



RICHLAND CREEK GREENWAY FEASIBILITY STUDY



DEVELOPED BY:



EQUINOX
balance through proper planning





ACKNOWLEDGEMENTS

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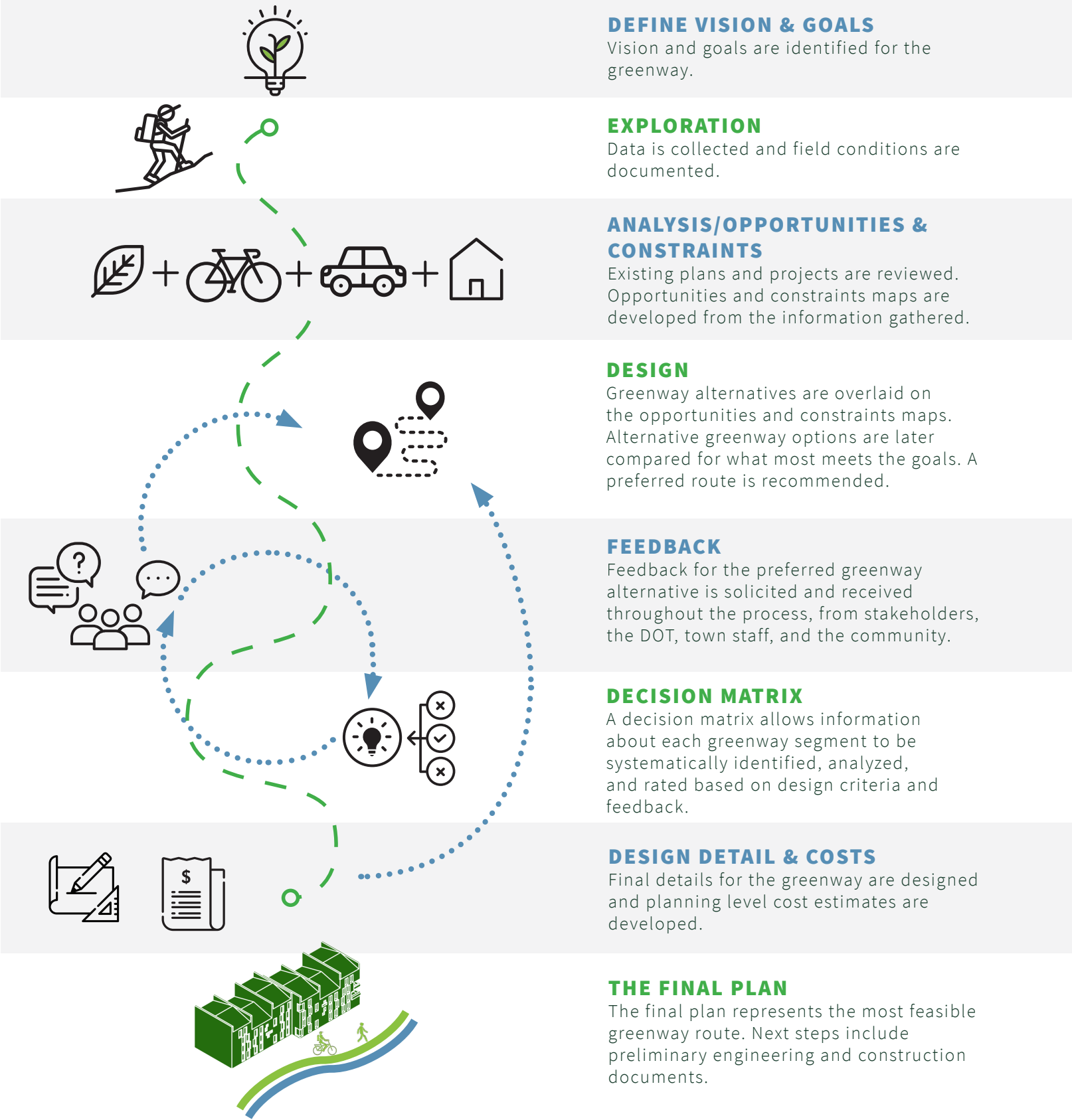
A special thank you to...

Several adjacent landowners for openly communicating with the Equinox team through the life of this project. Your input was invaluable in this process.



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The Greenway Feasibility Study Process



DEFINE VISION & GOALS
Vision and goals are identified for the greenway.

EXPLORATION
Data is collected and field conditions are documented.

ANALYSIS/OPPORTUNITIES & CONSTRAINTS
Existing plans and projects are reviewed. Opportunities and constraints maps are developed from the information gathered.

DESIGN
Greenway alternatives are overlaid on the opportunities and constraints maps. Alternative greenway options are later compared for what most meets the goals. A preferred route is recommended.

FEEDBACK
Feedback for the preferred greenway alternative is solicited and received throughout the process, from stakeholders, the DOT, town staff, and the community.

DECISION MATRIX
A decision matrix allows information about each greenway segment to be systematically identified, analyzed, and rated based on design criteria and feedback.

DESIGN DETAIL & COSTS
Final details for the greenway are designed and planning level cost estimates are developed.

THE FINAL PLAN
The final plan represents the most feasible greenway route. Next steps include preliminary engineering and construction documents.

Table of Contents

Executive Summary.....	1
Chapter 1: Introduction.....	2
Vision & Goals	3
Relevant Planning Efforts Summary	3
Chapter 2: Existing Conditions.....	8
Existing Conditions Summary	9
Opportunities & Constraints	12
Chapter 3: Initial Design & Alignment Decision Matrix	17
Alignment Decision Matrix	18
Alternatives Alignments Maps	19
Greenway Typologies	21
Chapter 4: Public Engagement.....	23
Process Engagement Process Summary	24
Example of Online Survey Results	25
Chapter 5: Greenway Design.....	26
Detailed Design Maps	27
Greenway Amenities & Design	31
Ecosystem Restoration	33
Phasing/ Probable Costs	35
Appendix A: Detailed Online Public Survey Results.....	38
Appendix B: Communication Summaries	41
Appendix C: Detailed Cost Estimates	43
Appendix D: Raccoon Creek Studies	47

EXECUTIVE SUMMARY

The Big Idea

The proposed 1.4-mile section of the Richland Creek Greenway will connect two important community locations in the Town of Waynesville, while traversing unique wetland pockets and riparian and ridgeline forest. This extension will provide much needed access from the Waynesville Recreation Park all the way to Lake Junaluska and will be a part of the regional Hellbender Trail.

To the west, the proposed greenway will connect via a bridge across Richland Creek to the existing Vance Street Park and the Waynesville Recreation Center. To the east, connections will be made to the Waynesville Industrial Park and tie into the existing trail to Lake Junaluska. When built, the segment will provide future opportunity to connect to Junaluska Elementary School. This Richland Creek Greenway segment is critical to the interconnection of pedestrians and bicyclists in a continuously developing Haywood County.

Challenges

With opportunity comes some challenge. While only 1.4 miles, this greenway corridor faces the challenges of steep mountainous terrain, major road crossings (Howell Mill Road), utility ROW constraints, and a railway crossing (Blue Ridge Southern Railway). Development constrains the ability to use the Richland Floodplain in some areas. There is little public land in this corridor, creating some up-front time investment in working with landowners to secure a permanently protected greenway corridor.

The Proposed Trail Sections

This plan proposes approximately one mile of greenway that will include a variety of trail types, from natural surface to paved greenways:

Town of Waynesville property: Includes trail connection across Richland Creek to Vance Park, and includes an accessible greenway walking loop with exercise stations, picnic area, benches, fishing access along the creek, and a trailhead complete with a parking lot.

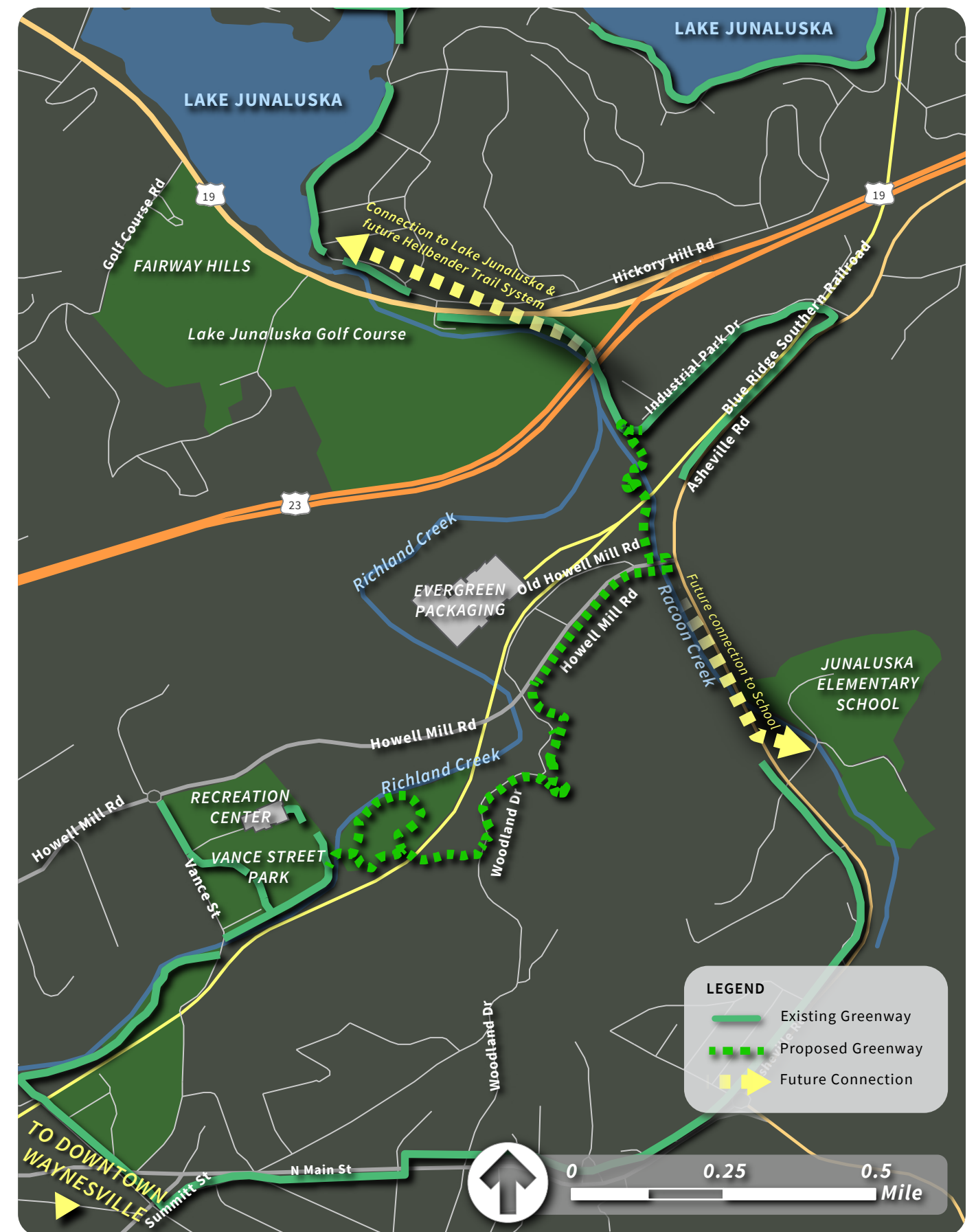
Woodland Drive: Includes traversing the steep mountainous terrain around Woodland Drive, a frequently utilized shortcut for local drivers. This section will bring users into forested areas and off of concrete sidewalks on busy roadways.

Howell Mill Road: Includes safely sharing a corridor with a newly revamped Howell Mill Road, including creating safe road and intersection crossings.

Raccoon Creek and potential for future connections: The undeveloped area surrounding Raccoon Creek provides opportunity for accessing nature and to potentially make future connections to upstream public schools and neighborhoods.

Partnerships & Community Support is Critical

Many organizations will be needed to partner on design oversight and construction, easement acquisition, fundraising and grant writing, and raising community support. The Town of Waynesville, Haywood Waterways, and local businesses are just a few of the partners that may be critical in trail development. Foundations, local business, and other potential funders will be vital in helping secure matches to grants or sponsoring major trail expenditures.





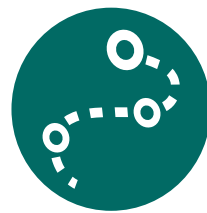
CHAPTER

INTRODUCTION 1

VISION

A ~1.4-mile greenway connection from Waynesville Recreation Center to the existing greenway at the industrial park will help protect the Richland Creek waterway. It will be a critical link to connect Lake Junaluska to downtown Waynesville and will be part of the greater WNC regional Hellbender Trail System. This greenway will be used for active transportation as well as active and passive recreation. The corridor will tell the story of the nature and heritage of the area through interpretation. The trail will also positively benefit and connect to surrounding businesses.

GOALS



Connect Key Destinations including the Recreation Center, Lake Junaluska, the existing greenways, the industrial park, and sidewalks. Where feasible, the greenway will travel along Richland Creek. Additionally, the completed greenway will be part of a greater regional system of greenways and trails and connect Waynesville to Asheville and the rest of Western NC.



Protect the Richland Creek Waterway and Wildlife Corridor by conserving land, preferably larger areas, for the greenway along the creek. Ensure that the greenway design does not negatively impact the creek by mitigating stormwater impacts, having a riparian buffer, and restoring the natural riparian condition to both preserve and improve the water resources.



Celebrate the Natural Cultural Heritage and Community around the corridor. Connect to businesses, both physically and by celebrating them and their history in the community. Tell the story of the community and ecology through interpretation and education.



Provide a Space that is Inviting for Both Passive and Active Recreation by providing amenities for greenway users for active transportation as well as more passive uses like dog walking, nature viewing, etc. This greenway has a wide variety of users. Ensure that the greenway feels comfortable and safe for all.



Image: View down into Richland Creek from under Howell Mill Road bridge



Image: The Blue Ridge Southern Railroad in Waynesville plays an important role in determining the final alignment for the greenway system.

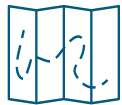
WHERE WE ARE IN THE PROCESS: DEFINE VISION & GOALS

Vision and goals are identified for the greenway.



Image: Richland Creek from Vance Street

Relevant Planning Efforts Summary



Waynesville 2035: Town of Waynesville Comprehensive Land Use Plan (2020)

*VISION: Waynesville will enable the growth of a vibrant, healthy, and successful community – true to our history, small-town culture and heritage; responsive to the changing aspirations and needs of all our citizens; purposefully built on the principles of smart growth; **mindful of the gift of our rivers and creeks**, farmland and mountain vistas; and attentive to the opportunities presented in regional preservation, arts and education, economic development, and land use initiatives.*

The Town of Waynesville’s Comprehensive Land Use Plan provides policy guidance for development and the provision of public services, including **investment in greenways and trails** over a 15-year planning horizon. It updates the 2002 Land Use Plan, which established a goal of **promoting multimodal transportation** and protecting the Town’s natural resources.

Responses from public input showed preferences for:

- Protected bike/pedestrian infrastructure
- **Richland Creek greenway expansion**
- Improving ADA compliance with the town’s pedestrian infrastructure
- Keeping Waynesville a walkable community

The goal of protecting the environment aligns with overall support for greenways along Richland Creek and Raccoon Road. However, comments from public meetings reflect a need to “respect landowner decisions and expectations,” which has implications for greenway routing and the methods by which easements are guaranteed.

The plan lists a priority goal to “protect and enhance Waynesville’s natural resources,” which includes protecting water quality and **encouraging park and greenway development to protect watersheds and improve access to open space**. The goal to “create opportunities for a sustainable economy” includes a task to develop recreational facilities and a greenway system that appeals to neighborhood and regional users. Finally, **Goal #6: Create an attractive, safe, and multimodal transportation system**, includes the following tasks:

- Provide an interconnected transportation network of roadways, **greenways**, freight mobility, bicycle routes, and sidewalks that **improves safety and strategic access for all users**.
- Ensure citizenry has access to recreational, health and wellness, and medical services.
- **Support development of the Richland Creek greenway** and regional greenway connections between Waynesville, Asheville, and other Haywood County and Western Carolina destinations.

The Land Use Plan also recommends that all new trails should meet a standard of 8-14 feet wide, with a preference of 12-14 feet in areas near parks and schools. It lists a recommendation for all greenway easement agreements on private property to specify adequate room for both the construction and maintenance of the trail, and to use available easements as a preliminary trajectory for greenways (such as unopened, platted rights-of-way and utility and sewer easements).

A key recommendation from the Waynesville 2035 plan is the “commitment to bicycling and walking as a commonplace form of transportation as well as an enjoyable recreational activity,” and mentions micro-mobility (bicycle and e-scooter rentals) as a future focus item. **“Prioritize sidewalk and greenway projects that improve access to parks”** is listed as a recommendation to help improve access to open space.

A specific recommendation is to **“continue to fund the planning, design, and construction of the Richland Creek Greenway,”** with new feasibility studies to connect the Rec Center and Waynesville Industrial Park, as well as new linkages along Raccoon Creek and Allen’s Creek. A new pedestrian bridge near Marshall Street is also recommended, **linking the Richland Creek Greenway to Waynesville Plaza**.

The Comprehensive Land Use Plan also notes a preference for promoting the use of **native species in “public parks, greenways, streetscapes, and municipal facilities.”** This is part of a broader goal to protect the streams and creeks in the area, including a strategy to “think of greenways, parks, and open space as a system of green infrastructure that protects environmentally sensitive areas, that provide stormwater and flood management, and promotes urban forestry.” There is a specific note to **“protect the Richland Creek Watershed through park and greenway development”** and “identify opportunities for stream and **riparian area restoration along Richland Creek** and its tributaries.” The clear intent is to preserve land along Richland Creek for greenways and other facilities that support preservation of the creek and its health.

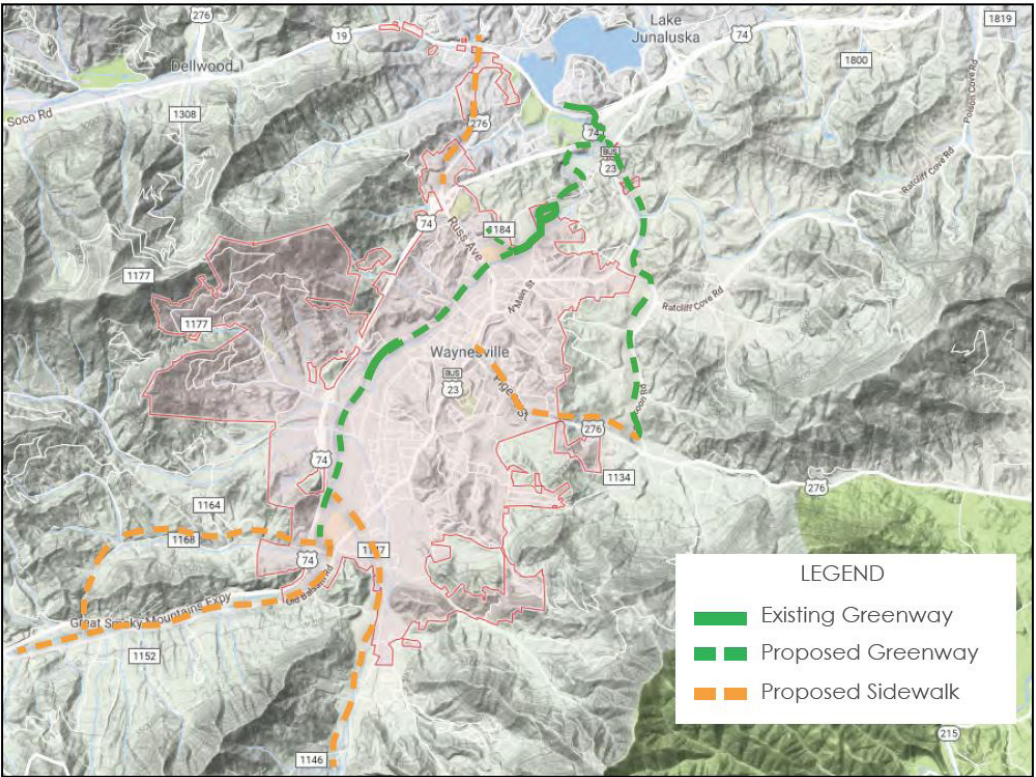
Bikes in Beds: How to Maximize Bicycle Tourism in Haywood County and WNC (2015)

In 2015, the Haywood County Tourism Development Authority (TDA) and Southwestern Commission developed *Bikes in Beds: How to Maximize Bicycle Tourism in Haywood County and WNC* to capitalize on the rapidly changing and growing bicycle tourism industry. The report states that “While there are no greenways in Western North Carolina that have the same draw as the Virginia Creeper Trail in Virginia or Swamp Rabbit Trail in South Carolina, there is some potential to **attract low stress riders**. Each community should work toward developing facilities and strategies to attract all types while capitalizing on their unique attributes for specific bicyclists.”

The report explains the economic benefits of bicycle tourism and lists several recommendations:

- **A greenway connecting Waynesville to Canton**, which it estimates could attract thousands of visitors to Haywood County each year and generate up to \$1 million in annual tourism expenditures, serving as a regional attraction for visitors. Families and other groups looking for low-stress cycling excursions without vehicle traffic would enjoy the trail. The cost of constructing the proposed Haywood County greenway is estimated at \$9 million but could result in increased property values.
- Mountain bike trails. The mountainous terrain and large amount of public land in Haywood County provide potential for the development of additional high-quality trails that can attract visiting mountain bikers. There is a large network of Forest Service roads in the region that could be promoted to attract the growing number of cyclists looking for gravel road riders and gravel grinder events.

Greenway & Sidewalks (Proposed)



(from Waynesville 2035, originally in the 2010 Waynesville Pedestrian Plan)

Waynesville Comprehensive Pedestrian Plan (2010)

VISION: The town of Waynesville is a safe and healthy place to live, work, learn and play. Our town is a community where walking is a major travel mode and where the town’s development patterns and interconnected pedestrian circulation network:

- Provide pedestrians convenient, safe and enjoyable access and mobility throughout the developed portions of the town.
- Link the town’s neighborhoods by providing a “seamless system,” which helps to maintain a vibrant and sustainable lifestyle.

The Waynesville Comprehensive Pedestrian Plan focuses on providing convenient, safe pedestrian access while linking neighborhoods to destinations and promoting a sustainable and vibrant lifestyle. One of five goals identified in the Plan is to “adopt policies that promote connectivity, coordination and continuity of pedestrian facilities throughout the town of Waynesville” to be achieved through the objectives: “identify a network of sidewalks and **shared use paths that serve all user groups**, including commuting, recreation, and utilitarian trips” and “continue to pursue the expansion of the greenway system.”

REF LET.	0-5 Years	SAFETY	ACCESSIBILITY & CONNECTIONS	RECREATION	ESTIMATED COSTS
	GREENWAY				
	Provide for more distinguished wayfinding signage along the greenway system.	✓	✓	✓	\$200 per High-Visibility Sign
T	Extend the Richland Creek Greenway from its current terminus at West Marshall Street along Richland Creek southwest to Russ Avenue.	✓	✓	✓	\$133 per foot of 10' shared use path - 965' = \$128,345
	Acquire ownership interests in floodway properties along corridors designated for greenway expansion.	✓	✓	✓	N/A
	Develop plans for extension of the Richland Creek Greenway along Richland Creek southwestward to Hyatt Creek Road.	✓	✓	✓	N/A
	Develop plans for development of a Raccoon Creek Greenway from the Richland Creek Greenway at the confluence of Richland and Raccoon Creeks southward along Raccoon Creek to US 276 (Pigeon Road).	✓	✓	✓	N/A
	5 - 10 Years	SAFETY	ACCESSIBILITY & CONNECTIONS	RECREATION	ESTIMATED COSTS
	GREENWAY				
X	Fill in the missing link of the Richland Creek Greenway along Richland Creek from the Waynesville Recreation Center northeastward to the existing greenway at the confluence of Richland Creek and Raccoon Creek.	✓	✓	✓	\$133 per foot of 10' shared use path - 4175' = \$555,275
	10+ Years	SAFETY	ACCESSIBILITY & CONNECTIONS	RECREATION	ESTIMATED COSTS
	GREENWAY				
AI	Extend the Richland Creek Greenway southward along Richland Creek to Hyatt Creek Road.	✓	✓	✓	\$133 per foot of 10' shared use path - 16,255' = \$2,161,915
AJ	Establish a Raccoon Creek Greenway from the Richland Creek Greenway at the confluence of Richland and Raccoon Creeks southward along Raccoon Creek to US 276 (Pigeon Road).	✓	✓	✓	\$133 per foot of 10' shared use path - 15,230' = \$2,025,590

Waynesville Pedestrian Plan Implementation Table

As part of this Plan, a Greenway Plan was developed which recommended further **extension of the greenway system to the southwest along Richland Creek to Hyatt Creek Road**, construction of a greenway along Raccoon Creek from its confluence with Richland Creek to US 276/Pigeon Road, and **completing the missing link along Richland Creek between the Waynesville Recreation Center and Industrial Park Drive**.

Survey results from the Plan’s public input efforts revealed that respondents would choose to walk more if a pedestrian system of better sidewalks and trail connections existed. **“Walking or running for personal fitness”** was the most common answer given among those surveyed when asked why people chose to use pedestrian facilities followed closely by **“leisure and recreation”**.

Specific Pedestrian Plan recommendations included creating developmental policies and regulations regarding the location of pedestrian facilities, **extending the greenways system along Richland Creek** and Raccoon Creek, **acquiring ownership interest in properties along corridors designated for greenway expansion**, and **providing better wayfinding signage along the greenway system**.

Goal #3: Adopt policies that promote connectivity, coordination and continuity of pedestrian facilities throughout the town of Waynesville.

Objectives:

- Identify a network of sidewalks and **shared use paths that serve all user groups**, including commuting, recreation, and utilitarian trips.
- Continue to pursue the expansion of the greenway system.

MountainElements: A MountainWise Health Impact Assessment for Western North Carolina (2015)

This 2015 eight-county health impact assessment (HIA) was designed to help the region share success stories and evaluate proposed planning and policy actions around the built environment, with recommendations based on the region’s context and heritage. The goal of the project is to merge planning with health, focusing on economic growth, job creation, mobility, access to nature, creating healthy conditions for citizens of all ages and abilities, and making sure future generations have a place to grow and prosper.

One of the HIA’s seven major themes is that **“active transportation can improve physical activity rates... [and] making walking, bicycling, and transit use accessible increases physical activity and participation.”**

Priority recommendations include:

- Linking recreational opportunities to communities via active transportation networks – **connecting parks, rivers, and greenways**.
- Collecting baseline count information for pedestrians and bicyclists around key areas for future comparison.

GroWNC Regional Plan (2011)

This plan highlights the goal of increasing transportation choices and providing for non-motorized transportation as a means of accelerating the economic potential of the region.

Key recommendations include:

- Support watershed protection efforts that preserve the integrity of the region’s critical watersheds (i.e. sustain and enhance water quality) by establishing, restoring, and promoting **streamside protection areas**.

- Direct growth to areas where transportation infrastructure exists, **preserving key ecological corridors that could accommodate greenways**, which serve as recreational and transportation corridors.
- Coordinate with NCDOT and FBRMPO to improve pre-NEPA environmental screening of transportation projects.
- Improve pedestrian and bicycle connectivity between neighborhoods and community destinations. This was the second-most important outcome of GroWNC overall, an “ingredient critical to achieving a number of other desired outcomes, including many not directly associated with transportation.”
- Use the MPO/RPO process to advance pedestrian and bike priorities and increase funding levels for pedestrian and bike projects in the TIP.
- Expand pedestrian and bicycle data collection to assess current gaps, barriers, safety hazards, and usage.
- **Enhance coordination of ongoing greenway planning and implementation.**
- Improve communications between NCDOT and local communities on greenway and bicycle plans as well as planned road improvements.

Opt-In Regional Vision (2014)

VISION: Existing roads should be made more pedestrian friendly through the addition of sidewalks, bicycle lanes, **crosswalks, good lighting, and other amenities**. Traffic calming, tree planting, and landscaping initiatives can also create a safer and more pleasant experience for pedestrians and bicyclists. On-street parking, reduced building setbacks, and sidewalk shops can also improve the pedestrian experience.

The Southwestern Commission, in partnership with the Appalachian Regional Commission and NCDOT, produced a regional vision for seven WNC counties. *Opt-In* was predicated on evaluating the regional utility of a major highway corridor and calls for the development of compact downtowns with a variety of transportation choices including biking and walking. The *Opt-In Vision* also supports incorporating NCDOT **Complete Streets Design Guidelines** in town transportation plans, ensuring streets enable convenient, comfortable, and safe travel and access by those walking, bicycling, driving automobiles, riding public transportation, or delivering goods.

Ongoing **implementation of trails and greenways “should be a priority to position the region as a leader in recreation and wellness.”** Towns should prioritize pedestrian and bikeway projects for funding through the French Broad River MPO.

Haywood County Comprehensive Bicycle Plan (2011)

VISION: Dedicated to enhancing cycling through advocacy and addressing improved health and wellness, community growth, and reduction in dependence upon foreign oil.

RELEVANT PLANNING EFFORTS SUMMARY



- Goal #1 – Build Bicycle Infrastructure & Other Improvements: Engineering-based infrastructure for bicycle routes and parking.
 - Construct bicycle lanes along major arterial roadways and **greenways along major rivers and streams.**
- Goal #5 – Support Policy Change & Economic Development: Identify methods for stakeholders, advocates, businesses and municipalities to promote bicycling.
 - **Pursue easements or other dedication of land for greenways and other bicycle-related facilities.**

During the visioning exercise for the Plan, the steering committee identified the need for special outreach programs designed to **help older adults feel more comfortable** on a bicycle and riding on the road and greenways. Public survey results showed that 74 percent of **respondents preferred off-road multi-use trails** as improvements to roadways and other facilities to accommodate bicyclists. Similarly, 63 percent of respondents said **they would be encouraged to ride their bike more often if “there were more clearly-marked trails.”**

The Plan highlights the “Haywood Hub” concept which “was identified early in the planning process as the Vision and Goals exercise prioritized the need for a central route that connects the population centers of Haywood County. The Hub route requires various improvements to streets and greenway through different land use contexts.”

80% of survey respondents in Haywood County support greenways that connect parks to schools.

—Survey data from Haywood County Bike Plan

Additional Plan recommendations included:

- **Upgrading unpaved sections of greenway** extending from Vance Street Park to Waynesville Recreation Center to paved sections and **connecting the greenway along Richland Creek or via Howell Mill Road to Industrial Park** via Old Asheville Hwy.
- **Upgrading, where feasible, the Richland Creek Greenway to Lake Junaluska to paved greenway** and constructing improvements at US 19 / Dellwood Road to facilitate crossing to Lake Junaluska and South Lakeshore Drive.
- **Developing a system of wayfinding signs** to direct bicyclists and pedestrians to major landmarks, parks, greenway trails, and other public attractions in the County and Towns.
- **Developing a countywide greenways master plan** that conducts a comprehensive analysis for greenways, with an emphasis on regional partnerships given the geography of Haywood County.

Blue Ridge Bike Plan (2016)

This plan was developed by the Land of Sky Regional Council for a seven-county region and the municipalities within them. This planning effort was developed to address safety, connect destinations, address dangerous roads and intersections, and develop recommendations to improve conditions. The plan advocates for **developing and implementing local greenway plans.**

Both the Blue Ridge Bike Plan and Canton’s Bicycle & Pedestrian Plan (2018) reflect a vision for a continuous greenway system that would **link Waynesville to Canton by traversing Richland Creek, Lake Junaluska, and the Pigeon River.** This vision, if implemented, could bolster new tourism and economic development activity, while improving the transportation and recreation options of residents throughout Haywood County. The Blue Ridge Bike Plan highlights the importance of the Town in **demonstrating support for regional multimodal connectivity initiatives** and planning ahead by **creating a viable greenway system within its limits;** Waynesville can become a leader and inspire other small towns throughout the region to follow.

Waynesville Greenway Feasibility Study (2017)

The goal of the Feasibility Study was to better understand the opportunities and constraints within the study area to determine the most feasible and preferred alignment for the Richland Creek Greenway through the Town of Waynesville. The study area included Richland Creek, Frog Level Historic District, Waynesville Middle School, and Hazelwood Park and was approximately 3.25 linear miles. This segment of greenway would represent the southern portion of the trail, with a terminus at Hyatt Creek Road.

Project Goals:

- Evaluate the feasibility of possible alignments of the greenway.
- When feasible, **the preferred greenway alignment should remain along Richland Creek.**
- Address the steps needed to develop a greenway corridor to connect existing greenways to complete the connection through town.
- **Connect the greenway to key locations** (as identified by stakeholders), including Hazelwood Park and proposed greenway connectors.

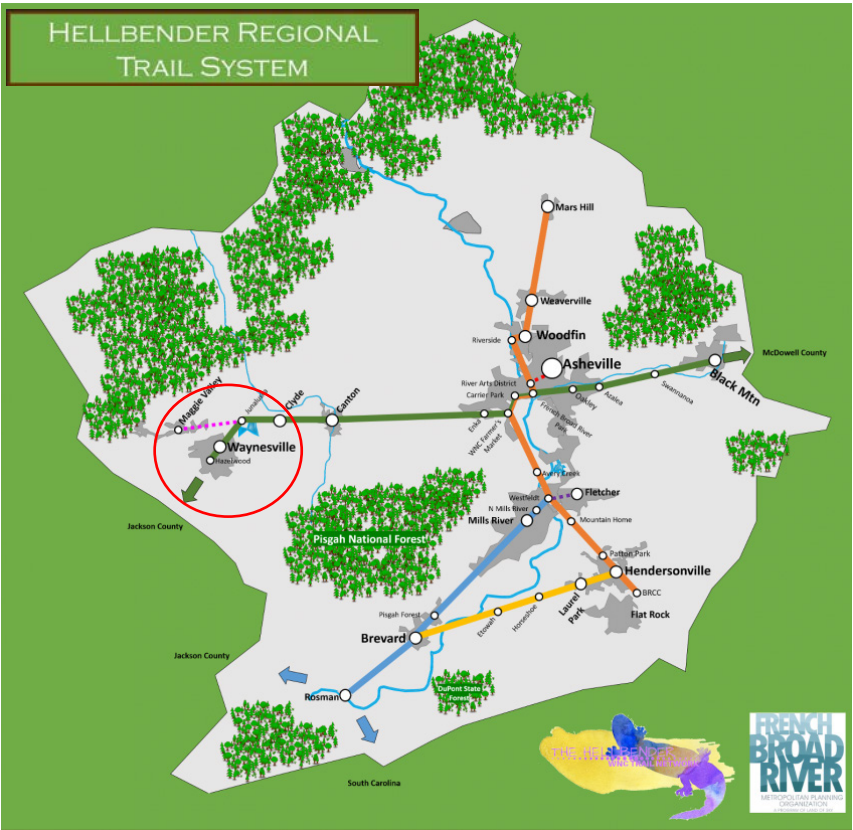
A preferred route was chosen based on project goals, existing conditions, opportunities and constraints and parcel analysis ranking of the study area and divided into seven sections to display.

The Hellbender Trail System (2020)

The Hellbender Regional Trail plan outlines a **150-mile greenway network** connecting communities, key recreational assets, and towns in Western North Carolina. This planning effort is being championed by the French Broad River MPO, The Land of Sky Regional Council, and local governments. This system would link

Waynesville to Asheville and beyond. Coupled with the Fonta Flora Trail (which will link McDowell County communities), someone from Waynesville could ride a bike safely and comfortably along a paved trail all the way to Morganton.

The major Haywood County connection runs mostly along the Pigeon River, but is planned to connect to Lake Junaluska and Waynesville along Richland Creek. **The Richland Creek Greenway is shown as a planned trail within this greater network.**



Town of Waynesville Systemwide Parks Master Plan 2017-2026 (2017)

In 2017, The Town of Waynesville developed a Comprehensive System-Wide Parks and Recreation Plan. The plan noted **the need for additional greenways, linear parks,** and bike facilities throughout the County - **survey respondents listed greenway trails as the second-most desired facility after neighborhood parks.** 80.8% either strongly agreed or agreed that they would be in favor of greenway development to interconnect parks with school facilities. The Plan also recommends developing a network of bike trails, bike lanes and shared roadways to enhance connectivity, **provide a viable alternative means of transportation, and promote recreational opportunities.** The study highlighted the need for bikeable roads and the **development of greenways** for biking that was also the topic of stakeholder discussions and in public meetings. With the focus on healthy lifestyles, the environment, and alternative transportation, the report found it important for Waynesville to develop and implement a bike plan.

The study suggested that the development of walking trails should be a priority for future park development. The concept of connecting parks and other points of interest with walking trails **utilizing underdeveloped property along the Town’s creeks** was reiterated in the public workshop and stakeholder meetings, forming a continuous recreational system that is accessible by all. **The highest priority for trail development is extension of the greenway along Richland Creek.**

Importantly, about 60% of survey respondents indicated a willingness to support **increasing financial investment in parks and recreation facilities**. Respondents stated that the county should consider grant money, participation fees, and bonds. Additionally, the plan recommends partnerships with private sector organizations and businesses to **secure donations, joint-use agreements, access through private lands, and funding**. Generally, “commitment of funding for maintenance of new facilities should be a priority.”

Relevant recommendations include:

- **Expand all types of parks, acquire land and develop specific master plans.**
- **Develop greenways in conjunction with other park and recreation providers in the area.**

Haywood County Comprehensive Systemwide Parks and Recreation Master Plan (2007)

The purpose of this study was to objectively review the existing parks and recreation levels of service and facilities offered to those citizens living within incorporated and non-incorporated areas of Haywood County. The plan makes general recommendations that deal with system-wide issues, specific recommendations for specific facilities and facility types, and recommendations that deal with organizational, operational and maintenance issues.

Recommendation #3 reflects the general **need for greenways**, noting that **80% of survey respondents favor development of greenways in Haywood County**. This plan recommends a **County-wide greenways master plan** and that **“greenways and land acquisition should be a priority.”**

The plan also lists a specific recommendation to “acquire the Able and Schulhofer properties for future [park] development.” These two parcels of land lie adjacent to Vance Street and Waynesville Recreation parks, totaling 23 acres, and should be acquired primarily for the future expansion of these two parks and for other City purposes as necessary. The availability of these two parcels adjacent to the existing parks makes this acquisition a prudent long-term decision.

Southwestern Commission Regional Trails Plan (2013)

This Plan was intended to gather ideas from citizens and community leaders to determine where towns, counties, and other community stakeholders should pursue new trails or enhancement of existing trails. This includes hiking trails,

mountain bike trails, **greenways**, paddle trails, equestrian trails and connections between trails. Trails identified through this Plan are intended to become part of the State Trails Plan and recognition in this Plan will help the region receive state funding through grant programs administered by State Parks (one criteria for ranking of applications is inclusion of a trail in a regional plan).

This Plan recommends **extending the Richland Creek Greenway from the Balsam community, through Waynesville, and connecting to Lake Junaluska**. It also recommends that the Town of Waynesville **“pursue conservation easements for land holdings** in Allen’s Creek (Waynesville) and Campbell Creek (Maggie Valley) watersheds, with a timeline based on efforts between property owners, land trusts and municipalities.” It also recommends a Pigeon River Greenway linking Canton to Clyde.

Richland Creek Watershed Action Plan (2013)

The purpose of the Richland Creek Watershed Action Plan is to guide restoration efforts and **improve surface water quality in the Richland Creek Watershed** of Haywood County, North Carolina. It focuses on nonpoint source pollution and was created by the Richland Creek Restoration Group, which is composed of agencies, organizations, and individuals with skills and/or interest in nonpoint source water quality issues. Recommended measures include monitoring, education, stormwater controls and treatment, stream work, **riparian improvements**, low impact development practices, **greenways**, and land use planning. It also includes information on technical and financial resources available to watershed groups and property owners, as well as evaluation measures to monitor the success of overall watershed management.

One action step is to **“promote greenways that include riparian buffers and other streambank protective measures;”** recognizing that greenways are an effective way to protect a creek or stream corridor from over-development and pollution. Also included as a key recommendation is to **“encourage development of greenways” overall**, with the following action steps:

- **Provide publicity and public support for greenways.**
- Provide technical support for the Haywood Greenways Advisory Council.
- Assist in **grant writing for new greenways.**
- Host public forums as needed to **focus attention and support for greenway initiatives.**

2020-2029 NCDOT State Transportation Improvement Program (STIP)

The North Carolina Department of Transportation’s STIP is NCDOT’s data-driven, multi-year schedule for its transportation projects. A community’s project(s) may be included in the STIP after the community scores projects against NCDOT goals.

Projects in the STIP include highway, bridge, public transit, bike, pedestrian, railroad, and other improvements.

The NCDOT projects for Haywood County mostly include bridge replacements, I-40 maintenance, and a few roadway improvements in Waynesville. Some of these planned STIP projects will affect Waynesville’s roadway capacity for a long time and improve overall pedestrian and bicycle transportation throughout town.

STIP project B-3186 involves the **replacement of the US 23/74 bridges over Richland Creek** (near Industrial Park) in 2022. An existing unpaved trail follows the creek under the existing bridge.

2045 Metropolitan Transportation Plan (MTP) (2020)

The French Broad River MPO is the planning organization in charge of transportation planning in a five-county region that includes the Town of Waynesville. A Metropolitan Transportation Plan (MTP) is a fiscally constrained plan that identifies how the multi-modal transportation will be managed and operated. The current MTP 2045, was adopted by the MPO on September 24, 2020.

Oftentimes, projects included in the MTP are pulled from supporting plans like a Pedestrian Plan. Projects are prioritized, and money is programmed for plans such as transit, roadway improvements, greenways, multi-use paths, sidewalks, and other upgrades and amenities.

Projects within the 20-year planning horizon for the Town of Waynesville include:

- Widening NC 209 around the Lake Junaluska area.
- Russ Avenue Corridor Improvements (including sidewalks).
- Pedestrian improvements on Hazelwood Avenue.

Objective 1A (Improve Bicycle and Pedestrian Safety) recommends **increasing the miles of multi-use paths to provide a safe, attractive way for pedestrian and bicyclists to get around**. Objective 1B is to “increase the number of trips made by transit, biking, and walking,” and the MTP in general is supportive of a Vision Zero policy to build a safer roadway system for all users. The Plan also lists an objective to “improve considerations for individuals with disabilities into planning and design efforts.”

The MTP’s Bicycle and Pedestrian Projects (Horizon Year 2040) includes project BP144530 – Richland Creek Greenway, which proposes **\$3,570,000 for a multi-use path from Waynesville Rec Park to Haywood High-Tech Center**.

The Plan also lists several projects in its 2045 horizon year:

- Project BP144545 – Richland Creek Greenway, for funding the southern extension from the Rec Park to Hyatt Creek Road (\$10,885,000).
- Project BP144548 – Vance Street Sidewalks (\$1,030,000).

RELEVANT PLANNING EFFORTS SUMMARY



WHERE WE ARE IN THE PROCESS:
EXPLORATION

Data is collected and field conditions are documented.

EXISTING CONDITIONS

CHAPTER 2

Introduction

Site conditions of the corridor have an array of challenges and opportunities. These conditions were gathered through site investigation, stakeholder input, and Geographic Information System (GIS) analysis. This written description pairs with the Opportunities, Constraints, and Alternative Alignment Maps which graphically displays what is discussed below.

This written portion provides details of the site constraints with implications as it relates to permitting, design, and user experience. Early identification of natural and built environment constraints can aid in understanding feasibility of routing, cost estimation, and knowledge of permits needed, which has both cost and time implications. The explanation also discusses opportunities that a greenway could capitalize on.

The Natural Environment

Floodplains and Trail Systems

Floodplains provide advantages and disadvantages for trails. Development is regulated within the floodplain, allowing for continuous undisturbed natural areas great for greenways. However, because of reoccurring flooding, regulations of the floodplain, and alterations of natural hydrology, any future trail design should consider the following guideline:

- **Avoid placement of structures or disturbance within the floodway.** Floodways are regulated locally and by the Federal Emergency Management Agency (FEMA). Fill, structures (walls, kiosks, etc.), and impervious surfaces are discouraged. Any structures located within the floodway require a no-impact/no-rise certification through FEMA. These studies can vary on cost but can range from \$2,500-\$15,000 depending on complexity.
- **A no-rise study uses stream modelling to reflect changes to the 100-year flood event water levels that would result from the proposed construction in the floodplain.** If there is no increase in elevation, a permit can be approved. If the disturbance causes a rise, then a FEMA CLOMR (Conditional Letter of Map Revision) is required prior to construction and an LOMR (Letter of Map Revision) is required post construction. Both steps significantly increase cost and add time to the project. When possible, all proposed changes should be considered within one study to increase project efficiency.

Much of the greenway corridor is proposed to be within the floodway or the 100-year floodplain of Richland Creek or Raccoon Creek. Any new bridge crossings will trigger a no-rise study.

A section of the corridor runs adjacent to the confluence of Richland Creek and Raccoon Creek. Alterations in this section of the floodplain may be complex to model the influences of two channels and associated backwater during flood events.

Wetlands

There are no wetlands identified using digital mapping sources. Sources used to identify any wetlands include:

- **The National Wetlands Inventory (NWI):** NWI indicates that there are no wetlands in the corridor. NWI is often inaccurate, often missing wetlands on site.
- **Field Analysis:** Field analysis of the corridor did reveal some potential wetlands on Town of Waynesville property.

Delineate future wetlands as part of corridor design studies. During the field visit for this study, it was determined that wetlands are likely present. Once a final alignment for the greenway is determined, a professional who determines whether wetlands are present should confirm this through a field visit.

Avoid impacts to wetlands. Wetlands are regulated by the U.S. Army Corps of Engineers (USACE) under the Clean Water Act. If wetland impacts occur (especially over any impacts exceeding a tenth of an acre), a Section 404 Permit through the USACE is required. The State is involved in Section 401 certification, see “Streams, Ponds, Lakes” below, in partner with USACE.

Streams, Ponds, Lakes

The corridor runs parallel to Richland Creek, there are few instances where the corridor interacts with contributing streams. It is intersected by Raccoon Creek near the industrial park. Some of the main considerations in future planning are explained further below.

Richland Creek is classified as a Class B waterway in North Carolina, meaning it is protected for maintaining biological integrity, as well as for use for primary recreational activities. Along this corridor, Richland Creek is commonly used for trout fishing activities as well as tubing during the summer months.

Raccoon Creek is a Class B waterway, and is listed as impaired due to poor fish community. Possible causes for the listing include high sediment loads, high water temperature, and poor riparian buffers.

Throughout these stream corridors a number of invasive plant populations were identified. Non-native invasive plants (NNIP) alter the type and abundance of organisms, relative abundance of species, and function of ecosystem processes, usually with undesirable outcomes. NNIP hinder the establishment of woody vegetation within riparian zones. This leads to areas of easily eroded, bare soil near streams, streambank erosion, and high stream temperatures due to a lack of canopy, among other negative effects on water quality.

Mature trees and vegetation exist along the corridor which are important to maintain as they assist in stabilizing channel banks. Overall the Richland Creek Channel appears stable, but there may be short sections of bank where mature trees are lacking and some reshaping on the bank could be beneficial.

Plan for Aquatic Resources Alteration Permits (ARAP). ARAPs and possibly Federal 401 /404 Certifications will likely be required in cases where any stream or waterway alterations occur. These alterations would be most likely in conjunction with bridge improvements or addition of structures near waterways. Triggers for the permit include disturbance to the stream bed, banks, damming of the waterway, or placement of material within the waterway (i.e. culverts/pipes). If disturbance exceeds the threshold allowed by a Section 404 Nationwide Permit, described above in “Wetlands”, an Individual Permit may be required.



Image: Richland Creek from Town-owned property

EXISTING CONDITIONS SUMMARY

Rare, Threatened & Endangered Species Review

Federally-Listed Species for the Project Area

Initial review of Rare, Threatened & Endangered Species within the project area was conducted from the desktop using the USFWS iPAC Tool. The iPAC report generates an official species list, which indicates that there are nine (9) Federally-listed species that would be potentially affected by project activities, listed below.

POTENTIAL FEDERALLY LISTED SPECIES WITHIN THE PROJECT AREA

Habit	Scientific Name	Common Name	Federal Status
Clam	<i>Alasmidonta raveneliana</i>	Appalachian Elktoe	Endangered
Flowering Plant	<i>Geum radiatum</i>	Spreading Avens	Endangered
Flowering Plant	<i>Isotria medeoloides</i>	Small Whorled Pogonia	Threatened
Mammal	<i>Myotis sodalis</i>	Indiana Bat	Endangered
Mammal	<i>Glaucomys sabrinus coloratus</i>	Carolina Northern Flying Squirrel	Endangered
Mammal	<i>Myotis grisescens</i>	Gray Bat	Endangered
Mammal	<i>Myotis septentrionalis</i>	Northern Long-Eared Bat	Threatened
Spider	<i>Microhexura montivaga</i>	Spruce-fir Moss Spider	Endangered
Lichen	<i>Gymnoderma lineare</i>	Rock Gnome Lichen	Endangered

Presence/Absence of Critical Habitat

Three of the above species, highlighted in blue, have a final Critical Habitat area designated by the USFWS. However the iPAC report indicates that the project location is outside of the critical habitat defined for each.



Presence/Absence of Suitable Habitat

Suitable summer roosting habitat for the Northern Long-Eared Bat and Gray bat exists in patches within and adjacent to the project area. They prefer to roost in crevices or behind the bark of mature, live trees or snags, both of which are present in small patches throughout the project area. Any clearing of suitable roost trees should occur in the off-season months and should follow guidance under the final 4(d) rulings for both species. For example, gray bats have been identified recently within the French Broad River corridor in Asheville. They were found to be inhabiting cavern-like box culverts that open to the river, indicating that the species is adapting to utilize infrastructure. For this reason, any project activities that may disturb box culverts or other cave-like habitats, natural or artificial, should be conducted only after negative surveys.

State-Listed Species for the Project Area

In addition to a desktop review of Federally-listed species within the project area, Equinox also conducted an online review of the NC Natural Heritage Program (NCNHP) database that contains rare species and rare natural community data within a quarter-mile of the study area. Records occurring within the study area of 5 different species. Records were further analyzed by their Status ('Current' versus 'Historical') and all were found to be historical records, indicating there may be less of a chance that these species may still be found in the area.

POTENTIAL STATE LISTED SPECIES WITHIN THE PROJECT AREA

Taxonomic Group	Scientific Name	Common Name	Survey Date	Status	Habitat Type
Vascular Plant	<i>Hackelia virginiana</i>	Virginia Stickseed	1968-Pre	Historical	Woods and thickets with circumneutral soil
Vascular Plant	<i>Orbexilum onobrychis</i>	Lanceleaf Scurfpea	1891-07-17	Historical	Habitat in North Carolina not known
Vascular Plant	<i>Pycnanthemum torreyi</i>	Torrey's Mountain-mint	1959-07-11	Historical	Dry upland forests and woodlands, over mafic rocks
Vascular Plant	<i>Platanthera peramoena</i>	Purple Fringeless Orchid	1937-07	Historical	Bogs, forests
Vascular Plant	<i>Poa palustris</i>	Swamp Bluegrass	1931-07-11	Historical	Spruce-fir forests, grassy balds

The Built/ Human Environment

Utilities

The study area has a combination of electric transmission and distribution lines, water lines, gas lines, telephone lines and sewer infrastructure. Sewer lines were provided by McGill and Associates and are indicated on the maps. Sewer is operated by the Town. Water lines, gas lines, and telephone are not shown on the maps.

Duke Energy's electric lines and poles were digitized by using aerial photos and are displayed on the maps. Duke also has a substation adjacent to where

the existing greenway terminates. Duke's several powerlines, easements, and the substation make them an important stakeholder and landowner for the greenway's development. Duke was contacted several times for this study and was not able to respond to requests for feedback on this study.

Transportation

State Roads and Facilities

There are several state managed roads which are indicated on the maps. Any proposed facilities within the North Carolina Department of Transportation (NCDOT) right-of-way needs to follow specific NCDOT guidelines.

The Great Smoky Mountain Expressway had a bridge over the existing greenway which is slated for redesign as part of the State Transportation Improvement Plan (TIP). This TIP Project (#B-3786/B-5898) will be bidded out in 2022, giving the Town of Waynesville enough time to coordinate with NCDOT on any improvements to the greenway underneath the bridge. The greenway underneath currently fills with sediment and design recommendations for that are addressed later in this study. Other than that, no NCDOT projects are planned that would immediately impact the corridor. Further information and feedback was provided by NCDOT Division 14 during this study and is further outlined in Appendix C of this Plan.

Rail

Blue Ridge Southern Railroad (BRSR) runs through the center of the study area. This rail line was previously operated by Norfolk Southern Railroad but was purchased by BRSR in recent years. Their local office is based in Canton, NC but their parent company WATCO is based out of state. Both the local office and WATCO representatives will need to review and approve of any proposed facilities within their property.



BRSR was contacted and met with the Town and Equinox to discuss the study and to garner any feedback. BRSR was generally supportive on the greenway, with the major concerns be no new on-grade crossings and that the greenway steer away users from walking the rail line. A full summary of their feedback can be found in Appendix B of this Plan.

Historic Resources

Archaeological/Sensitive Cultural Resource Areas

Construction funded or permitted by the federal government will trigger a project review by the State Historic Preservation Office (SHPO) for any resources covered under Section 106 (National Historic Preservation Act). These resources could include human remains, burial sites, archaeology sites, and historic sites discussed below. For any NCDOT funded project, consultation with the SHPO and potentially tribal cultural resources offices may be needed. If it is found that the action of trail construction could potentially adversely affect cultural resources, the SHPO will work with the related federal agency to eliminate or minimize the effect. Potential presence of these resources is typically flagged at the design and engineering phase when in consultation with the SHPO.

Historic Sites and Landscape

The SHPO oversees a large database of historic sites and resources. These resources include information from SHPO surveys as well as a large list of sites related to the National Register of Historic Places (which the National Park Service oversees but individual States manage). The most critical sites include those listed on the National Register (NR) or determined eligible (DOE) as they have further protection under Section 106. In general, a greenway would have no effect or a complimentary relationship to preservation of these sites, but may require SHPO coordination in circumstances like alterations to historic bridges or whole properties. The SHPO database does not indicate that there are any resources within the study area or that the greenway would potentially impact.

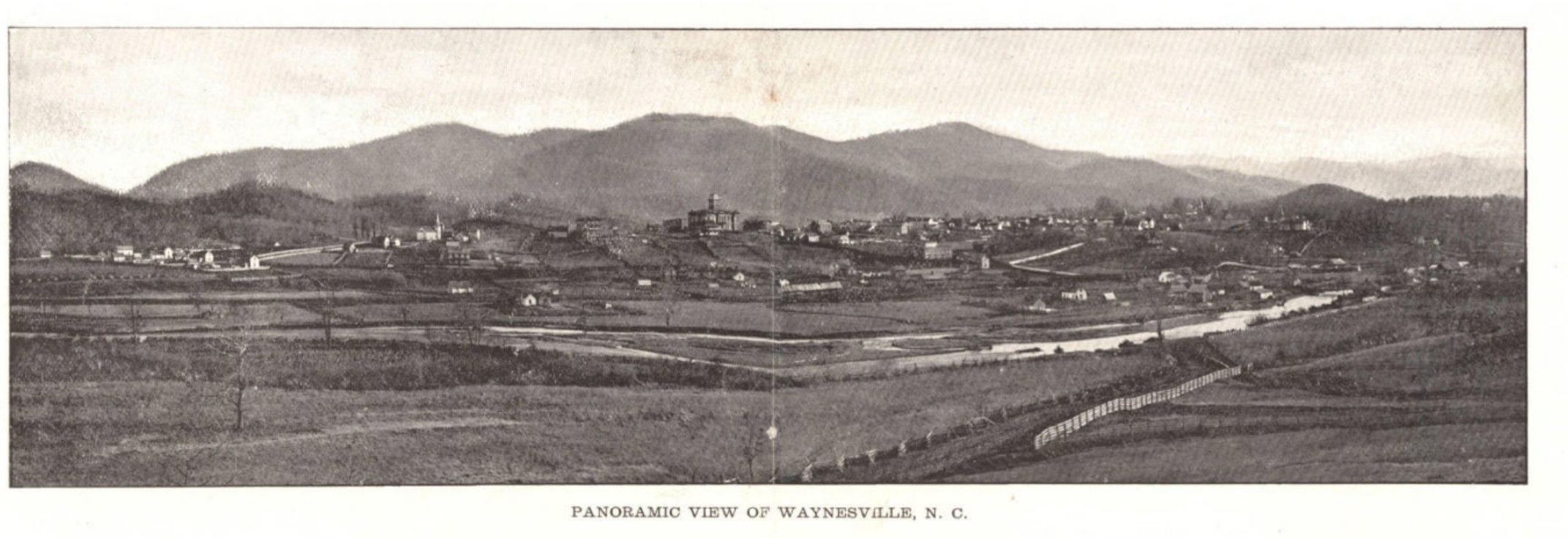


Image credit: Western Carolina University (WCU) Library Digital Collections

EXISTING CONDITIONS SUMMARY



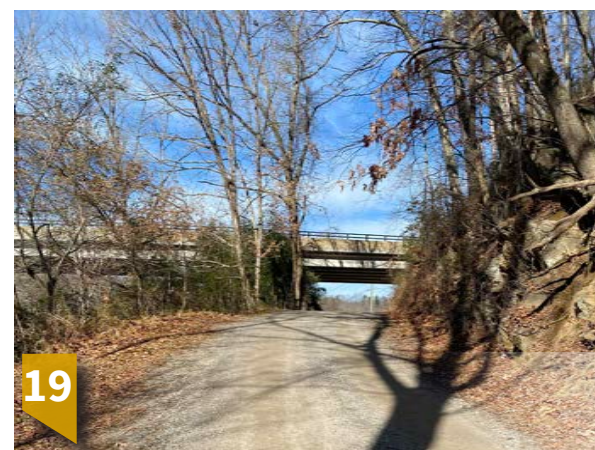
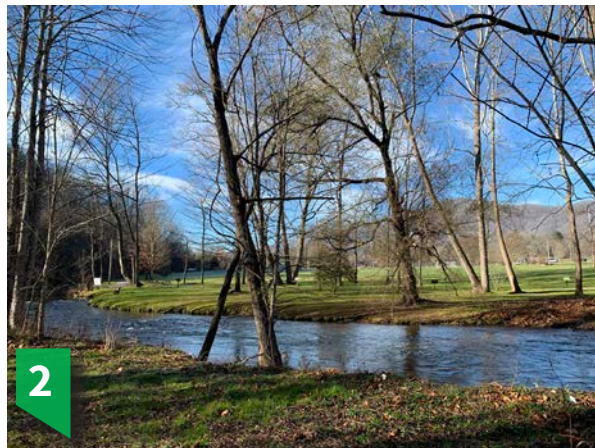
WHERE WE ARE IN THE PROCESS:
**ANALYSIS/OPPORTUNITIES &
CONSTRAINTS**

Opportunities and constraints maps are developed from the information gathered.

OPPORTUNITIES & CONSTRAINTS



OPPORTUNITIES & CONSTRAINTS:



Areas where regrading can occur along road to accommodate side paths where there is room. Consider making the whole section a yield roadway/shared road. Consider using different gravel for the side paths to further distinguish them from roadway.

1

Multiple streambank restoration and riparian buffer enhancement opportunities are present throughout the project area.

2

Potential location for pedestrian bridge. Police may need to close bridge when dogs are training. Problem could be mitigated with good signage and map of alternative routes.

3

Alternative bridge location marked by Town. May require stream bank mitigation due to property use, and further study.

4

Opportunity to provide access points to river along bank for fishing.

5

Police dog training occurs at scheduled times (at least once a month) in this half of the field. The public will not have access to this area during these times.

6

This area can be used to loop trail further from dog training area, as the property is Town owned.

7

Town has indicated that there is potential to relocate dog training area to this side of field, which may alleviate some conflict of use.

8

Wetlands are likely in this area. There is potential for a nature park and boardwalk area.

9

There is an opportunity for a trailhead/parking area here.

10

Town has an 80' ROW for road access, though use of this road for a trail would exceed grades for accessibility.

11

Two culverts here under road at the stream crossing. Area is wet alongside road.

12

Consider closing Woodland Road at this location to local-only traffic to decrease vehicle traffic. This would need resident buy-in.

13

Historic-looking barn adds to character of this corridor.

14

Wetlands in this area create obstacles for greenway alignment, but this could provide a nice wildlife viewing area with observation tower. There is also opportunity for wetland restoration.

15

A more gentle grade in this area could allow for a greenway that somewhat parallels the road.

16

Consider benefits of Town taking ownership of road from NCDOT if Woodland Dr. is used in alignment. This is a narrow roadway with low traffic volume. There may potential for a road redesign to include trail.

17

Area very steep, acting as a barrier for greenway connection.

18

Major constraint - there may not be enough clearance for a culverted underpass of the rail in this area. Track is elevated, therefore a new on-grade crossing will not work. There is also not enough clearance for trail to pass inbetween creek and bridge abutment.

19

Potential greenway alignment above Woodland Dr. will require significant earthwork and tree clearing, but will allow safe passage in this area vs. on-road. This road has several blind turns and is dangerous for pedestrians.

20

Connection to sidewalk and adding an additional 5' feet of concrete could provide cost savings and would utilize NCDOT ROW.

21

Consider having a mural painted on the underside of the bridge to decrease graffiti.

22

Crossing under railroad trestle is likely not feasible due to steep drop off on one side, and both sides of Woodland Dr. through this section are likely infeasible or too costly.

23

This landowner is a "no go" and does not want the alignment within the property.

OPPORTUNITIES & CONSTRAINTS: MAP 1

- 1** Opportunity for creek access, although existing bank is steep.
- 2** Limited visibility at this corner; potential traffic risk if alignment is on-road.
- 3** Evergreen Packaging has requested that the alignment must avoid truck access area of their facility. Crossing too close to this area may not be supported by landowner.
- 4** Grassy wide NCDOT-owned corridor south of and along Old Howell Mill Road. However, this crossing may be too steep and is likely infeasible.
- 5** Alignment should be off-road and follow Howell Mill Road to avoid truck traffic.
- 6** Truck traffic will be a concern when recommending at grade pedestrian crossing along Old Howell Mill Road. Limited ROW and utility lines greatly constrain a location to place a greenway.
- 7** Train loading area could block any pedestrian crossing for long periods of time.
- 8** Grade becomes steep along railroad, preventing pedestrian crossing.
- 9** Potential for pedestrian refuge island at this crossing since a center lane exists.
- 10** Potential alignment corridor to connect to existing sidewalk on Howell Mill Road.
- 11** Greenway alignment corridor beside residential structures will be narrow and will require an easement.
- 12** Location of existing gas line (general location drawn on map).
- 13** Opportunity for railroad underpass here with sufficient space.
- 14** Businesses located on the west side of Asheville Rd. require several access points from the road, which create many constraints for an alignment in this area.
- 15** Spacious grassy NCDOT ROW located here.
- 16** Existing sewer line here creates constraint with the existing grade through floodway.
- 17** Potential location for bridge crossing here, which will require an additional flood study. This is a high-cost option. See Appendix E: Raccoon Creek Studies for options.
- 18** There is an opportunity for an updated trailhead/parking area here on the Duke Energy owned property. This is supported by both the Town and adjacent property owner Sunburst Trout Farm LLC.
- 19** Grassy corridor owned by Duke Energy which presents an opportunity, though the area is wet and may require a boardwalk.
- 20** Opportunity for at-grade railroad crossing.
- 21** Potential location for bridge crossing here; there is a small area outside of utility line ROW. However, utility lines heavily constrain opportunity for greenway placement and further study is needed to ensure feasibility.
- 22** Frequent flooding occurs on existing greenway alignment under the highway bridge. An updated surface is needed here; NCDOT will not allow asphalt. Concrete resurfacing may be an option.
- 23** There is no safe crossing at this busy location between the existing Waynesville Greenway and Lake Junaluska path.
- 24** Potential connection to future Raccoon Creek Greenway and Lake Junaluska Elementary School.



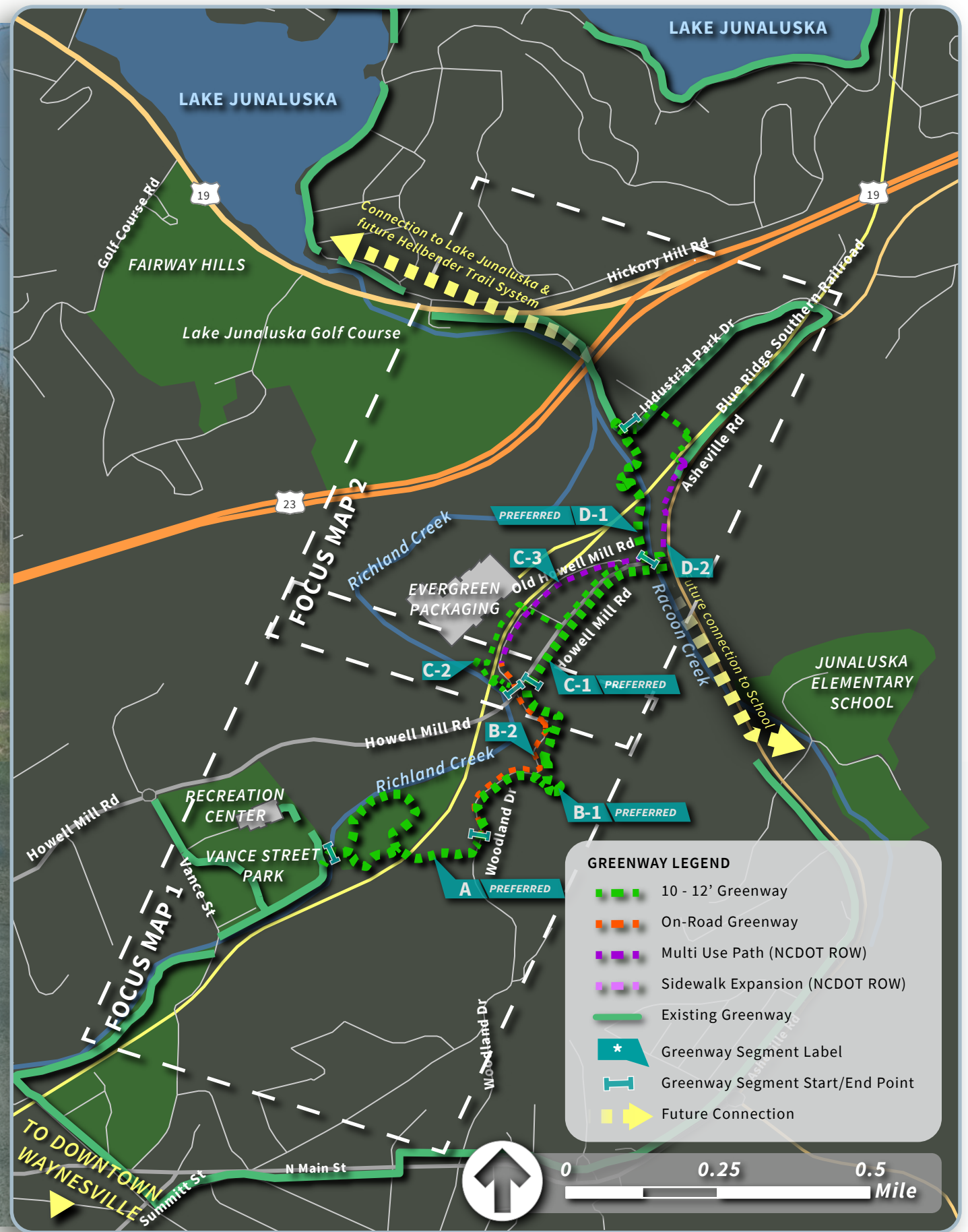
OPPORTUNITIES & CONSTRAINTS: MAP 2



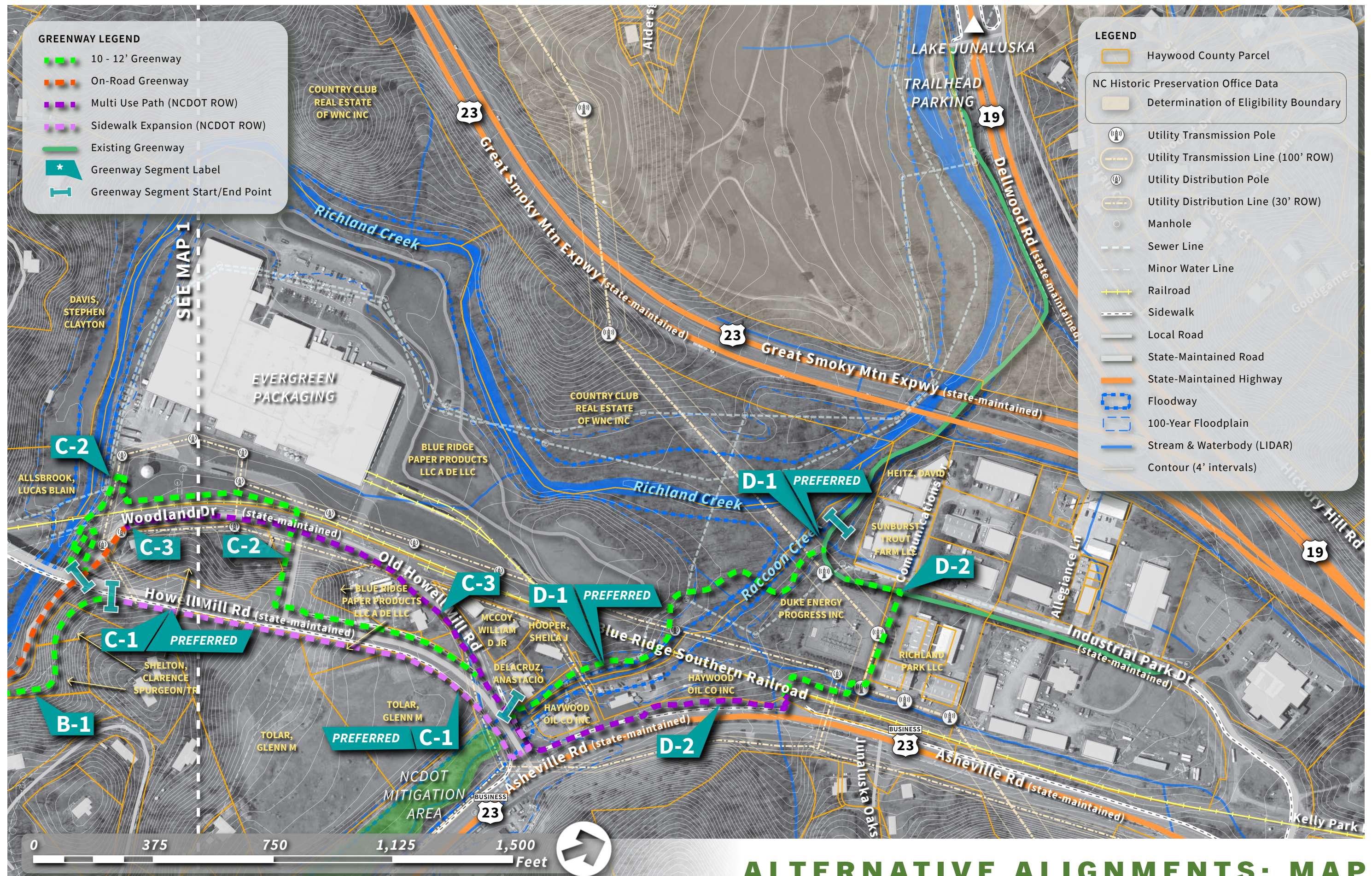
OPPORTUNITIES & CONSTRAINTS: MAP 2



CHAPTER 3 INITIAL DESIGN & ALIGNMENT DECISION MATRIX



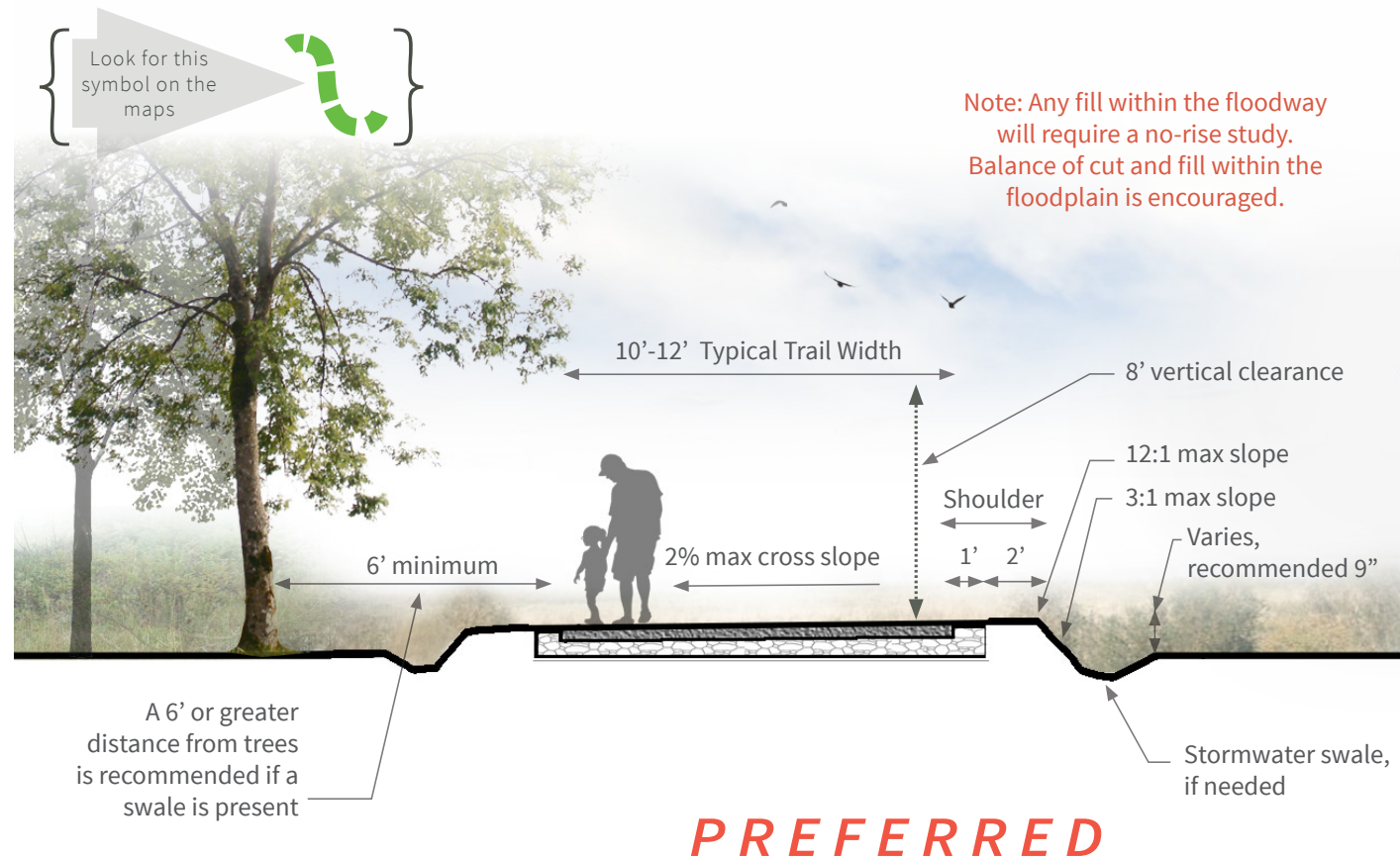
SECTION	FOCUS MAP REFERENCE	Connects Key Destinations and is the Most Accessible	Provides an Inviting & Comfortable User Experience	Stakeholder & Landowners Support		Constructability	
				Stakeholders	Landowners		
		All people regardless of ability, have the opportunity to access the trail at convenient locations across the County. The route provides connectivity to regional attractions, commercial areas, parks/natural areas, higher density housing, transit, etc. The proposed greenway is used by tourists & locals alike.	The route provides users the opportunity to interact with the natural environment, Richland Creek, and provides a visually interesting experience. The proposed greenway has the highest comfort for users, with the least amount of interaction with roads, challenging grades that require climbing ramps, congested areas, crossings, & parking.	Stakeholder support for the alignment.	Landowners have indicated they may be amendable to an easement or sale of land, a ROW currently exists, etc.	Factors that drive cost or barriers to constructability, such as easements, ROW relocations/designing to accommodate utilities, the crossing of waterways & roads with bridges, environmental factors, such as sensitive habitat, flood potential, limitations due to terrain, etc.	<div>WHERE WE ARE IN THE PROCESS: DECISION MATRIX</div> <div>A decision matrix allows information about each greenway segment to be systematically identified, analyzed, and rated based on design criteria and feedback.</div> <div>Level of Greenway Feasibility Legend:<div><div>Highly Favorable</div><div>Somewhat Favorable</div><div>Unfavorable</div></div></div>
WAYNESVILLE RECREATION PARK TO WOODLAND DRIVE							Notes
PREFERRED	A	1			TBD		Alignment largely on public land, would require cooperation with one landowner.
WOODLAND DRIVE AREA							
PREFERRED	B-1	1			TBD		Alignment would require cooperation from multiple landowners. Preferred by NCDOT. Adjacent landowners expressed B-1 feels more safe than B-2.
	B-2	1					Woodland Drive is currently a state-maintained road and any modifications would need state approval or cooperation with landowners to convert to a local road. B-2 feels more unsafe than B-1 to adjacent landowners. NCDOT expressed this would be the more difficult option.
HOWELL MILL ROAD/ OLD HOWELL MILL ROAD							
PREFERRED	C-1	2			TBD		Alignment proposed along Howell Mill Road ROW and would extend sidewalk to full greenway, with an adequate buffer already existing. Grade along road is not always under 5%, but per AASHTO guidelines, greenways paralleling roads can allow for this. NCDOT and stakeholders prefer this option. NCDOT owns some of the ROW for this option.
	C-2	2					Areas along this alignment may be infeasible or too cost prohibitive. Concerns with crossing near truck loading entrance. Stakeholders and landowners prefer C-1.
	C-3	2					Significant regrading, and possible needed purchase of private property at the intersection of Woodland Drive and Old Howell Mill Road, may make this option too cost prohibitive. Stakeholders and landowners prefer C-1.
RACCOON CREEK							
PREFERRED	D-1	2			TBD		Crossing underneath the elevated railroad and crossing Raccoon Creek are the two biggest cost and design challenges. Alignment has two landowners, with one of them confirmed as willing to accommodate the greenway. This option is preferred by stakeholders and NCDOT.
	D-2	2					Crossing near Duke substation may be infeasible and not supported by Duke due to patchwork of utility restrictions. Driveway Access points along Asheville Road present a design and safety challenge. Stakeholders -grade crossing did not prefer this option. Blue Ridge Southern Railroad does not prefer this option because of the new on-grade crossing. NCDOT does not prefer this because of multiple driveway access points.



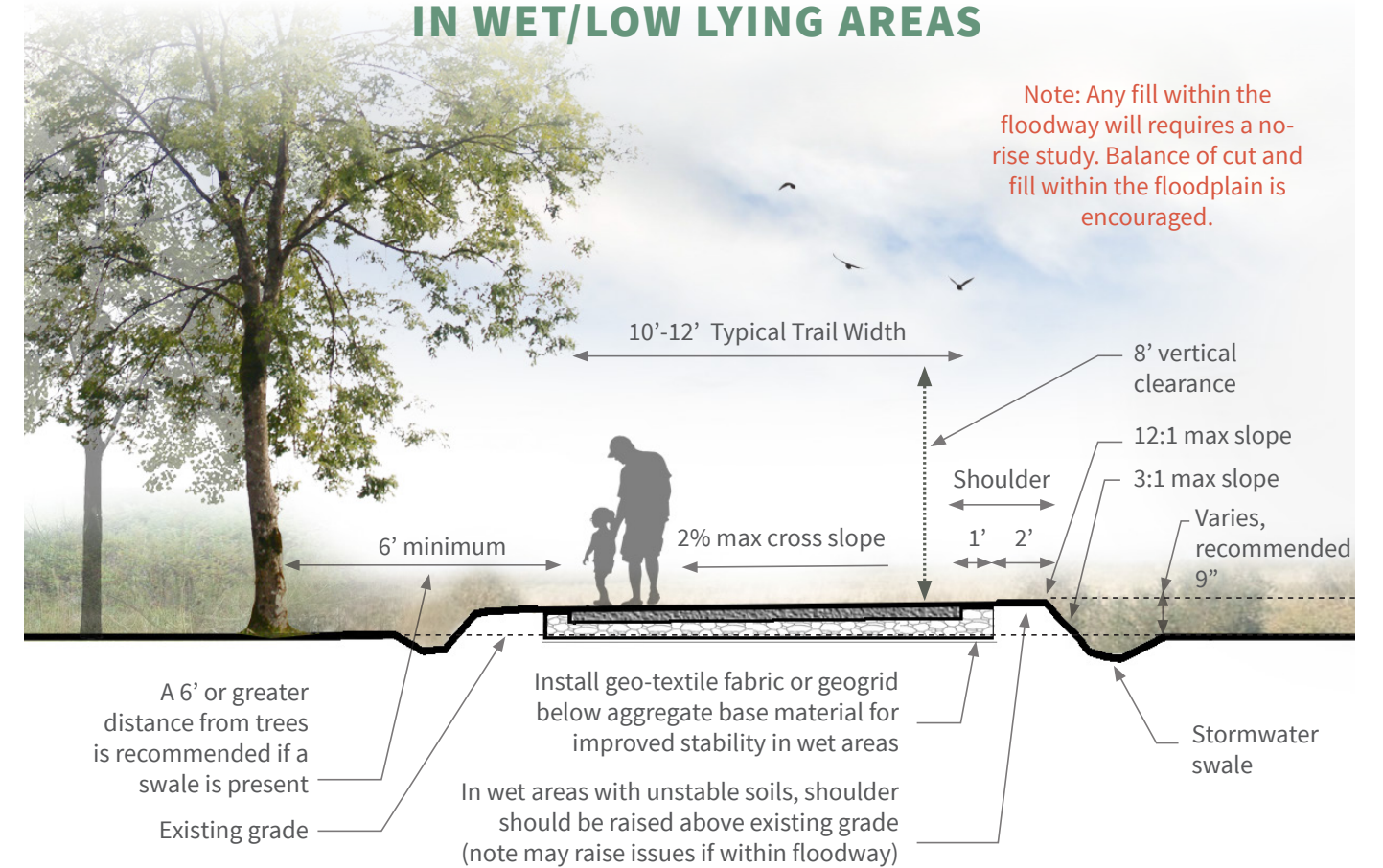
ALTERNATIVE ALIGNMENTS: MAP 2

TYPICAL GREENWAY

TYPICAL 10-12' PAVED GREENWAY



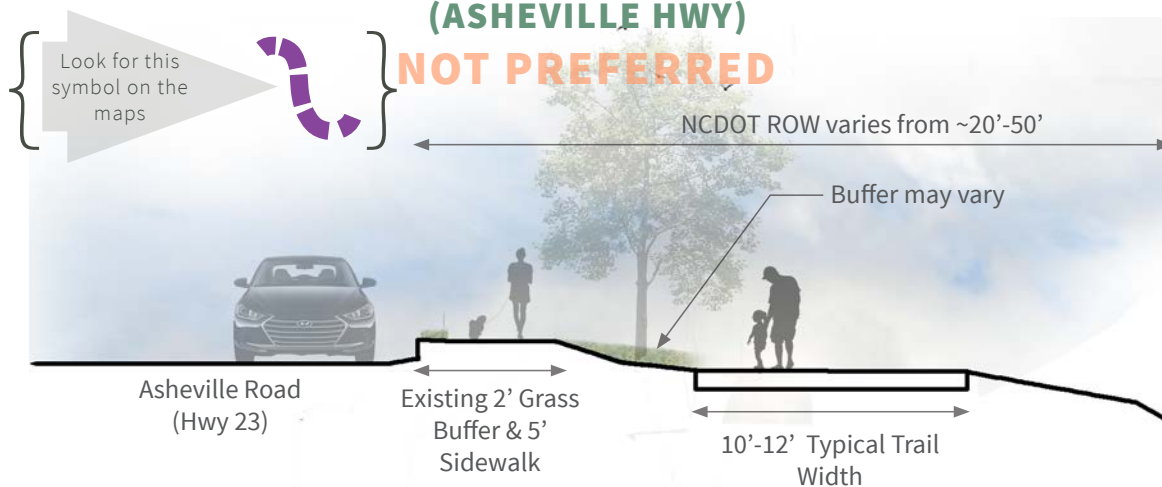
TYPICAL 10-12' PAVED GREENWAY IN WET/LOW LYING AREAS



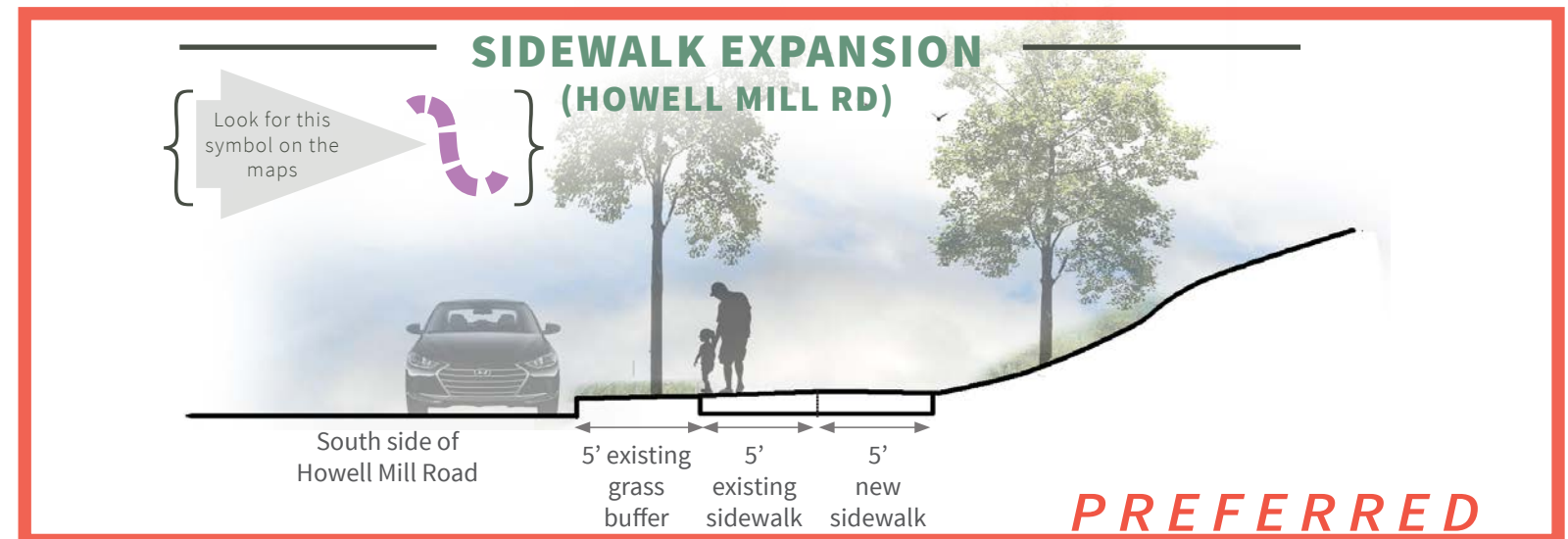
NCDOT ROW GREENWAYS

NCDOT MULTI USE PATH (ASHEVILLE HWY)

NOT PREFERRED



SIDEWALK EXPANSION (HOWELL MILL RD)

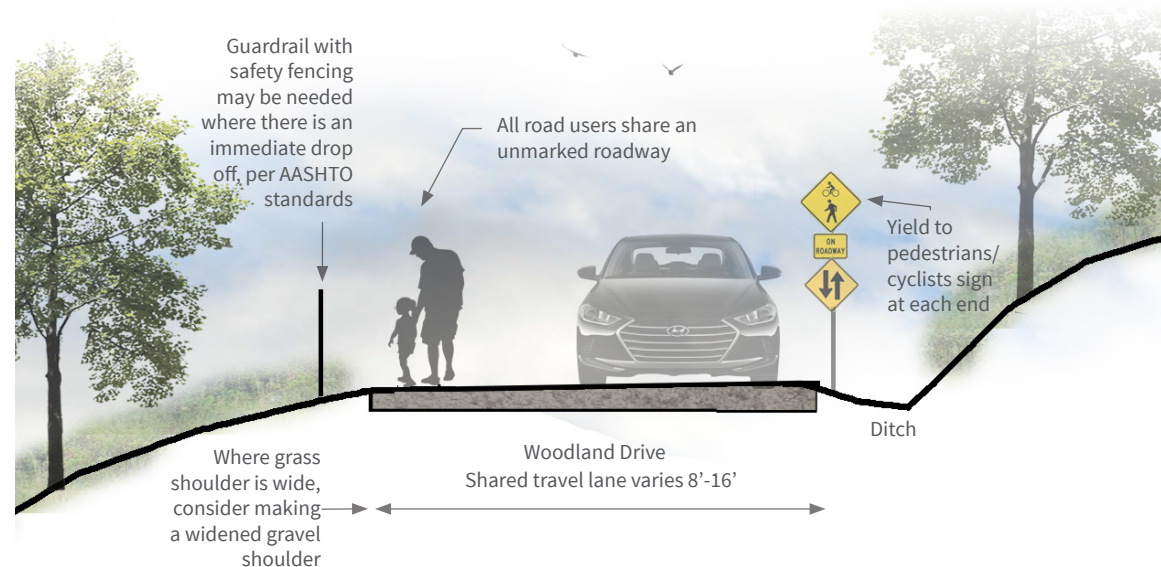


GREENWAY TYPOLOGIES

ON-ROAD/YIELD ROADWAY GREENWAY

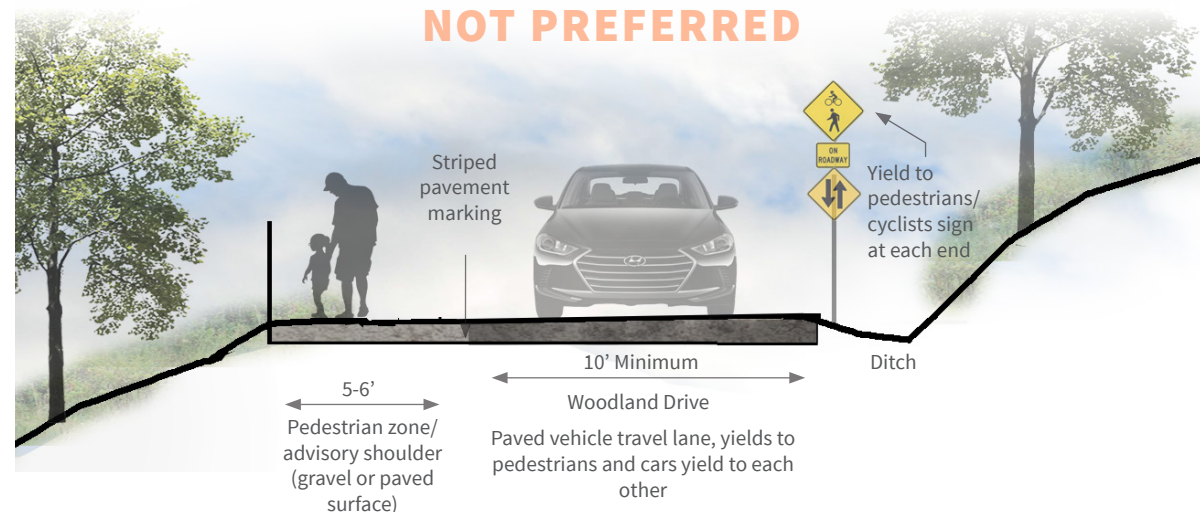
SHARED USE/YIELD ROADWAY ROAD (IMMEDIATE PHASE)

NOT PREFERRED



ADVISORY SHOULDER FUTURE PHASE (ROAD PAVED)

NOT PREFERRED



NOTE: This option would only be feasible where the road can be widened at least 15'-16' wide so that a 5'-6' advisory shoulder can fit alongside a consistent minimum 10' wide vehicular travel lane. The Town is recommended to (after it assumes ownership of Woodland Drive) receive approval from the FHWA for request to experiment with implementation of either a yield roadway or advisory shoulder, including custom traffic control signage, to limit Town liability.

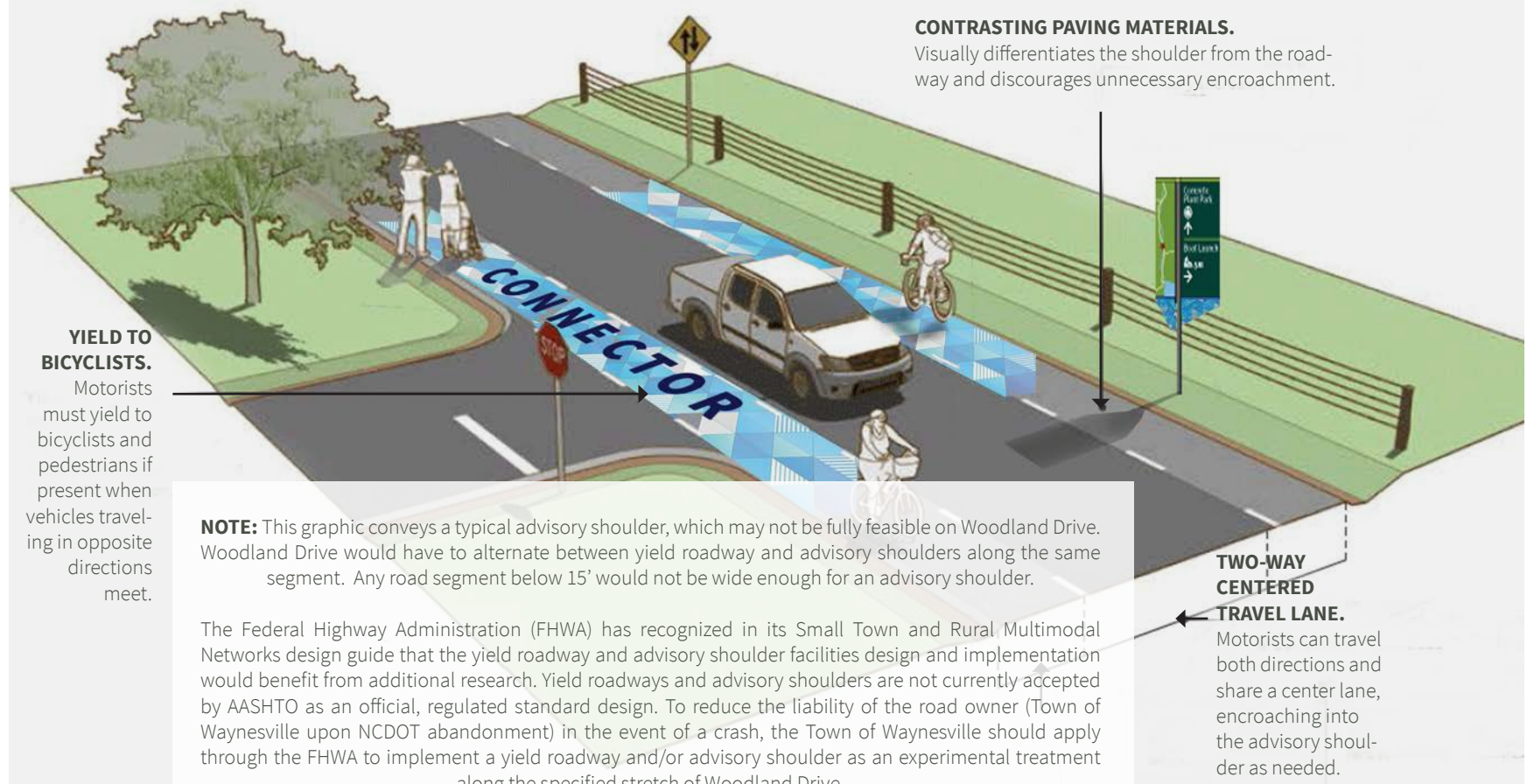
NOTE: A yield roadway is designed to serve pedestrians, bicyclists, and motor vehicle traffic in the same slow-speed travel areas. Yield roadways serve bi-directional motor vehicle traffic without land markings in the roadway travel area. Many local, neighborhood roads often function as de facto yield roadways. There are no pavement markings. Traffic volume is low. People regularly walk and ride their bikes in the middle and also along the sides of the street, and pedestrians, bicyclists, and motor vehicles "figure it out" when more than one user is occupying the same stretch of road. However, in such instances, facilities are not designated as official yield roadways, and thus, liability rests with roadway users rather than the roadway owner.

GENERAL GUIDANCE & RECOMMENDATIONS ON USE OF THIS TYPOLOGY

NOT PREFERRED

OPTIONS TO ACHIEVE THE SAFEST ON-ROAD FACILITY:

- Work with NCDOT to transfer Woodland Drive into local Town of Waynesville ownership
- Consider option of eliminating through traffic by dead-ending roadway from two sides (would require landowner buy-in)
- Widen shoulder where possible



NOTE: This graphic conveys a typical advisory shoulder, which may not be fully feasible on Woodland Drive. Woodland Drive would have to alternate between yield roadway and advisory shoulders along the same segment. Any road segment below 15' would not be wide enough for an advisory shoulder.

The Federal Highway Administration (FHWA) has recognized in its Small Town and Rural Multimodal Networks design guide that the yield roadway and advisory shoulder facilities design and implementation would benefit from additional research. Yield roadways and advisory shoulders are not currently accepted by AASHTO as an official, regulated standard design. To reduce the liability of the road owner (Town of Waynesville upon NCDOT abandonment) in the event of a crash, the Town of Waynesville should apply through the FHWA to implement a yield roadway and/or advisory shoulder as an experimental treatment along the specified stretch of Woodland Drive.

GREENWAY TYPOLOGIES



WHERE WE ARE IN THE PROCESS:

FEEDBACK

Feedback for the preferred greenway alternative is solicited and received throughout the process, from stakeholders, the DOT, town staff, and the community.

CHAPTER

**4 PUBLIC
ENGAGEMENT**

Public Forum

The Town of Waynesville staff presented and discussed the project at the public meeting held on March 25, 2021, at the Waynesville Recreation Center. Participants were encouraged to provide input and share ideas for the Town-owned property as well as the rest of the proposed greenway. Ideas initially presented in the forum were those that had come up previously in greenway council, parks and recreation commission, and staff discussions for feedback:

- Outdoor exercise equipment - using the greenway as a fitness trail
- Picnic areas with grills and benches
- Extension, enhancement of disc golf course with relocation of some holes – particularly those that come into conflict with other park users during busy times
- Working with Haywood Waterways on an additional stream access and educational areas
- Requested recreation facilities that are in short supply such as horseshoes, bocce, or corn hole

Some of the top ideas provided by the participants during the forum included:

- A place to connect to nature - preservation and planting of shade trees well as wetland restoration
- Electric vehicle (EV) charging stations and solar panels
- Accessible (ADA-compliant) and family-friendly amenities
- Routes and safe spaces for 5K distance competitions
- Outdoor education areas where children can learn about the river and the local environment

These ideas were recorded by Town staff and informed the initial design of trailside amenities. Additionally, a more in-depth survey was distributed to residents of the Town for feedback on greenway use and desired amenities.

Online Survey

Distribution of the Survey. The Waynesville Richland Creek Greenway Survey was publicized through press releases and via Facebook, Instagram, and the Town’s website. It was also advertised via email and text messages from contact lists maintained by the Town, as well as at the public forum held on March 25, 2021, at the Waynesville Recreation Center. It was available to complete online using a variety of devices; paper copies were available at the Waynesville Recreation Center and Old Armory Recreation Center. The survey was available to the public from March 15 to April 16, 2021.

Demographics. The largest age groups represented in the survey are ages 60-74 (32% of respondents), ages 30-44 (31% of respondents) and age 45-59 (24% of respondents). Almost 9% were between the ages of 18-29 and 5% were 75 years or older. These data show that people from a wide range of ages use and/or support the greenway. These demographics roughly match up the Town’s age distribution, as measured by the US Census (American Community Survey, 2014-2019). The Census reports a larger amount/percentage of older adults age 75+ (13% of the population) and a smaller percentage of adults age 45-59 (18%).

More women than men completed the survey – 59% of respondents identified as females, 40% as males and 1% preferred not to say. The Census estimates that the Town’s population consists of 51% females and 49% males. The difference in these two results may indicate that more women than men use and/or are interested in the Town’s greenways.

In terms of household sizes, 55% of survey respondents represent two-person households and 27% were from three- and four-person households; 10% were from one-person households and 9% were from households containing 5 or more people. It is a little more difficult to compare the survey results to the Town’s Census data regarding household sizes. The Town had 4,680 households in 2019 and the average household size was 2.08 people.

Waynesville’s population was estimated to be 9,965 in 2019. The population of everyone in the Town age 18 and over was 8, 079. 443 survey responses represent about 5% of this adult (age 18 and over) population.

Waynesville Richland Creek Greenway Survey

Hello and thank you for being an active participant in your town's parks and recreation planning process! The purpose of this survey is to find out the opinions and preferences of the citizens of Waynesville for the existing and future expansion of the Richland Creek Greenway system. The Town is applying for a NC Parks and Recreation Trust Fund Grant for the construction of this section of greenway and associated amenities. We need your input to make this greenway system the best it can be!

What are Greenways? They are linear open spaces that connect parks or other public areas and often contain either a paved or unpaved trail. Sometimes greenways rely on other connections, such as sidewalks and on-road connections when off-road options just aren't available. Greenways connect places and provide paths for active transportation.

Please complete the brief survey below and if you have any additional input or questions, please send them to: rlangston@waynesvillenc.gov

Online Survey (continued)

Results of the Survey. The response to the survey was enthusiastic, with **443 complete responses**. Respondents overwhelmingly supported a greenway connection from the existing Vance Street Park to Lake Junaluska. Of the total respondents, 96.4%, or 427 people, answered that they support this greenway connection. Only 4 people responded “No” and 12 responded “Maybe”. The responses from people who chose “Maybe” were generally supportive of the project and indicated the need for more information about the project, its cost and how it was being funded.

Almost 87% of survey respondents are current users of the Town’s greenways. Over a quarter of them use the greenway 2-3 times a week and 41% use it at least once a week. Only 7% (31 respondents) said they had never used Waynesville’s greenways.

In terms of amenities that are desired along a new section of greenway, two-thirds of respondents would like to see **Picnic Tables** (the most popular response). Other top choices were **Fishing Access** (38%), **Exercise Stations** (30%), **Disc Golf** (23%), and **Horseshoes** (10%). **Benches** were the fifth choice with 14 votes, and there were over 100 “Other” responses where responders filled in the blank with amenities that they would like to see along the greenway. All additional feedback including any other comments or suggestions provided by the survey were taken into consideration by the Town. See the graphic on the next page for a summary of the top requested amenities.



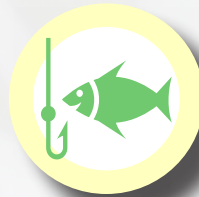
PUBLIC ENGAGEMENT PROCESS SUMMARY

Online Survey Results

“What are the amenities you would most like to see on a new section of greenway?”
Top 6 Responses Ranked



279 responses



168 responses



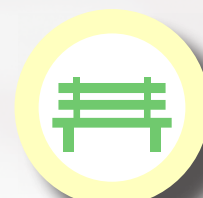
134 responses



103 responses



46 responses



14 responses

EXAMPLE OF ONLINE SURVEY RESULTS

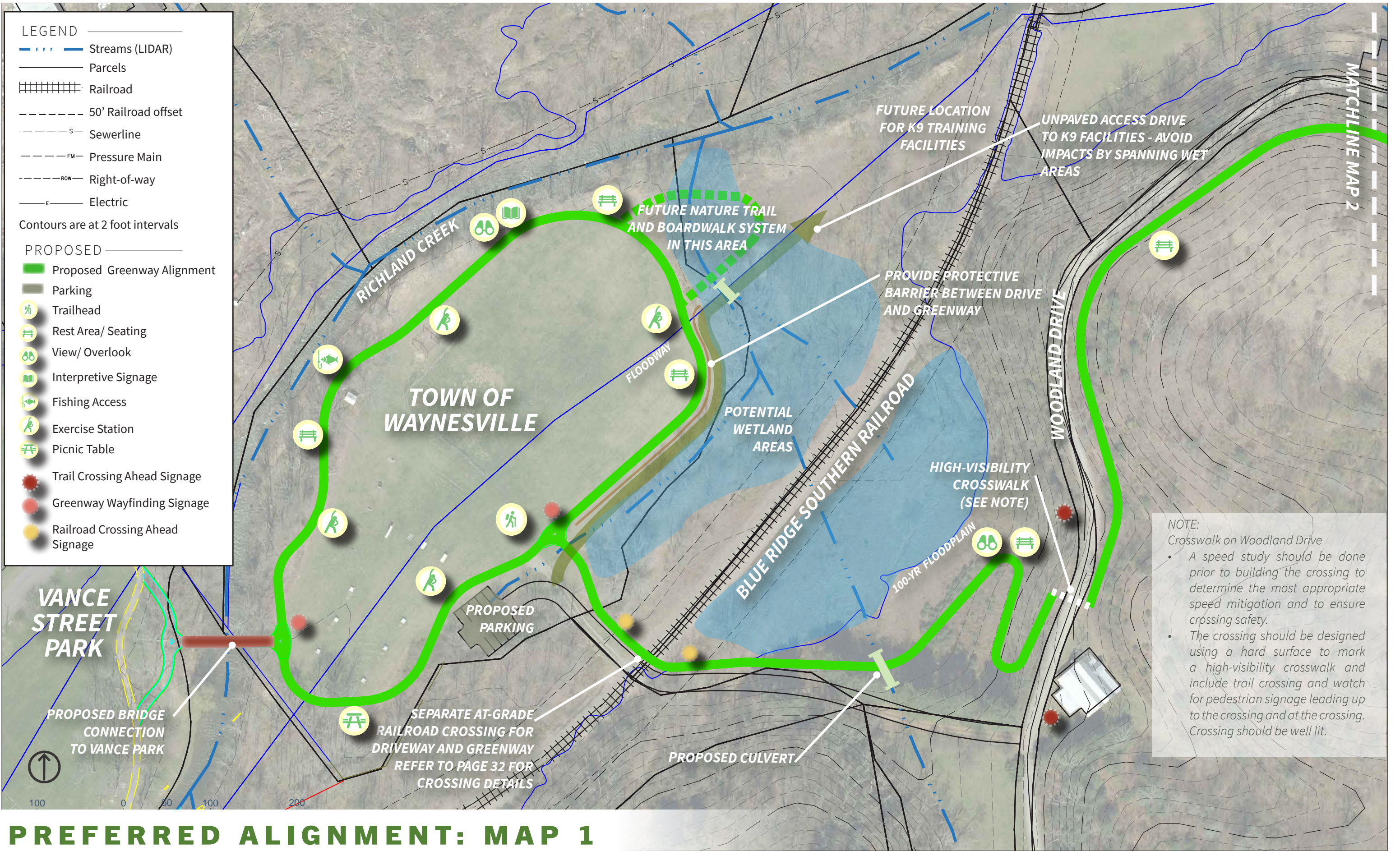




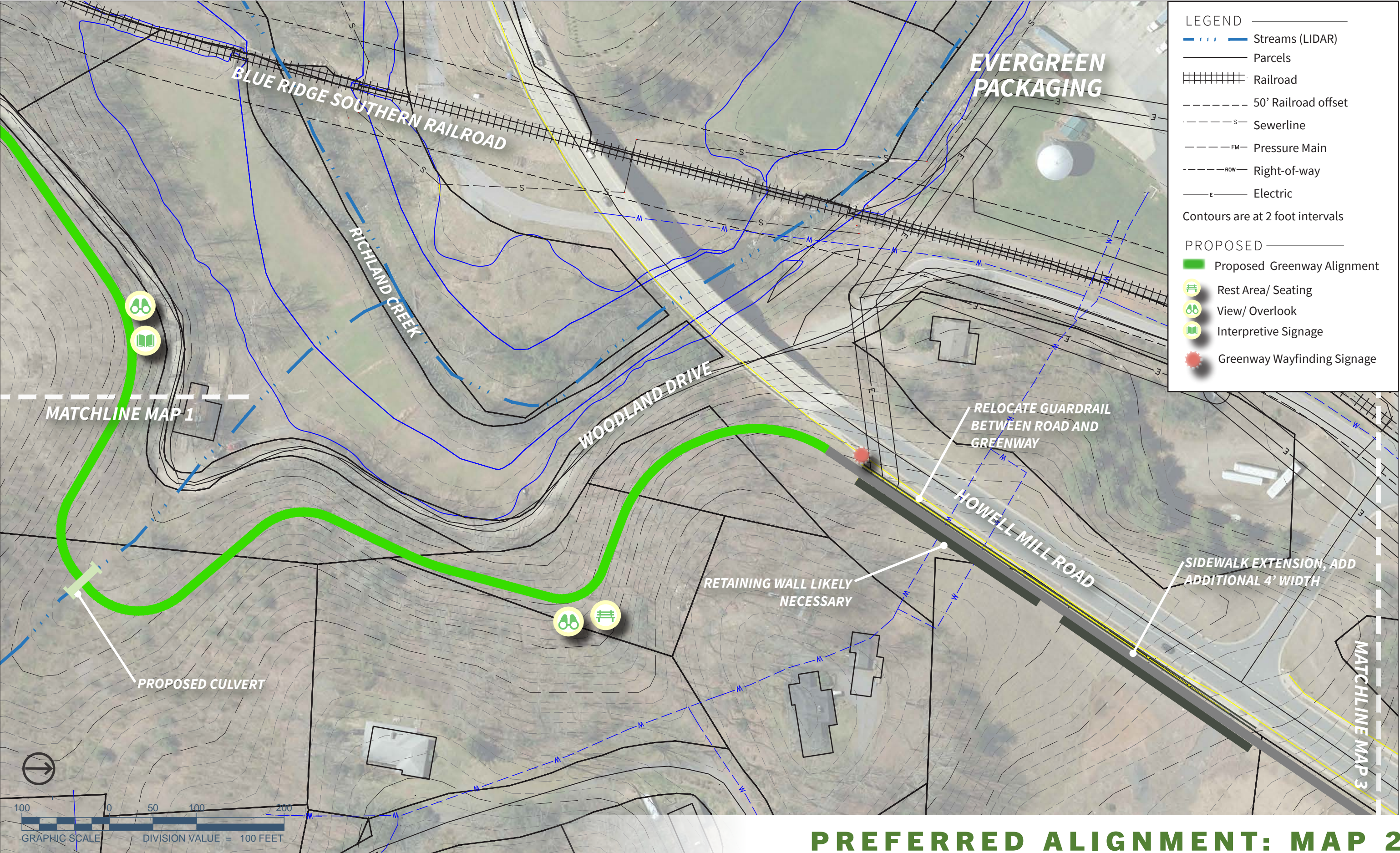
WHERE WE ARE IN THE PROCESS:
DESIGN DETAIL & COSTS

Final details for the greenway are designed and planning level cost estimates are developed.

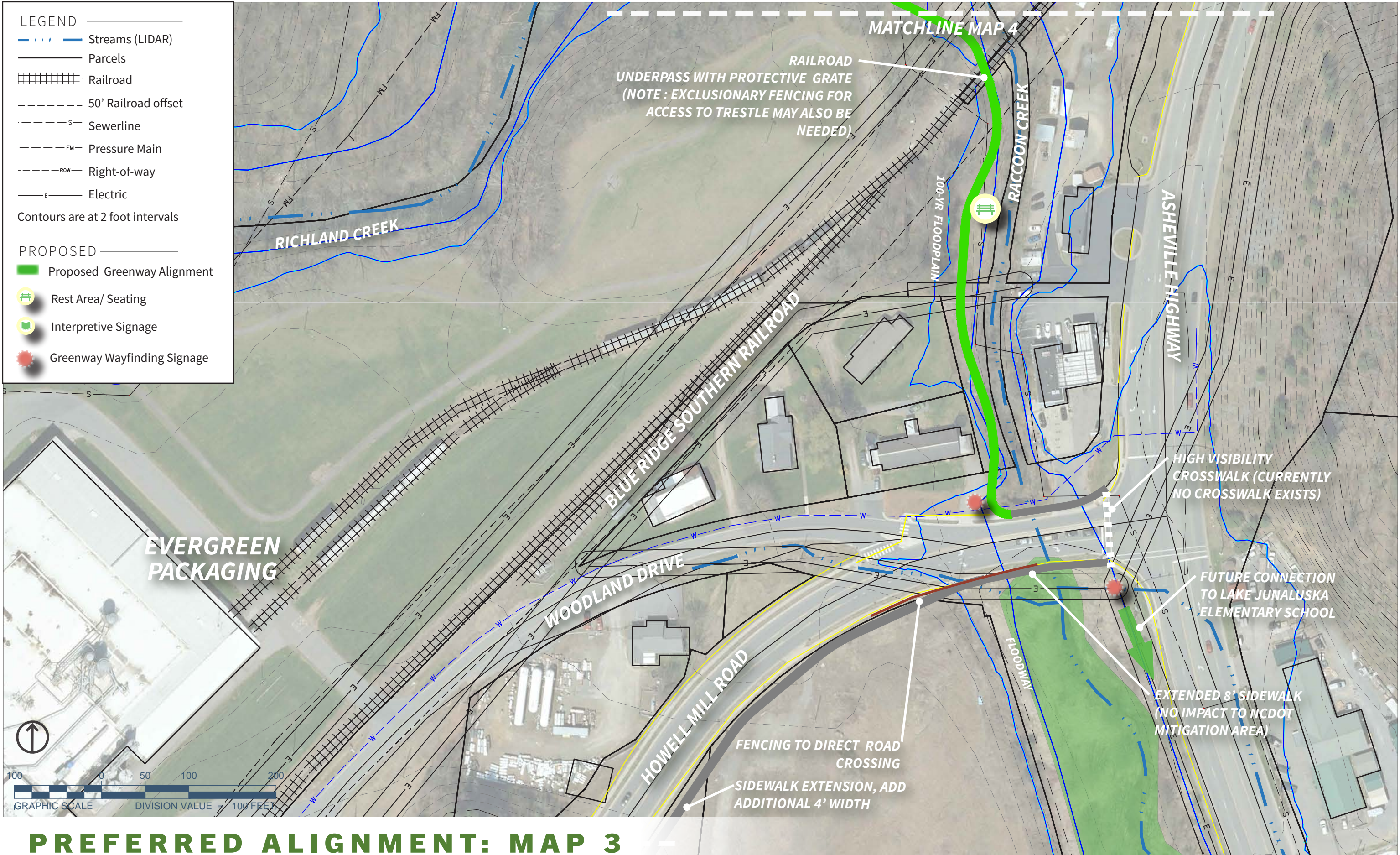
CHAPTER
GREENWAY DESIGN **5**



PREFERRED ALIGNMENT: MAP 1



PREFERRED ALIGNMENT: MAP 2



PREFERRED ALIGNMENT: MAP 3

LEGEND

Streams (LIDAR)

Parcels

Railroad

50' Railroad offset

Sewerline

FM Pressure Main

ROW Right-of-way

Electric

Contours are at 2 foot intervals

PROPOSED

Proposed Greenway Alignment

Existing Trail Alignment

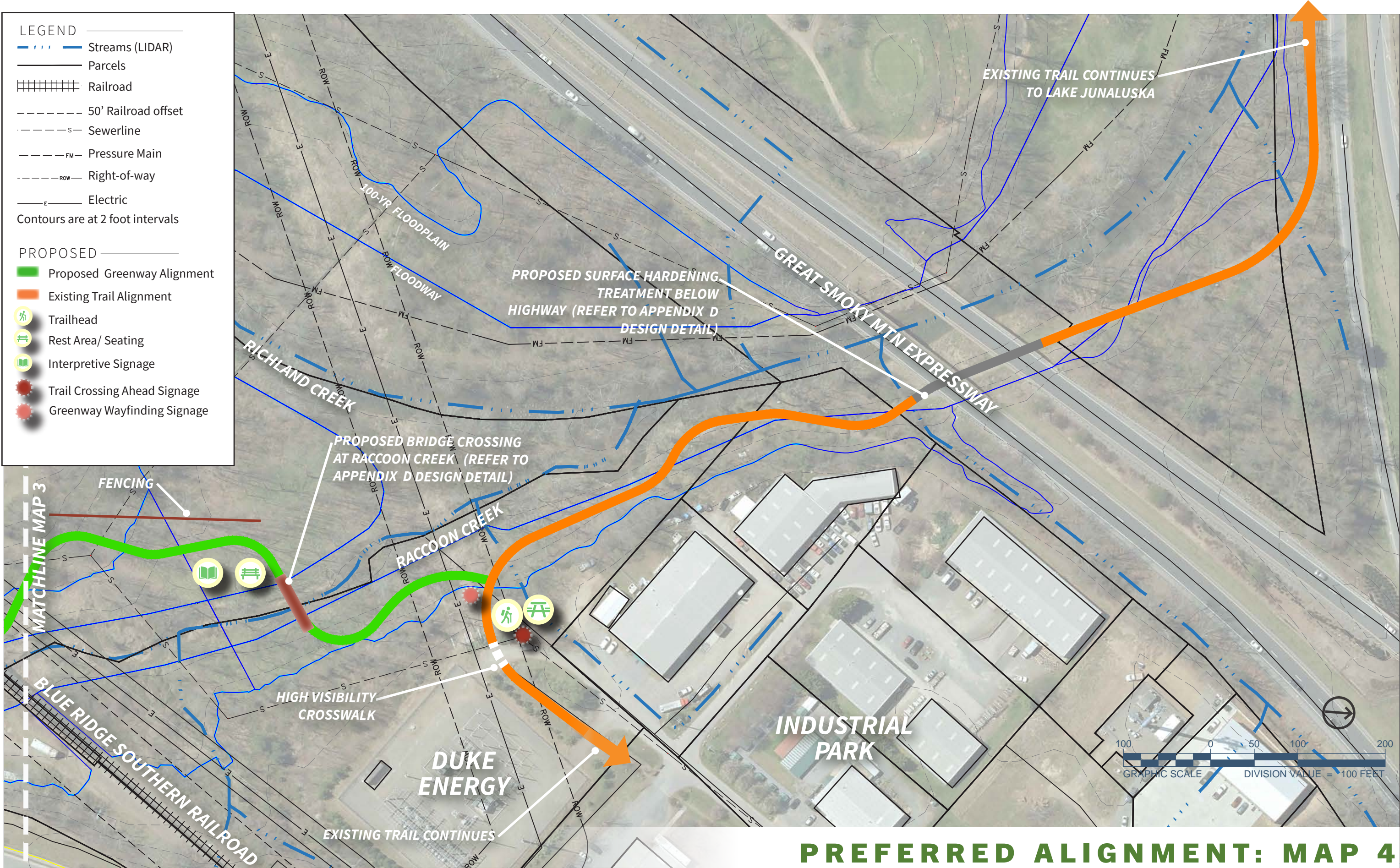
Trailhead

Rest Area/ Seating

Interpretive Signage

Trail Crossing Ahead Signage

Greenway Wayfinding Signage



PREFERRED ALIGNMENT: MAP 4



TRAILHEAD

One trailhead are proposed for the Town of Waynesville park addition.



REST AREA/SEATING & VIEW/OVERLOOK

Several locations offer long-range or creek views, with good chance for wildlife viewing. A small pull-off with seating in the direction of the views.



Other seating areas provide opportunity to be near water or to view interpretive signage.



INTERPRETIVE SIGNAGE

Interpretive signage should be continued as a theme along the trail highlighting natural and historic features of the corridor and the larger Waynesville community. Some themes might be water quality and fish aquaculture (located near Sunburst Trout's facilities), nearby historic places, history and story of nearby community businesses like Evergreen Packaging, and Richland Creek watershed facts.



PICNIC TABLE

Two picnic tables are proposed at the Town of Waynesville property park addition and one near the Sunburst Trout business at the terminus of the greenway.



FISHING ACCESS

Fishing access with stone steps will serve both for fishing and tubers that put in at Vance Street Park.



EXERCISE STATIONS

A variety of exercise stations are proposed at the Town of Waynesville park addition.

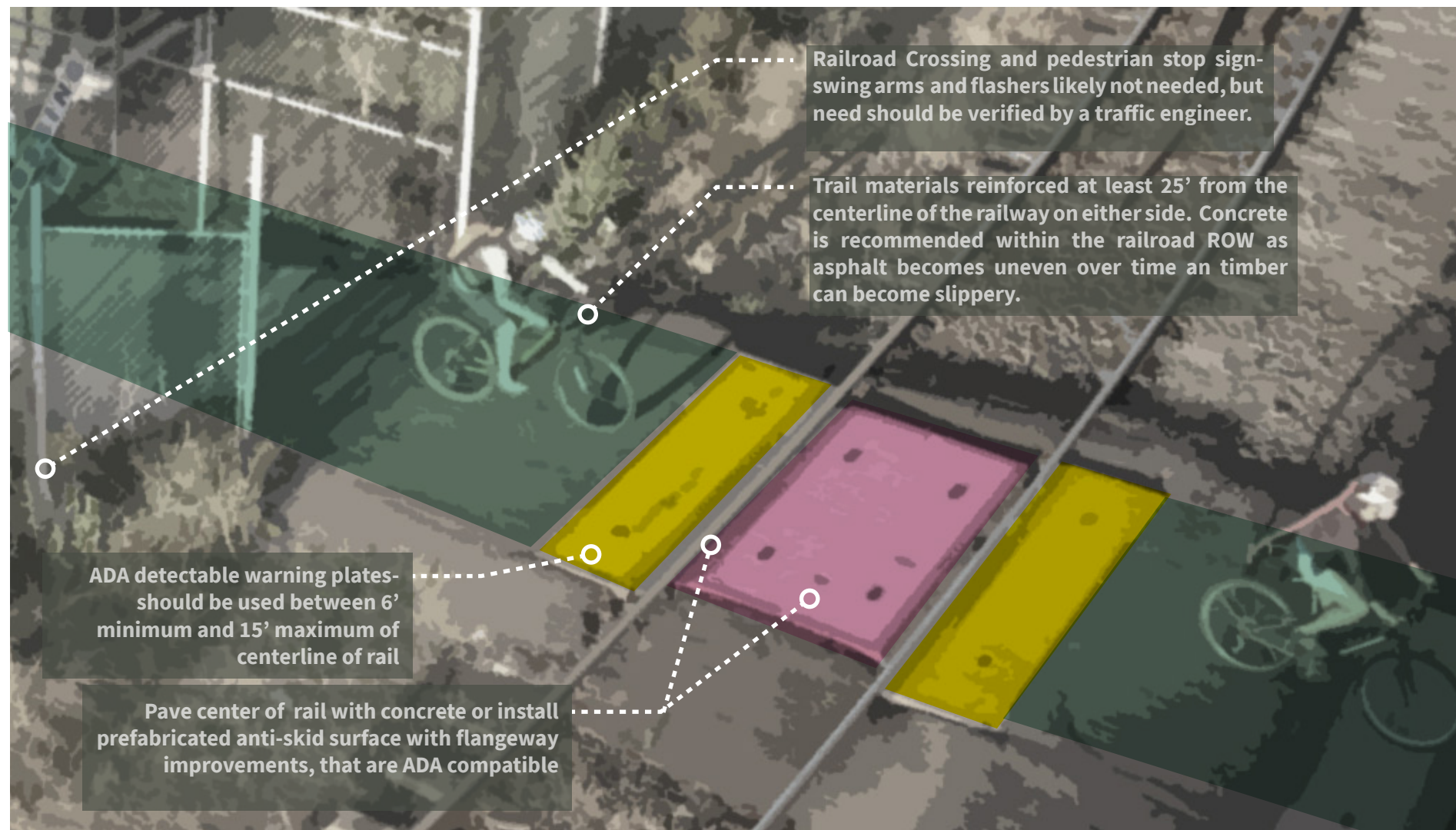


WAYFINDING SIGNAGE

New wayfinding signage that uses the existing design is proposed with the potential for additional signage types that can serve as mile markers or on-street directional signage.



AMENITY EXAMPLE IMAGES



GREENWAYS THAT INTERFACE WITH RAILROAD CROSSINGS

MAKING RAILROAD CROSSINGS SAFER. Retrofitting railroad crossings for greenway users is important for safety and for accessibility requirements. Typically many railroads will have stringent requirements for crossing and paralleling railroads. The Blue Ridge Southern Railroad's requirements, per conversation with their manager, have suggested their requirements are less stringent for crossings as they have not required flashers and gates for other crossings in the region.

Other safety improvements that are highly recommended from a liability standpoint are the following:

- Greenways should always cross perpendicular to the track.
- Improved crossing, including surface and gaps, through the use of flangeways and poured concrete. See more about this to the right.
- Use of variable MUTCD signs.

COMPONENTS OF A SAFE CROSSING. Design for each crossing will vary but should contain some of the following features:

- **Flangeway Improvements:** The flangeway is the filling between the rail and greenway surface. This can be particularly dangerous to bicyclists whose tires can be caught in the flangeway. Prefabricated fillers are recommended. These fillers should also address ADA issues, to allow for safe crossings for those of wheelchairs or with canes.
- **Signage Improvements:** Need for detectable flashers and gates should be determined at the next phase. A pedestrian stop sign and railroad crossing sign should be present at all crossings.



DESIGN DETAILS



Why Riparian Buffer Enhancements?

- Prevent Erosion & Reduce Stormwater Velocity

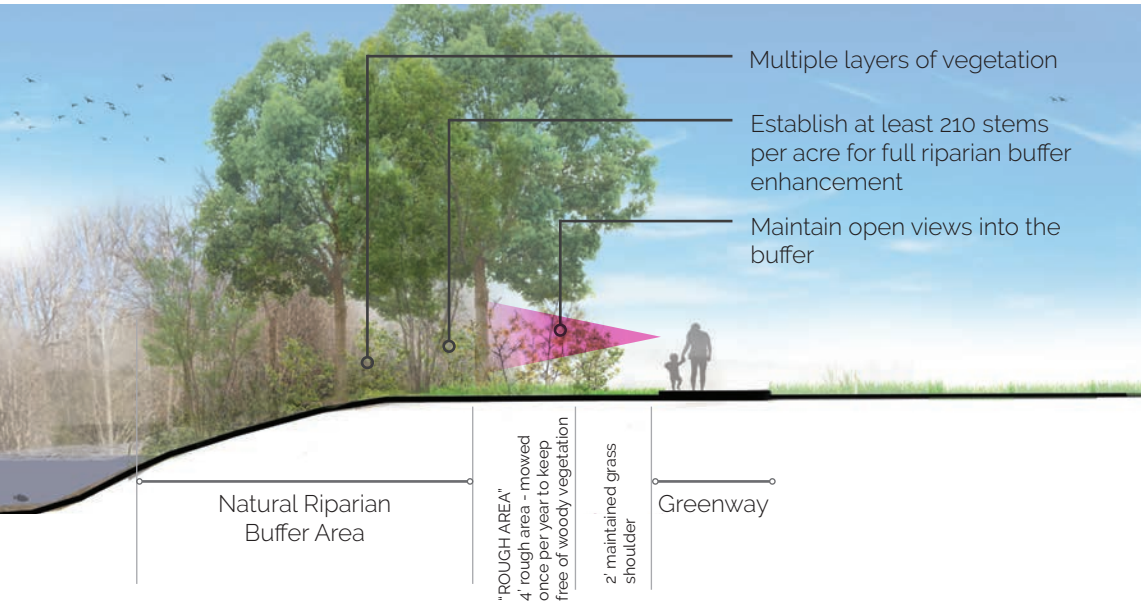
Larger storm events produce high intensity stormwater that flows directly into Richland Creek.

- Provide Bank Stability, Shade & Habitat

Heavily vegetated banks with extensive root systems help stabilize streambanks, and also slow and filter stormwater runoff and enable it to infiltrate into the groundwater.

- Control Invasive Species Populations

Invasive species can crowd out areas for native species to thrive. Native species provide important habitat and food sources for native fauna.



Why Wetland Enhancements

- Vegetative Enhancements

Removing invasive species and planting native species will create beneficial habitat for native animals.

- Opportunity to Educate Public on Benefits of Wetlands

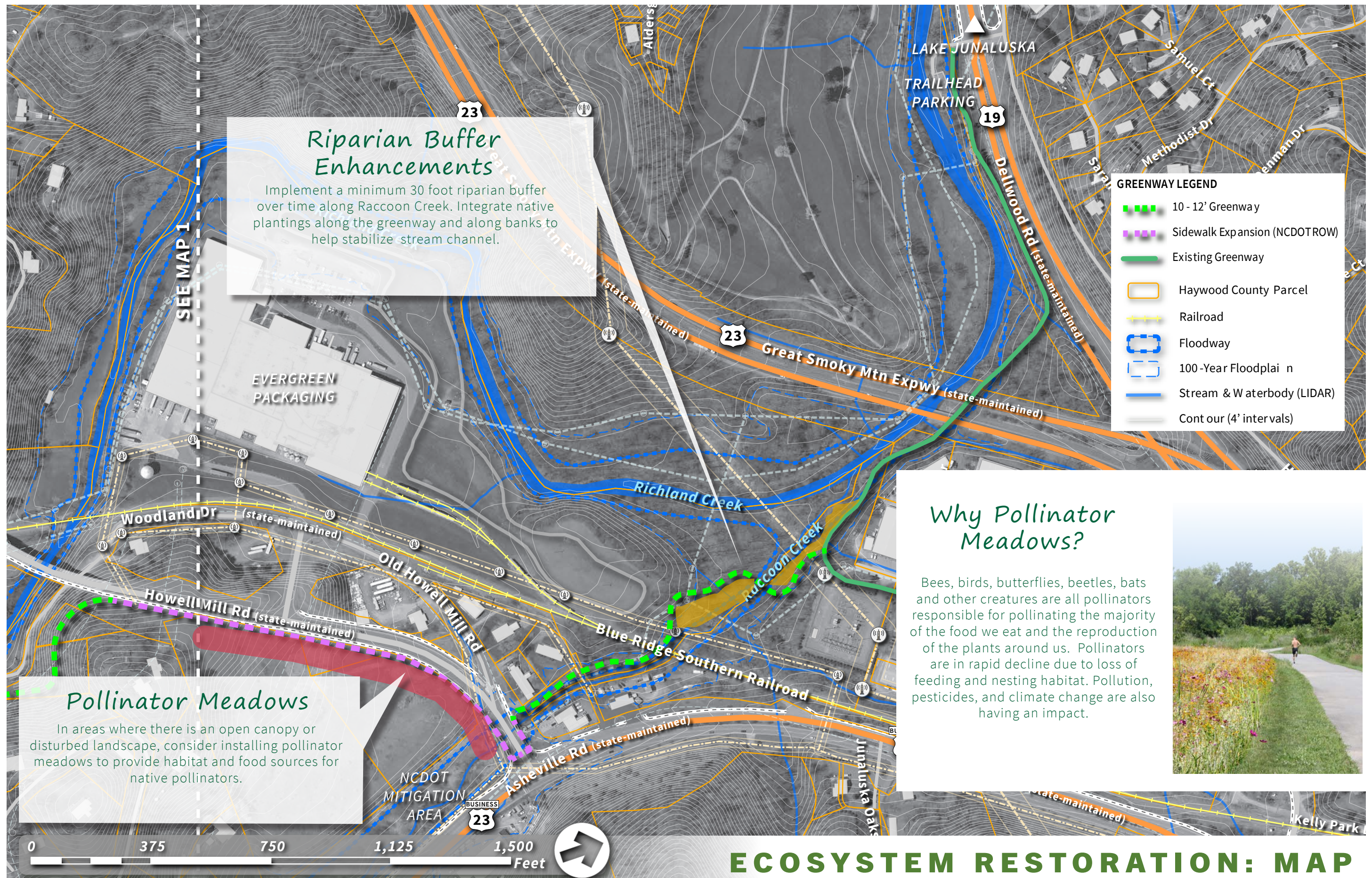
Wetlands provide important ecological functions, including filtering pollutants from stormwater and create habitat for native species. Use interpretive signage to educate the public on the importance of these ecosystems.

Wetland Enhancements

Enhance existing wetlands by planting native species and removing invasive plant populations.

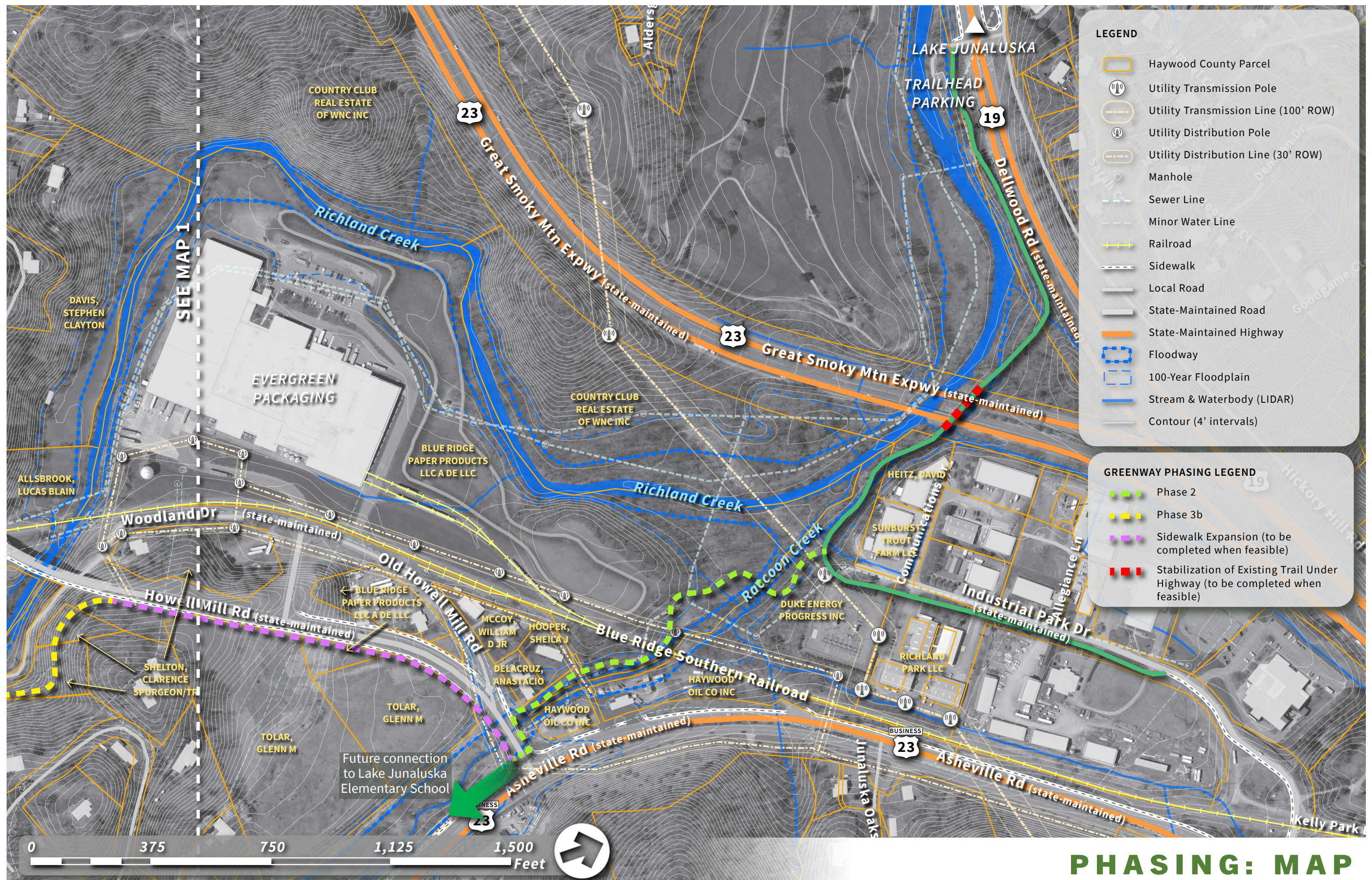
ECOSYSTEM RESTORATION: MAP 1







PHASING: MAP 1



PROBABLE COST SUMMARY

PHASE 1	PHASE 2	PHASE 3a	PHASE 3b
Vance Park to TOW Property 0.31 mi Greenway Trail Parking Lot Bridge Crossing - Richland Creek Picnic Table Exercise Equipment Benches Picnic Table Wayfinding Grills	Howell Mill Road to Industrial Park 0.28 mi Greenway Trail Retaining Wall and Safety Rails Sidewalk Extension High Visibility Crossing Railroad Underpass - Pedestrian Protection Bridge Crossing - Raccoon Creek Benches Picnic Table Wayfinding	TOW Property to Woodland Drive 0.17 mi Greenway Trail Railroad Crossing Driveway Improvements Culvert Crossing Bench Interpretive Signage Wayfinding	Woodland Drive to Howell Mill Road 0.39 mi Greenway Trail High Visibility Crossing Culvert Crossing Benches Interpretive Signage Wayfinding
TOTAL Phase 1 \$698,991	TOTAL Phase 2 \$865,393	TOTAL Phase 3a \$241,985	TOTAL Phase 3b \$702,313

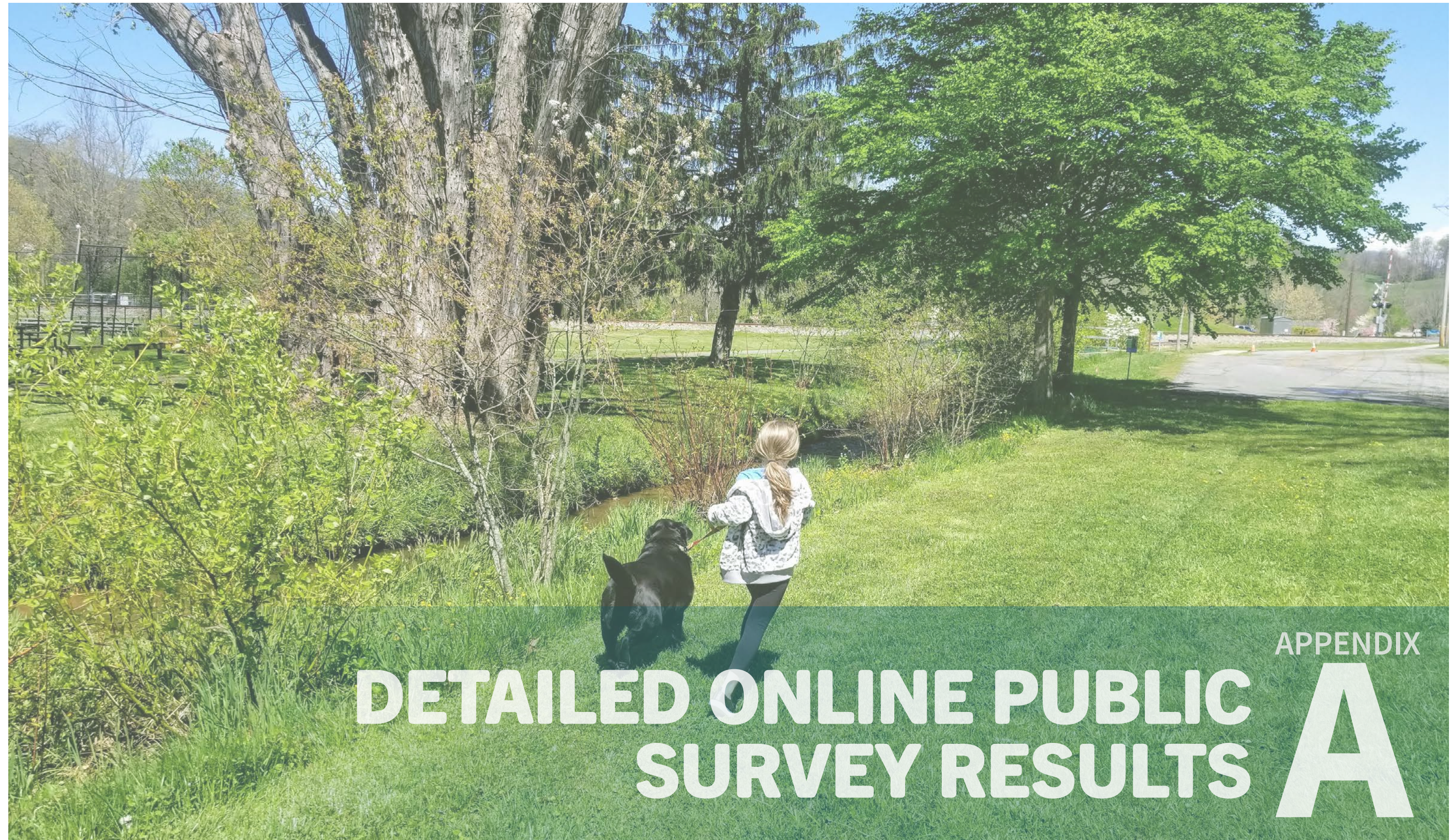
Howell Mill Sidewalk Ext.	Bridge Underpass Stabilization
Howell Mill Road Sidewalk Extension 0.27 mi Sidewalk Extension Safety Railing Retaining Wall	Richland Creek/ Great Smoky Mountain Expressway Bridge Underpass Stabilization - Existing Trail 0.02 mi Concrete Stabilization in Floodway
TOTAL \$570,507	TOTAL \$18,850

Notes on the Probable Cost Estimate

- These are planning level cost estimates and should not be used to estimate for construction, valid for 2021.
- Estimates are rounded up in the cost summary and may vary slightly from the detail cost estimates.
- Costs are based on recent bid or cost estimates. Inflation of a minimum of 3-4% should be applied annually to estimates beyond the year 2021. Costs should be refined and updated as future design and engineering plans are provided.
- Costs not included in this estimate: Utilities (unless otherwise noted), geotechnical/ soils investigation, rock removal, surveying, permitting, bonding requirements, archaeological investigations, septic investigations, demolition, environmental surveys, traffic studies/traffic engineering, sewer and water utility design, and stream and wetland determinations.
- A 30% contingency is recommended for costs at the master plan phase. Costs can greatly vary based on market prices and due to assumptions that are made without having access to detailed information like grading and a detailed site survey, refinement of material quantities, and any unforeseen circumstance that could require a change order during construction. A more accurate cost can be pursued at the Design Development or Construction Document phase of design.

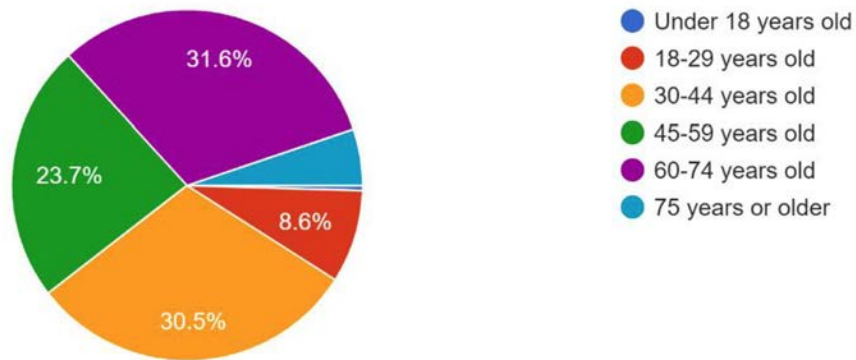
1.44 miles TOTAL \$3,098,039

PROBABLE COST SUMMARY

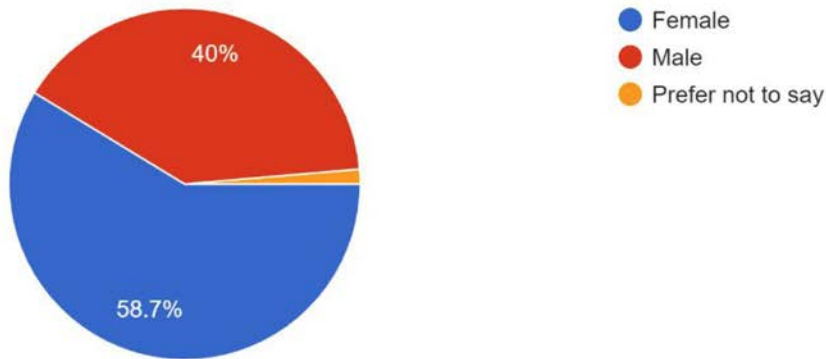


APPENDIX A DETAILED ONLINE PUBLIC SURVEY RESULTS

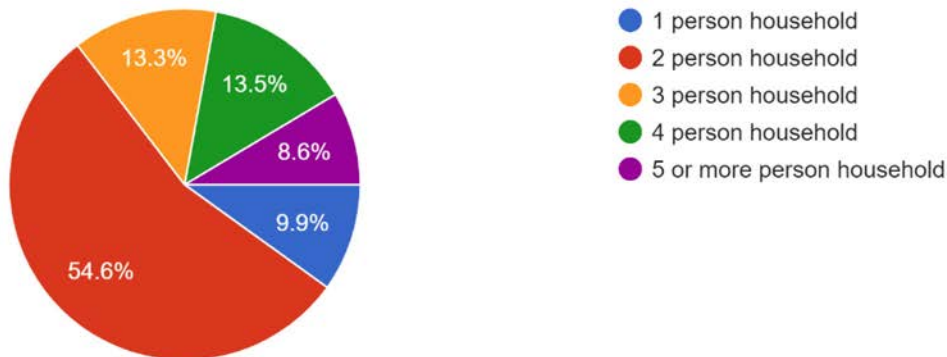
1. Please tell us your age group:
443 responses



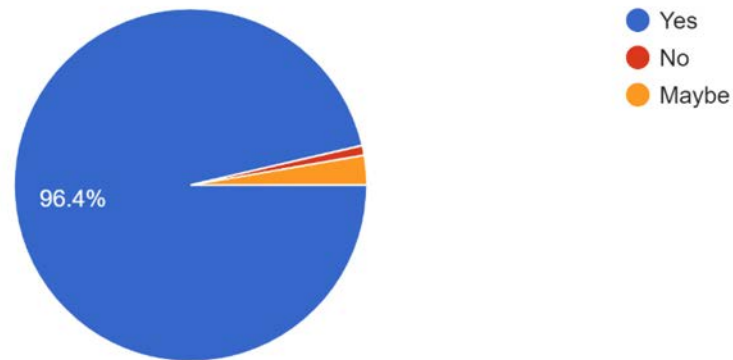
2. Please tell us your gender:
443 responses



3. Please tell us your household size:
443 responses



4. Do you support a greenway connection from Vance Park to Lake Junaluska?
443 responses

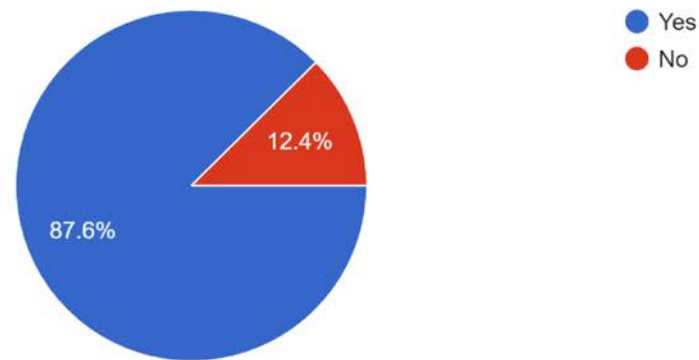


5. If you answered “Maybe” to the last question, what if anything, would enable you to support a greenway connection from Vance Park to Lake Junaluska?

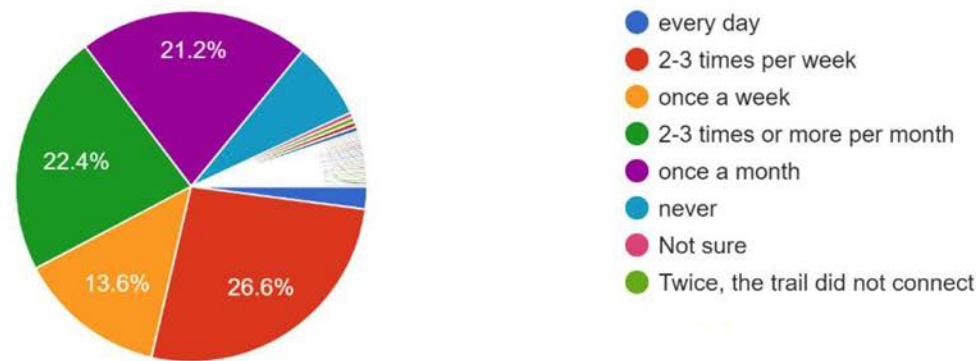
- 1. Not sure
- 2. Cost and if the path is laid out well / is shaded
- 3. More information
- 4. the Vance Park and Lake Junaluska both get a lot of use, a longer trail with additional parking would be beneficial
- 5. More information
- 6. Security
- 7. A safe, unobstructed pathway that is well lit during evening hours.
- 8. low cost and high usage and fix town streets first
- 9. Where would the greenway be placed? Does it involve purchasing land or acquiring through eminent domain? Expanding recreational areas in our town is definitely something that would enhance our quality of life here.
- 10. If the funding came solely from grants or private donations. I do not think that tax dollars should support this endeavor.
- 11. not walking on Asheville Road - too much traffic, not a pleasant place to walk
- 12. No tax increase
- 13. Several: 1. funds don't come from other, more needed, projects. 2. Land used is already owned by the town, or bought at fair price, no ED used.
- 14. Would be a beautiful route
- 15. More greenway!

DETAILED ONLINE PUBLIC SURVEY RESULTS

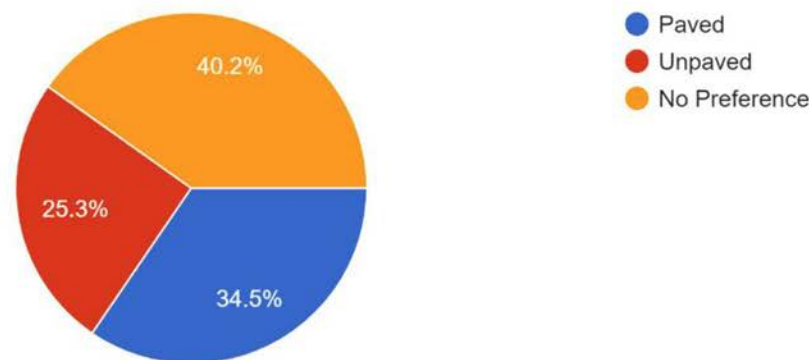
6. Do you currently use Waynesville's existing greenways?
443 responses



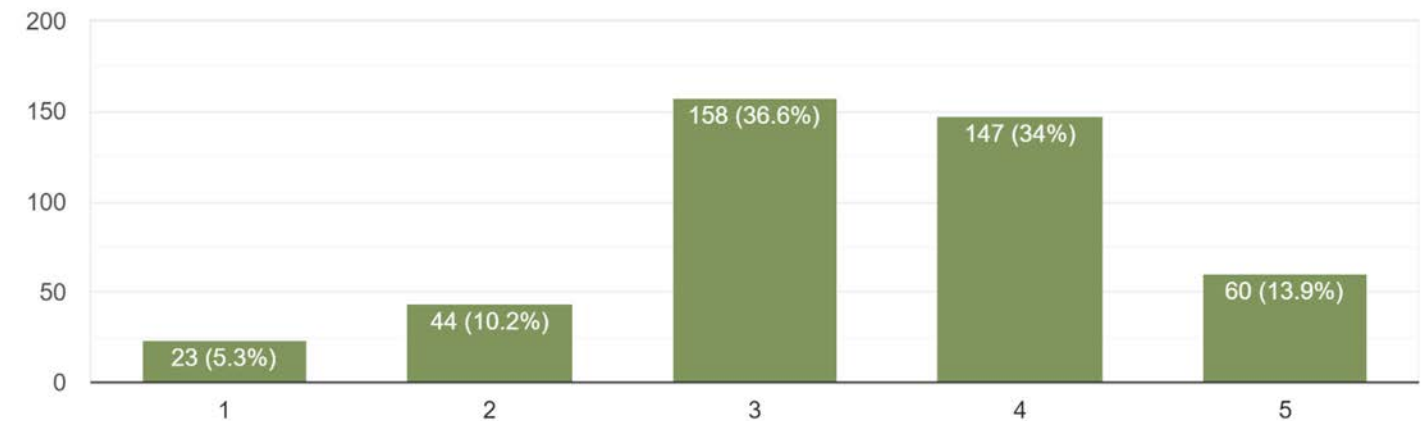
7. How often do you typically use a Waynesville greenway?
433 responses



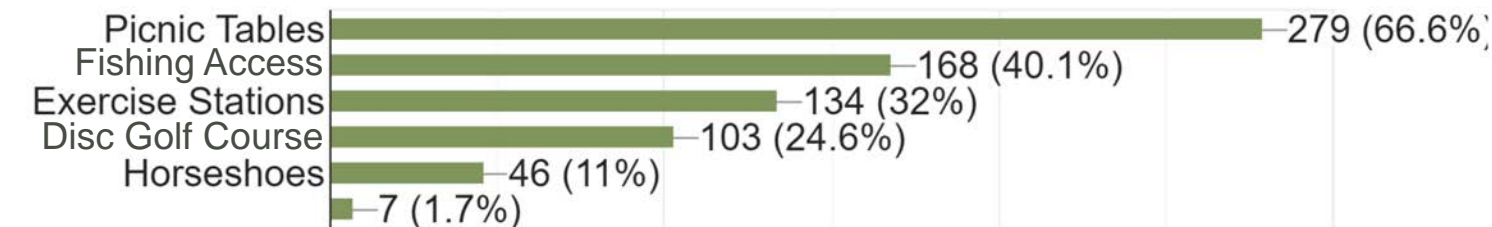
8. Do you prefer paved or unpaved surfaces on a greenway or trail?
443 responses



9. Rank the quality of Waynesville's existing trail/greenway system?
432 responses



10. What are the amenities you would most like to see on a new section of greenway? If "Other" please specify
419 responses



*Additionally, there were over 100 "Other" responses where respondents made suggestions and comments on what they would like to see along the greenway. Educational signage and exercise equipment are some requested amenities that are explored in this plan.

11. Please share any other comments or suggestions you have for this greenway section (Vance Park to Lake Junaluska) or for the Waynesville greenway system in general.
156 responses

*These additional 156 comments from respondents provided diverse ideas about the project and greenways in general. These comments overwhelmingly displayed positive support for the connection to Lake Junaluska and the greenway in general.

DETAILED ONLINE PUBLIC SURVEY RESULTS



APPENDIX

B COMMUNICATION SUMMARIES

Waynesville Greenway Feasibility Study

Meeting with Blue Ridge Southern Railroad (BRSR)

February 24th, 2021

Attendees: Equinox, Elizabeth Teague with the Town of Waynesville, Derrick Jackson (manager) and Brian Carnes

Note: BRSR shared that the rail line within the study area operates four times a day. BRSR occasionally subs out line to others like Omega Rail to use.

- **Crossing of railroad at town owned property (where police dogs are currently being trained)**
 - BRSR only sees the need for minor improvements. Improve the driveway condition (pave it) so cars can quickly move away from crossing. It is currently in bad repair. A driveway with an additional greenway path would be possible.
 - BRSR has some concerns about pedestrian/vehicle increase in this area. Once it was explained that the majority of access to the site will only be pedestrian, BRSR felt a little more comfortable.
- **Utilization of BRSR Right-of-Way (ROW) and design review by BRSR**
 - **Use of BRSR ROW would need to be leased.** BRSR's parent company WATCO would review via a real estate division and contractor that reviews leases.
 - The town or a consultant should develop any design for crossing of the railroad and submit to BRSR/Watco who will review the design.
- **Crossing underneath the railroad trestle adjacent to Raccoon Creek, BRSR's preferred option**
 - BRSR supports going under the trestle on Evergreen Packaging's land. They much prefer crossing below grade than at grade.
 - BRSR doesn't need the level of safety improvement that Norfolk Southern asks for (like steel guard overhead structures for falling debris). Netting or some other fix could work.
- **Crossing at a new at-grade crossing off Asheville Highway**
 - BRSR does not prefer this crossing as they do not prefer at-grade crossings, especially new ones.

Waynesville Greenway Feasibility Study

Meeting with the North Carolina Department of Transportation-Division 14

March 16th, 2021

Attendees: JM Teague Staff, Equinox, Elizabeth Teague with the Town of Waynesville,

NCDOT Division 14 Staff: Jacob Day, Steve Williams, Josh Deyton, Wanda Austin, Chris Lee

- **Howell Mill Road and extending the sidewalk to a 10-12' pathway**
 - No strong feelings about sidewalk extension but does appear to be within NCDOT ROW.
 - NCDOT staff wonder who the agreement for the sidewalk would be with, usually a 2-3 party agreement (i.e. landowner, town or county, and NCDOT). The Town felt it could likely be with the Town as the adjacent property could be annexed into the town and is part of their ETJ.
- **Review of Howell Mill Road crossing options, constraints, and recommendations**
 - **NCDOT staff felt that these were the prioritized options for crossing, in order of preference:**
 - 1) **Crossing at the signal** (intersection of Howell Mill Road and Asheville Highway), with new pedestrian signal heads added. Staff are ok with some kind of barrier to prevent early crossing, but feel if people wanted to cross, they would even with a guardrail.
 - 2) **Midblock crossing:** generally, NCDOT tried to stay away from mid-block crossings, especially if there is a signal nearby.
- **Asheville Highway at Howell Mill**
 - When ROW was secured, there was likely set access widths, looking at what is there, NCDOT staff feel it is likely the widths cannot be reduced any more for safety.
 - It could be possible to stripe the greenway crossing where there are access drives.
 - NCDOT staff ok with having shared use path/greenway removed away from the sidewalk behind the row of trees.
- **Highway 19/23 Bridge crossing over Richland Creek**
 - Bridge redesign is in process and project will be complete in February 2022. There is still time for the Town to coordinate with NCDOT to get a hardened pathway underneath the bridge. The Town should work with NCDOT to ensure that there aren't environmental permitting issues and to incorporate the design. HDR is the consultant NCDOT is working with.
- **Woodland Drive**
 - **The yield roadway option:** NCDOT does have concerns with the yield roadway option where greenway users would share the road with vehicles.
 - **Abandonment of the road:**
 - All landowners along the abandoned section of the road would need to agree to make Woodland Drive a local road. Then, county commissioners would need to agree to the abandonment. Lastly, it would need to go through a public hearing and input to close it.
 - There would need to be a NCDOT vehicle maintenance turnaround wherever there is a termination and abandonment of a state road.
 - Abandonment of a road is much harder to do on a through road, which this road is.
 - **Construction improvements on Woodland Drive:** If NCDOT wanted to help improve the road (i.e. paving), they would have to rank it to be included on a statewide priorities list.



APPENDIX

C DETAILED COST ESTIMATES

Richland Creek Greenway Cost Estimate

Description	#	Unit	Unit Cost	Total Cost
PHASE 1 (Bridge and Town of Waynesville Park) 0.31 mi				
Richland Creek Bridge Costs				
Bridge Fabrication & Delivery	1	lump sum	\$155,000.00	\$155,000.00
Crane for Bridge Installation	1	each	\$10,000.00	\$10,000.00
Bridge Installation	1	lump sum	\$148,300.00	\$148,300.00
Total Bridge Cost				\$313,300.00
Parking Lot Costs				
Mobilization	1	lump sum	\$6,810.00	\$6,810.00
Parking Lot Clearing & Grubbing	1	lump sum	\$7,000.00	\$7,000.00
Parking Lot ABC Stone (60' x 60' area)	170	tons	\$25.00	\$4,250.00
Parking Lot ABC Stone Haul	12	loads	\$100.00	\$1,200.00
Parking Lot ABC Stone Setup	1	lump sum	\$3,500.00	\$3,500.00
Parking Lot Asphalt Paving	45	tons	\$150.00	\$6,750.00
Total Parking Lot Cost				\$29,510.00
Greenway Trail Costs				
Mobilization	1	lump sum	\$25,950.00	\$25,950.00
Greenway Trail Clearing & Grubbing	1	lump sum	\$15,000.00	\$15,000.00
Greenway Trail ABC Stone (12' x 1,720' area)	970	tons	\$25.00	\$24,250.00
Greenway Trail Stone Haul	65	loads	\$100.00	\$6,500.00
Greenway Trail Stone Setup	1	lump sum	\$7,000.00	\$7,000.00
Greenway Trail Asphalt Paving	225	tons	\$150.00	\$33,750.00
Total Greenway Trail Cost				\$112,450.00
Additional Recreational Amenity Costs				
Exercise Equipment	1	each	\$13,415.00	\$13,415.00
8' Heavy Duty Rectangular Picnic Tables	4	each	\$985.00	\$3,940.00
8' Single Sided Picnic Table - ADA	1	each	\$998.00	\$998.00
300 Sq. Multilevel Park and Camp Grills	2	each	\$233.00	\$466.00
32-Gal. Expanded Metal Trash Receptacles	2	each	\$309.00	\$618.00
Plastic Liners for Trash Receptacles	2	each	\$55.00	\$110.00
Rolled Flat Top Lid for Trash Receptacles	2	each	\$128.00	\$256.00
Multi-Use Field	1	each	in-house	\$0.00
Trailhead Kiosk	1	each	\$6,000.00	\$6,000.00
Greenway Wayfinding Sign	2	each	\$500.00	\$1,000.00
Total Recreational Amenity Cost				\$26,803.00
Subtotals				
Subtotal Cost to Build				\$482,063.00
Design and Engineering				
Design and Engineering		15%		\$72,309.45
Contingency for the Cost of Building				
Contingency		30%		\$144,618.90
TOTAL				
TOTAL				\$698,991.35

Notes on the Probable Cost Estimate

- These are planning level cost estimates and should not be used to estimate for construction, valid for 2021.
- Estimates are rounded up in the cost summary and may vary slightly from the detail cost estimates.
- Costs are based on recent bid or cost estimates. Inflation of a minimum of 3-4% should be applied annually to estimates beyond the year 2021. Costs should be refined and updated as future design and engineering plans are provided.
- Costs not included in this estimate: Utilities (unless otherwise noted), geotechnical/ soils investigation, rock removal, surveying, permitting, bonding requirements, archaeological investigations, septic investigations, demolition, environmental surveys, traffic studies/traffic engineering, sewer and water utility design, and stream and wetland determinations.
- A 30% contingency is recommended for costs at the master plan phase. Costs can greatly vary based on market prices and due to assumptions that are made without having access to detailed information like grading and a detailed site survey, refinement of material quantities, and any unforeseen circumstance that could require a change order during construction. A more accurate cost can be pursued at the Design Development or Construction Document phase of design.

PHASE 2 (Howell Mill to Industrial Park) 0.28 mi				
Greenway Trail Costs				
Mobilization	1	lump sum	\$62,568.00	\$62,568.00
Greenway Trail Clearing & Grubbing	1	lump sum	\$15,000.00	\$15,000.00
Grading	1.18	acre	\$30,000.00	\$35,400.00
Erosion Control	1.18	acre	\$23,000.00	\$27,140.00
Greenway Trail ABC Stone (12' x 1238' area)	721	tons	\$55.00	\$39,655.00
Greenway Trail Asphalt Paving	193	tons	\$165.00	\$31,845.00
Sidewalk Extension	90	square yard	\$97.00	\$8,730.00
Retaining Wall	180	square feet	\$48.00	\$8,640.00
Safety Rail	45	linear feet	\$70.00	\$3,150.00
Split Rail Fence	300	linear feet	\$30.00	\$9,000.00
High Visibility Crosswalk	2	lump sum	\$5,000.00	\$10,000.00
Railroad Underpass - Pedestrian Protection	1	lump sum	\$20,000.00	\$20,000.00
Total Greenway Trail Cost				\$271,128.00
Raccoon Creek Bridge Costs				
Bridge Fabrication & Delivery (50 LF bridge)	1	lump sum	\$155,000.00	\$155,000.00
Crane for Bridge Installation	1	each	\$10,000.00	\$10,000.00
Bridge Installation	1	lump sum	\$148,300.00	\$148,300.00
Total Bridge Cost				\$313,300.00
Additional Recreational Amenity Costs				
Bench	2	each	\$846.00	\$1,692.00
8' Heavy Duty Rectangular Picnic Table	1	each	\$985.00	\$985.00
Interpretive Signage	1	each	\$1,500.00	\$1,500.00
Pedestrian Crossing Ahead Sign - MUTCD	1	each	\$600.00	\$600.00
Trailhead Kiosk	1	each	\$6,000.00	\$6,000.00
32-Gal. Expanded Metal Trash Receptacles	2	each	\$309.00	\$618.00
Greenway Wayfinding Sign	2	each	\$500.00	\$1,000.00
Total Recreational Amenity Cost				\$12,395.00
Subtotals				
Subtotal Cost to Build				\$596,823.00
Design and Engineering				
Design and Engineering		15%		\$89,523.45
Contingency for the Cost of Building				
Contingency		30%		\$179,046.90
TOTAL				
TOTAL				\$865,393.35

PHASE 3a (TOW property to Woodland Drive) 0.17 mi				
Greenway Trail Costs				
Mobilization	1	lump sum	\$37,740.00	\$37,740.00
Greenway Trail Clearing & Grubbing	1	lump sum	\$15,000.00	\$15,000.00
Grading	0.6	acre	\$30,000.00	\$18,000.00
Erosion Control	0.6	acre	\$23,000.00	\$13,800.00
Greenway Trail ABC Stone (12' x 890' LF)	497	tons	\$55.00	\$27,335.00
Greenway Trail Asphalt Paving	129	tons	\$165.00	\$21,285.00
Culvert (24"RCP)	20	linear feet	\$109.00	\$2,180.00
Railroad Crossing - Truncated Dome	4	each	\$500.00	\$2,000.00
Signage at Railroad Crossing	2	each	\$600.00	\$1,200.00
Railroad Crossing - Flangeway Gap	8	each	\$2,600.00	\$20,800.00
Striping	60	linear feet	\$20.00	\$1,200.00
Driveway Repaving (30' each side)	15	tons	\$200.00	\$3,000.00
Total Greenway Trail Cost				\$163,540.00
Additional Recreational Amenity Costs				
Bench	1	each	\$846.00	\$846.00
Interpretive Signage	1	each	\$1,500.00	\$1,500.00
Greenway Wayfinding Sign	2	each	\$500.00	\$1,000.00
Total Recreational Amenity Cost				\$3,346.00
Subtotals				
Subtotal Cost to Build				\$166,886.00
Design and Engineering				
Design and Engineering		15%		\$25,032.90
Contingency for the Cost of Building				
Contingency		30%		\$50,065.80
TOTAL				
TOTAL				\$241,984.70

Notes on the Probable Cost Estimate

- These are planning level cost estimates and should not be used to estimate for construction, valid for 2021.
- Estimates are rounded up in the cost summary and may vary slightly from the detail cost estimates.
- Costs are based on recent bid or cost estimates. Inflation of a minimum of 3-4% should be applied annually to estimates beyond the year 2021. Costs should be refined and updated as future design and engineering plans are provided.
- Costs not included in this estimate: Utilities (unless otherwise noted), geotechnical/ soils investigation, rock removal, surveying, permitting, bonding requirements, archaeological investigations, septic investigations, demolition, environmental surveys, traffic studies/traffic engineering, sewer and water utility design, and stream and wetland determinations.
- A 30% contingency is recommended for costs at the master plan phase. Costs can greatly vary based on market prices and due to assumptions that are made without having access to detailed information like grading and a detailed site survey, refinement of material quantities, and any unforeseen circumstance that could require a change order during construction. A more accurate cost can be pursued at the Design Development or Construction Document phase of design.

PHASE 3b (Woodland Drive to Howell Mill Road) 0.39 mi				
Greenway Trail Costs				
Mobilization	1	lump sum	\$110,806.50	\$110,806.50
Greenway Trail Clearing & Grubbing	1	lump sum	\$15,000.00	\$15,000.00
Grading	3	acre	\$30,000.00	\$90,000.00
Erosion Control	3	acre	\$23,000.00	\$69,000.00
Greenway Trail ABC Stone (12' x 3285' area)	1839	tons	\$55.00	\$101,145.00
Greenway Trail Asphalt Paving	492	tons	\$165.00	\$81,180.00
Culvert - 24" RCP	20	linear feet	\$109.00	\$2,180.00
High Visibility Crosswalk	1	lump sum	\$5,000.00	\$5,000.00
Concrete Surface for Crosswalk on Woodland Drive	30	square yard	\$155.00	\$4,650.00
Pedestrian Crossing Ahead Sign - MUTCD	2	each	\$600.00	\$1,200.00
Total Greenway Trail Cost				\$480,161.50
Additional Recreational Amenity Costs				
Bench	2	each	\$846.00	\$1,692.00
Greenway Wayfinding Sign	2	each	\$500.00	\$1,000.00
Interpretive signage	1	each	\$1,500.00	\$1,500.00
Total Recreational Amenity Cost				\$4,192.00
Subtotals				
Subtotal Cost to Build				\$484,353.50
Design and Engineering				
Design and Engineering		15%		\$72,653.03
Contingency for the Cost of Building				
Contingency		30%		\$145,306.05
TOTAL				
TOTAL				\$702,312.58

Notes on the Probable Cost Estimate

- These are planning level cost estimates and should not be used to estimate for construction, valid for 2021.
- Estimates are rounded up in the cost summary and may vary slightly from the detail cost estimates.
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- Costs not included in this estimate: Utilities (unless otherwise noted), geotechnical/ soils investigation, rock removal, surveying, permitting, bonding requirements, archaeological investigations, septic investigations, demolition, environmental surveys, traffic studies/traffic engineering, sewer and water utility design, and stream and wetland determinations.
- A 30% contingency is recommended for costs at the master plan phase. Costs can greatly vary based on market prices and due to assumptions that are made without having access to detailed information like grading and a detailed site survey, refinement of material quantities, and any unforeseen circumstance that could require a change order during construction. A more accurate cost can be pursued at the Design Development or Construction Document phase of design.

Howell Mill Road Sidewalk Extension 0.27 mi				
Greenway Trail Costs				
Mobilization	1	lump sum	\$90,796.80	\$90,796.80
Grading	0.64	acre	\$30,000.00	\$19,200.00
Erosion Control	0.64	acre	\$23,000.00	\$14,720.00
Sidewalk Extension	1088	square yard	\$97.00	\$105,536.00
Safety Rail	600	linear feet	\$70.00	\$42,000.00
Split Rail Fence	200	linear feet	\$30.00	\$6,000.00
Retaining wall	2400	square feet	\$48.00	\$115,200.00
Total Greenway Trail Cost				\$393,452.80
Subtotals				
Subtotal Cost to Build				\$393,452.80
Design and Engineering				
Design and Engineering		15%		\$59,017.92
Contingency for the Cost of Building				
Contingency		30%		\$118,035.84
TOTAL				
TOTAL				\$570,506.56

Richland Creek/ Great Smoky Mtn Expressway Bridge Underpass Stabilization 0.02 mi				
Greenway Trail Costs				
6" Reinforced Concrete Slab with Turndowned Edge(114 linear feet)	1	lump sum	\$13,000.00	\$13,000.00
Subtotals				
Subtotal Cost to Build				\$13,000.00
Design and Engineering				
Design and Engineering		15%		\$1,950.00
Contingency for the Cost of Building				
Contingency		30%		\$3,900.00
TOTAL				
TOTAL				\$18,850.00

TOTAL PROJECT COST 1.44 mi	
TOTAL	\$3,098,038.54

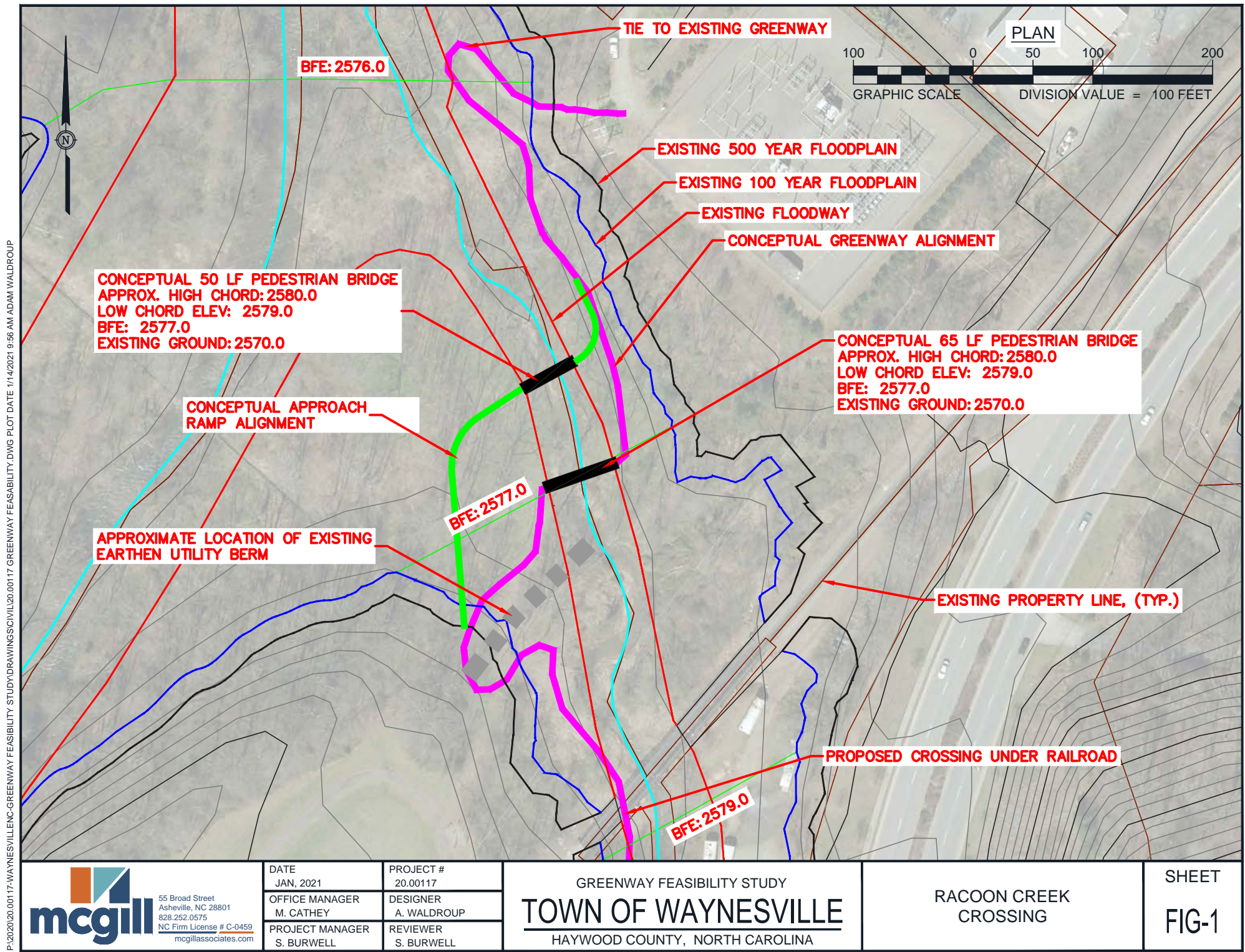


APPENDIX

D RACCOON CREEK STUDIES

Raccoon Creek Crossing Options

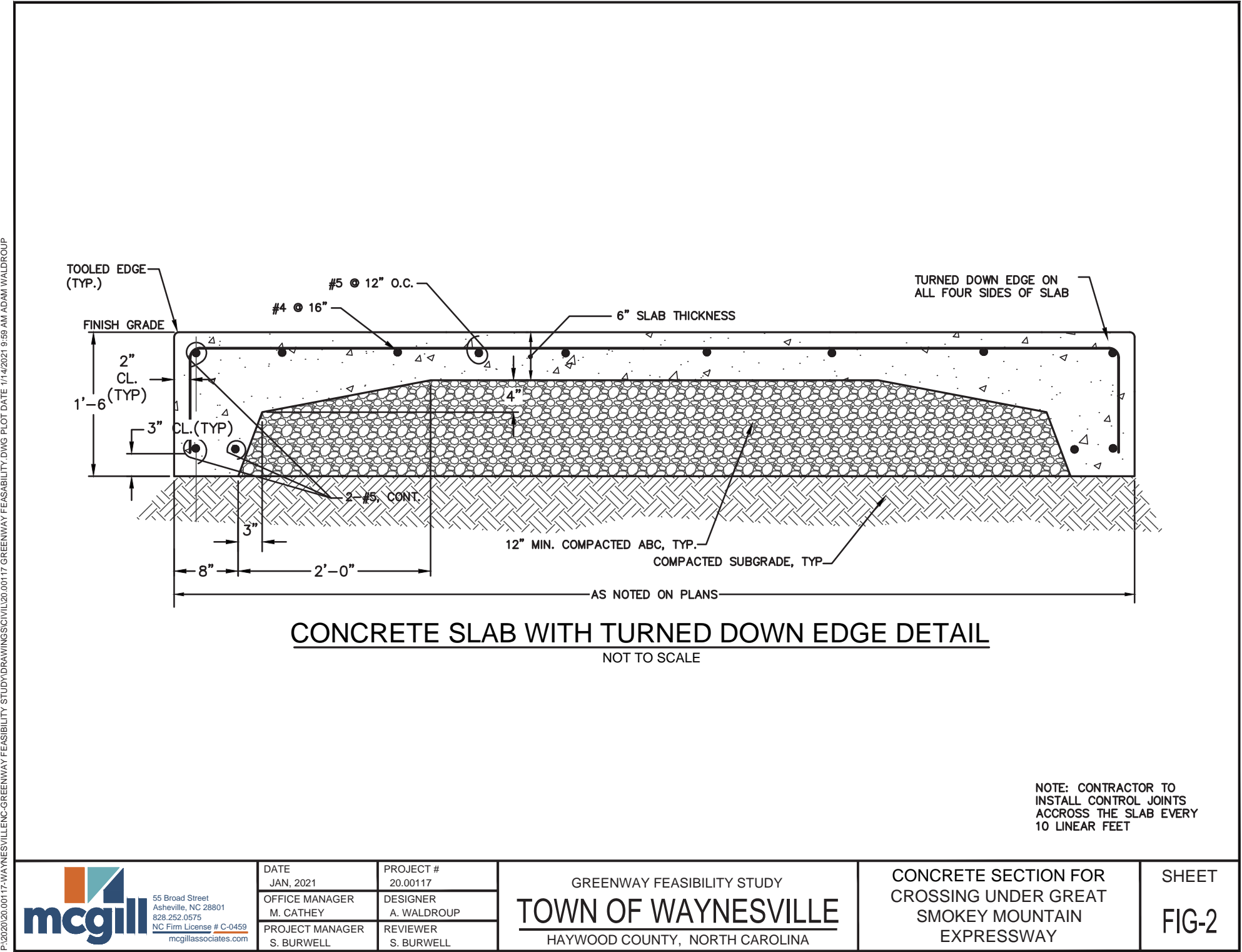
Due to the proximity of the confluence of Richland Creek and Raccoon Creek in this location, consideration was given to understanding a bit more about where a proposed bridge crossing could be located to have the least impact to flood events. The adjacent diagram shows two options for a proposed bridge location, including the length of the bridge structure that would be necessary to cross the creek.



RACCOON CREEK BRIDGE CROSSING OPTIONS

Underpass Surface Stabilization Option

Consistent flooding events along Raccoon Creek have contributed to sediment build up along the existing trail that passes below the Great Smoky Mountain Expressway, connecting Industrial Park to Lake Junaluska. The adjacent diagram presents an option for stabilizing this section of the trail within the floodway of Raccoon Creek.



UNDERPASS STABILIZATION OPTION

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EQUINOX





TROUT

Haywood County has abundant streams that are cold, clear, and highly vegetated, perfect conditions for trout, our most popular game fish. Waynesville is a "Mountain Heritage Trout Run," and Rockledge Creek is a hatchery-supported stream by the NC Wildlife Resources Commission. The "Carolinian" frequently stocks rainbow, brook, and brown trout. Most fish caught by anglers are stocked, but "wild" individuals are found, indicating an abundant spawning habitat and excellent water quality.

SPECIES
Brook Trout (*Salvelinus fontinalis*)
Often called "specks," "speckled trout," or "mudminnows." Brook trout are the only native trout in the Southeast. While stocked individuals are frequently caught everywhere, native fish are typically only found in higher elevation streams where the cool water and more aggressive rainbow and brown trout are not found.



Brook trout are short-lived, usually only four years in the wild, and grow to about 10 inches. They are also highly sensitive to pollution, especially changes in temperature, pH, and habitat.



Trout are predators, eating just about anything they capture.

Partners: The Town of Waynesville, Haywood County, and the Haywood Watershed Association are working with the North Carolina Rural Economic Development Center.

Brown Trout (*Salmo trutta*)
Brown trout are native to Europe and western Asia but have been introduced throughout the world. They are the largest of the three trout species in Southeastern North Carolina, weighing about two pounds, but larger individuals are frequently caught. Brown trout have the longest life expectancy at 20 years.



Rainbow Trout (*Oncorhynchus mykiss*)
Rainbow trout are also native and native to Pacific Ocean tributaries in North America and Asia. They have been introduced throughout the world, both as a gamefish and as a popular aquaculture species. There are several trout farms in Western North Carolina that focus on rainbow trout. On average, they are slightly smaller than the brown trout with life spans of about 10 years.



REFERENCE: NC Wildlife Resources Commission

THREATS

One of the biggest threats to trout is sedimentation. Sediment can fill the water column and cover the spawning grounds, making it difficult for trout to lay their eggs. Other threats include pollution, habitat loss, and overfishing. Trout are also vulnerable to diseases and parasites. The Haywood Watershed Association is working to protect the trout in the great and scenic mountains.

