



BENT CREEK – LAKE JULIAN GREENWAY FEASIBILITY STUDY

Prepared For:

NCDOT Bicycle & Pedestrian Division
and
Buncombe County

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INTRODUCTION

Overview and Study Area

The Bicycle & Pedestrian Division of the North Carolina Department of Transportation (NCDOT), at the request of the Buncombe County Recreation Services, initiated a feasibility study for the proposed Bent Creek-Lake Julian greenway corridor. The study area for the project begins in the vicinity of the Brevard Road (NC 191) interchange on I-26 and generally encompasses land along and between I-26 and Brevard Road south to approximately Long Shoals Road (NC 146) interchange with I-26. The study area falls within the municipal boundary of the City of Asheville, Buncombe County, and the Blue Ridge Parkway (See Figure 1).

As noted in the Buncombe County *Greenways and Trails Master Plan* (Plan), western North Carolina, generally, and Buncombe County, specifically, has been a destination for outdoor enthusiasts to enjoy the region's trails and other amenities for more than a century. Cities and towns within the County have invested considerable resources in planning and building greenway systems. Finishing in 2012, Buncombe County developed the Plan to provide a countywide, comprehensive approach to greenways and trails planning.

The Plan envisions a system of connected greenways and trails for pedestrians and bicyclists that promotes tourism, economic development, health, recreation, diverse and safe transportation options, and connects the communities in Buncombe County. The Bent Creek and Lake Julian Greenway Corridors, two of eight priority corridors identified in the Plan, include approximately eight miles of greenway that may provide access to locations including:

- Asheville Outlet Mall,
- Blue Ridge Parkway,
- Mountains to Sea Trail,
- French Broad River,
- Bent Creek River Park,
- NC Arboretum,
- Ridgefield Business Park,
- Biltmore Park Town Square,
- Mission Health and Park Ridge medical facilities, and
- Lake Julian Park.

Purpose and Methodology

The purpose of this study is to determine the feasibility of a multi-use/multi-modal, paved greenway in the vicinity of the NCDOT State Transportation Improvement Program (STIP) Project No. I-4700. I-4700 proposes to add additional lanes from NC 280 (Exit 40) to US 25 (Exit 54) on I-26. This study considers design constraints of the natural and human environment to determine alignment alternatives using publicly available information. The study was led by Buncombe County planning and recreation staff, with technical support from NCDOT staff from Division 13 and the Bicycle and Pedestrian Division. The study was funded by NCDOT and the Friends of Connect Buncombe non-governmental organization. The study produced a recommended alignment for the proposed greenway based on multiple design factors, a set of sketch plans (functional plans) for sections of the trail, and a mid-level cost estimate for constructing the recommended alignment.

DESIGN CONSIDERATIONS

Buncombe County is located in western North Carolina in the Appalachian Mountains. The mountainous topography of the region creates a unique element in the design of a greenway system. The urban and rural land use of the county is a further consideration in the design. Additional design considerations stem from the human environment; particularly in the location of the greenway along rights-of-way, and parcel and easement ownership. Finally, every effort was made to adhere to American's with Disabilities Act (ADA) standards.

Natural Environment

Topography

As previously mentioned, the topography of the region is mountainous and elevations range from 1,305 feet to 6,373 feet within the County. Due to the terrain, Buncombe County and the City of Asheville have implemented policies to manage development on steep slopes. These policies have been implemented to maintain slope stability and control erosion and stormwater.

The portion of the study area that falls within the City of Asheville is subject to its Steep Slope Ordinance. The Steep Slope Ordinance does not prevent development on these slopes, but provides guidelines to minimize impacts.

Floodplain/Floodway

The French Broad River is a significant natural resource and community asset to Buncombe County and the City of Asheville. Due to the scenic and relatively flat nature of a floodplain, it is desirable to design greenways along waterways. In addition, a greenway would utilize land not be suitable for other development activities.

In 1980, Buncombe County joined the National Flood Insurance Program (NFIP) and began regulating development within the 100-year floodplain (Zone AE). The Flood Damage Prevention Ordinance is found in Chapter 34 of the County Code of Ordinances.

The French Broad River Basin is part of the NC Division of Mitigation Services (DMS), formerly Ecosystem Enhancement Program (EEP), Watershed Restoration Plan. The study area is within the Targeted Local Watersheds of Lower Hominy Creek and Avery/Bent/Dingle Creeks. DMS developed River Basin Restoration Priorities (updated 2009) to guide mitigation activities. The portion of the French Broad River from Mud Creek to NC 146 is on the 2014 Final 303(d) list of impaired waters for fecal coliform.

The French Broad River does not have a state Buffer Rule. However, it is Buncombe County's policy under Stormwater Management to require a minimum 30-foot buffer for all development activities along jurisdictional streams. Mr. Mike Goodson, Buncombe County Stormwater Manager, indicated that greenways are generally allowed in the buffer; however, a hydrologic study to determine the amount of additional runoff into drainages from the greenway would be required. The project would then need to avoid or minimize the impact using appropriate mitigative measures such as rain gardens. Education may also be used as part of the mitigation.

Cynthia Barcklow, Floodplain Administrator for Buncombe County, stated that any structure located within the floodway such as a drinking fountain, kiosk, signage, and even the trail itself, would require a no impact/ no-rise study. A greenway can be located in the floodplain with the submittal of a flood permit application, which requires a plan for the greenway, identification of structures to be located with the greenway, and the location of the floodplain and floodway.

Streams and Wetlands

“Waters of the United States” include surface waters and wetlands as defined in 33 CFR Part 328.3. Impacts to these waters fall under the jurisdiction of the U.S. Army Corps of Engineers through Section 404 of the Clean Water Act (33 U.S.C. 1344) and under the jurisdiction of the NC Department of Environment and Natural Resources Division of Water Resources through the Section 401 Water Quality Certification process (NC General Statutes Chapter 143 Article 21, Part 1). Due to the location of the greenway within much of the French Broad River floodplain, it is likely that it will cross either streams or wetlands that can be claimed as jurisdictional. Any of these jurisdictional waters that require fill, culverts, or bridge footings within those waters, will require a Section 404/401 Water Quality Certification. As part of the certification process, the design will need to show avoidance and minimization of impacts where practicable.

Best management practices for erosion control would be used to re-stabilize the disturbed area and prevent soil erosion.

Human Environment

Right of Way

In addition to placing greenways adjacent to waterways, it is also common to develop them in right of ways owned by public entities. In addition to private and publicly owned property, there is a large amount of right of way owned by NCDOT and the Metropolitan Sewerage District of Buncombe County (MSD) within the study area. The extent of right of way owned by NCDOT varies in width and is dependent on both the type of road and its control of access. The MSD owns sewer easements within the corridor that may also be used. Coordination with both NCDOT and MSD will be required to locate a greenway within their easements or right of way.

On-road connections may be required to link separate segments of the greenway system. These connections may result in re-striping of roadways, expanded shoulders, sidewalks or multi-use paths to protect greenway users and vehicular traffic. Again, coordination with NCDOT would be required. To provide an on-road connection with the Blue Ridge Parkway, coordination with the National Park Service would be required.

Bridges

As previously discussed, the French Broad River, Blue Ridge Parkway and other roads are found within the study area. Although the proposed alignment alternatives were designed to minimize the need for bridge crossings of the river and other streams it is not possible to avoid them completely and still connect the greenway to areas of interest. Three locations where the greenway alignment may cross the river are:

- 1) I-26
- 2) West of I-26 along the existing bridge on Long Shoals Road
- 3) The Blue Ridge Parkway

I-26 bridges crossing the French Broad River will be replaced with the I-4700 project and any alternative crossing at this location would need to be coordinated through project development and final design stages (current schedule in the 2016-2025 STIP shows ROW in 2018 and Construction in 2020 – subject to change).

There is the potential to utilize the new I-26 bridge over the French Broad River by cantilevering a pedestrian bridge onto the bridge. An



Pedestrian and bicycle bridge above the Brooklyn Bridge, New York City, NY



Pedestrian and bicycle path adjacent to the Tacoma Narrows Bridge, Washington

engineering study would be required to determine if the bridge has sufficient strength to hold the additional structure. Additional requirements include a no impact/no-rise to the floodway study. On greenway and trail projects, a Federal Emergency Management Agency (FEMA) no-rise certification is needed whenever modifications are made in the floodway. Bridges over mapped streams, as well as the French Broad River, would trigger the need for a no-rise analysis and report at each crossing. The FEMA no-rise report demonstrates, using modeling of FEMA stream data to reflect proposed changes in the floodway, that there is no increase in the water depth during a 100-year storm event. If the disturbance does cause a rise in the 100-year storm stream flood level, then a FEMA CLOMR (Conditional Letter of Map Revision prior to construction) and LOMR (Letter of Map Revision done

post-construction) is required. Because of both the expense and project delay associated with CLOMR and LOMR, the detailed final designs for the greenway should endeavor to incorporate design elements that will meet the no-rise requirement and not trigger the more expensive and lengthy CLOMR permitting process. On Long Shoals Road, a bridge retrofit to allow pedestrian access may require bridge widening. The additional width may be obtained by widening or restriping lanes. This retrofit design should provide a physical separation from the pathway and vehicle lane.

Other Infrastructure

Although the greenway is largely designed within undeveloped natural areas of the study area, it will encounter infrastructure. This additional infrastructure may include roads, water and sewer lines, drainage structures (culverts and pipes), electrical, fiber optic, cable, and telephone utility lines above and below ground. Coordination with the individual utilities and NCDOT will be necessary. This coordination should begin early in the design phase.

Design Criteria and Exceptions

The design criteria utilized for the design of the greenway are included in Appendix A. This criteria worksheet lists the minimum criteria used throughout the project. Among the criteria are curve radius and landing spacing, described below.

Curve Radius

The minimum radius per NCDOT Bicycle and Pedestrian Greenway Design Guidelines is 90 feet, which is recommended in the design criteria workbook. However, a 2013 Value Engineering Report recommended smaller radii be allowed in areas that are topographically and environmentally sensitive.

Landing Spacing

Different design manuals outline the various requirements for providing level landings after areas with steep slopes. In general, the steepest slope allowed is 5 percent unless the path is parallel to an existing roadway with steeper slopes. In that instance, the slope may be as steep as, but not steeper than, the adjacent roadway.

Some manuals allow for steeper slopes with landings at different spacings depending on the slope used. However, it is understood that future ADA requirements, as outlined in the US Access Board's Supplemental Notice of Proposed Rulemaking (SNPRM), will only allow a 5 percent maximum slope unless parallel to a steeper roadway.

No landings are anticipated at this phase of the project's development.

ALIGNMENT ALTERNATIVES

Three alternative alignments were originally proposed that took different paths from NC 191 to NC 146. They were split into segments at each decision point to allow the stakeholders to have a broader range of possibilities to choose from. The following table describes the individual proposed segments that would make up the full length of the greenway as shown in Figure 2.

Table 1. Segment Descriptions








Segment	Limits	Description	Comments
 1	East side of NC 191, from north of I-26 to just south of I-26. Approximately 2,700'.	10' hard surface path within the right of way of NC 191.	Connects to future Farmer's Market greenway connection. <u>Common to all alternatives.</u>
 2	East side of NC 191, from south of I-26 to Ridgefield Boulevard. Approximately 2,570'.	10' hard surface path within the right of way of NC 191.	Provides access to outlet mall and other businesses along NC 191.
 3	East Side of Ridgefield Boulevard and Ridgefield Court, from NC 191 to southeast of Ridgefield Court near I-26. Approximately 4,690'.	10' hard surface path within the right of way of Ridgefield Boulevard and Ridgefield Court 10' hard surface path on new alignment.	Provides access to business parks along Ridgefield Boulevard.
 4	Eastern perimeter of Asheville Outlets, from NC 191 to southeast of Ridgefield Court near I-26. Approximately 5,430'.	10' hard surface path near outlet mall. 10' hard surface path on new alignment.	Provides access to outlet mall.
 5	East side of NC 191 and Dry Ferry Road, from intersection with Ridgefield Boulevard to intersect Segments 7 or 8 near Boring Mill Branch. Approximately 8,570'.	10' hard surface path within right of way along NC 191 and Dry Ferry Road. 10' hard surface path near Boring Mill Branch.	Provides access to businesses along NC 191.
 6	West side of I-26, outside of the controlled access right of way, from the southeast of Ridgefield Court to the north side of the French Broad River. Approximately 4,190'.	10' hard surface path on new alignment.	Limited access points and isolated. Lack of scenic views.
 7	Western bank of the French Broad River, from the southern end of Segment 6 to the intersection with Segment 5, near Boring Mill Branch. Approximately 2,850'.	10' hard surface path on new alignment.	Scenic views and potential river access.
 8	Western bank of the French Broad River, from Boring Mill Branch to the intersection with Blue Ridge Parkway. Approximately 3,220'.	10' hard surface path on new alignment.	Scenic view, potential river access, and access to Bent Creek River Park.

Table I. Segment Descriptions

Segment	Limits	Description	Comments
9	Eastern bank of the French Broad River, from end of Segment 6, north of the French Broad River, crossing to the eastern bank of the river to north of the Blue Ridge Parkway. Utilizes MSD easement where possible. Approximately 5,300'.	Bridge over the French Broad River. 10' hard surface path on new alignment.	Scenic view and potential river access. Limited access points and isolated.
10	Connection from eastern bank of the French Broad River to the Blue Ridge Parkway. Approximately 3,530'.	10' hard surface path on new alignment.	Scenic view and Blue Ridge Parkway access. Steep grades and potentially isolated.
11	North side of the Blue Ridge Parkway, from the intersection with Brevard Road to the intersection with segment 10. Approximately 3,570'.	10' hard surface path parallel to Blue Ridge Parkway. Widen Parkway bridge of French Broad River.	Scenic views and steep grades.
12	Eastern bank of the French Broad River, from north of the Blue Ridge Parkway to west of the I-26 underpass. Utilizes MSD easement where possible. Approximately 11,320'.	10' hard surface path on new alignment.	Scenic river views, potential river access, but isolated.
13	Western bank of the French Broad River and north side of Long Shoals Road, from Blue Ridge Parkway to the intersection with Schenk Parkway. Approximately 16,240'.	10' hard surface path on new alignment, 10' hard surface path in Long Shoals Road right of way, and bridge widening across river.	Scenic view, potential river access, and multiple access points.
14	North side of the Blue Ridge Parkway and along new alignment following contours, from east of the French Broad River at segment 10 to east of I-26. Approximately 9,637'.	10' hard surface path parallel to Blue Ridge Parkway. 10' hard surface path on new alignment.	Scenic view, access to Blue Ridge Parkway and Mountains to Sea Trail. Limited access points and isolated.
15	New alignment and east side of Schenck Parkway and Schenck Crest, from east of I-26 to Long Shoals Road. Utilizes an existing MSD easement for a portion of the segment. Approximately 5,270'.	10' hard surface path on new alignment. 10' hard surface path in Schenck Parkway/Crest right of way.	Lack of scenic views, but many potential access points. Provides access to the Biltmore Park Town Square.

Table I. Segment Descriptions

Segment	Limits	Description	Comments
16	South side of Long Shoals Road, from Schenck Parkway intersection to Lake Julian Park. Approximately 3,810'.	10' hard surface path in Long Shoals Road right of way. 10' hard surface path in new alignment to access Park.	Connects to Lake Julian Park and businesses along Long Shoals Road. <u>Common to all alternatives.</u>
17	West side of I-26, from south of the French Broad River to west of the I-26 underpass. Approximately 11,080'.	10' hard surface path on new alignment.	Lack of scenic views and steep grades. Limited access points and isolated.
18	West side of I-26, from west of the I-26 underpass to Long Shoals Road. Approximately 3,710'.	10' hard surface path on new alignment.	Scenic river views and potential river access.

PUBLIC INVOLVEMENT

A steering committee was developed to help guide the planning process of the greenway. The steering committee included members from the following organizations:

- Biltmore Estate
- Biltmore Farms
- Buncombe County
- Blue Ridge Parkway
- Citizen Representative
- City of Asheville
- Friends of Connect Buncombe
- NC Arboretum
- NCDOT – Division of Bike and Pedestrian Transportation
- NCDOT – Division 13
- RiverLink

Steering committee meeting #1, held January 26, 2015, members were introduced to the project and asked for input on three draft greenway alignments. Issues concerning the proposed alignments included:

- Adding a greenway on the Biltmore property may be difficult because it is a historic property and is a Section 106 and 4(f) resource.
- Greenway alignment may be able to use the culvert at Asheville Outlets.
- Pockets of land along a potential greenway corridor should be identified for possible future purchase.
- Additional coordination with the National Park Service for possible Blue Ridge Parkway connection.
- A new I-26 and Blue Ridge Parkway bridge will be constructed as part of STIP I-4700.
- STIP I-5504, Brevard Road interchange typical section allows for bicycle and pedestrian use.

A **public meeting** was held for the project on March 23, 2015 from 4:00 p.m. to 6:00 p.m. The purpose of the meeting, which was led by Buncombe County and NCDOT Division 13 staff, was to allow the public an opportunity to review the different alignment segments proposed for the study and provide feedback to help determine the overall preferred alignment. Approximately 190 citizens attended the meeting. Materials provided at the meeting are included in Appendix B. Ninety-two comment sheets were returned during the meeting and an additional 30 comments were

submitted by mail or e-mail during the comment period, ending on April 6, 2015. All comments are on file with NCDOT and are summarized in Table 2. Commenters listed their preferred segment configuration and other concerns for the greenway. Common themes in the comments included:

- Safety, particularly when using I-26 or NC 146 (Long Shoals Road) to cross the French Broad River;
- High priority connections to neighborhoods, businesses, AB Tech Enka site, NC Arboretum, the Blue Ridge Parkway, and Bent Creek Park;
- Isolation of the greenway in some segments;
- Request for the fewest number of roadway crossings possible;
- Request for river access points for boating; and
- Consider using underpass on Segment I instead of the NC 191/I-26 interchange.

The most popular routes chosen in the comments were:



These three pathways were further analyzed and are shown in Table 2.

Table 2. Complete Path Analysis Matrix

Path	Segments	Segment Combination	Description	Length of Path	Existing easements or right of way available	Public Support	Aesthetics	Topography	Floodplain Impacts	Public Access	Commercial Access/Economic Development	Vehicular Conflicts	Comment
A			East side of NC 191, from north of I-26 to just south of I-26; to eastern perimeter of Asheville Outlets and the western side of I-26 to the French Broad River. The path then proceeds along the western bank of the French Broad River to the Long Shoals Road crossing at NC 146. The path crosses the river and I-26 on the north side of NC 146 and crosses the highway at the Schenck Parkway intersection. The path then proceeds along the south side of NC 146 to Lake Julian Park.	7.28 mi	NC 191 and NC 146 public right of way available. Some opportunity to utilize publicly owned parcels along the western bank of the French Broad River.	Highest	High	Favorable	High	High	High	Medium	This alternative received the most public support and provides high levels of access to the public. This alternative is similar to Path C.
B			East side of NC 191, from north of I-26 to Dry Ferry Road, and along Dry Ferry Road to Boring Mill Branch. The path then proceeds along the western bank of the French Broad River to the Long Shoals Road crossing at NC 146. The path crosses the river and I-26 on the north side of NC 146 and crosses the highway at the Schenck Parkway intersection. The path then proceeds along the south side of NC 146 to Lake Julian Park.	7.03 mi	NC 191 and NC 146 public right of way available. Some opportunity to utilize publicly owned parcels along the western bank of the French Broad River.	2nd Highest	Medium	Favorable	High	Highest	Highest	Highest	This alternative received the 2nd most public support and provides the highest level of access to the public. However, this alternative also has the highest number of vehicular and pedestrian conflicts.
C			East side of NC 191, from north of I-26 to just south of I-26; to the eastern perimeter of Asheville Outlets and the western side of I-26 to the French Broad River. The path then proceeds along the western bank of the French Broad River to the Long Shoals Road crossing at NC 146. The path crosses the river and then turns north along the eastern bank of the river to the existing underpass of I-26. The path then goes under I-26 and proceeds along Schenk Parkway to the south side of Long Shoals Road and ultimately to Lake Julian Park.	8.94 mi	NC 191 and NC 146 public right of way available. Some opportunity to utilize publicly owned parcels along the western and eastern banks of the French Broad River.	3rd Highest	High	Unfavorable: little space and steep grades between I-26 and the French Broad River.	High	High	High	Medium	This alternative is very similar to Path A. The key difference is that Path C bypasses the SPU interchange crossing at Long Shoals Road and I-26. This alternative is unfeasible due to a lack of area and unfavorable topography between I-26 and the French Broad River.
Color Coding:	Highly Favorable		Favorable	Potential Problem	Unfavorable								

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A **second steering committee meeting** was held on May 5, 2015. The top three alternatives, as well as an additional Alternative A*, were discussed. Alternative A* is a variation on Alternative A and is an option if land becomes more accessible due to development on the east side of the river. The steering committee raised questions including:

- *Do any property owners oppose any of the segments?* A property owner in Segment 6 has expressed concern.
- *What effect would the Map Act have on the greenway study?* None, the County does not intend to file the designs with the county court.
- *What would the NPS require for Segment 13 to cross the Blue Ridge Parkway?* The greenway is likely to cross under the Parkway making it a non-issue. Otherwise, someone with the Park Service could assist in determining the best place to cross.

Based on the more detailed analysis of the three routes, the steering committee chose **Path A** as the preferred alternative.

PREFERRED ALTERNATIVE

Potentially Impacted Properties

As shown on Figure 3, the preferred alternative is located to the west of I-26. While every effort was made to design the greenway in public right of way, the topography and other factors necessitate it crossing private property. Fee simple purchase is recommended for acquiring right of way and temporary easements are recommended for the construction easements.

There is a potential to realign the greenway between the Outlet Mall and Ridgefield Court within the existing control of access right of way. This realignment would shorten the length of the greenway, potentially avoid some impacts to commercial properties, and avoid some conflicts with motor vehicles. Additional discussions with FHWA will determine the feasibility of this option.

Cost Estimates

The cost of the greenway will be influenced by many different factors. These factors include the cost of petroleum products and other commodity costs, right of way 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 cost. 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, professional services and others are estimated on a per mile basis or as a percentage of construction cost. Contingencies of 15 percent on the structures costs and 45 percent on the roadway items costs capture some of these unquantifiable pay items and the general uncertainty associated with the project at this early phase of development.

Detailed functional design level cost estimates are included in Appendix C for the entire length of the project and Segments 4, 6, 7, 8, 13, and 16, which together make up Path A.

The current construction cost estimate is \$9,532,795. This estimate is outlined in Tables 3 and 4 by segment and cost components.

Table 3. Construction Cost Estimate by Segment

Segment	Total \$	Calculated Cost per Mile by Segment
Segment 4	\$2,693,665	\$2,615,210
Segment 6	\$808,750	\$825,260
Segment 7	\$317,620	\$721,860
Segment 8	\$912,100	\$1,425,160
Segment 13	\$4,357,605	\$1,410,230
Segment 16	\$443,055	\$418,000
Total	\$9,532,795	

Table 4. Construction Cost Estimate by Cost Component

Cost Components	Total \$	Calculated Cost per Mile (7.24 miles)
Civil Items	\$3,772,025	\$521,000/mi
Structural Items (walls/bridges)	\$2,451,570	\$338,600/mi
Contingencies	\$2,065,600	\$285,300/mi
Engineering & Construction Services	\$1,243,600	\$171,800/mi
Total	\$9,532,795	\$1,316,700/mi

The estimated cost and cost per mile of this greenway facility is higher than comparable facilities due to several factors. The most influential is the high cost of structures associated with the crossing of the French Broad River in Segment 13 and retaining walls required to maintain a maximum five percent grade between NC 191 and the Outlet Mall parking lot in Segment 4. Other contributing factors include large amounts of earthwork and the pedestrian safety rail that are required due to the mountainous topography of the area.

As described in the next section, there may be opportunities to realize cost savings by coordinating with adjacent NCDOT projects. The bulk of those savings would be from a potential reduction in the cost of earthwork, safety rail and retaining wall structures.

To enhance the overall experience of the greenway, it is recommended that emergency services be added to the proposed greenway. Many greenways are currently adding mile marker signs placed at quarter-mile increments to allow greenway users to describe their location during an emergency call. This will allow responders to more quickly arrive at the location. The construction cost for this item was included in the per mile cost for Pavement Marking/Signing. In more advanced stages of design, the cost will be split into its components.

Coordination Opportunities

The proposed greenway crosses other projects that are scheduled for design and construction in the near future. The two most prominent projects include I-4700 (I-26 Widening and Reconstruction from NC 280 to I-40) and U-3403B (NC 191 Widening from NC 146 to north of the Blue Ridge Parkway). Where the greenway interfaces with the roadway projects there may be opportunities to coordinate efforts between Buncombe County and NCDOT during project development and final design phases of the projects prior to ROW acquisition and construction.

The greenway project is parallel to I-4700 for approximately 4,200 feet from just east of Ridgefield Court to north of the French Broad River. Along this area, it is possible that Buncombe County could coordinate final and preliminary design and construction activities that could provide some savings to the County at minimal additional cost to NCDOT. These savings could come in the form of reduced grading and easier access during greenway construction.

Right of way acquisition for I-4700 is scheduled to begin in fiscal year (FY) 2018 and construction is scheduled to begin in FY 2020 (subject to change). A public hearing is tentatively scheduled to be held in late 2015. The public will be given an opportunity to make comments and may suggest that the two projects be coordinated.

Greater opportunities for cost savings could arise from coordination during the design of U-3403B. The greenway's current design is parallel to NC 191 for approximately 4,100 feet. By coordinating the designs of these two facilities, Buncombe County could significantly reduce the amount of earthwork, retaining walls and handrails required for the greenway.

Right of way acquisition for U-3403B is scheduled to begin in FY 2022 and construction is scheduled to begin in FY 2024 (subject to change). Planning, NEPA and design have not yet been scheduled.

CONCLUSION and NEXT STEPS

This feasibility study has determined that there is broad support for the greenway, both for recreation as well as transportation needs. The preferred alternative was chosen based on public preference, as well as analysis by the steering committee of the path that would best meet the needs of Buncombe County.

This project is not currently funded by either Buncombe County or NCDOT and will likely take several years to complete. However, funding mechanisms to consider may include:

- public/private partnerships;
- adding on-street greenway access at the time of NCDOT roadway improvement projects;
- use of the FEMA buy-out program for properties within the floodplain; and
- other traditional government funding mechanisms, such as bonds.

The amount of funding available will depend on the priority level this project receives from the County. In the interim, the County may consider adopting an outreach strategy to land owners for property acquisition for the greenway.

As this project is advanced to future stages of design and construction, the following activities will need to be considered by Buncombe County to advance the project:

- NEPA Document if Federal funds are used
- SEPA Document if state funds are used
- Preliminary and Final Design
- 401/404 Permits
- No-Rise Certification
- NCDENR Erosion Control Permit
- NCDOT Right of Way Encroachment Permit
- Right of Way Acquisition
- Construction Administration
- Construction Inspection

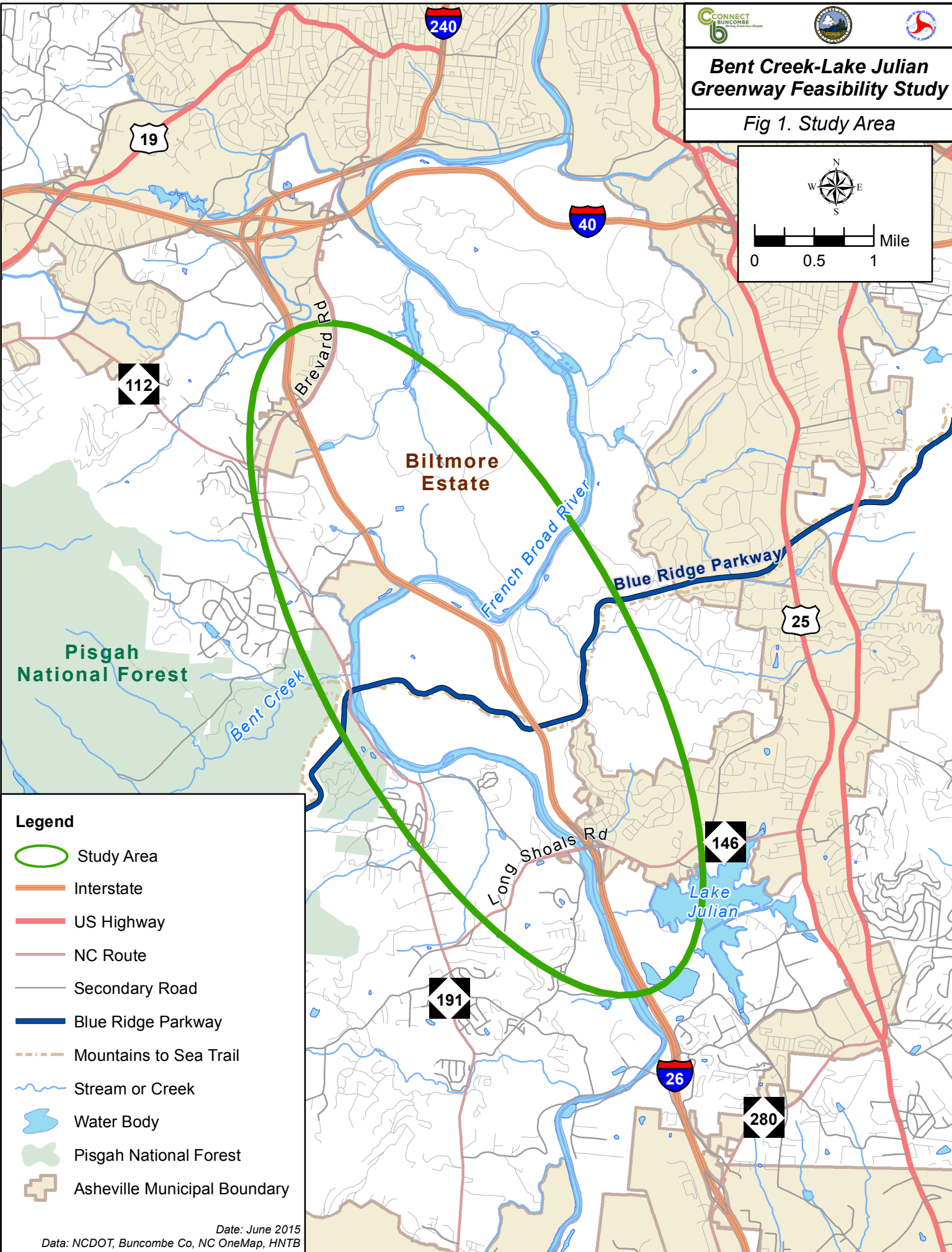
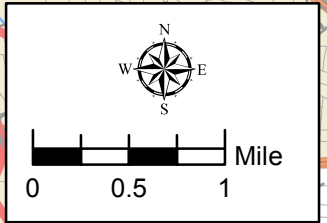
SOURCES

- Barcklow, Cynthia. Buncombe County Floodplain Administrator. Personal communication June 2015.
- Barcklow, Cynthia. Buncombe County Floodplain Administrator. Personal communication April 2015.
- Buncombe County. *Buncombe County Greenways and Trails Master Plan*. August 2012.
- Buncombe County. Flood Damage Prevention Ordinance. County Code of Ordinances, Chapter 34. Accessed April 2015.
- City of Asheville. Steep Slope Ordinance. Municipal Code Ch. 8, Article XII, Sec. 7-12-4.
- Goodson, Mike. Buncombe County Stormwater Manager. Personal communication June 2015.
- NC Division of Mitigation Services. Local Watershed Plan for the French Broad River Basin. January 2006.

FIGURES

Bent Creek-Lake Julian Greenway Feasibility Study

Fig 1. Study Area



Legend

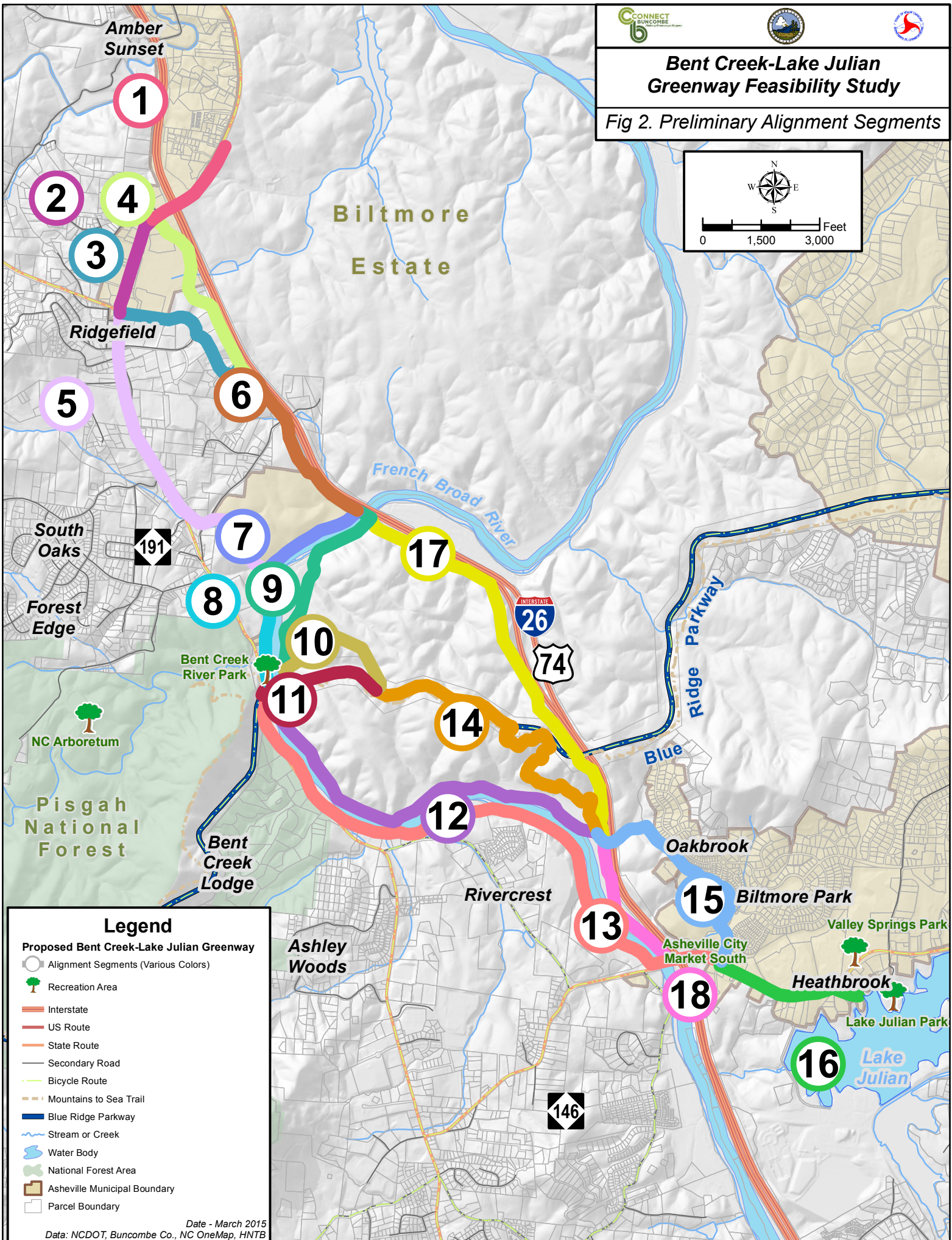
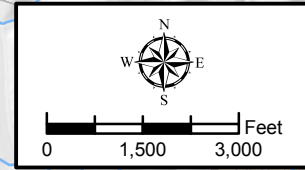
- Study Area
- Interstate
- US Highway
- NC Route
- Secondary Road
- Blue Ridge Parkway
- Mountains to Sea Trail
- Stream or Creek
- Water Body
- Pisgah National Forest
- Asheville Municipal Boundary

Date: June 2015

Data: NCDOT, Buncombe Co, NC OneMap, HNTB

Bent Creek-Lake Julian Greenway Feasibility Study

Fig 2. Preliminary Alignment Segments



Legend

Proposed Bent Creek-Lake Julian Greenway

○ Alignment Segments (Various Colors)

🌳 Recreation Area

🛣️ Interstate

🛣️ US Route

🛣️ State Route

🛣️ Secondary Road

🚲 Bicycle Route

🛤️ Mountains to Sea Trail

🛣️ Blue Ridge Parkway

🌊 Stream or Creek

🌊 Water Body

🌲 National Forest Area

🏠 Asheville Municipal Boundary

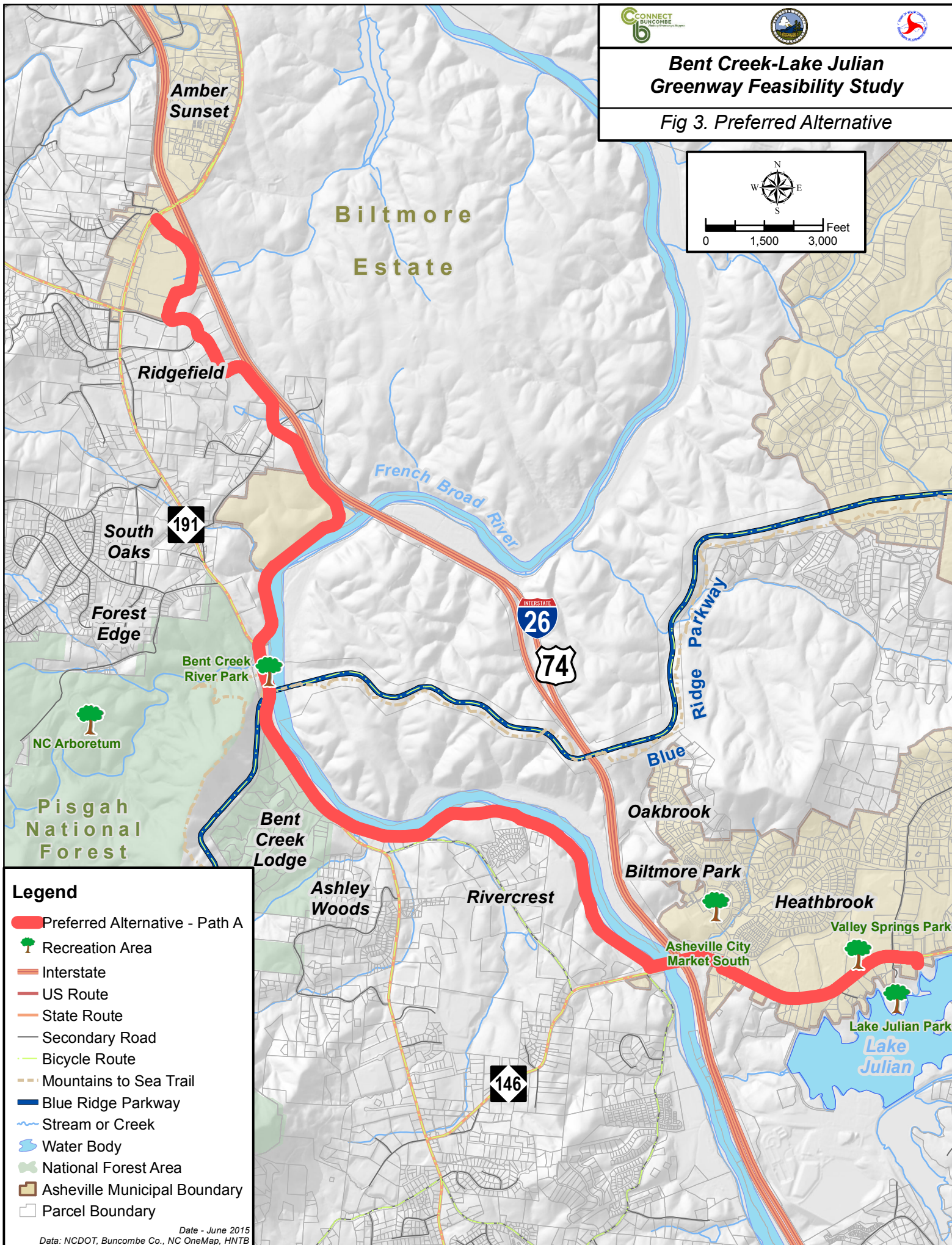
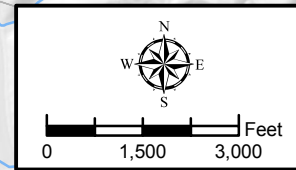
🏠 Parcel Boundary

Date - March 2015

Data: NCDOT, Buncombe Co., NC OneMap, HNTB

Bent Creek-Lake Julian Greenway Feasibility Study

Fig 3. Preferred Alternative



Legend

- █ Preferred Alternative - Path A
- Recreation Area
- █ Interstate
- █ US Route
- █ State Route
- █ Secondary Road
- █ Bicycle Route
- █ Mountains to Sea Trail
- █ Blue Ridge Parkway
- ~ Stream or Creek
- █ Water Body
- █ National Forest Area
- █ Asheville Municipal Boundary
- █ Parcel Boundary

Date - June 2015

Data: NCDOT, Buncombe Co., NC OneMap, HNTB

APPENDIX A

DESIGN CRITERIA

PROPOSED PATH DESIGN CRITERIA

STATE PROJECT: NA
 F. A. PROJECT: NA
 COUNTY: Buncombe
 PROJECT DESCRIPTION: Multiuse Bike Path

TIP: NA

PAGE: 1 of 1

DIVISION: 13

DATE: 7/1/2015

PREPARED BY: HNTB

Line		Reference Notes
Traffic Data		
Classification		
	Paved Multiuse Path	
Design Speed Grade < 4% (mph)	20	NC Bicycle Facilities Planning and Design Guidelines pg. 45
Design Speed Grade ≥ 4% (mph)	30	NC Bicycle Facilities Planning and Design Guidelines pg. 45
Prop. R/W Width (ft)	Varies	
Lane Width (ft)	5', 10' Total	NC Bicycle Facilities Planning and Design Guidelines pg. 42
Shoulder Width (Total)		
Outside w/ Shoulder Slope < 3:1 (ft)	2'	NC Bicycle Facilities Planning and Design Guidelines pg. 43
Outside w/ Shoulder Slope ≥ 3:1 (ft)	5'	NC Bicycle Facilities Planning and Design Guidelines pg. 44
Landings		
Landing Spacings	NA	US Access Board SNPRM
Grade		
Max. (Des)	5%*	NC Bicycle Facilities Planning and Design Guidelines pg. 47
Min.	0.5% Des (0.3% Min)	AASHTO Bike Facility pg. 5-17
Safety Rail Criteria		
Criteria for Utilizing Safety Rail	Slope>3:1, fill>6'	NC Bicycle Facilities Planning and Design Guidelines pg. 52
	Slope>2:1, fill>4'	NC Bicycle Facilities Planning and Design Guidelines pg. 52
	Slope>1:1, fill>3'	NC Bicycle Facilities Planning and Design Guidelines pg. 52
Vertical Clearance		
Desirable (ft.)	10	NC Bicycle Facilities Planning and Design Guidelines pg. 45
Min. (ft.)	8	NC Bicycle Facilities Planning and Design Guidelines pg. 45
Min. Stopping Sight Distance		
Negative Grade < 4% (ft)	195	NC Bicycle Facilities Planning and Design Guidelines pg. 47
Negative Grade ≥ 4% (ft)	385	NC Bicycle Facilities Planning and Design Guidelines pg. 47
Positive Grade < 4% (ft)	140	NC Bicycle Facilities Planning and Design Guidelines pg. 47
Positive Slope Grade ≥ 4% (ft)	255	NC Bicycle Facilities Planning and Design Guidelines pg. 47
Horiz. Align.		
Max. Super	2%	NC Bicycle Facilities Planning and Design Guidelines pg. 45
Min. Radius, Grade < 4% (ft)	95	NC Bicycle Facilities Planning and Design Guidelines pg. 45
Min. Radius, Grade ≥ 4% (ft)	250	NC Bicycle Facilities Planning and Design Guidelines pg. 45
Cross Slopes		
Pavement	2%	NC Bicycle Facilities Planning and Design Guidelines pg. 45

NOTES:

* 5% max grade utilized where possible. In areas where the alignment is parallel to an existing roadway, the Path grade is equal to the adjacent roadway grade.

APPENDIX B

PUBLIC INVOLVEMENT

BUNCOMBE COUNTY & NORTH CAROLINA DEPARTMENT OF TRANSPORTATION



Bent Creek – Lake Julian Greenway Feasibility Study Buncombe County



Public Meeting: March 23, 2015 from 4 p.m. – 6 p.m.

The North Carolina Arboretum - 100 Frederick Law Olmsted Way, Asheville, NC 28806

Purpose and Need of Project

The purpose of this project is to determine the feasibility of a greenway adjacent to, crossing, or in the vicinity of the Interstate-26 Improvements (NCDOT STIP I-4700) project. This feasibility study will select a preferred route alternative for a portion of the planned greenway that is included in the Buncombe County Greenways & Trails Master Plan and create a refined cost estimate for construction. This feasibility study was initiated in late 2014 with a final deliverable due by spring 2015. Deliverables from this study will help inform the I-4700 project and local decisions for constructing the greenway. There is no current plan to fund final design or construction of this facility.

Purpose of Public Meeting

The purpose of this public meeting is to allow the public an opportunity to review the different alignments proposed for study and to provide feedback to the study team (comprised of NCDOT and Buncombe County staff along with a group of community partners) to help determine the overall preferred alignment.

Project Description

The Bent Creek-Lake Julian Greenway Feasibility Study project will analyze various segments of greenway alternatives for portions of both the Bent Creek Corridor and the Lake Julian Corridor as well as newly developed segments. The feasibility study will progress the plan for a greenway in this area from its current long-range status (e.g., need, vision, and destination) to a level where potential engineering issues can be determined. The study will consider and evaluate alternative alignments and identify a preferred alignment for the horizontal placement of the greenway along the full length of the study area. The study area for this project generally follows I-26 and the French Broad River from Long Shoals Road (NC 146) to Brevard Road (NC 191). There is no current plan to fund final design or construction of this facility.

Your Participation

Please participate by viewing the maps on display illustrating the various proposed greenway alignment segments and making your comments and/or questions a part of the public record. Representatives from NCDOT and Buncombe County are available to talk with you, explain the project, and answer your questions. Please write your comments or questions on the comment form and place it in the designated comment box here, leave it with one of the project representatives, or return it by email or mail (see form) by April 6, 2015. *The study team is especially interested in the route that you prefer, so please indicate this on the comment form by listing the numbers of the segments that you would like the greenway route to take from north to south.*

What is Done with the Input?

The study team considers safety, cost, constructability, environmental and social impacts, and public comments in making final decisions. The study team will review all public comments and seek opportunities to resolve the issues raised.

What Happens Next?

Comments received regarding the studied alignments will be considered and incorporated, where feasible, into the selection and development of the preferred alternative.

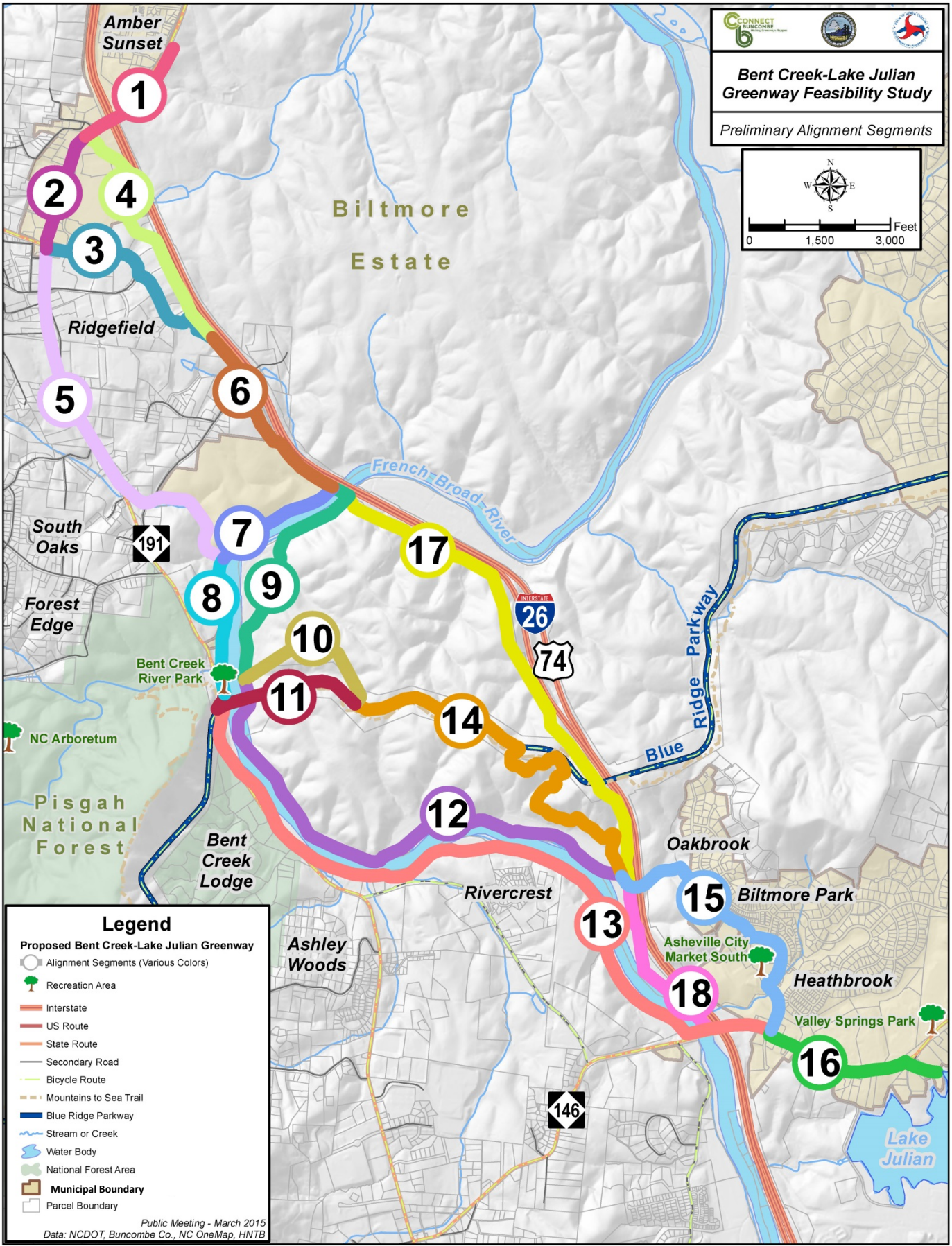
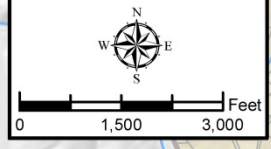
Who are the Project Partners?

Buncombe County and NCDOT (including both Division 13 and the Bicycle and Pedestrian Division staff) are jointly managing the study. The Friends of Connect Buncombe organization and NCDOT are funding partners for the project. Consulting firm HNTB is responsible for technical review and study deliverables. Other local leaders and property owners advise the project team and encourage the public to participate.



**Bent Creek-Lake Julian
Greenway Feasibility Study**

Preliminary Alignment Segments













Legend

Proposed Bent Creek-Lake Julian Greenway

- Alignment Segments (Various Colors)
- Recreation Area
- Interstate
- US Route
- State Route
- Secondary Road
- Bicycle Route
- Mountains to Sea Trail
- Blue Ridge Parkway
- Stream or Creek
- Water Body
- National Forest Area
- Municipal Boundary
- Parcel Boundary

Public Meeting - March 2015
Data: NCDOT, Buncombe Co., NC OneMap, HNTB

Segment	Limits	Description	Comments
 1	South side of NC 191, from north of I-26 to just south of I-26. Approx. 2,700'.	10' hard surface path within the right of way of NC 191.	Connects to future Farmer's Market greenway connection. <u>*Common to all alternatives.</u> Future studies will determine the location of the greenway on the east side of I-26.
 2	South side of NC 191, from south of I-26 to Ridgefield Blvd. Approx. 2,570'.	10' hard surface path within the right of way of NC 191.	Provides access to outlet mall and other businesses along NC 191.
 3	East Side of Ridgefield Blvd and Ridgefield Ct, from NC 191 to southeast of Ridgefield Court near I-26. Approx. 4,690'.	10' hard surface path within the right of way of Ridgefield Blvd and Ridgefield Ct. and on new alignment.	Provides access to business parks along Ridgefield Boulevard.
 4	Eastern perimeter of Biltmore Square Mall, from NC 191 to southeast of Ridgefield Court near I-26. Approx. 5,430'.	10' hard surface path near outlet mall and on new alignment.	Provides access to outlet mall.
 5	East side of NC 191 and Dry Ferry Road, from intersection with Ridgefield Blvd to intersect segment 7/8 near Boring Mill Branch. Approx. 8,570'.	10' hard surface path within right of way along NC 191, Dry Ferry Road and near Boring Mill Branch.	Provides access to businesses along NC 191.
 6	West side of I-26, outside of the controlled access right of way, from the southeast of Ridgefield Ct to the north side of the French Broad River. Approx. 4,190'.	10' hard surface path on new alignment.	Limited access points and isolated. Lack of scenic views.
 7	Western bank of the French Broad River, from the southern end of segment 6 to the intersection with segment 5, near Boring Mill Branch. Approx. 2,850'.	10' hard surface path on new alignment.	Scenic views and potential river access.
 8	Western bank of the French Broad River, from Boring Mill Branch to the intersection with Blue Ridge Parkway. Approx. 3,220'.	10' hard surface path on new alignment.	Scenic view, potential river access, and access to Bent Creek River Park.
 9	Eastern bank of the French Broad River, from end of segment 6, north of the French Broad River, crossing to the eastern bank of the river to north of the Blue Ridge Parkway. Utilizes an existing utility easement where possible. Approx. 5,300'.	10' hard surface path on new alignment and crossing over the French Broad River.	Scenic view and potential river access. Limited access points and isolated.
 10	Connection from eastern bank of the French Broad River to the Blue Ridge Parkway. Approx. 3,530'.	10' hard surface path on new alignment.	Scenic view and Blue Ridge Parkway access. Steep grades and potentially isolated.

Segment	Limits	Description	Comments
11	North side of the Blue Ridge Parkway, from the intersection with Brevard Road to the intersection with segment 10. Approx. 3,570'.	10' hard surface path parallel to Blue Ridge Parkway. Includes crossing over the French Broad River.	Scenic views and steep grades.
12	Eastern bank of the French Broad River, from north of the Blue Ridge Parkway to west of the I-26 underpass. Utilizes an existing utility easement where possible. Approx. 11,320'.	10' hard surface path on new alignment.	Scenic river views, potential river access, but isolated.
13	Western bank of the French Broad River and north side of Long Shoals Road, from Blue Ridge Parkway to the intersection with Schenk Parkway. Approx. 16,240'.	10' hard surface path on new alignment and in Long Shoals Road right of way, and crossing over the French Broad River.	Scenic view, potential river access, and multiple access points.
14	North side of the Blue Ridge Parkway and along new alignment following contours, from east of the French Broad River at segment 10 to east of I-26. Approx. 9,637'.	10' hard surface path parallel to Blue Ridge Parkway and on new alignment.	Scenic view, access to Blue Ridge Parkway and Mountains to Sea Trail. Limited access points and isolated.
15	New alignment and east side of Schenk Parkway and Schenck Crest, from east of I-26 to Long Shoals Road. Utilizes an existing utility easement for a portion of the segment. Approx. 5,270'.	10' hard surface path on new alignment and in Schenk Parkway/Crest right of way.	Lack of scenic views, but many potential access points. Provides access to the Biltmore Park Town Square.
16	South side of Long Shoals Road, from Schenk Parkway intersection to Lake Julian Park. Approx. 3,810'.	10' hard surface path in Long Shoals Road right of way and on new alignment to access Park.	Connects to Lake Julian Park and businesses along Long Shoals Road. <u>*Common to all alternatives.</u>
17	West side of I-26, from south of the French Broad River to west of the I-26 underpass. Approx. 11,080'.	10' hard surface path on new alignment.	Lack of scenic views and steep grades. Limited access points and isolated.
18	West side of I-26, from west of the I-26 underpass to Long Shoals Parkway. Approx. 3,710'.	10' hard surface path on new alignment.	Scenic river views and potential river access.

COMMENT FORM

Bent Creek – Lake Julian Greenway Feasibility Study

Buncombe County

PUBLIC MEETING – MARCH 23, 2015

NAME:

ADDRESS:

EMAIL ADDRESS:

Please list the segment numbers for the route that you prefer from north to south and include any comments or questions that may assist the study team in developing a preferred greenway alternative:

Comments may be returned by April 6, 2015 to:

Lauren Blackburn, AICP, Director
NCDOT – Bicycle and Pedestrian Division
MSC 1552
Raleigh, NC 27699-1552
Email: lblackburn2@ncdot.gov

PLACE
STAMP
HERE



ATTN: Lauren Blackburn, AICP, Director
NCDOT – Bicycle and Pedestrian Division
MSC 1552
Raleigh, NC 27699-1552

APPENDIX C

COST ESTIMATE

North Carolina Department of Transportation
Preliminary Estimate

TIP No. N/A
 Route Bent Creek - Lake Julian Greenway
 From NC 191 to Lake Julian Park
 Typical Section 10' Wide Greenway

Func

County: Buncombe

CONSTR. COST
\$9,532,795

Prepared By: EWS
 Requested By: KDS

Date 7/17/2015
 Date 6/25/2015

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	20.7	Acre	\$ 10,000.00	\$ 207,000.00
			Earthwork	136,000	CY	\$ 6.00	\$ 816,000.00
			Drainage (Greenway)	7.24	Miles	\$ 16,000.00	\$ 115,840.00
			Fine Grading	82,250	SY	\$ 2.00	\$ 164,500.00
			Pavement Widening	25	SY	\$ 42.00	\$ 1,050.00
			New Pavement	40,890	SY	\$ 22.00	\$ 899,580.00
			Roadway Pedestrian Handrail	16,370	LF	\$ 60.00	\$ 982,200.00
			1'-6" Concrete Curb and Gutter	25	LF	\$ 25.00	\$ 625.00
			Single Face Concrete Barrier Wall	1,110	LF	\$ 85.00	\$ 94,350.00
			Fencing				
			Woven Wire (Remove and Replace)	815	LF	\$ 4.00	\$ 3,260.00
			Erosion Control	25.6	Acres	\$ 12,000.00	\$ 307,200.00
			Upgrade Traffic Signal	3	Each	\$ 10,000.00	\$ 30,000.00
			Traffic Control	3.7	Miles	\$ 25,000.00	\$ 92,500.00
			Pavement Marking/Signing	7.2	Miles	\$ 8,000.00	\$ 57,920.00
			Structures				
			Retaining Wall 127+00 - 136+50 RT (MSE)	16,050.0	SF	\$ 75.00	\$ 1,203,750.00
			Retaining Wall 158+50 - 159+50 LT (Gravity)	750.0	SF	\$ 40.00	\$ 30,000.00
			Retaining Wall 159+50 - 160+09 RT (Gravity)	327.0	SF	\$ 40.00	\$ 13,080.00
			Retaining Wall 290+69 - 305+75 LT (Gravity)	4,392.5	SF	\$ 40.00	\$ 175,700.00
			Retaining Wall 318+27 - 322+55 LT (Gravity)	2,470.0	SF	\$ 40.00	\$ 98,800.00
			Bridge over French Broad River 17.25"W x 449.37'L	7,752.00	SF	\$ 120.00	\$ 930,240.00
			Utility Construction				
			Relocate Existing Water Line		LF	\$	-
			Relocate Existing Sewer Line		LF	\$	-
			Misc. & Mob (15% Strs&Util)				\$ 367,900.00
			Misc. & Mob (45% Functional)				\$ 1,697,700.00

Lgth 7.3 Miles

Contract Cost	\$ 8,289,195.00
E. & C. 15%	\$ 1,243,600.00
Construction Cost	\$ 9,532,795.00

North Carolina Department of Transportation
Preliminary Estimate

TIP No. N/A
 Route Bent Creek - Lake Julian Greenway Segment 4
 From NC 191 to I-26 near Ridgefield Ct
 Typical Section 10' Wide Greenway

Func

County: Buncombe

CONSTR. COST
\$2,693,665

Prepared By: EWS
 Requested By: KDS

Date 7/17/2015
 Date 7/17/2015

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	0.4	Acre	\$ 10,000.00	\$ 4,000.00
			Earthwork	21,590	CY	\$ 6.00	\$ 129,540.00
			Drainage (Greenway)	1.03	Miles	\$ 16,000.00	\$ 16,480.00
			Fine Grading	11,900	SY	\$ 2.00	\$ 23,800.00
			Pavement Widening	25	SY	\$ 42.00	\$ 1,050.00
			New Pavement	5,930	SY	\$ 22.00	\$ 130,460.00
			Roadway Pedestrian Handrail	2,510	LF	\$ 60.00	\$ 150,600.00
			1'-6" Concrete Curb and Gutter	25	LF	\$ 25.00	\$ 625.00
			Single Face Concrete Barrier Wall	1,110	LF	\$ 85.00	\$ 94,350.00
			Fencing				
			Woven Wire (Remove and Replace)	235	LF	\$ 4.00	\$ 940.00
			Erosion Control	3.3	Acres	\$ 12,000.00	\$ 39,600.00
			Upgrade Traffic Signal	0	Each	\$ 10,000.00	\$ -
			Traffic Control	1.1	Miles	\$ 25,000.00	\$ 26,750.00
			Pavement Marking/Signing	1.0	Miles	\$ 8,000.00	\$ 8,240.00
			Structures				
			Retaining Wall 127+00 - 136+50 RT (MSE)	16,050.0	SF	\$ 75.00	\$ 1,203,750.00
			Retaining Wall 158+50 - 159+50 LT (Gravity)	750.0	SF	\$ 40.00	\$ 30,000.00
			Retaining Wall 159+50 - 160+09 RT (Gravity)	327.0	SF	\$ 40.00	\$ 13,080.00
			Utility Construction				
			Relocate Existing Water Line		LF	\$	-
			Relocate Existing Sewer Line		LF	\$	-
			Misc. & Mob (15% Strs&Util)				\$ 187,100.00
			Misc. & Mob (45% Functional)				\$ 281,900.00

Lgth 1.03 Miles

Contract Cost	\$ 2,342,265.00
E. & C. 15%	\$ 351,400.00
Construction Cost	\$ 2,693,665.00

North Carolina Department of Transportation
Preliminary Estimate

TIP No. N/A
 Route Bent Creek - Lake Julian Greenway Segment 6
 From I 26 near Ridgefield Ct to north of French Broad River
 Typical Section 10' Wide Greenway

Func

County: Buncombe

CONSTR. COST
\$808,750

Prepared By: EWS
 Requested By: KDS

Date 7/17/2015
 Date 7/17/2015

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	4.1	Acre	\$ 10,000.00	\$ 41,000.00
			Earthwork	5,750	CY	\$ 6.00	\$ 34,500.00
			Drainage (Greenway)	0.98	Miles	\$ 16,000.00	\$ 15,680.00
			Fine Grading	11,530	SY	\$ 2.00	\$ 23,060.00
			New Pavement	5,750	SY	\$ 22.00	\$ 126,500.00
			Roadway Pedestrian Handrail	3,035	LF	\$ 60.00	\$ 182,100.00
			<u>Fencing</u>				
			Woven Wire (Remove and Replace)	580	LF	\$ 4.00	\$ 2,320.00
			Erosion Control	4.1	Acres	\$ 12,000.00	\$ 49,200.00
			Traffic Control	0.1	Miles	\$ 25,000.00	\$ 2,750.00
			Pavement Marking/Signing	1.0	Miles	\$ 8,000.00	\$ 7,840.00
			<u>Structures</u>				
			<u>Utility Construction</u>				
			Relocate Existing Water Line		LF	\$	-
			Relocate Existing Sewer Line		LF	\$	-
			Misc. & Mob (15% Strs&Util)			\$	-
			Misc. & Mob (45% Functional)			\$	218,300.00

Lgth 0.98 Miles

Contract Cost	\$	703,250.00
E. & C. 15%	\$	105,500.00
Construction Cost	\$	808,750.00

North Carolina Department of Transportation
Preliminary Estimate

TIP No. N/A
 Route Bent Creek - Lake Julian Greenway Segment 7
 From North of French Broad River to Boring Mill Branch
 Typical Section 10' Wide Greenway

Func

County: Buncombe

CONSTR. COST
\$317,620

Prepared By: EWS
 Requested By: KDS

Date 7/17/2015
 Date 7/17/2015

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	2.0	Acre	\$ 10,000.00	\$ 20,000.00
			Earthwork	5,550	CY	\$ 6.00	\$ 33,300.00
			Drainage (Greenway)	0.44	Miles	\$ 16,000.00	\$ 7,040.00
			Fine Grading	5,120	SY	\$ 2.00	\$ 10,240.00
			New Pavement	2,560	SY	\$ 22.00	\$ 56,320.00
			Roadway Pedestrian Handrail	600	LF	\$ 60.00	\$ 36,000.00
			<u>Fencing</u>				
			Erosion Control	2.0	Acres	\$ 12,000.00	\$ 24,000.00
			Pavement Marking/Signing	0.4	Miles	\$ 8,000.00	\$ 3,520.00
			<u>Structures</u>				
			<u>Utility Construction</u>				
			Relocate Existing Water Line		LF	\$	-
			Relocate Existing Sewer Line		LF	\$	-
			Misc. & Mob (15% Strs&Util)			\$	-
			Misc. & Mob (45% Functional)			\$	85,700.00

Lgth 0.44 Miles

Contract Cost	\$ 276,120.00
E. & C. 15%	\$ 41,500.00
Construction Cost	\$ 317,620.00

North Carolina Department of Transportation
Preliminary Estimate

TIP No. N/A
 Route Bent Creek - Lake Julian Greenway Segment 8
 From Boring Mill Branch to Blue Ridge Parkway
 Typical Section 10' Wide Greenway

Func

County: Buncombe

CONSTR. COST
\$912,100

Prepared By: EWS
 Requested By: KDS

Date 7/17/2015
 Date 7/17/2015

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	1.6	Acre	\$ 10,000.00	\$ 16,000.00
			Earthwork	27,310	CY	\$ 6.00	\$ 163,860.00
			Drainage (Greenway)	0.64	Miles	\$ 16,000.00	\$ 10,240.00
			Fine Grading	7,560	SY	\$ 2.00	\$ 15,120.00
						\$	-
			New Pavement	3,780	SY	\$ 22.00	\$ 83,160.00
			Roadway Pedestrian Handrail	3,795	LF	\$ 60.00	\$ 227,700.00
			<u>Fencing</u>				
			Erosion Control	1.6	Acres	\$ 12,000.00	\$ 19,200.00
			Traffic Control	0.3	Miles	\$ 25,000.00	\$ 6,500.00
			Pavement Marking/Signing	0.6	Miles	\$ 8,000.00	\$ 5,120.00
			<u>Structures</u>				
			<u>Utility Construction</u>				
			Relocate Existing Water Line		LF	\$	-
			Relocate Existing Sewer Line		LF	\$	-
			Misc. & Mob (15% Strs&Util)			\$	-
			Misc. & Mob (45% Functional)			\$	246,200.00

Lgth 0.64 Miles

Contract Cost	\$	793,100.00
E. & C. 15%	\$	119,000.00
Construction Cost	\$	912,100.00

North Carolina Department of Transportation
Preliminary Estimate

TIP No. N/A
 Route Bent Creek - Lake Julian Greenway Segment 13
 From Blue Ridge Parkway to the Schenk Parkway Intersection
 Typical Section 10' Wide Greenway

Func

County: Buncombe

CONSTR. COST
\$4,357,605

Prepared By: EWS
 Requested By: KDS

Date 7/17/2015
 Date 7/17/2015

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	12.4	Acre	\$ 10,000.00	\$ 124,000.00
			Earthwork	69,330	CY	\$ 6.00	\$ 415,980.00
			Drainage (Greenway)	3.09	Miles	\$ 16,000.00	\$ 49,440.00
			Fine Grading	34,740	SY	\$ 2.00	\$ 69,480.00
			New Pavement	17,260	SY	\$ 22.00	\$ 379,720.00
			Roadway Pedestrian Handrail	6,430	LF	\$ 60.00	\$ 385,800.00
			<u>Fencing</u>				
			Erosion Control	12.5	Acres	\$ 12,000.00	\$ 150,000.00
			Upgrade Traffic Signal	3	Each	\$ 10,000.00	\$ 30,000.00
			Traffic Control	1.1	Miles	\$ 25,000.00	\$ 28,525.00
			Pavement Marking/Signing	3.1	Miles	\$ 8,000.00	\$ 24,720.00
			<u>Structures</u>				
			Retaining Wall 290+69 - 305+75 LT (Gravity)	4,392.5	SF	\$ 40.00	\$ 175,700.00
			Retaining Wall 318+27 - 322+55 LT (Gravity)	2,470.0	SF	\$ 40.00	\$ 98,800.00
			Bridge over French Broad River 17.25"W x 449.37'L	7,752.00	SF	\$ 120.00	\$ 930,240.00
			<u>Utility Construction</u>				
			Relocate Existing Water Line		LF		\$ -
			Relocate Existing Sewer Line		LF		\$ -
			Misc. & Mob (15% Strs&Util)				\$ 180,800.00
			Misc. & Mob (45% Functional)				\$ 746,000.00

Lgth 3.09 Miles

Contract Cost	\$ 3,789,205.00
E. & C. 15%	\$ 568,400.00
Construction Cost	\$ 4,357,605.00

North Carolina Department of Transportation
Preliminary Estimate

TIP No. N/A
 Route Bent Creek - Lake Julian Greenway Segment 16
 From Schenck Parkway to Lake Julian Park
 Typical Section 10' Wide Greenway

Func

County: Buncombe

CONSTR. COST
\$443,055

Prepared By: EWS
 Requested By: KDS

Date 7/17/2015
 Date 7/17/2015

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	0.2	Acre	\$ 10,000.00	\$ 2,000.00
			Earthwork	6,470	CY	\$ 6.00	\$ 38,820.00
			Drainage (Greenway)	1.06	Miles	\$ 16,000.00	\$ 16,960.00
			Fine Grading	11,400	SY	\$ 2.00	\$ 22,800.00
			New Pavement	5,610	SY	\$ 22.00	\$ 123,420.00
			<u>Fencing</u>				
			Erosion Control	2.1	Acres	\$ 12,000.00	\$ 25,200.00
			Traffic Control	1.1	Miles	\$ 25,000.00	\$ 27,975.00
			Pavement Marking/Signing	1.1	Miles	\$ 8,000.00	\$ 8,480.00
			<u>Structures</u>				
			<u>Utility Construction</u>				
			Relocate Existing Water Line		LF	\$	-
			Relocate Existing Sewer Line		LF	\$	-
			Misc. & Mob (45% Functional)				\$ 119,600.00

Lgth 1.06 Miles

Contract Cost	\$	385,255.00
E. & C. 15%	\$	57,800.00
Construction Cost	\$	443,055.00