION: PRELIMINARY COST FOR PHASE 3 14' TRAIL
PHASE 3 LOCATION: I-20 TO I-26

LOCATION: Lexington Co
ESTIMATE BY: SRL
DATE: 2/11/2021
REVISED:
CHECKED BY: TN

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
A-1	Mobilization	1	LS	\$421,500	\$421,500
A-2	Clearing & Grubbing - Includes all Demolition	1	LS	\$236,000	\$236,000
A-3	Erosion Control	1	LS	\$47,500	\$47,500
B-1	Grading Complete	1	LS	\$851,500	\$851,500
B-2	8' Concrete Trail	600	LF	\$70	\$42,000
B-3	14' Concrete Trail	7915	LF	\$117	\$926,055
B-4	14' Low Boardwalk	600	LF	\$810	\$486,000
B-5	14' High Boardwalk	530	LF	\$1,080	\$572,400
B-6	14' Wood Bridge	80	LF	\$1,980	\$158,400
B-7	105' Contech-style prefab Bridge	1	LS	\$720,000	\$720,000
C-1	4" Topsoil Placement	130	SY	\$15	\$1,950
C-2	Landscape	1200	SF	\$4	\$4,800
D-1	8" DIP	112	LF	\$90	\$10,080
E-1	Furnish and Install Wayfinding Sign with Support	17	EA	\$810	\$13,770
E-2	Furnish and Install Interpretive Sign with Support	14	EA	\$2,700	\$37,800
E-3	Picnic Table	13	EA	\$2,160	\$28,080
E-4	Bench	17	EA	\$1,350	\$22,950
E-5	Trash Receptacle	20	EA	\$1,350	\$27,000
E-7	Electrical Service	4	LS	\$6,750	\$27,000
Subtotal Items					\$4,634,785
CONSTRUCTION CONTINGENCY				0%	\$0
Total Cost Estimate					\$4,635,000

NOTES:

1. This cost estimate is based on 2019-2020 material/equipment/labor costs and should be adjusted to fit current year if needed.
2. Striping is assumed to be thermoplastic.
3. Estimate does not include construction surveying, engineering, or right-of-way acquisition.
4. Trail lengths calculated using professional judgement during site walks.
5. Trailheads to include parking, signage, trash receptacles, potential restrooms & maintenance sheds.
6. Estimate does not include stormwater treatment or permitting.
7. Typical trail road crossing includes traffic control, signal modifications, curb ramps, signs and pavement marking.
8. Trail, Boardwalk and Bridge estimates include materials and clearing and grubbing through installation.
9. Assume lighting to be leased by Dominion Energy and is not included in estimate.

DISCLAIMER:

Cost estimates were developed by identifying pay items and establishing rough quantities. Please note that the estimates include approximate costs for asphalt, concrete, drainage improvements, limited utility relocation, pavement markings, signs and traffic signal adjustments. The estimate does not include easement, right-of-way acquisition, construction management, surveying, geotechnical investigation, environmental documentation, special site remediation or the cost for ongoing maintenance. A cost range has been assigned to some general categories such as utility relocations; however, these costs can vary widely depending on the exact details and nature of the work. The overall estimates are intended to be general and used for planning purposes. Construction costs will vary based on the ultimate project scope (i.e. potential combination of projects), schedule, and economic conditions at the time of construction.



**ENGINEER'S OPINION OF PROBABLE COST -
PRELIMINARY DESIGN ESTIMATE**

DESCRIPTION: PRELIMINARY COST FOR TYPICAL TYPE 1 TRAILHEAD

LOCATION: Lexington Co
ESTIMATE BY: SRL

TYPE 1 INCLUDES: 60 PARKING SPACES, RESTROOMS, MAINTENANCE ROOM,
TRASH RECEPTACLES,

DATE: 2/11/2021

REVISED:

CHECKED BY: TN

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
	Mobilization	1	LS	\$43,000	\$43,000
	Traffic Control	1	LS	\$10,000	\$10,000
	Clearing & Grubbing	1	LS	\$10,500	\$10,500
	Erosion Control	1	LS	\$2,500	\$2,500
	R&D Asphalt Pavement	250	SY	\$5	\$1,250
	Remove Thermoplastic Striping	75	LF	\$2	\$150
	Remove Pavement Markings	4	EA	\$50	\$200
	Grading Complete	1	LS	\$10,000	\$10,000
	Concrete Curb	200	LF	\$20	\$4,000
	Curb Ramps + Warning Strip	2	EA	\$4,000	\$8,000
	Stamped Concrete	3300	SF	\$20	\$66,000
	14' Concrete Trail	20	LF	\$117	\$2,340
	Concrete Wheel Stop	60	EA	\$45	\$2,700
	Pavement Mill & Overlay	4170	SY	\$30	\$125,100
	Accessible Parking Stall Pavement Marking	3	EA	\$30	\$90
	Thermoplastic Pavement Marking, White (24")	140	LF	\$15	\$2,100
	Thermoplastic Pavement Marking, White (4")	2000	LF	\$2	\$4,000
	4" Topsoil Placement	100	SY	\$15	\$1,500
	Landscape	650	SF	\$4	\$2,600
	Utility Allowance	1	LS	\$10,000	\$10,000
	Signal Modifications	1	LS	\$80,000	\$80,000
	Bollard	4	EA	\$250	\$1,000
	Furnish and Install Interpretative Sign with Support	1	EA	\$2,700	\$2,700
	Furnish and Install Wayfinding Sign with Support	2	EA	\$810	\$1,620
	Furnish and Install Standard Sign with Support	4	EA	\$270	\$1,080
	Picnic Table	2	EA	\$2,160	\$4,320
	Bench	2	EA	\$1,350	\$2,700
	Trash Receptacle	2	EA	\$1,350	\$2,700
	Call Box	1	EA	\$8,100	\$8,100
	Restroom Facility	1	EA	\$50,000	\$50,000
	Maintenance Shed	1	EA	\$10,000	\$10,000
Subtotal Items					\$470,250
CONSTRUCTION CONTINGENCY				0%	\$0
Total Cost Estimate					\$471,000

NOTES:

1. This cost estimate is based on 2019-2020 material/equipment/labor costs and should be adjusted to fit current year if needed.
2. Striping is assumed to be thermoplastic.
3. Estimate does not include construction surveying, engineering, or right-of-way acquisition.
4. Assumption of curbs to be constructed without a pavement sawcut.
5. Estimate does not include stormwater treatment or permitting.
6. Trail, Boardwalk and Bridge estimates include materials and clearing and grubbing through installation.
7. Assume lighting to be leased by Dominion Energy and is not included in estimate.

DISCLAIMER:

Cost estimates were developed by identifying pay items and establishing rough quantities. Please note that the estimates include approximate costs for asphalt, concrete, drainage improvements, limited utility relocation, pavement markings, signs and traffic signal adjustments. The estimate does not include easement, right-of-way acquisition, construction management, surveying, geotechnical investigation, environmental documentation, special site remediation or the cost for ongoing maintenance. A cost range has been assigned to some general categories such as utility relocations; however, these costs can vary widely depending on the exact details and nature of the work. The overall estimates are intended to be general and used for planning purposes. Construction costs will vary based on the ultimate project scope (i.e. potential combination of projects), schedule, and economic conditions at the time of construction.



**ENGINEER'S OPINION OF PROBABLE COST -
PRELIMINARY DESIGN ESTIMATE**

DESCRIPTION: PRELIMINARY COST FOR TYPICAL TYPE 2 TRAILHEAD

LOCATION: Lexington Co

TYPE 2 INCLUDES: 30 PARKING SPACES, TRASH RECEPTACLES,

ESTIMATE BY: SRL

DATE: 2/11/2021

REVISED:

CHECKED BY: TN

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
	Mobilization	1	LS	\$16,500	\$16,500
	Traffic Control	1	LS	\$4,000	\$4,000
	Clearing & Grubbing - Includes all Demolition	1	LS	\$4,000	\$4,000
	Erosion Control	1	LS	\$1,000	\$1,000
	Grading Complete	1	LS	\$5,000	\$5,000
	Curb Ramps + Warning Strip	2	EA	\$4,000	\$8,000
	14' Concrete Trail	20	LF	\$117	\$2,340
	Concrete Wheel Stop	30	EA	\$50	\$1,500
	Pavement Mill & Overlay	2620	SY	\$30	\$78,600
	Accessible Parking Stall Pavement Marking	2	EA	\$30	\$60
	8" DIP	0	LF	\$90	\$0
	Utility Allowance	1	LS	\$5,000	\$5,000
	Signal Modifications	1	LS	\$40,000	\$40,000
	Furnish and Install Wayfinding Sign with Support	1	EA	\$810	\$810
	Furnish and Install Standard Sign with Support	3	EA	\$270	\$810
	Trash Receptacle	1	EA	\$1,350	\$1,350
	Call Box	1	EA	\$8,100	\$8,100
Subtotal Items					\$177,070
CONSTRUCTION CONTINGENCY				0%	\$0
Total Cost Estimate					\$178,000

NOTES:

1. This cost estimate is based on 2019-2020 material/equipment/labor costs and should be adjusted to fit current year if needed.
2. Striping is assumed to be thermoplastic.
3. Estimate does not include construction surveying, engineering, or right-of-way acquisition.
4. Assumption of curbs to be constructed without a pavement sawcut.
5. Estimate does not include stormwater treatment or permitting.
6. Trail, Boardwalk and Bridge estimates include materials and clearing and grubbing through installation.
7. Assume lighting to be leased by Dominion Energy and is not included in estimate.

DISCLAIMER:

Cost estimates were developed by identifying pay items and establishing rough quantities. Please note that the estimates include approximate costs for asphalt, concrete, drainage improvements, limited utility relocation, pavement markings, signs and traffic signal adjustments. The estimate does not include easement, right-of-way acquisition, construction management, surveying, geotechnical investigation, environmental documentation, special site remediation or the cost for ongoing maintenance. A cost range has been assigned to some general categories such as utility relocations; however, these costs can vary widely depending on the exact details and nature of the work. The overall estimates are intended to be general and used for planning purposes. Construction costs will vary based on the ultimate project scope (i.e. potential combination of projects), schedule, and economic conditions at the time of construction.



**ENGINEER'S OPINION OF PROBABLE COST -
PRELIMINARY DESIGN ESTIMATE**

DESCRIPTION: PRELIMINARY COST FOR THE AT GRADE CROSSINGS AT SC 6 AND SC 60

LOCATION: Lexington Co
ESTIMATE BY: SRL
DATE: 2/11/2021
REVISED:
CHECKED BY: TN

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
A-1	Mobilization	1	LS	\$21,500	\$21,500
A-2	Traffic Control	1	LS	\$10,000	\$10,000
A-3	Clearing & Grubbing	1	LS	\$5,000	\$5,000
A-4	Erosion Control	1	LS	\$1,000	\$1,000
B-1	R&D Asphalt Pavement	500	SY	\$5	\$2,500
B-2	R&D Existing Curb and Gutter	300	LF	\$5	\$1,500
B-3	R&D Concrete Walks	900	SF	\$2	\$1,800
B-4	Adjust Utility Box and Cover to Grade	4	EA	\$600	\$2,400
B-5	Remove Thermoplastic Striping	400	LF	\$2	\$800
B-6	Remove Pavement Markings	2	EA	\$50	\$100
C-1	Concrete Curb & Gutter (1'-6") Vertical Face	350	LF	\$25	\$8,750
C-2	Concrete Curb	210	LF	\$20	\$4,200
C-3	Raised Crosswalk	2	EA	\$20,000	\$40,000
C-4	Detectable Warning	150	SF	\$30	\$4,500
C-5	Concrete Sidewalk (4" Uniform)	500	SY	\$65	\$32,500
C-6	Curb Ramps + Warning Strip	12	EA	\$2,000	\$24,000
C-7	Thermoplastic Pavement Marking (ARROW)	1	EA	\$350	\$350
C-8	Thermoplastic Pavement Marking, White (24")	1000	LF	\$15	\$15,000
D-1	Furnish and Install Sign with Support	5	EA	\$300	\$1,500
D-2	Remove & Reset Existing Sign	5	EA	\$125	\$625
D-3	Landscape	1250	SF	\$4	\$5,000
D-4	Utility Allowance	1	LS	\$10,000	\$10,000
D-5	Signal Modifications	1	LS	\$40,000	\$40,000
Subtotal Items					\$233,025
CONSTRUCTION CONTINGENCY				0%	\$0
Total Cost Estimate					\$234,000

NOTES:

1. This cost estimate is based on 2019-2020 material/equipment/labor costs and should be adjusted to fit current year if needed.
2. Striping is assumed to be thermoplastic.
3. Estimate does not include construction surveying, engineering, or right-of-way acquisition.
4. Raised crossing includes pavement, markings & associated drainage.
5. Assumption of curbs to be constructed without a pavement sawcut.
6. Estimate does not include stormwater treatment or permitting.
7. Signal modifications expected to include pedestrian signals with push buttons that meet accessibility guidelines.
8. Assume lighting to be leased by Dominion Energy and is not included in estimate.

DISCLAIMER:

Cost estimates were developed by identifying pay items and establishing rough quantities. Please note that the estimates include approximate costs for asphalt, concrete, drainage improvements, limited utility relocation, pavement markings, signs and traffic signal adjustments. The estimate does not include easement, right-of-way acquisition, construction management, surveying, geotechnical investigation, environmental documentation, special site remediation or the cost for ongoing maintenance. A cost range has been assigned to some general categories such as utility relocations; however, these costs can vary widely depending on the exact details and nature of the work. The overall estimates are intended to be general and used for planning purposes. Construction costs will vary based on the ultimate project scope (i.e. potential combination of projects), schedule, and economic conditions at the time of construction



**ENGINEER'S OPINION OF PROBABLE COST -
PRELIMINARY DESIGN ESTIMATE**

DESCRIPTION: PRELIMINARY COST FOR TYPICAL UNCONTROLLED RAILROAD CROSSING

LOCATION: Lexington Co.
ESTIMATE BY: SRL
DATE: 2/11/2021
REVISED:
CHECKED BY: TN

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
A-1	Mobilization	1	LS	\$6,000	\$6,000
A-2	Clearing & Grubbing - Includes all Demolition	1	LS	\$3,500	\$3,500
A-3	Erosion Control	1	LS	\$1,000	\$1,000
B-1	Grading Complete	1	LS	\$15,000	\$15,000
B-2	Curb Ramps + Warning Strip	2	EA	\$4,000	\$8,000
B-3	Rail Concrete Panel and Crossing Improvements	20	TF	\$500	\$10,000
B-4	14' Asphalt Trail	50	LF	\$90	\$4,500
B-5	14' Concrete Trail	100	LF	\$117	\$11,700
C-1	Furnish and Install Sign with Support	4	EA	\$750	\$3,000
Subtotal Items					\$62,700
CONSTRUCTION CONTINGENCY				0%	\$0
Total Cost Estimate					\$63,000

NOTES:

1. This cost estimate is based on 2019-2020 material/equipment/labor costs and should be adjusted to fit current year if needed.
3. Estimate does not include construction surveying, engineering, or right-of-way acquisition.
4. Assumption of curbs to be constructed without a pavement sawcut.
5. Estimate does not include stormwater treatment or permitting.
6. Estimate does not include utility or drainage work.
7. Estimate does not include railroad coordination or pedestrian scale crossing control.
8. Trail, Boardwalk and Bridge estimates include materials and clearing and grubbing through installation.
9. Assume lighting to be leased by Dominion Energy and is not included in estimate.

DISCLAIMER:

Cost estimates were developed by identifying pay items and establishing rough quantities. Please note that the estimates include approximate costs for asphalt, concrete, drainage improvements, limited utility relocation, pavement markings, signs and traffic signal adjustments. The estimate does not include easement, right-of-way acquisition, construction management, surveying, geotechnical investigation, environmental documentation, special site remediation or the cost for ongoing maintenance. A cost range has been assigned to some general categories such as utility relocations; however, these costs can vary widely depending on the exact details and nature of the work. The overall estimates are intended to be general and used for planning purposes. Construction costs will vary based on the ultimate project scope (i.e. potential combination of projects), schedule, and economic conditions at the time of construction.

