

Buncombe County, NC

NC 251 / Riverside Drive Greenway Feasibility Study

AECOM



Acknowledgments

Buncombe County Recreation Services

Josh O’Conner, Department Director

Karla Furnari, Greenway Planner

Steering Committee

Lucy Crown, City of Asheville

Stephanie Monson-Dahl, City of Asheville

Kirstina Solberg, NCDOT Division 13

Ricky Tipton, NCDOT Division 13

Lyuba Zuyeva, French Broad River MPO

Consultant Team

AECOM Technical Services of North Carolina

Table of Contents

1. Introduction	6
1.1 Overview of Study Area	6
1.2 Purpose and Methodology	8
1.3 Existing Plans	9
2. Design Considerations	12
2.1 Natural Environment	12
2.2 Human Environment	14
2.3 Design Criteria and Exceptions	20
3. Alignment Alternatives	22
3.1 Segment Descriptions	22
4. Public Involvement	30
4.1 Steering Committee Meeting #1	30
4.2 Steering Committee Meeting #2	31
4.3 Greenway Segment Evaluation	32
5. Proposed Alternatives	36
5.1 Purple-Orange Alternative	36
5.2 Green-Blue Alternative	38
5.3 Coordination Opportunities	39
6. Conclusion and Next Steps	40
Sources	41

Figures

Figure 1	Study Area	7
Figure 2	Planning Process Diagram	8
Figure 3	Riverside Drive North Concepts - Wilma Dykeman Riverway Master Plan	9
Figure 4	Greenways Map - Asheville in Motion Mobility Plan	10
Figure 5	Corridor Maps - Buncombe County Greenways and Trails Master Plan	11
Figure 6	Project Design Considerations	16
Figure 7	Alternative Segments Map	24
Figure 8	Alternative Green Typical Section	26
Figure 9	Alternative Purple Typical Section	26
Figure 10	Alternative Blue Typical Section	27
Figure 11	Alternative Orange Typical Section	27
Figure 12	Alternative Pink Typical Section	28

Tables

Table 1	Landfill and Hazardous Materials	18
Table 2	Multipurpose Recreational Trail Design Criteria.....	20
Table 3	Segment Description	23
Table 4	Segment Analysis Matrix	32
Table 5	Opinion of Probable Cost by Segment	34
Table 6	Cost Component for Purple-Orange Alternative.....	38
Table 7	Cost Component for Green-Blue Alternative w/ Optional Loop.....	39

Chapter 1

Introduction

1.1 - Overview

This feasibility study examines the opportunities and constraints of constructing a greenway of approximately one mile that runs parallel to the French Broad River and Riverside Drive in the City of Asheville, Buncombe County. The limits of the study area of this greenway, referred to as the Riverside Drive Greenway within this document, include the French Broad River to the west, I-26 to the east, Broadway Street to the north, and Hill Street to the south (**Figure 1**). Buncombe County Recreation Services is leading this feasibility study for the Riverside Drive Greenway with AECOM providing technical support.



View of French Broad River from Study Area

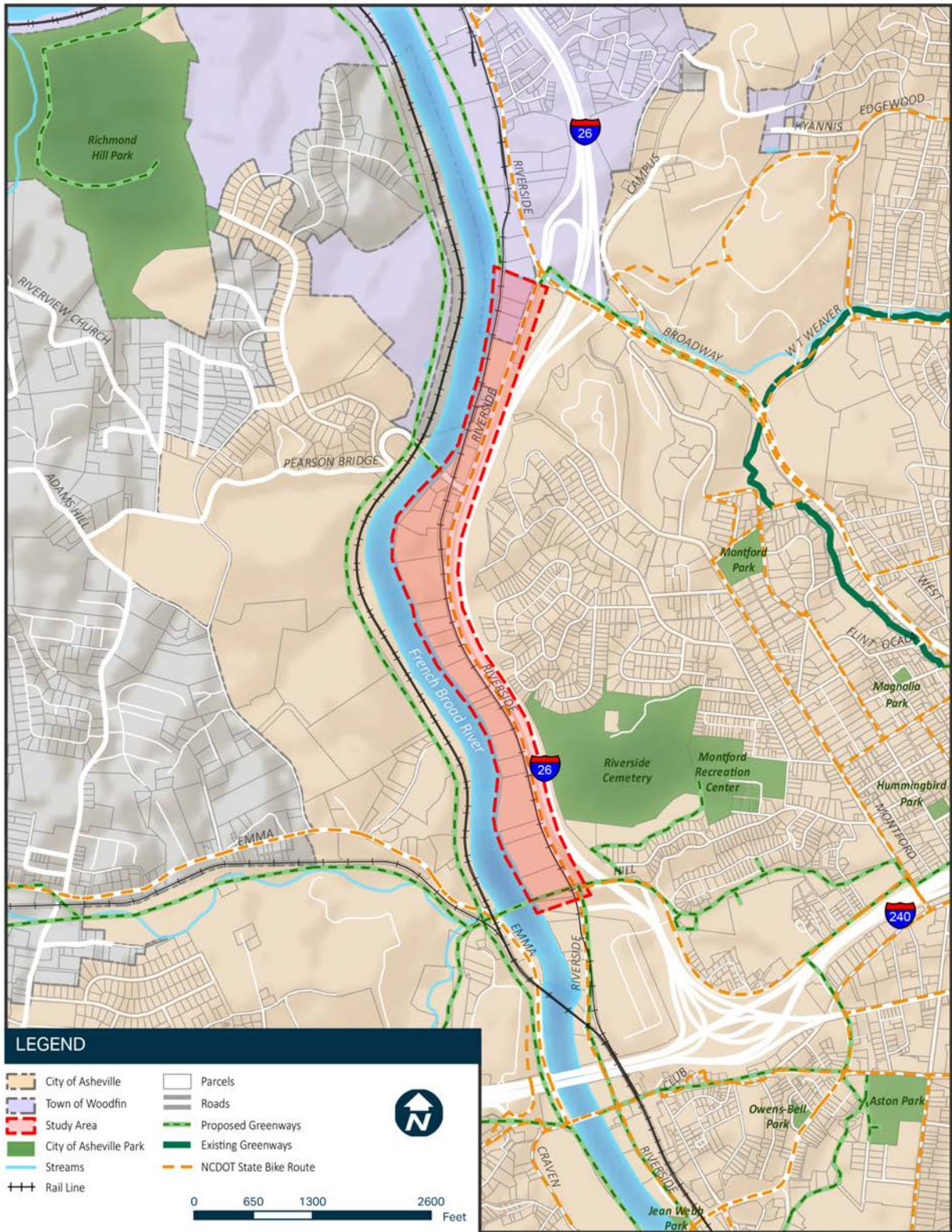


Figure 1 Study Area

1.2 - Purpose and Methodology

This feasibility study examines a multi-use/multi-modal, paved greenway that would provide a vital protected bicycle and pedestrian connection between Broadway Street and Hill Street, completing an important segment in the greenway system. Since greenway facilities and other pedestrian accommodations are planned for the areas north and south of the study area along the French Broad River, as well as along Broadway Street and Hill Street, this project will be examining alternatives that provide connections between these adjacent facilities. This feasibility study considers existing plans addressing the Riverside Drive Greenway study area and how the natural and human environments determine the design opportunities and constraints for greenway alignment alternatives.

A steering committee was formed of area stakeholders that included representatives from Buncombe County, the City of Asheville, the French Broad River Metropolitan Planning Organization, and the North Carolina Department of Transportation (NCDOT) Division 13. As part of this feasibility study, two meetings were held with the steering committee to gather input and feedback.

The feasibility study is a product of known factors and assumptions at the time the assessments were completed. The feasibility study does not represent an absolute plan or intent to proceed with the project, but does create the foundation for future efforts and serves as reference for decision makers. Changes within the project environment including transitions in land ownership, permitting requirements, etc. will result in divergence from the presented study.

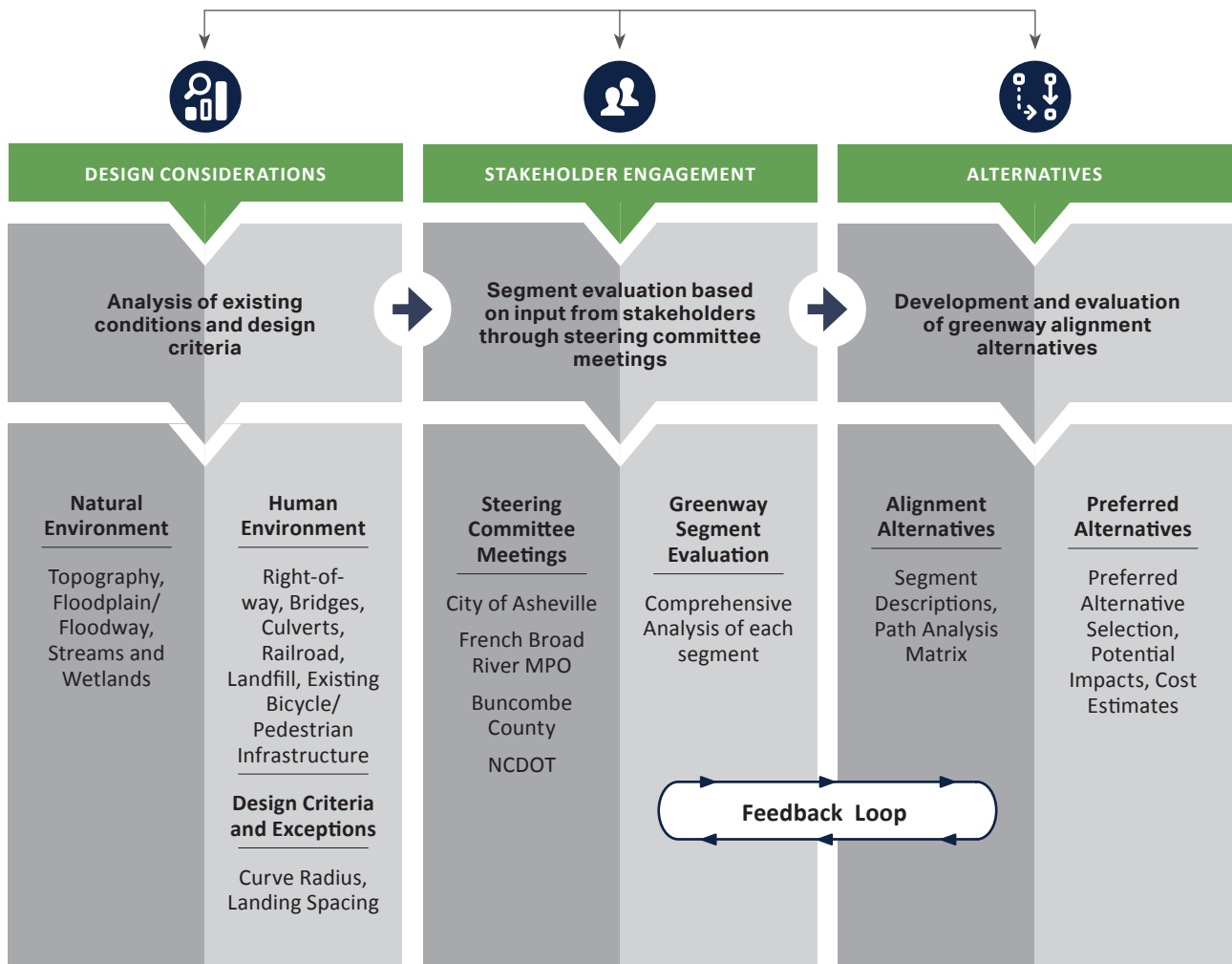


Figure 2 Planning Process Diagram

The Buncombe County Greenways and Trails Master Plan encompasses eight corridors throughout Buncombe County, one of which is the Wilma Dykeman RiverWay Corridor. Using the *Wilma Dykeman RiverWay Master Plan* as a foundation, the *Buncombe County Greenways and Trails Master Plan* encourages a greenway system across Buncombe County, including the greenway along Riverside Drive, which provides destinations for a variety of users, such as bicyclists, pedestrians walking for leisure and exercise, and those with disabilities. This plan envisions greenways throughout Buncombe County, providing well-maintained facilities to offer educational and safe opportunities to contribute to local economies and overall public health. The Wilma Dykeman RiverWay Corridor provides access to the following locations:

- Downtown Asheville
- River Arts District
- Biltmore Village
- Biltmore Estate
- University of North Carolina at Asheville and Asheville-Buncombe Technical Community College Main Campus
- Carrier Park
- Azalea Park
- Western North Carolina Nature Center
- French Broad River
- Swannanoa River
- Wilma Dykeman RiverWay
- Blue Ridge Parkway
- Woodfin

Buncombe County Recreation Services also has plans for the *French Broad River/Highway 251 Greenway*, which would run along the French Broad River and NC 251 from Broadway Street north to Elk Mountain Road. Functional designs and environmental analysis are currently being developed.

The City of Asheville’s *Comprehensive Bicycle Plan* (2008) identifies Riverside Drive and its existing bike lanes as an area needing bicycling infrastructure improvements. Currently, bicycle lanes on Riverside Drive begin at Hill Street and end approximately 1,900 feet before Broadway Street. Bicycle lanes continue on Riverside at the intersection of Riverside Drive and Broadway Street. The *Comprehensive Bicycle Plan* calls for bicycle lanes in gaps along Riverside Drive to facilitate continuous and safe bicycle lanes.

The City of Asheville’s mobility plan, *Asheville in Motion* (2016), highlights two projects adjacent to the Riverside Drive Greenway study area that could impact the design and construction of the Riverside Drive Greenway. First, the River Arts District Transportation Improvement Project (RADTIP) is a portion of the Wilma Dykeman RiverWay from Amboy Road to Hill Street along Lyman Street and Riverside Drive. The project includes the addition of sidewalks, bike lanes, and greenways. Construction began in 2016 and is scheduled to conclude in 2020. Because this project corridor connects to the southern side of the Riverside Drive Greenway (near Hill Street), design considerations should be made to ensure bicyclists and pedestrians can connect safely from the Riverside Drive Greenway to the RADTIP project and the River Arts District.

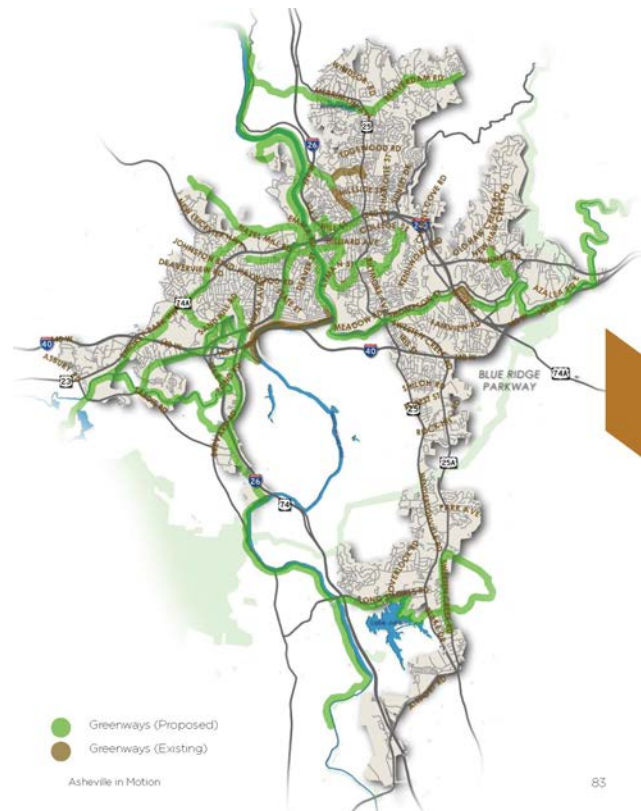
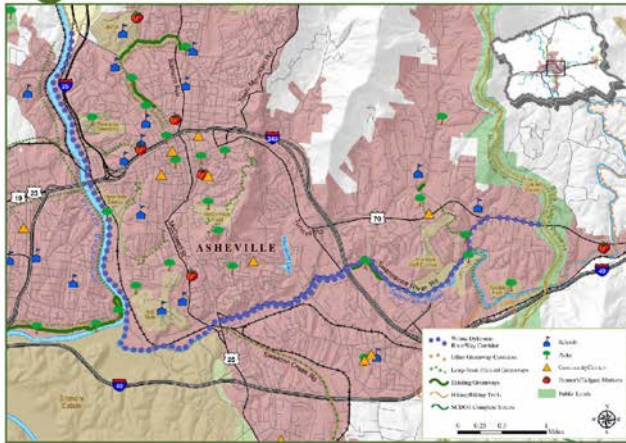


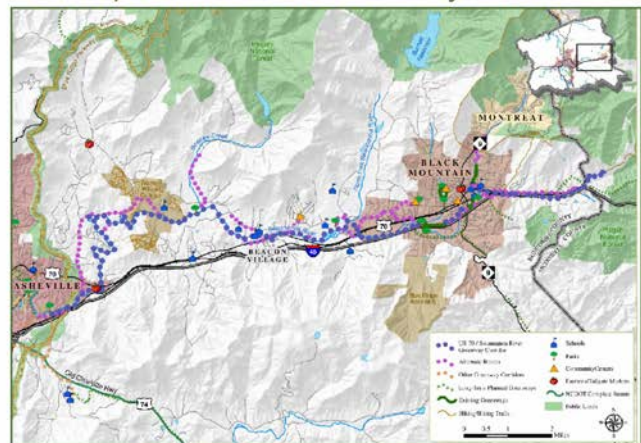
Figure 4 Greenways Map - Asheville in Motion Mobility Plan



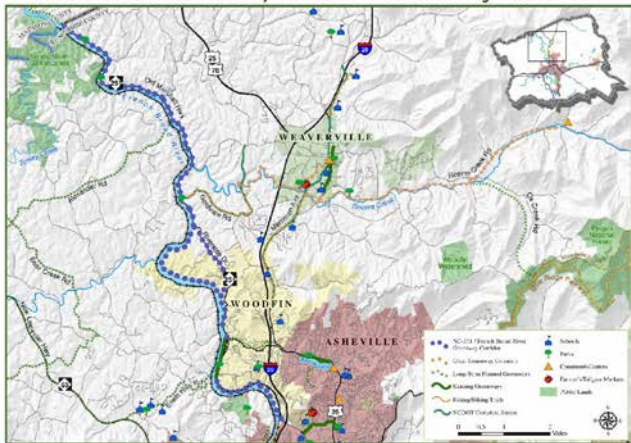
Wilma Dykeman RiverWay Corridor



US 70 / Swannanoa River Greenway Corridor



French Broad River / NC 251 Greenway Corridor



Bent Creek Greenway Corridor

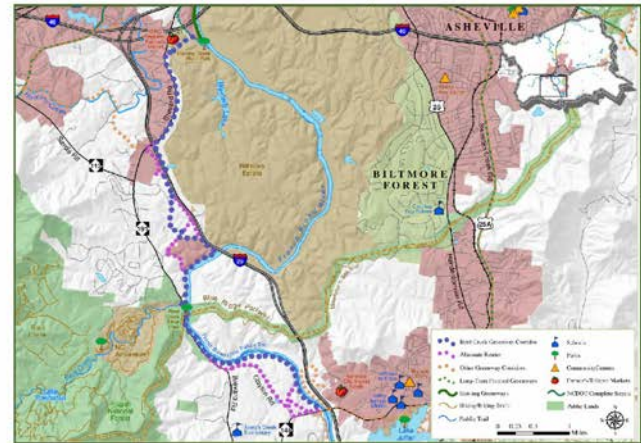


Figure 5 Corridor Maps - Buncombe County Greenways and Trails Master Plan

Second, *Asheville in Motion* outlines bicycle and pedestrian improvements along the Broadway Street corridor from I-240 to Riverside Drive. Plans involve the addition of bicycle lanes and wider sidewalks along Broadway Street; however, the larger vision for the corridor is to implement a road diet to decrease vehicle lanes from four to two and construct separated bicycle and pedestrian facilities. Either configuration should connect to the Riverside Drive Greenway near the intersection of Riverside Drive and Broadway Street.

Chapter 2

Design Considerations



Mountainous terrain near Asheville
Source: AARP

This study considers both natural and human environmental constraints. Local, state, and federal design guidelines are also referenced. Other considerations to the greenway design include connections to existing and planned greenways, bicycle lanes, and sidewalks that are adjacent to the study area limits; right-of-way constraints associated with Riverside Drive, I-26, and the Norfolk Southern Railroad; and proximity to the French Broad River. The following section of the study further evaluates these design considerations.

2.1 - Natural Environment

2.1.1 - Topography

The mountainous topography in Buncombe County ranges in elevation from 1,305 feet to 6,373 feet. The County and the City of Asheville have implemented steep slopes policies to manage development, maintain slope stability, and control erosion and stormwater. The study area has a relatively flat terrain and elements of the steep slope policies would not affect the project.

Grade changes along the greenway alternatives have been minimized to remain in compliance with the American's with Disabilities Act (ADA). In addition to the ADA, reference was provided to guidelines for federally developed outdoor recreation sites as required by the Architectural Barriers Act (ABA) Accessibility Standards which may impact local guidelines in the near future. Adjacent to the French Broad River, there are some steep slopes going down to the river. Thus, sections of the greenway near the river may require a railing for safety.

2.1.2 - Floodplain/Floodway

The French Broad River forms the western edge of the study area. The river serves as a natural and community asset to communities throughout Buncombe County, especially the City of Asheville. Providing greenways along the French Broad River would take advantage of the river's scenery, relatively flat topography, and land unsuitable for other development activities.



French Broad River

According to the National Flood Insurance Program, Buncombe County joined the program and began regulating development within the 100-year floodplain in 1980. Buncombe County's Flood Damage Prevention Ordinance regulates new structures, additions or changes to existing structures, grading, filling, or any other manmade change within the floodplain. The project study area falls within the floodplain and is subject to the county's Flood Damage Prevention Ordinance in Chapter 34 of the County Code of Ordinances. As such, a flood development permit would be required, which includes a site development plan, identification of structures to be built along the greenway, and the location of the floodplain and floodway.

The North Carolina Division of Mitigation Services *French Broad River Basin Restoration Priorities* (2009) manages mitigation activities along the French Broad River and within the project study area. The proposed section is within the Avery/Bent/Dingle Creek Targeted Local Watershed. The French Broad River is listed as impaired because of high levels of fecal coliform bacteria.

The City of Asheville Stormwater Ordinance requires a minimum thirty-foot vegetative buffer between all perennial waters, including the French Broad River, for all development activities that disturb more than 1-acre of land. However, public projects such as greenways, are allowed within the buffer if they minimize built-upon surface area, direct runoff away from the surface waters, and maximize the utilization of stormwater best management practices. The stream banks along the French Broad River have been identified as unstable, so mitigation would likely be required.

Greenways located within the floodway require a no-impact/no-rise study by the City of Asheville. The county also requires the submittal of a flood permit application, which includes a plan for the greenway, identification of structures to be located with the greenway, and the location of the floodplain and floodway.

2.1.3 - Streams and Wetlands

Surface waters and wetlands are considered "waters of the United States" according to 33 CFR Part 328.3 of the U.S. Code of Federal Regulations. The U.S. Army Corps of Engineers manages the permit review process for all proposed activities that impact these waters under Section 404 of the Clean Water Act (33 USC 1344). Within North Carolina, the North Carolina Division of Water Resources issues all water quality certifications according to Section 401 of the Clean Water Act (North Carolina General Statutes Chapter 143 Article 21, Part 1). The location of the project could encroach on the French Broad River floodplain and impact jurisdictional streams and wetlands. A Section 404/401 Water Quality Certification would be required if there is any disturbance to a stream bed or banks, disturbance to a wetland, placement of material within a stream or wetland necessary for construction, and temporary impacts. A project site plan including depictions of the impacted areas and mitigation of impacts are required for certification.

Re-stabilization of the impacted area can be achieved through erosion control best management practices such as vegetated buffers, erosion seeding, and soil binders.



Water Access



River Bank Beneath Pearson Bridge Road

2.2 - Human Environment

2.2.1 - Right-of-way

Existing rights-of-way typically offers the most efficient opportunities for greenway construction. There are three options for using an existing right-of-way within the project study area: right-of-way maintained by the NCDOT, Norfolk Southern Railroad, and the Metropolitan Sewage District (MSD).

NCDOT owned right-of-way within the study area is associated with I-26 and Riverside Drive. NCDOT has two projects listed in the State Transportation Improvement Program (STIP) that are located within the project study area: the I-26 Connector Project (STIP No. I-2513) and the Riverside Drive Improvements Project (STIP No. U-5868). Both of NCDOT's projects are scheduled to begin right-of-way acquisitions in fiscal-year 2019 (**Figure 6**). Greenway route options that are adjacent to either of NCDOT's projects, would present opportunities for cost-sharing with NCDOT including land acquisition for the project. Sidewalks qualify for a 60/40 split with NCDOT, which includes the cost of materials associated with the sidewalk only. Multi-use paths (greenways) are typically an 80/20 split of the entire project's costs, including land acquisition.

Norfolk Southern operates a railroad west of Riverside Drive running north and south and owns rights-of-way along the railroad within the study area. Greenway route options along the French Broad River and north of Pearson Bridge Road would require coordination with Norfolk Southern regarding encroachment of their right-of-way. Due to safety considerations, railroads do not typically allow encroachment on their right-of-way. Greenway route options adjacent to the railroad-owned right-of-way may require a fence or other barrier.

The MSD operates a 72-inch sewer line within the project study area that runs parallel to the French Broad River and sits between the river and the Norfolk Southern Railroad. Greenway route options that encroach on the MSD right-of-way would require coordination with the agencies involved.

2.2.2 - Bridges

Proposed greenway options attempt to minimize the need for pedestrian bridge crossings. One potential site for a pedestrian bridge exists for greenway options that cross over a small stream inlet between two private properties, Zen Tubing and Riverside Stump Dump, along the French Broad River. Access to this site has been limited, so it currently is uncertain if crossing this inlet will require a pedestrian bridge or a culvert.

NCDOT's I-26 Connector Project (STIP No. I-2513) will involve a new bridge over Riverside Drive near Hill Street. All greenway alternatives in this area of the project study area would traverse under this bridge and should include adequate safety considerations in the designs.



Riverside Drive Right-of-way



Pearson Bridge Road

2.2.3 - Culverts

Two culverts exist at the northern edge of the Riverside Drive Greenway study area that could impact alignment alternatives. First, the culvert under Riverside Drive sits at the southern section of the Riverside Drive and Broadway Street intersection. Second, the culvert under the Norfolk Southern Railroad railway is west of the Riverside Drive culvert and opens into the French Broad River.

2.2.4 - Railroad

Norfolk Southern Railroad operates a railroad line through the project study area running parallel to the French Broad River and Riverside Drive. Currently, there is one train a day that utilizes this railroad to reach the Silverline Plastics Company located north of the project limits. The Riverside Drive Greenway Steering Committee would prefer to locate proposed alignment alternatives away from the railroad because it presents safety concerns for pedestrians and bicyclists.

2.2.5 - Streets

Broadway Street, Pearson Bridge Road, and Hill Street each intersect Riverside Drive in the study area. Greenway alternatives that involve the crossing of these streets and/or connections to other bicycle and pedestrian infrastructure near these intersections would need to include appropriate signage, pavement markings, lighting, and other safety measures. Since Riverside Drive is an NCDOT maintained road, NCDOT bicycle and pedestrian design guidelines and policies must be referenced.



Culvert Under Riverside Drive

2.2.6 - Land Owners

There are thirty-six parcels located within the project study area, which includes commercial and industrial enterprises that are mostly located between Riverside Drive and the French Broad River (**Figure 6**). Greenway alternatives that involve direct impacts to any privately owned parcels may have implications to the business operations that could include a loss of parking and alterations to access to the parcel from Riverside Drive and/or the French Broad River. In addition, greenway alternatives that include crossing access driveways will need to include appropriate signage and pavement markings to protect the safety of the greenway users.

2.2.7 - Landfill and Hazardous Materials

Five hazardous materials sites have been identified within the study area (**Table 1**) (**Figure 6**).

A Preliminary Site Assessment report was prepared in 1993 for Site 5, an abandoned landfill located between Riverside Drive and the French Broad River (Environmental Investigations, Inc. 1993, NCDOT 1993a). The landfill starts just north of the Norfolk Southern Railroad bridge and extends north to Pearson Bridge Road (approximately 1.25 miles). The landfill operated as an open dump/landfill in the 1940s and 1950s and closed in the late 1950s to early 1960s.

In addition, the Riverside Drive Greenway Steering Committee stated that Riverside Stump Dump (Site 3) operations create hazards for passing bicyclists and pedestrians. As the Riverside Stump Dump cuts and grinds wood, wood particles and dust carry into the air and into areas under consideration as greenway alignment alternatives.



Existing Rail Line

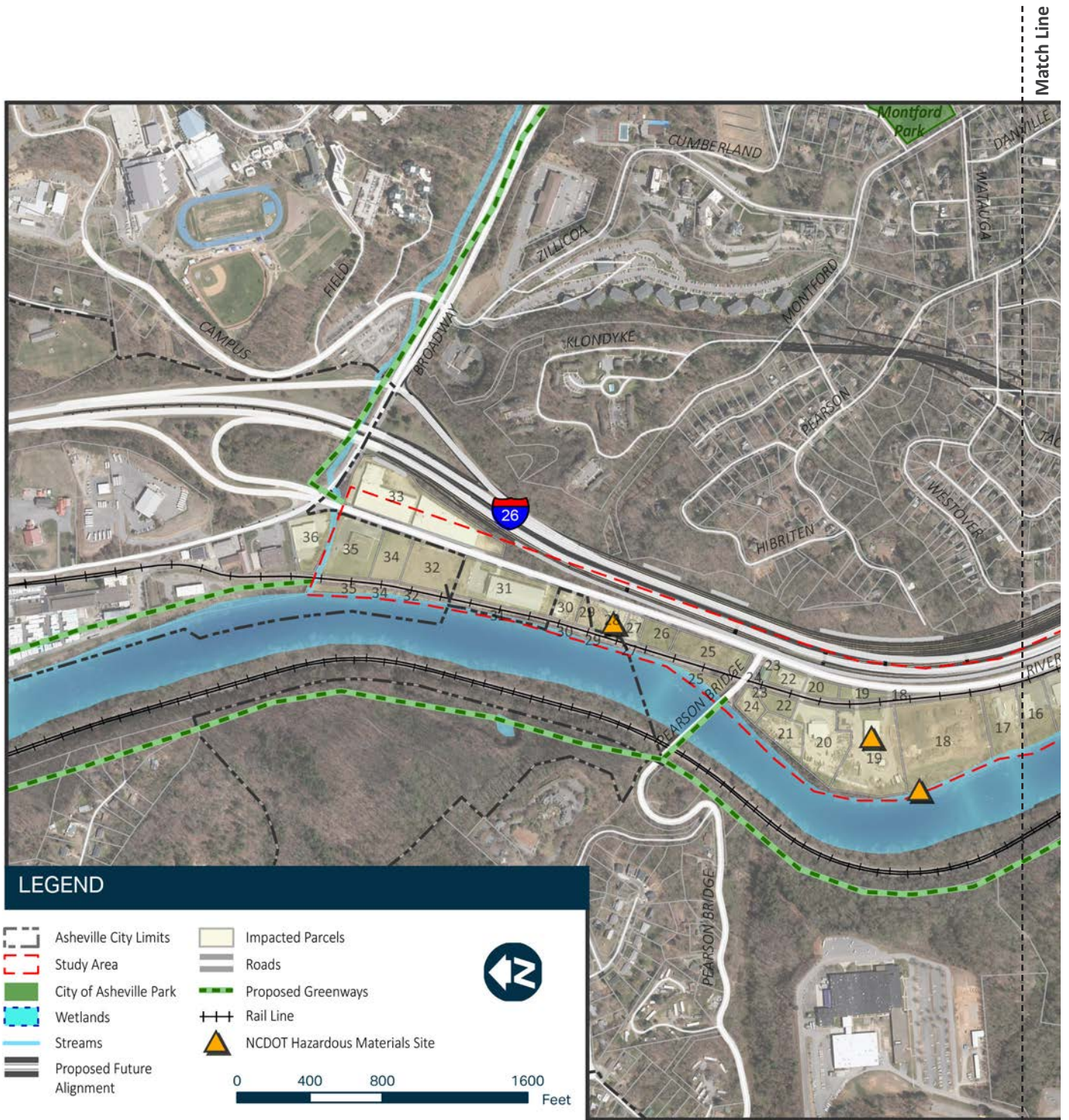


Figure 6 Project Design Considerations

Match Line

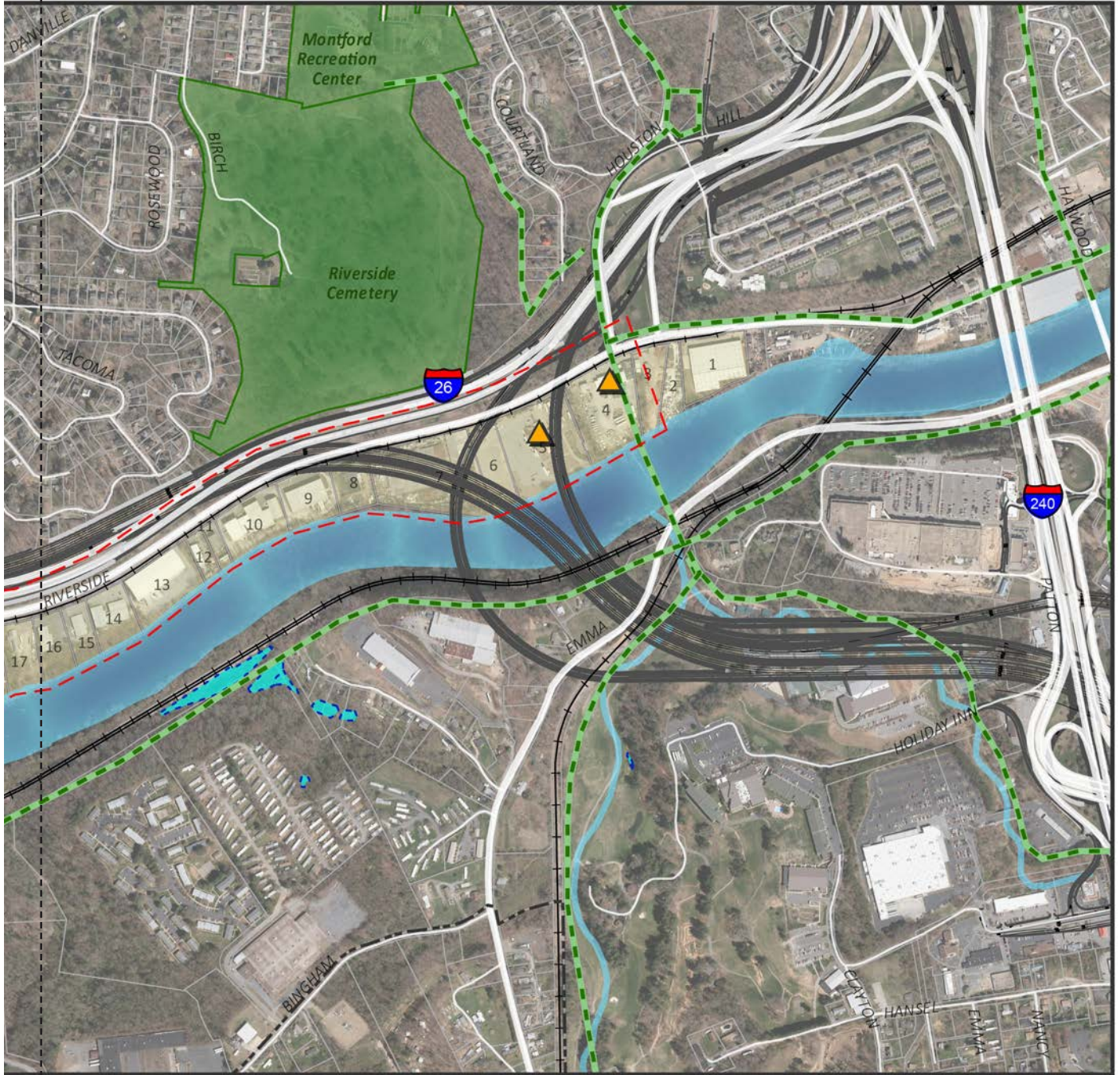


Table 1 Landfill and Hazardous Materials

Site No.	Type	Locations	UST Facility ID #	Property Name	UST Owner/ Property Owner	Anticipated Impact	Anticipated Risk	Comments
1	Farm Supplies	464 Riverside Drive	N/A	Southern States Farm Supply	Southern States Corporation	Pesticide	Low	Currently Southern States Farm Supplies; no UST information; see comments Site 8
2	Junk Yard	665 Riverside Drive	N/A	Asheville Auto Parts	Terri S. Eury	Petroleum-contaminated soils	Low	Junk yard; no UST information; see comments Site 8
3	UST	690 Riverside Drive	0-007332	Riverside Stump Dump	Farm Equipment Co. of Asheville	Petroleum-contaminated soils	Low	Former Farm Equipment Co. of Asheville; four USTs closed in 1990; see comments Site 8
4	UST	796 Riverside Drive	N/A	The Byway	Agiqua LLC	Petroleum-contaminated soils	Low	Possible old gas station; no UST information; see comments Site 8
5	Landfill	Along the Bank of the French Broad River	N/A	N/A	N/A	Landfill materials of unknown composition	High	Area along the French Broad River is the site of the historic uncontrolled landfilling; site-specific data are needed for any route selected

UST = Underground Storage Tank



Businesses on Riverside Drive



Riverside Stump Dump

2.2.8 - Utilities

Duke Energy operates a transmission line through the study area. Based on the site visit and a review of aerial imagery, the transmission line is located parallel to the Norfolk Southern Railroad line from Broadway Street to Pearson Bridge Road. The transmission line continues south of Pearson Bridge Road to Hill Street running parallel to the French Broad River. Coordination will be required with Duke Energy.

In addition to the Duke Energy transmission line, there are segments of overhead utility poles along the west side of Riverside Drive. The first segment extends from Broadway Street to parcel 19. Second, a short segment is in front of parcels 15 and 16 adjacent to the Norfolk Southern Railroad and parallel to Riverside Drive. Third, a segment is in front of parcels 10-12 adjacent to the Norfolk Southern Railroad and parallel to Riverside Drive. The fourth segment extends from parcel 7 to Hill Street adjacent to the Norfolk Southern Railroad and parallel to Riverside Drive.



Overhead Transition Line Parallel to Railroad Line

2.2.9 - Existing Bicycle/Pedestrian Infrastructure

There are bicycle lanes within the project study area located along Riverside Drive beginning at the intersection with Hill Street and ending approximately 1,900 feet before the intersection with Broadway Street. A bicycle turn lane is also located at the south leg of the Riverside Drive and Broadway Street intersection. Other existing bicycle and pedestrian infrastructure includes pedestrian accommodations at Pearson Bridge Road to provide access to the French Broad River and a small paved trail segment between the French Broad River and Norfolk Southern Railroad and northwest of the Asheville Community Movement building that crosses the railroad and is not linked to any other bicycle or pedestrian infrastructure.

The following bicycle and pedestrian infrastructure are planned for the project study area:

- Hill Street: Sidewalks are planned along Hill Street, leading up to Riverside Drive. The sidewalks are scheduled to be completed by 2018.
- Riverside Drive, south of Hill Street: a future Greenway along the French Broad River is planned as part of the Wilma Dykeman Riverway. This project is not currently funded.
- Riverside Drive, north of Broadway Street: French Broad River/NC 251 Greenway] along the French Broad River and NC 251 is planned. Broadway Street, east of Riverside Drive: Sidewalks, bike lanes, and/or a greenway are planned.



Bike Lane on Riverside Drive

2.3 - Design Criteria and Exceptions

The *North Carolina Bicycle Facilities Planning and Design Guidelines (1994)* for multipurpose recreational trails, the *AASHTO Guide to Bicycle Facilities, 4th Edition*, the *North Carolina Complete Streets Planning and Design Guidelines*, *FHWA's Manual on Uniform Traffic Control Devices (MUTCD)*, and the City of Asheville were used as the design criteria for the project. **Table 2** provides specific notations and references to the criteria used to design the greenway alternatives. Further criteria that may be necessary for the alternatives are described below, including guard rails, intersections and the restriction of motor vehicle traffic.

2.3.1 - Guard Rails

Wide separation between a greenway and slopes or a nearby highway or roadway is encouraged. While five feet is the desirable criteria, some restrictions between a greenway and highway could decrease the distance less than five feet. In such instances, a suitable barrier could be implemented to separate the greenway from the roadway in areas without curb and gutter. Guard rails are common dividers and should be a minimum of 54 inches high.

2.3.2 - Intersections

The greenway options may necessitate crossings at intersections. Best practices encourage the greenway crossing to be located at intersections rather than mid-block. Adequate signage and pavement markings following MUTCD standards, standard traffic control devices and normal rules of the road can be used to allow for safe bicyclist and pedestrian crossing.

2.3.3 - Restriction of Motor Vehicle Traffic

In order to restrict motor vehicle traffic from entering the greenway, lockable and removable posts are recommended for locations at motor vehicle crossings of the greenway at intersections and driveways. Implementing such barriers will increase the safety of bicyclists and pedestrians and allow the passage of emergency or maintenance vehicles.

2.3.4 - Steep Slopes

Where a path is adjacent to parallel bodies of water or downward slopes of 1V:3H or steeper, a wider separation should be considered. A 5 foot (1.5 m) separation from the edge of the path pavement to the top of the slope is desirable. Depending on the height of the embankment and condition at the bottom, a physical barrier, such as dense shrubbery, railing, or fencing may be needed.

Table 2 Multipurpose Recreational Trail Design Criteria- NCDOT, ASSHTO, MUTCD, City of Asheville

Width and Clearance		
Paved Width	10'	Permit safe and frequent passing opportunities
Horizontal Clearances	3' Desirable, 2' Minimum	Provide clearance from trees, polls, walls, fences, and guardrails
Outside to Shoulder Slope	5' Desirable, 2' Minimum	Create separation between bicycle path and canals, ditches, rivers, and creeks. Handrail can be utilized in areas with steep side slopes necessitating use of minimum shoulder widths.
Vertical Clearances	16'	Permit passage of maintenance vehicles
Horizontal Alignment and Superelevation		
Minimum	2%	Encourage adequate drainage
Grade		
Maximum Desirable	5%	
Sustained	2%	Accommodate a wide range of riders
Drainage		
Minimum Cross Slope	2%	Provide adequate drainage



Chapter 3

Alignment Alternatives

3.1 - Segment Descriptions

Five greenway segments were developed for the Riverside Drive Greenway between Broadway Street and Hill Street, with Pearson Bridge Road functions as a dividing line between the five greenway segments (**Figure 7**). The greenway segments can be combined to form alternatives that run the full length of the project study area. Three segments exist from Broadway Street to Pearson Bridge Road: the green segment, the purple segment, and the pink segment. Two segments exist from Pearson Bridge Road to Hill Street: the orange segment and the blue segment. **Table 3** provides descriptions of each alternative.

All greenway segments will be paved multi-use paths that are 10 feet wide. Connections to existing and planned bicycle and pedestrian facilities are common to each of the proposed greenway segments. In addition, an opportunity to develop a trailhead was identified near Hill Street in the area that the proposed I-26 overpass is planned. This trailhead site may provide waterfront access, parking, and other amenities. Both segments that connect into Hill Street offer connections to this trailhead site.








West Side of Riverside Drive Looking South



West Side of Riverside Drive Looking North

Table 3 Segment Description

Alternative	Length (ft)	Description
Green 	2,370	Runs parallel to the east side of Riverside Drive from Broadway Street to Pearson Bridge Road.
Purple 	2,370	Runs parallel to the west side of Riverside Drive from Broadway Street to Pearson Bridge Road.
Blue 	4,730 (Optional Loop-2,140)	Runs parallel to the east side of Riverside Drive from Pearson Bridge Road to Hill Street. This also includes an optional loop that would cross Riverside Drive approximately 1,500 feet north of the intersection with Hill Street and run southwest towards the east bank of the French Broad River. This segment would then run along the east bank of the French Broad River before connecting back over to Riverside Drive at the intersection with Hill Street. The Blue segment includes an optional loop on the southern end near Hill Street that would provide access to the proposed trailhead opportunity and the riverfront. This optional loop is depicted on Figure 7 .
Orange 	6,010	Runs parallel to the east bank of the French Broad River from Pearson Bridge Road south before turning east and connecting into Riverside Drive near the intersection with Hill Street. This segment includes access to the area of the proposed trailhead.
Pink 	2,720	Runs west and perpendicular to Riverside Drive to the east side of the railroad tracks, then turns south and runs parallel to the east side of the railroad tracks. Then the segment turns and crosses the railroad tracks to run parallel to the west side of the railroad tracks and along the eastern bank of the French Broad River to Pearson Bridge Road.



East Side of Riverside Drive



Riverbank Parallel to Railroad Line Looking South

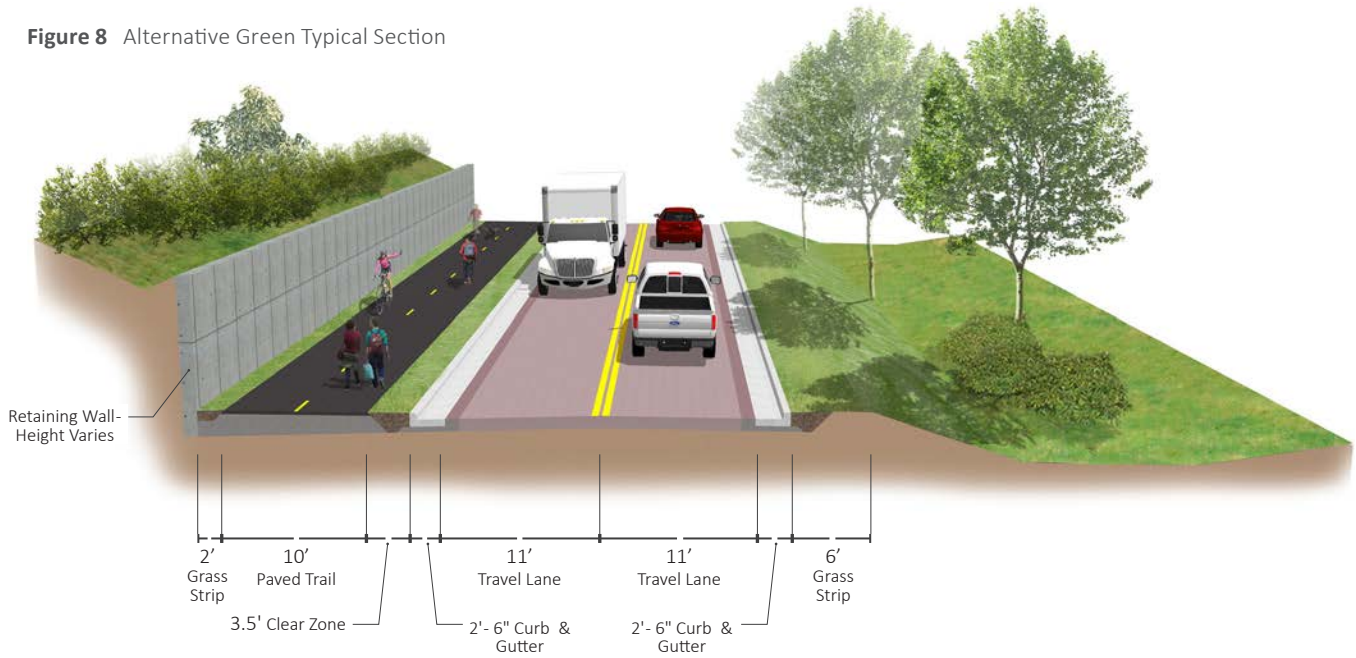


Figure 7 Alternative Segment Map

Match Line

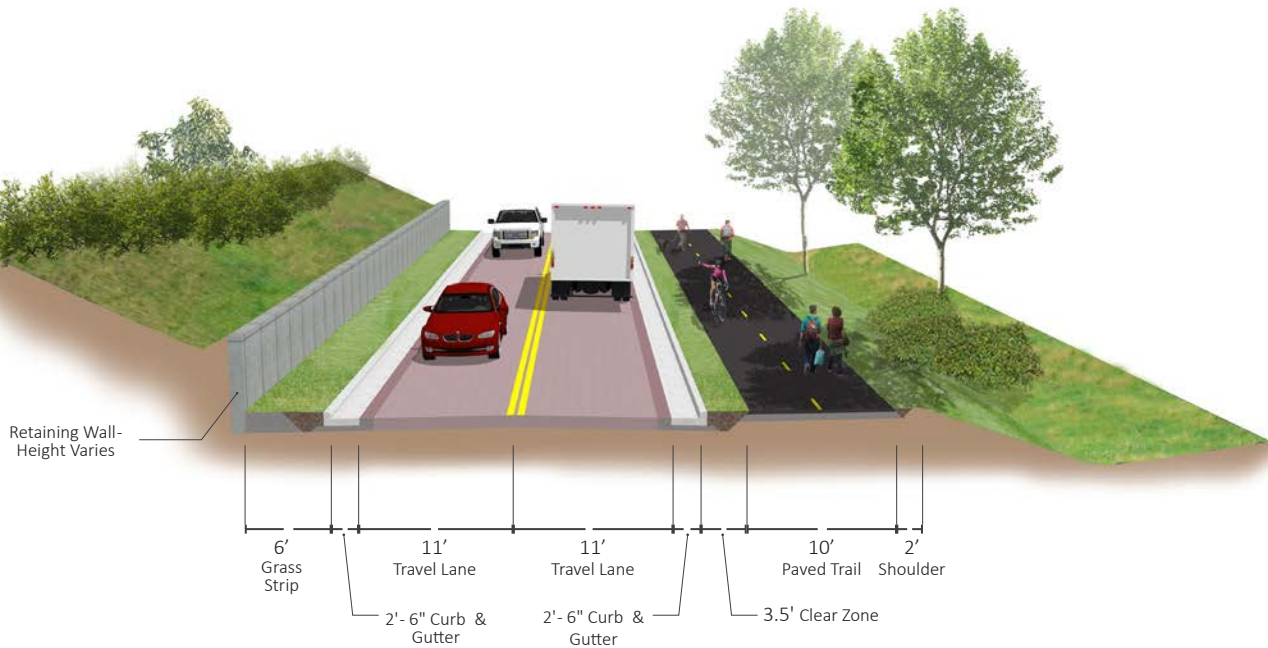


Figure 8 Alternative Green Typical Section



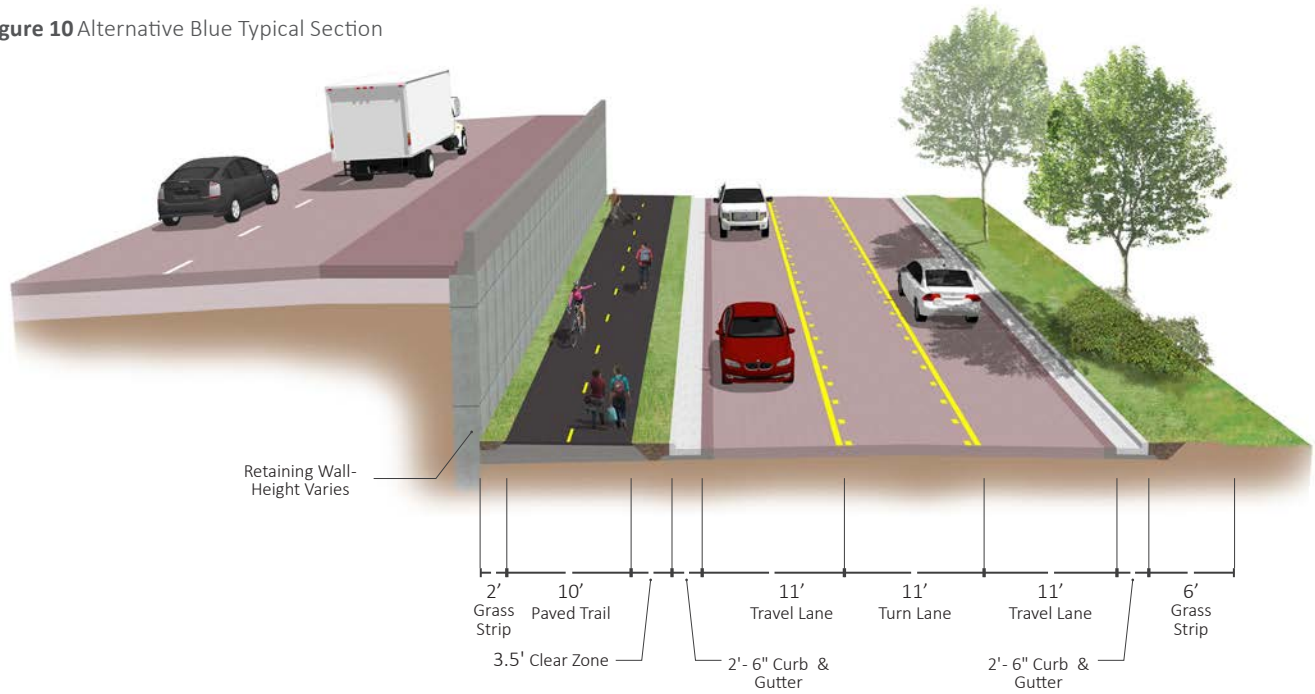
Alternative Green

Figure 9 Alternative Purple Typical Section



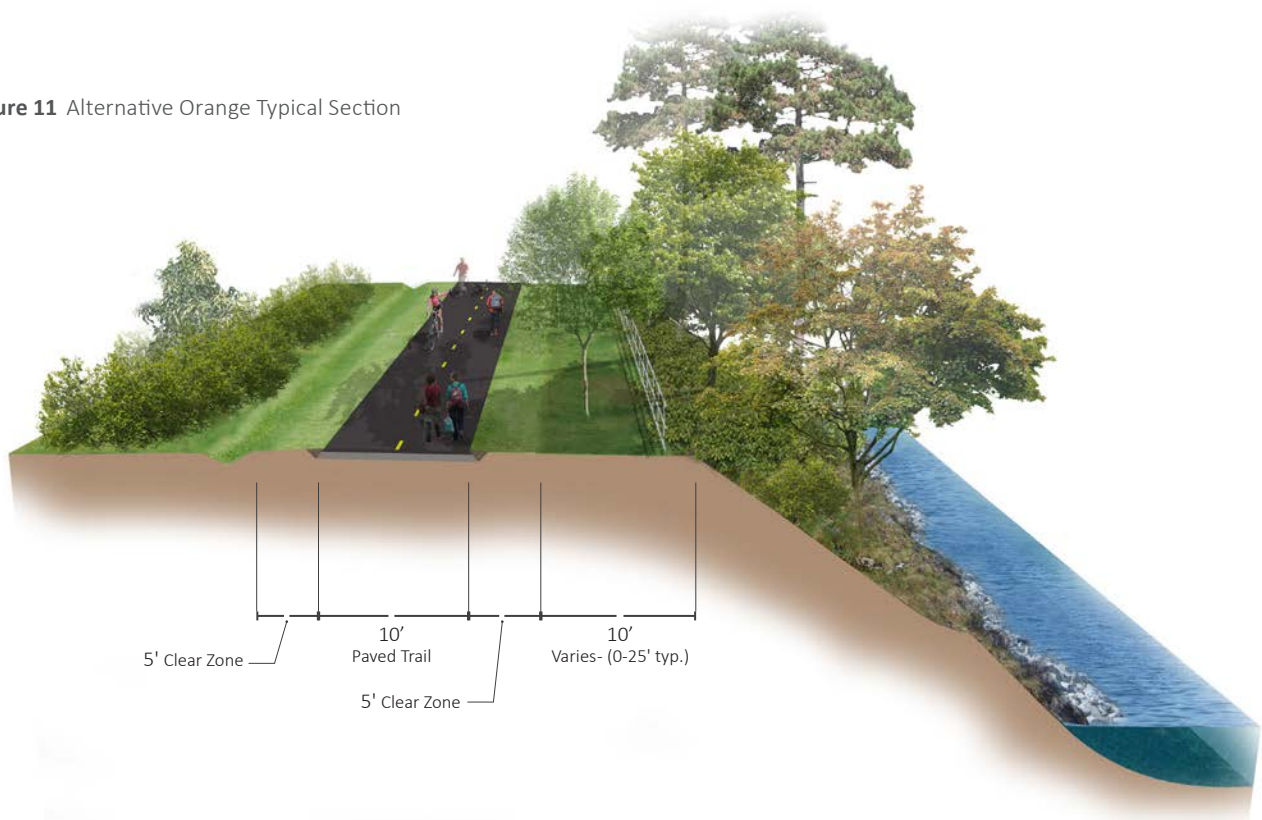
Alternative Purple

Figure 10 Alternative Blue Typical Section



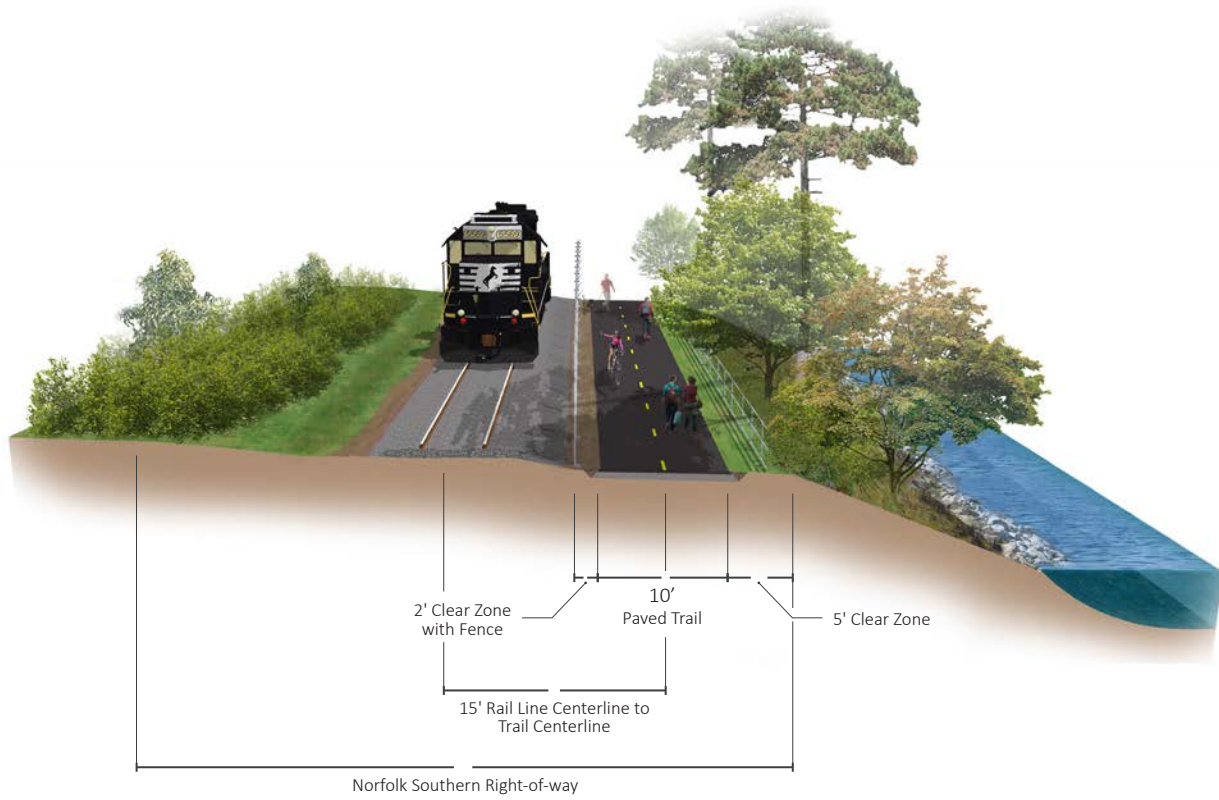
Alternative Blue

Figure 11 Alternative Orange Typical Section



Alternative Orange

Figure 12 Alternative Pink Typical Section



Alternative Pink

Chapter 4

Public Involvement

The Riverside Drive Greenway Steering Committee has met twice to discuss alignment alternatives, opportunities and constraints. The following is a summary of each steering committee meeting.

4.1 - Steering Committee Meeting #1

Held on March 6, 2017, the first steering committee meeting included attendees from the following organizations:

- City of Asheville,
- French Broad River MPO
- Buncombe County
- NCDOT

The purpose of the meeting was to discuss the purpose and need for the project, provide an overview of the project study area, and gather additional information from attendees about land uses and proposed projects that could impact the Riverside Drive Greenway. In addition, attendees were asked to draw potential alignments for the project. The following information was gathered from the Steering Committee:

- The stream banks in the study area of the French Broad River are unstable, as much of the land along the river is the former site of a landfill.
- The railroad that runs parallel to the French Broad River and Riverside Drive is operated by Norfolk Southern Railroad.
- A transmission line runs through the project corridor and will require coordination with Duke Energy.
- The MSD has a line that runs adjacent to the French Broad River and is located on the river side of the Norfolk Southern Railroad.
- The adjacent greenway project in the Town of Woodfin begins at Broadway Street and runs north along the French Broad River. The design and engineering for this project is expected to be completed in a 12 to 18 month timeframe.

- The Buncombe County Commissioners will not use the power of condemnation for greenway projects. However, partnering organizations, such as the City of Asheville, may be able to purchase the required right-of-way for the project to expedite the process.
- NCDOT has two projects within the project study area, the I-26 Connector Project (STIP No. I-2513) and Riverside Drive Improvements (STIP No. U-5868).
- The Reed Creek Greenway will likely be extended along Broadway Street on the south side.
- Pedestrian and cyclist mobility and safety along this corridor are a concern. The City of Asheville prefers the greenway be constructed to city standards since it would retain maintenance responsibilities for the greenway once constructed.
- Connecting the greenway with Hill Street via a sidewalk is a funded bond project that will be completed within the next five years.
- Ramp Studios, which is located at the intersection of Broadway Street and Riverside Drive, is considered an anchor of this corridor, and recent investments have been put into this building by University of North Carolina-Asheville and Duke Energy.
- Near Pearson Bridge Road there is a historic United States Geological Survey water gage which is the oldest one east of the Mississippi River.
- The French Broad River Outfitters operates a tubing and boat rental company that has a take-out point and launch ramp near the Pearson Bridge Road. Each year they have approximately 9,000 people that take out at their facilities and are required to cross the Norfolk Southern Railroad without pedestrian facilities. Clear access from the river to the operations facilities is important for their operations to continue.
- Buncombe County has not made any formal announcement of the project to the local property owners within the project study area. The adjacent property owners will be brought into the project development process at the next round of meetings when conceptual alignments can be shown to them to obtain their feedback and recommendations.

4.2 - Steering Committee Meeting #2

Held on May 18, 2017, the second steering committee meeting included attendees from the following organizations:

- City of Asheville,
- French Broad River MPO
- Buncombe County
- NCDOT

The purpose of the meeting was to review conceptual designs. The following information was gathered from the Steering Committee:

- The City of Asheville has a greenway planned along the French Broad River that is a part of the Wilma Dykeman RiverWay Plan. The City would like for this project to show a connection to that project near Hill Street.
- The high potential for hazardous materials and poor soil conditions for the area along the Orange alignment was noted due to the former landfill and industrial land uses.
- Methodology for cost estimates was discussed. It was noted that previous greenway projects along the river have exceeded standard estimates due to unstable soil conditions.
- Right-of-way acquisitions for the Riverside Drive Project (U-5868) and I-26 Connector Project (I-2513) are projected for fiscal year 2019.
- There were concerns over the mid-block crossing along Riverside Drive (Blue/Orange alignments), and noted that this would need to be evaluated to determine if it would be allowable.
- The City of Asheville prefers that whenever possible the greenway be along the river. However, the Pink alignment would not be ideal, considering its close proximity to the railroad.
- A path along the retaining wall related to the I-26 Connector could potentially discourage people from using it.
- When this project moves forward, it must go through the City of Asheville review process, as the City will be responsible for the long-term maintenance of this project.

4.3 - Greenway Segment Evaluation

An analysis of each greenway segment alternative was completed and included assessment of aesthetics, accessibility, safety, right-of-way impacts, utility relocation, schedule, costs, and major concerns. A summary of this analysis is shown on **Table 4**.

The cost of the greenway will be influenced by many different factors which include cost of petroleum products and other commodity costs, right-of-way acquisition costs, local market conditions, cost of professional services, and other factors.

At this early phase of development, there are still many uncertainties that may influence costs. Major pay items that are quantifiable using the functional design such as grading, paving, drainage, and structures are quantified and estimated using NCDOT or other local average unit prices. Other pay items, which are not included in the functional design, such as detailed drainage, erosion control, minor utilities, and professional services are estimated as a percentage of construction cost and on the total number of impacted parcels. Contingencies of 15 percent on the structures costs and 45 percent on the roadway items costs capture some of these unquantifiable

Table 4 Segment Analysis Matrix

Alternative	Aesthetics	Accessibility	Safety	Right-of-way
Green	Adjacent to I-26 (retaining wall) and Riverside Drive.	Mid-block crossings may be required to provide greenway-users access to businesses along the west side of Riverside Drive.	Adjacent to Riverside Drive.	Primarily utilizes existing right-of-way associated with Riverside Drive. Anticipated impacts to parcel 33.
Purple	Adjacent to Riverside Drive.	Requires crossing of multiple access driveways to businesses, which creates potential for motor vehicle/greenway-user conflicts.	Adjacent to Riverside Drive. Requires crossing of multiple access driveways to businesses that creates potential user conflicts between greenway-users and vehicular traffic.	Primarily utilizes existing right-of-way associated with Riverside Drive. Anticipated impacts to parcels 25-32, 34, and 35; which includes potential loss of parking on parcels 27, 28, and 35.
Blue	Adjacent to I-26 (retaining wall) and Riverside Drive. Passes under I-26 overpass.	Mid-block crossings will be required to provide greenway-users with access to businesses along the west side of Riverside Drive. Potential trailhead and parking opportunities on parcels 4-8.	Adjacent to Riverside Drive. Lighting concerns under future I-26 overpass.	Uses existing right-of-way associated with Riverside Drive.
Orange	Adjacent to the French Broad River. Passes under I-26 overpass.	Businesses would lose informal direct access to the French Broad River. Potential trailhead and parking opportunities on parcels 4-8.	Lighting concerns under future I-26 overpass.	Anticipated impacts to parcels 9-24.
Pink	Adjacent to the French Broad River and Norfolk Southern railroad.	Businesses would lose direct access to the French Broad River.	Separated from vehicular traffic. Requires fencing along railroad side of greenway. Requires crossing of the railroad tracks at Parcel 32.	Anticipated impacts to parcels 32, 34, and 35. Will require agreement with Norfolk Southern Railroad to infringe on their right-of-way.

pay items and the general uncertainty associated with the project at this early phase of development.

The right-of-way and easement acquisition cost estimates require the parcel area, area type (urban or rural), project control of access, whether the project is in a new or existing location, the area of the parcel in the right-of-way, the total value of the parcel (in dollars), the county, and the parcel ID. This data is either available in GIS, or can be interpreted into GIS. NC OneMap's standardized statewide parcel data contains the parcel ID, parcel area, total value of the parcel, and the county where the parcel is located. NC

OneMap also provides smoothed urban area boundaries for determining whether the parcel is in an urban or rural area. The project specific information, level of control of access, and type of location (new or existing) was added to the right-of-way file, which was used to determine the area of the parcel in the right-of-way. A polygon in GIS was used to represent the right-of-way in each parcel.

The NCDOT Feasibility Unit guidelines start by determining the percentage of each parcel in the right-of-way, then provide a matrix for determining whether a parcel acquisition may be partial or whether it will necessitate

Utility Relocation	Schedule	Costs	Concerns
Anticipated relocations of overhead utilities.	Anticipated in 2019, as part of NCDOT's project to improve Riverside Drive (STIP No. U-5868).	A cost-sharing opportunity exists with NCDOT as part of scheduled improvements to Riverside Drive (STIP No. U-5868).	The ten foot wide path will be meant for bicyclists and pedestrians. User conflicts could spill onto the road. May not be user-friendly option for families without physical barrier between greenway and roadway
Anticipated relocations of overhead utilities.	Anticipated in 2019, as part of NCDOT's project to improve Riverside Drive (STIP No. U-5868).	A cost-sharing opportunity exists with NCDOT as part of scheduled improvements to Riverside Drive (STIP No. U-5868).	Would require a safe crossing to the RAMP studios. Multiple existing driveways create conflict points.
Anticipated relocations of overhead utilities.	Anticipated in 2019, as part of NCDOT's project to improve Riverside Drive (STIP No. U-5868).	A cost-sharing opportunity exists with NCDOT as part of scheduled improvements to Riverside Drive (STIP No. U-5868).	The ten foot wide path would be meant for bicyclists and pedestrians. User conflicts could spill onto the road due to lack of greenway pull-off areas. May not be user-friendly option for families without physical barrier between greenway and roadway.
Anticipated relocations of overhead utilities.	Unknown	No known cost-sharing opportunity is available at this time.	Hazardous materials are likely. Stream bank in area may be unstable.
Anticipated relocations of overhead utilities.	Unknown	No known cost-sharing opportunity is available at this time.	Hazardous materials are likely. Stream bank in area may be unstable.

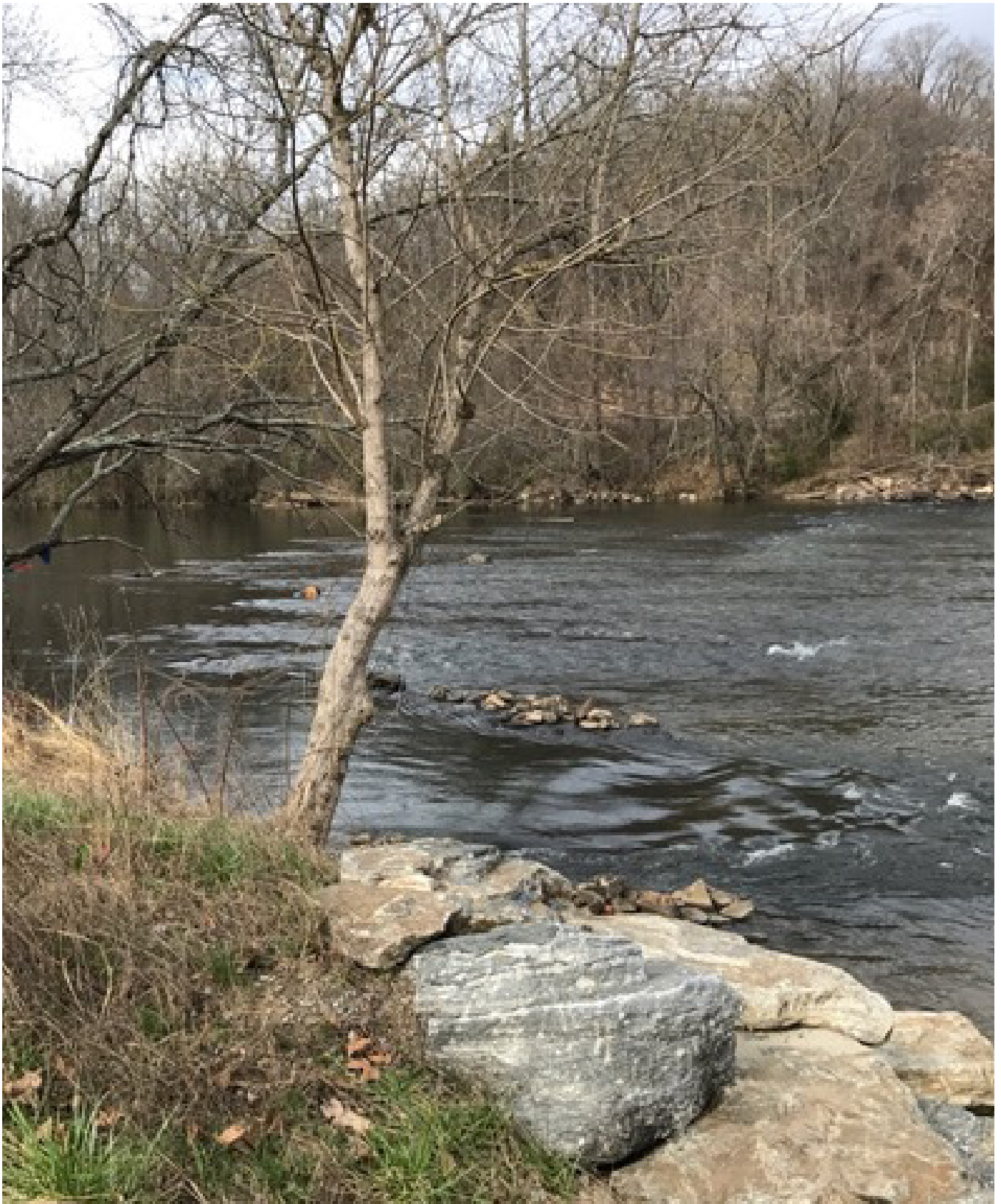
purchasing the entire parcel. The cost as a percentage of the total cost proportional to the percentage of the parcel being acquired is multiplied by a factor based on the level of control of access. This value is then added to set a value for acquisition, relocation, and demolition costs found in the aforementioned matrix. Finally, the sum is multiplied by a location multiplier, determined by the county of the parcel. A distinction is made between partial acquisitions and total acquisitions. Since the Riverside Drive Greenway requires only partial acquisitions, the formula is as follows:

$$\text{Partial Acquisition: } (((\text{land value} * (\text{area in right-of-way}/\text{total area})) * \text{control of access multiplier}) + \text{displacement cost}) * \text{location multiplier}$$

All costs are in 2017 dollars. Detailed functional design level opinion of probable cost estimates are included in Appendix A for each alignment alternative.

Table 5 Opinion of Probable Cost by Segment

Segment	Construction	Right-of-way	Utilities	Total Cost
Green	\$333,100	\$48,400	\$30,000	\$411,500
Purple	\$440,993	\$399,300	\$30,000	\$870,293
Blue	\$646,867	N/A	\$5,000	\$651,867
Orange	\$222,351	\$1,348,300	\$5,000	\$1,575,651
Blue-Orange (Optional Loop)	\$165,222	\$488,000	\$3,000	\$656,222
Pink	\$237,589	\$560,400	\$55,000	\$802,989



Chapter 5

Proposed Alternatives



Pearson Bridge Road



East Side of Riverside Drive

Based on the results of the segment analysis and input received during the stakeholder engagement process, two proposed alternatives for the Riverside Drive Greenway are recommended for further consideration and analysis: the Purple-Orange Alternative and the Green-Blue Alternative with an optional loop for consideration (**Figure 7**). These two alternatives offered the most logical connections between the segments north and south of Pearson Bridge Road, based on the need to minimize pedestrian crossings over Riverside Drive. Both alternatives are feasible for moving forward. Due to constraints and safety considerations associated with the Norfolk Southern Railroad, the Pink segment was eliminated from further consideration.

Specific details about the two proposed alternatives are outlined in the following sections.

5.1 - Purple-Orange Alternative

5.1.1 - Alignment with Existing Plans

The Purple Segment of the Purple-Orange Alternative aligns with typical section identified in the Wilma Dykeman RiverWay Master Plan, which recommends a multi-use pathway that would be parallel to Riverside Drive. The Purple Segment will allow for opportunities to tie into the planned bicycle lane along Broadway Street and the planned French Broad River/NC 251 Greenway to the north of Broadway Street. The Orange Segment will allow for opportunities to tie into the planned sidewalk along Hill Street and the planned segment of the Wilma Dykeman Riverway that would run along the French Broad River south of Hill Street.

5.1.2- Natural Environment Considerations

Floodplain/Floodway

The Purple-Orange Alternative falls within the French Broad River floodplain and is subject to the county's Flood Damage Prevention Ordinance in Chapter 34 of the County Code of Ordinances. As such, a flood development permit would be required, which includes a site development plan, an identification of structures to be built along the greenway, and the location of the floodplain and floodway. In addition, portions of the Orange Segment are also located within the floodway, which requires that a no-impact/ no-rise study is completed.

Jurisdictional Streams

The Orange Segment may have impacts to jurisdictional streams (French Broad River) and wetlands. As such, a Section 404/401 Water Quality Certification would be required if there is any disturbance to a stream bed or banks, disturbance to a wetland, placement of material within a stream or wetland necessary for construction, and temporary impacts. A project site plan including depictions of the impacted areas and mitigation of impacts are required for certification.

The stream banks along the French Broad River have been identified as unstable, which would require mitigation for the Orange Segment. Re-stabilization of the impacted area can be achieved through erosion control best management practices such as vegetated buffers, erosion seeding, and soil binders.

5.1.3 - Human Environment Considerations

Right-of-way

The Purple-Orange Alternative will require the acquisition of additional right-of-way to construct the project. Additional right-of-way is expected to be needed from parcels 9 through 32, 34, and 35. Other portions of the greenway will use existing right-of-way associated with Riverside Drive. Impacts to parcels 12, 13, 27, 28, and 35 will likely impact parking and/or loading areas. Rights-of-way along the Purple Segment could be acquired during the construction of the Riverside Drive Improvements Project (STIP No. U-5868) to take advantage of the NCDOT cost-share program and prevent repetitive takings from individual property owners.

Infrastructure

The Purple Segment has the potential to impact an existing culvert under Riverside Drive that is just south of the intersection with Broadway Street. The Orange Segment includes a site that will have the need for a pedestrian bridge or culvert that crosses over a small stream inlet between parcels 17 (Zen Tubing) and 18 (Riverside Stump Dump).

NCDOT's I-26 Connector Project (STIP No. I-2513) will involve a new bridge over Riverside Drive near Hill Street. The Orange Segment will traverse under this overpass and should include adequate safety considerations, such as lighting, in the designs.

A connection between the Purple Segment and the Orange Segment would require a crossing over the Norfolk Southern Railroad and Pearson Bridge Road. Adequate safety measures, such as pavement markings signage, should need to be incorporated into the designs at these crossings.

The overhead utility poles located on the western side of Riverside Drive will likely be impacted by the Purple Segment. Overhead utility poles are also present near Hill Street along Riverside Drive and could also be impacted by the Orange Segment.

Hazardous Materials

The Orange Segment is expected to impact an abandoned landfill located between Riverside Drive and the French Broad River (Environmental Investigations, Inc. 1993, NCDOT 1993a). The extent of these impacts and remediation that may be required is unknown at this time. Other potential hazardous sites also exist along the Purple and Orange Segments. Parcel 28 on Riverside Drive is in the vicinity of the Purple Segment. In addition, hazardous sites in parcels 4 and 5 are in the vicinity of the Orange Segment.

5.1.4 - Estimated Costs

The estimated costs for the Purple-Orange Alternative include general sitework construction, right-of-way and easement acquisition, owner's construction contingency, and engineering/construction administration. The total cost estimate is \$2,874,846. A large portion of this estimate is contained in the right-of-way required to complete the project.

Table 6 Cost Components for Purple-Orange Alternative

Component	Cost
General Sitework Construction Cost	\$828,566
Right-of-way and Easement Acquisition	\$1,747,600
Owner's Construction Contingency	\$185,649
Engineering / Construction Administration	\$113,031
Total	\$2,874,846

5.2 - Green-Blue Alternative

5.2.1 - Alignment with Existing Plans

The Green-Blue Alternative aligns with the typical section identified in the Wilma Dykeman RiverWay Master Plan, which recommends a multi-use pathway that would be parallel to Riverside Drive. The Green Segment will allow for opportunities to tie into the planned bicycle lane along Broadway Street and the planned French Broad River/ NC 251 Greenway to the north of Broadway Street. The Blue Segment will allow for opportunities to tie into the planned sidewalk along Hill Street. The optional loop will allow for a direct connection to the Wilma Dykeman Riverway.

5.2.2 - Natural Environment Considerations

Floodplain/Floodway

The Green-Blue Alternative, including the optional loop, falls within the French Broad River floodplain and is subject to the county’s Flood Damage Prevention Ordinance in Chapter 34 of the County Code of Ordinances. As such, a flood development permit would be required, which includes a site development plan, an identification of structures to be built along the greenway, and the location of the floodplain and floodway. In addition, portions of the optional loop is located within the floodway, which would require a no-impact/ no-rise study be completed.

Jurisdictional Streams

The Green-Blue Alternative is not expected to have impacts to jurisdictional streams or wetlands, as the alternative is mostly located in areas that are already disturbed. The exception is the optional loop that runs near the French Broad River. As such, a Section 404/401 Water Quality Certification will be required if there is any disturbance to a stream bed or banks, disturbance to a wetland, placement of material within a stream or wetland necessary for construction, and temporary impacts. A project site plan including depictions of the impacted areas and mitigation of impacts are required for certification.

The stream banks along the French Broad River have been identified as unstable which would require mitigation for the optional loop that runs along the river. Re-stabilization of the impacted area can be achieved through erosion control best management practices such as vegetated buffers, erosion seeding, and soil binders.

5.2.3 - Human Environment Considerations

Right-of-way

The Green-Blue Alternative is expected to directly impact parcel 33. Other portions of the greenway will use existing right-of-way associated with Riverside Drive and I-26. Right-of-way along the Green Segment from parcel 33 could be acquired during the construction of the Riverside Drive Improvements Project (STIP No. U-5868) to take advantage of the NCDOT cost-share program and prevent repetitive takings from individual property owners.

The optional loop is expected to directly impacts parcels 4 through 8; however, these parcels are anticipated to be purchased by NCDOT for right-of-way for the I-26 Connector Project. If that remains true, no additional right-of-way acquisitions would be required for construction of the optional loop.

Infrastructure

The Green Segment has the potential to impact an existing culvert under Riverside Drive that is just south of the intersection with Broadway Street.

NCDOT’s I-26 Connector Project (STIP No. I-2513) will involve a new bridge over Riverside Drive near Hill Street. The Blue Segment will traverse under this overpass and

should include adequate safety considerations, such as lighting, in the designs.

The optional loop will potentially require two crossings over Riverside Drive. Adequate safety measures, such as pavement markings signage, will need to be incorporated into the designs at these crossings.

The overhead utility poles located on the western side of Riverside Drive near Hill Street may be impacted by the optional loop.

Hazardous Materials

The optional loop of the Blue Segment is expected to impact an abandoned landfill located between Riverside Drive and the French Broad River (Environmental Investigations, Inc. 1993, NCDOT 1993a). The extent of these impacts and remediation that may be required is unknown at this time. The optional loop segment could impact hazardous sites on parcels 4 and 5.

5.2.4 Estimated Costs

The estimated costs for the Green-Blue Alternative include general sitework construction, right-of-way and easement acquisition, owner's construction contingency, and engineering/construction administration. The total cost estimate is \$1,405,072. Right-of-way costs are limited

Table 7 Cost Components for Green-Blue Alternative w/ Optional Loop

Component	Cost	
	Green-Blue	Green-Blue w/ Optional Loop
General Sitework Construction Cost	\$979,967	\$1,145,189
Right-of-way and Easement Acquisition	\$48,400	\$436,400
Owner's Construction Contingency	\$132,387	\$173,129
Engineering / Construction Administration	\$244,318	\$266,260
Total	\$1,405,072	\$2,210,978

with this alternative because the alignments utilize existing right-of-way between Riverside Drive and I-26.

The Green-Blue Alternative with the optional loop is estimated to cost \$2,120,978. The right-of-way costs increase with this alternative because the optional loop is located on existing privately-owned parcels.

5.3 - Coordination Opportunities

The Riverside Drive Greenway crosses two NCDOT STIP projects scheduled for planning, design, and construction in the near future. The two projects include the I-26 Connector Project (STIP No. I-2513) in the southern and eastern portion of the study area and Riverside Drive Improvements (STIP No. U-5868). In addition, the project connects to the RADTIP being built by the City of Asheville.

At the northern end of the project, the Purple Segment and the Green Segment, run alongside STIP No. U 5868 from Broadway Street to Pearson Bridge Road. Buncombe County should coordinate with NCDOT to align design and construction schedules that could benefit both Buncombe County and NCDOT. Benefits to Buncombe County could include reduced grading and easier access during greenway construction. Right-of-way acquisition for U-5868 is scheduled to begin in fiscal year 2019.

At the southern end of the project the Orange Segment, the Blue Segment, and the optional loop are crossed by the I-26 Connector (STIP No. I-2513). Part of this project includes pedestrian improvements to Hill Street, the southern endpoint of the Riverside Drive Greenway. Buncombe County should coordinate with NCDOT to align design and construction schedules. Right-of-way acquisition for I-2513 is scheduled to begin in Fiscal Year 2019.

The City of Asheville has begun construction on the RADTIP, which ends at Hill Street on Riverside Drive. The ending of this project crosses the southern end of the Riverside Drive Greenway. Buncombe County should coordinate with the City of Asheville to align designs. Benefits would include constructing a well-connected greenway network.

Chapter 6

Conclusion and Next Steps

This feasibility study has determined that two viable options for constructing a greenway within the project study area exist. The Green-Blue Alternative, including the optional loop, offers a more utilitarian option that is projected to be more economical to construct and have fewer impacts to private property owners. On the other hand, the Purple-Orange Alternative offers the benefit of having a longer segment located along the river front, which has aesthetic and safety benefits for the users. It also remains possible that both alternatives could be constructed independent of each other.

As the community moves forward with the development of the Riverside Drive Greenway, as well as their larger greenway system, they will need a determination of which greenway alternative best fits the community's goals, vision, and financial means. In addition, as this area redevelops in the coming years, opportunities to construct portions of either greenway alternative may arise.



View of French Broad River from Study Area

Sources

Buncombe County. *Buncombe County Greenways and Trails Master Plan*. August 2012.

Buncombe County. Flood Damage Prevention Ordinance. County Code of Ordinances, Chapter 34. Accessed May 2017.

City of Asheville. *Asheville in Motion: Mobility Plan*. 2016.

City of Asheville. *Comprehensive Bicycle Plan*. April 2008.

City of Asheville. *Parks, Recreation, Cultural Arts, and Greenways Master Plan*. February 2009.

City of Asheville. Steep Slope Ordinance. Municipal Code Ch. 8, Article XII, Sec. 7-12-4.

City of Asheville. *The Wilma Dykeman RiverWay Master Plan*. June 2004.

North Carolina Division of Mitigation Services. Local Watershed Plan for the French Broad River Basin. January 2006.

North Carolina Department of Transportation. *North Carolina Bicycle Facilities Planning and Design Guidelines*. 1994.

Riverside Drive Greenway Steering Committee. Steering Committee 1 Meeting Minutes. March 6, 2017.

Riverside Drive Greenway Steering Committee. Steering Committee 2 Meeting Minutes. May 18, 2017.

Federal Highway Administration *Manual on Uniform Traffic Control Devices*.

North Carolina Bicycle Facilities Planning and Design Guidelines (1994)

American Association of State Highway and Transportation Officials Guide to Bicycle Facilities, 4th Edition

North Carolina Complete Streets Planning and Design Guidelines

Appendix A

North Carolina Department of Transportation
Preliminary Estimate

TIP No.
Route Riverside Dr MUP - Alt. Green
From
Typical Section

Prel.

County: **Buncombe**

CONSTR. COST
\$363,100

Prepared By:
Requested By:

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	0.30	Acres	\$ 10,000.00	\$ 3,000.00
			Unclassified Excavation	1,800	CY	\$ 10.00	\$ 18,000.00
			Earthwork - borrow	0	CY	\$ 20.00	\$ -
			Roadway Drainage Existing Location	0.4	Miles	\$ 100,000.00	\$ 44,940.89
			2'-6" Concrete Curb and Gutter	2,460.0	LF	\$ 27.00	\$ 66,420.00
			Multi-Use Path	2,637	SY	\$ 20.00	\$ 52,730.65
			Erosion Control	0.4	Acres	\$ 20,000.00	\$ 8,487.39
			Traffic Control	1	LS	\$ 15,000.00	\$ 10,000.00
			Utility Construction				
			Relocate existing	1.0	LS	\$ 30,000.00	\$ 30,000.00
			Misc. & Mob (15% Strs&Util)				\$ 4,500.00
			Misc. & Mob (45% Functional)				\$ 77,660.52

Length 0.4 Mile

Contract Cost	\$ 315,739.46
E. & C. 15%	\$ 47,360.92
Construction Cost	\$ 363,100.38

North Carolina Department of Transportation
Preliminary Estimate

TIP No.
Route Riverside Dr MUP - Alt. Purple
From
Typical Section

Prel.

County: **Buncombe**

CONSTR. COST
\$470,993

Prepared By:
Requested By:

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	0.10	Acres	\$ 10,000.00	\$ 1,000.00
			Unclassified Excavation	2,300	CY	\$ 10.00	\$ 23,000.00
			Earthwork - borrow	3,100	CY	\$ 20.00	\$ 62,000.00
			Roadway Drainage Existing Location	0.4	Miles	\$ 100,000.00	\$ 44,083.65
			2'-6" Concrete Curb and Gutter	2,670	LF	\$ 27.00	\$ 72,090.00
			Multi-Use Path	2,984	SY	\$ 20.00	\$ 59,672.59
			Erosion Control	0.7	Acres	\$ 20,000.00	\$ 13,159.82
			Traffic Control	1	LS	\$ 15,000.00	\$ 15,000.00
			Utility Construction				
			Relocate existing	1.0	LS	\$ 30,000.00	\$ 30,000.00
			Misc. & Mob (15% Strs&Util)				\$ 4,500.00
			Misc. & Mob (45% Functional)				\$ 85,052.73

Length 0.4 Mile

Contract Cost	\$ 409,558.79
E. & C. 15%	\$ 61,433.82
Construction Cost	\$ 470,992.61

North Carolina Department of Transportation
Preliminary Estimate

TIP No.

Prel.

County:

Buncombe

Route Riverside Dr MUP - Alt. Pink

From

CONSTR. COST

Typical Section

\$242,589

Prepared By:

Requested By:

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	0.40	Acres	\$ 10,000.00	\$ 4,000.00
			Unclassified Excavation	2,300	CY	\$ 10.00	\$ 23,000.00
			Earthwork - borrow	300	CY	\$ 20.00	\$ 6,000.00
			Roadway Drainage Existing Location		Miles	\$ 100,000.00	\$ -
			2'-6" Concrete Curb and Gutter	70	LF	\$ 27.00	\$ 1,890.00
			Multi-Use Path	2,987	SY	\$ 20.00	\$ 59,748.78
			Erosion Control	1.3	Acres	\$ 20,000.00	\$ 26,175.60
			Traffic Control	1	LS	\$ 3,000.00	\$ 3,000.00
			Z RR Crossing	1.00	EA	\$ 10,000.00	\$ 10,000.00
			Chain Link Fence	2,640.54	LF	\$ 10.00	\$ 26,405.35
			Utility Construction				
			Relocate existing	1.0	LS	\$ 5,000.00	\$ 5,000.00
			Misc. & Mob (15% Strs&Util)				\$ 6,210.80
			Misc. & Mob (45% Functional)				\$ 39,516.47

Length 0.5 Mile

Contract Cost	\$ 210,947.01
E. & C. 15%	\$ 31,642.05
Construction Cost	\$ 242,589.06

North Carolina Department of Transportation
Preliminary Estimate

TIP No.
Route Riverside Dr MUP - Alt. Blue
From
Typical Section

Prel.

County: **Buncombe**

CONSTR. COST
\$651,867

Prepared By:
Requested By:

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	0.80	Acres	\$ 10,000.00	\$ 8,000.00
			Unclassified Excavation	1,800	CY	\$ 10.00	\$ 18,000.00
			Earthwork - borrow	0	CY	\$ 20.00	\$ -
			Roadway Drainage Existing Location	0.9	Miles	\$ 100,000.00	\$ 90,266.09
			2'-6" Concrete Curb and Gutter	4,900	LF	\$ 27.00	\$ 132,300.00
			Multi-Use Path	5,318	SY	\$ 20.00	\$ 106,366.65
			Erosion Control	1.5	Acres	\$ 20,000.00	\$ 29,750.35
			Traffic Control	1	LS	\$ 15,000.00	\$ 15,000.00
			Utility Construction				
			Relocate existing	1.0	LS	\$ 5,000.00	\$ 5,000.00
			Misc. & Mob (15% Strs&Util)				\$ 750.00
			Misc. & Mob (45% Functional)				\$ 161,407.39

Length 0.9 Mile

Contract Cost	\$ 566,840.48
E. & C. 15%	\$ 85,026.07
Construction Cost	\$ 651,866.55

North Carolina Department of Transportation
Preliminary Estimate

TIP No.
Route Riverside Dr MUP - Alt. Orange
From
Typical Section

Prel.

County: Buncombe

CONSTR. COST
\$227,351

Prepared By:
Requested By:

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	0.50	Acres	\$ 10,000.00	\$ 5,000.00
			Unclassified Excavation	1,100	CY	\$ 10.00	\$ 11,000.00
			Earthwork - borrow	0	CY	\$ 20.00	\$ -
			Roadway Drainage Existing Location		Miles	\$ 100,000.00	\$ -
			2'-6" Concrete Curb and Gutter	70	LF	\$ 27.00	\$ 1,890.00
			Multi-Use Path	4,171	SY	\$ 20.00	\$ 83,423.11
			Erosion Control	1.8	Acres	\$ 20,000.00	\$ 36,029.61
			Traffic Control		LS	\$ -	\$ -
			<u>Utility Construction</u>				
			Relocate existing	1.0	LS	\$ 5,000.00	\$ 5,000.00
			Misc. & Mob (15% Strs&Util)				\$ 750.00
			Misc. & Mob (45% Functional)				\$ 54,604.22

Length	0.7 Mile	Contract Cost	\$ 197,696.93
		E. & C. 15%	\$ 29,654.54
		Construction Cost	\$ 227,351.47

North Carolina Department of Transportation
Preliminary Estimate

TIP No.
Route Riverside Dr MUP - Alt. Blue/Orange
From
Typical Section

Prel.

County: **Buncombe**

CONSTR. COST
\$168,222

Prepared By:
Requested By:

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	0.10	Acres	\$ 10,000.00	\$ 1,000.00
			Unclassified Excavation	700	CY	\$ 10.00	\$ 7,000.00
			Earthwork - borrow	0	CY	\$ 20.00	\$ -
			Roadway Drainage Existing Location	0.1	Miles	\$ 100,000.00	\$ 8,333.33
			2'-6" Concrete Curb and Gutter	440	LF	\$ 27.00	\$ 11,880.00
			Multi-Use Path	2,454	SY	\$ 20.00	\$ 49,079.86
			Erosion Control	1.0	Acres	\$ 20,000.00	\$ 20,244.81
			Traffic Control	1	LS	\$ 5,000.00	\$ 5,000.00
			Utility Construction				
			Relocate existing	1.0	LS	\$ 3,000.00	\$ 3,000.00
			Misc. & Mob (15% Strs&Util)				\$ 450.00
			Misc. & Mob (45% Functional)				\$ 40,292.10

Length 0.4 Mile

Contract Cost	\$ 146,280.10
E. & C. 15%	\$ 21,942.02
Construction Cost	\$ 168,222.12

The AECOM logo is positioned in the lower-left area of the page. It consists of the word "AECOM" in a bold, white, sans-serif font. The background behind the logo is a dark blue-grey color, which is part of a larger abstract design of overlapping geometric shapes in various shades of blue and green. The overall aesthetic is modern and professional.

AECOM