Johnson City MTPO

DRAFT PLAN MARCH 2013

Rail Trail Master Plan

ACKNOWLEDGEMENTS

Citizen Involvement

A special thanks to the 300+ local residents who participated in this master planning process through comment forms, public workshops, and meetings.

Project Coordination Team

Gary Ferguson, TDOT

Steve Neilson, Johnson City Planning Department

Lawrence Perry, Johnson City Public Works

Jon Hartman, Elizabethton Planning Department

Roger Blakely, Johnson City Parks & Recreation

Becky Hilbert, Johnson City Community Relations

Angie Carrier, Johnson City Development Services

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Charlie Stahl, Johnson City Assistant City Manager

Prepared on Behalf Of:

Johnson City Metropolitan Transportation Planning Organization

Representing Carter County, City of Elizabethton, Town of Jonesborough, City of Johnson City, Washington County and Town of Unicoi

This report was prepared in cooperation with the United States Department of Transportation, Federal Highway Administration, and the Tennessee Department of Transportation.

September 2012

Prepared by:

alta GREENWAYS

PARSONS BRINCKERHOFF

Bradley Arant Boult Cummings LLP

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Project Background 1

Introduction

This Master Plan provides a comprehensive overview of the conversion of the Eastern Tennessee/Western North Carolina narrow gauge railway (ET/WNC) to a 10-mile shared-use trail between the Cities of Johnson City and Elizabethon. The broader purpose of this Master Plan is based on the many benefits that a rail trail could bring to this region, especially as the area continues to develop a comprehensive network of greenways, trails, and shared-use paths.

Background & Purpose

The City of Johnson City recently acquired the 10-mile railroad corridor connecting downtown Johnson City to downtown Elizabethton through the process of federal railbanking and plans to develop a trail along this route. Railbanking is the process by which a railroad is preserved for future rail use through conversion to a trail in the interim. The converted railroad line will serve as a shared-use path for pedestrians, bicyclists, and equestrians separated from motorized traffic.

In an effort to enhance the transportation system, promote wellness and livability, and provide a foundation for expanded economic growth opportunities, the Johnson City MTPO and the City of Johnson City worked closely with project consultants to develop this master plan for the rail trail corridor.

Value Statement

The following value statement was developed early in the planning process to guide the master planning process:

Value Statement

The Johnson City Rail Trail:

Connecting our region through health, play, and livability.

Rail Trail Master Plan Goals

This Master Plan identifies that the Johnson City rail corridor will be preserved for interim use as a shared-use trail and when constructed, will become a regional destination with a multitude of benefits to users and non-users. The Johnson City Rail Trail has the potential to:

- Offer a safe route for pedestrian and bicycle travel as a transportation alternative.
- Provide outdoor recreation to residents and visitors.
- Attract tourism and stimulate the regional economy.
- Attract and retain employers and new businesses as well as their employees.
- Increase adjacent property values.
- Revitalize neighborhoods along the corridor.
- Improve quality of life through healthy and active living.
- Enhance local natural and cultural resources.
- Create an off-road connection between downtown Johnson City and downtown Elizabethton.

Chapter Contents

Planning Process

The Master Plan was created through an open and participatory planning process, which strongly encouraged public involvement. The process involved all of the stakeholder members of the Project Coordination Team (PCT) plus direction from the planning and design consultant team.

Blue Plum public engagement event - June 2012

Public Involvement

In order to gain local knowledge and input, a public outreach component was included as an integral part of planning efforts for the Rail Trail Master Plan. Public input was gathered through several different means including the following: Project Coordination Team meetings, a project website, a project comment form, press releases, and public workshops.

The PCT was involved throughout the planning process. During the kick-off meeting, the group reviewed and provided feedback on the project website, project comment form, established a value statement and goals for the plan, and discussed the timeline and schedule of the planning process. Members of the PCT worked with the consultant team to mark up rail corridor maps to identify potential problem areas and solutions. Input from the PCT is reflected throughout the recommendations of this planning document.

Several public input workshops were conducted during the planning process. The first opportunity was a booth during the Blue Plum Festival in downtown Johnson City in June of 2012. This initial public involvement event sought to gather preliminary input from citizens to assist in the development of draft recommendations for the plan. The next opportunity for public engagement took place during the Covered Bridge Festival in Elizabethon during the weekend of June 9th and 10th, 2012. Like the Blue Plum Festival, this event sought to gather preliminary input from citizens to assist in the development of draft recommendations for the plan. In the fall of 2012, a public open house was held to promote and receive community input on the draft recommendations. Preliminary recommendations were presented in map form, and on educational boards at this event. Citizens responded to recommendations by providing feedback and discussions regarding the proposed rail trail design, features, and amenities.

At all workshop sessions, public input was obtained in the form of map markups, written comments, verbal question and answer sessions, and discussions between citizens, consultant staff and representatives of the PCT. In addition, a hardcopy public comment form was distributed for hand written responses during each meeting.

Public Comment Form

A comment form was developed for the Johnson City Rail Trail Master Plan and was made available in both hardcopy and online formats. The comment form was available online throughout the duration of the project. To maximize responses to the online form, the web address was distributed at public meetings, advertised in press releases, sent out to local interest groups, and included on flyers that were distributed around the City. Over 280 people completed the comment form.

Results of the comment form were collected and tabulated by the Consultant to provide insight into local residents' values and opinions about the project. The results are included in Appendix A of this Plan.

Adjacent Property Owners

A specific comment form was developed to obtain information from adjacent property owners along the corridor. To maximize the number of responses that were received from the property owners, comment forms were mailed via regular mail. The Consultant team compiled the responses to the comment form and facilitated meetings with the property owners willing to participate to discuss specific opportunities, challenges and strategies regarding the planning, design and construction of the future rail trail.

Tweetsie Railroad History[1]

ET/WNC passenger service operated from 1882 until 1950 and for a period of time was the primary means for portions of mountainous Eastern Tennessee and Western North Carolina to have contact with the "outside world". Due to the rugged and difficult terrain, ET/WNC was designed and built as a narrow gauge railroad, at a width of three feet. The completion of the railroad in 1882 contributed to a significant population growth in Johnson City, Tennessee. The population grew from 685 to 4,161 people by 1890. Located near both the Cranberry Mines in North Carolina and the coal fields of Virginia, Kentucky, and West Virginia, Johnson City was seen as a strategic crossroads and transfer point for Appalachian mining interests and related transportation ventures. The huge Bemberg and Glanzstoff rayon plants in Elizabethton, Tennessee were major customers of the railroad for decades as the ET/WNC played a major part in the daily life in Eastern Tennessee and Western North Carolina and a crucial role in the region's development for almost a century. From the 1950s to 2002, the railway operated primarily between Elizabethton

and Johnson City serving important industrial customers. Passengers and residents of Johnson City affectionately referred to the ET/WNC railroad as "Eat Taters and Wear No Clothes".

Copyright/Legal Name Assessment

The Eastern Tennessee & Western North Carolina Railroad was known by several monikers, some less family-friendly than others, but the most memorable was to call it the "Tweetsie" railroad. This name reportedly stems from sound of the high pitched steam whistles used on their narrow gauge locomotives. Particularly when those whistles were blown up in the mountains near the state line, their echoes were the stuff from which memories are made. Curiously, however, the railroad company never formally identified themselves as the "Tweetsie Railroad". The word "Tweetsie" is now used by a theme park in Blowing Rock, North Carolina that appears to be using a railroad engine from the original Tweetsie Railroad. The railroad line that Johnson City intends to develop into a trail that was acquired from East Tennessee Railway, L.P. is the same line that the Tweetsie Railroad used to operate upon. Project consultants searched as to whether the name is trademarked with a state or federal registry. There is a registered trademark under the name "Tweetsie Railroad" when a search was performed on the United States Patent and Trademark Office online database. Because the theme park and East Tennessee Railway, L.P. undoubtedly have common law rights to the name, the consent to the use of the name Tweetsie on the proposed rail trail could be as simple as a grant of consent, or the company may require entering into a license agreement. A license agreement would limit certain uses of the name to avoid confusion as to whether the name is the trail, the train, or the theme park. In the future, if there is interest in incorporating "Tweetsie" into the name or branding of the Johnson City Rail Trail, the theme park operator and the East Tennessee Railway, L.P. should be consulted for consent of the use of the name "Tweetsie."

The daily train in Johnson City circa 1930.
(Photo from: http://www.johnsonsdepot.com/crumley/tour4.htm)

Chapter 1: "Project Background" Information Sources

1. Eastern Tennessee & Western North Carolina Railroad (ET/WNC). Tweetsie History. http://www.johnsonsdepot.com/

Johnson City, Tennessee

Rail Trail crossing Buffalo Creek, Carter County, TN

Existing Conditions 2

Overview

Both Johnson City and Elizabethton have made significant progress in recent years in their efforts to create more livable communities. This region of eastern Tennessee has much to offer its residents and visitors in terms of active lifestyles, recreation and connections to the outdoors. Johnson City and Elizabethton both have unique historical downtown cores with existing multi-use trails, such as the State of Franklin Trail and the Linear Path. The downtown cores, existing trails, and a number of well-established, high-quality destinations and attractions throughout the area will become more accessible and connected by the construction of the rail trail.

This chapter considers the current physical conditions along the rail trail corridor and the surrounding area. The evaluation of existing physical conditions, opportunities, and challenges serves as the foundation for a comprehensive recommendation for the development of a shared-use trail along the rail trail corridor. The evaluation includes a thorough analysis of GIS data and on-the-ground fieldwork investigations along the rail trail corridor in Johnson City, the City of Elizabethton, Washington and Carter Counties. The fieldwork investigations included the exploration of nearby neighborhoods, schools, parks, existing trails, and the downtown cores to identify opportunities for enhanced connections and potential trail access points. A visual assessment of existing bridges and roadway crossings along the rail trail corridor was performed to determine the integrity and safety of all crossings.

Physical & Natural Features

In the development of the Master Plan, it is important to identify potential environmentally sensitive areas along or near the potential rail trail. These elements could be attractive destinations to consider connecting to the rail trail, and during the rail trail design and construction phases, it is also important to assess potential adverse impacts to these sensitive areas. Detailed evaluation and consideration of environmentally sensitive areas early in the planning process is crucial, so that later project development processes are more streamlined by including realistic assumptions of potential environmental impacts.

The GIS data used to evaluate existing conditions and to inform the recommendations of this Plan was provided by the Johnson City Metropolitan Transportation Planning Organization and the City of Elizabethton Planning Department. Figure 2.1 on page 2-2, "Existing Conditions", illustrates existing conditions along the 10-mile corridor. The corridor winds through industrial, commercial, urban and rural areas with features such as wooded/natural areas, ponds, streams, established tree canopies, wildflowers, and native plant species. The cities of Johnson City and Elizabethton provide anchors of medium density, mixed-use development at each end of the corridor.

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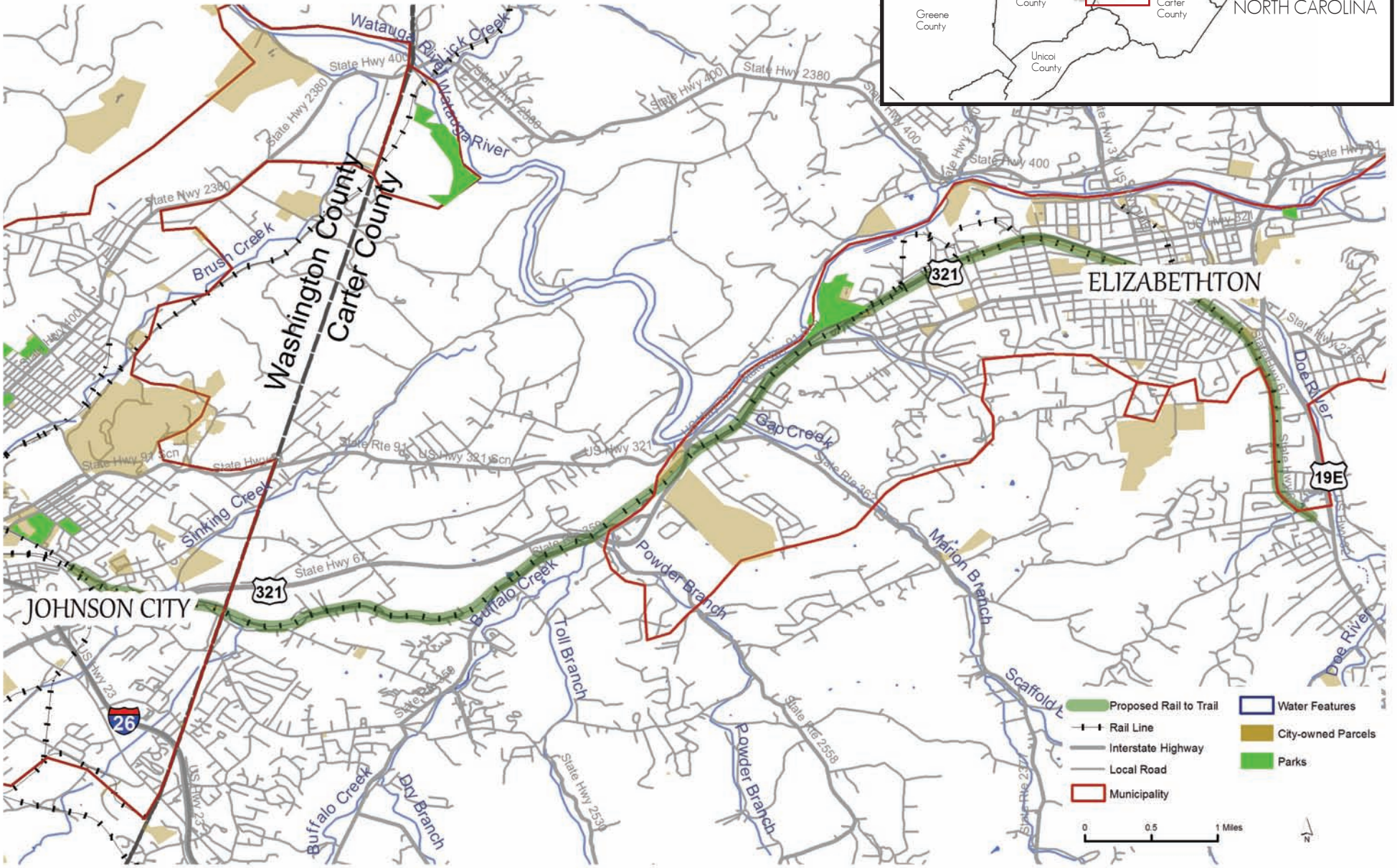
Figure 2.1: Existing Conditions, Johnson City Rail Trail Corridor



Geology

The geology of the northeast region of Tennessee is comprised of metamorphic rocks from the Cambrian and Ordovician periods, ranging from 400 to 550 million years in age. The rock types include limestone, shale, dolomite, siltstone, standstone, claystone, conglomerate, quartzite, and arkose.[1] A rock outcrop exists along the northern side of the rail trail corridor in Carter County and presents an educational opportunity to learn about local geology history and natural processes. The outcrop is shown in the "Rock Feature Area" photo on this page. Figure 2.2 on page 2-4 illustrates the geological features of the region.

Hydrology

The Watauga River's headwaters are on the slopes of Grandfather Mountain and Peak Mountain in Watauga County, North Carolina. The Watauga River is formed by the confluence of the Shanty Spring Branch and the Green Ridge Branch in Watauga County, North Carolina. The River flows through North Carolina before traveling to Washington County and Carter County, Tennessee.

It was originally dammed and used by the former Tennessee Electric Power Company, and then by TVA for hydro generated electricity.[2] The Watauga River is now used extensively for boating, fishing, and supporting the tourism industry, and it is an important water source in the region.

Figure 2.3 on page 2-5 shows the Watauga River, the Doe River, Gap Creek, Buffalo Creek, Sinking Creek, Toll Branch, and Marion Branch, all of which are located near the rail trail corridor. A former rock quarry is located along the north side of the rail trail corridor, west of the intersection of Happy Valley Road and Milligan Highway in Carter County. The former rock quarry presents an educational opportunity to learn about local hydrology and geology history and natural processes.

As the rail trail is developed, it is important to be aware of potential impacts to wetlands and floodplains. Wetlands can be described as lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on the surface. A floodplain is a low plain adjacent to a river that is formed mainly of river sediment and is subject to flooding. The consultant team identified one area along the rail trail corridor, approximately 0.5-0.75 miles from the trailhead along Legion Street, where the railroad line passes by or through wetland areas, and GIS mapping analysis confirmed that this area is in the 100 year floodplain. The rail corridor in this area has steep slopes on either side of the rail line and the wet conditions in this area could possibly be a result of drainage from the sloping wall of the corridor.

Rock feature area, Carter County, Tennessee

Historic Points of Interest

Former rock quarry, Carter County, Tennessee

Figure 2.2: Geology, Johnson City Rail Trail Corridor

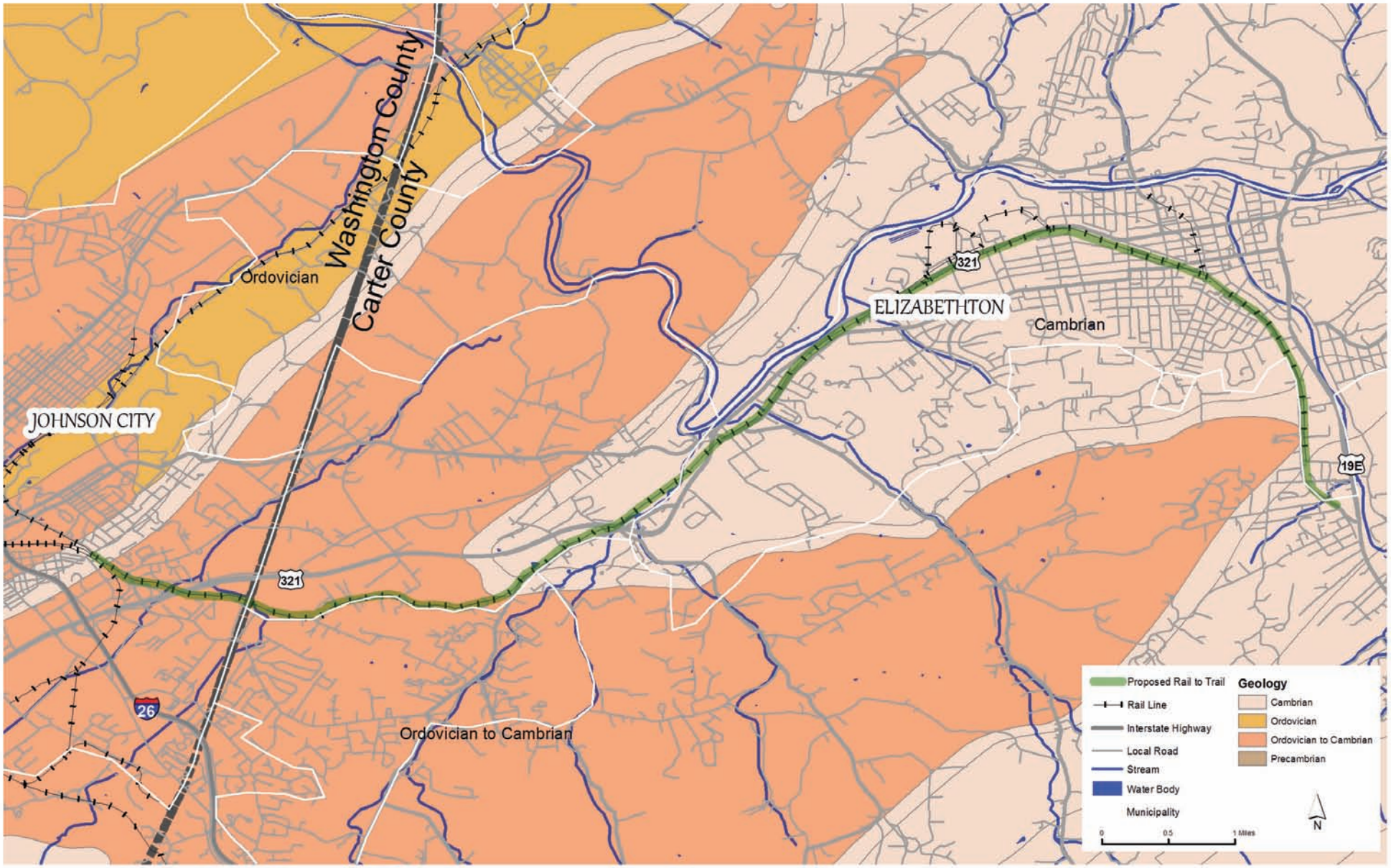
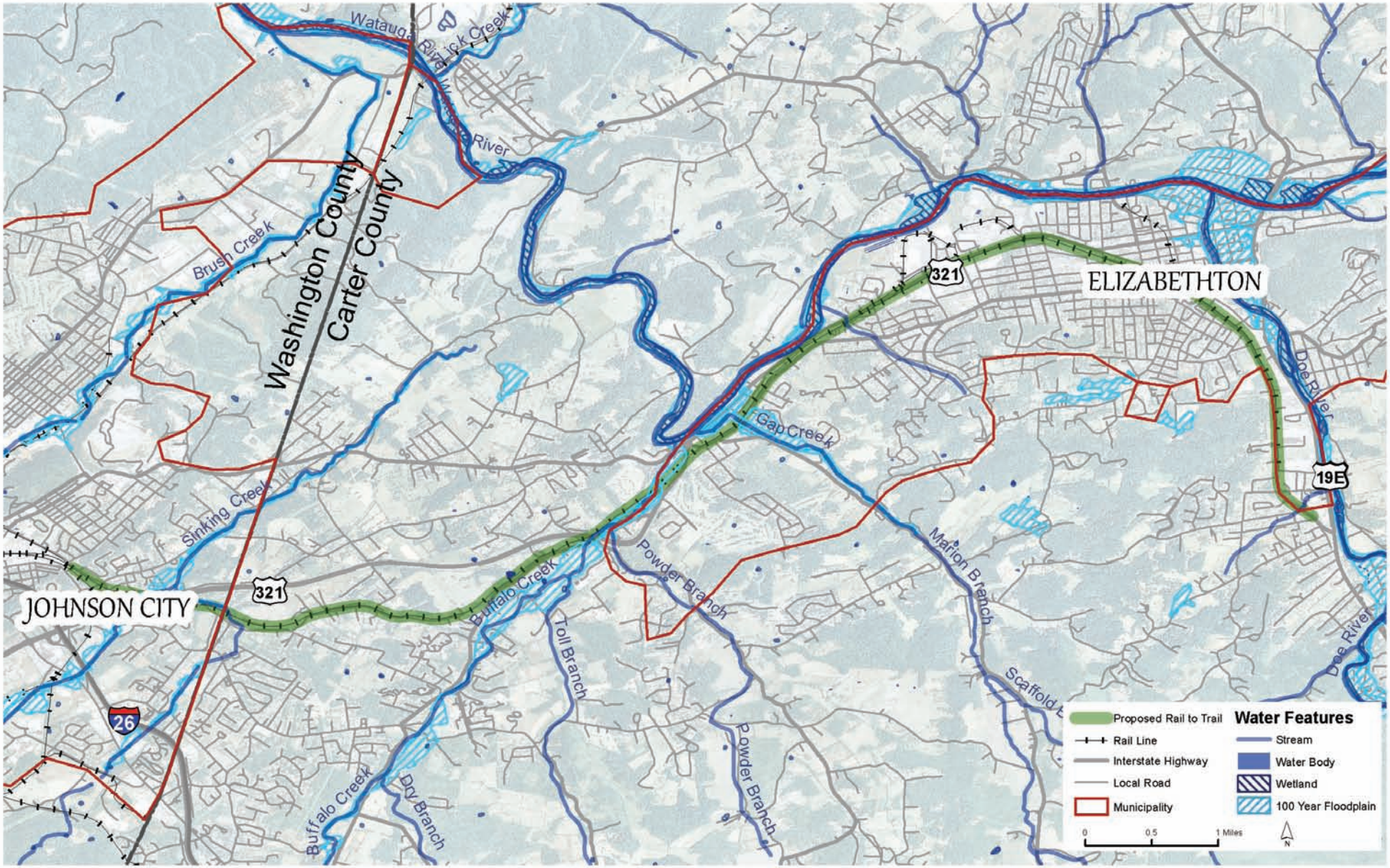


Figure 2.3: Hydrology, Johnson City Rail Trail Corridor



Within Washington and Carter Counties, there are numerous historic places in the vicinity of the rail trail. These places fall into three major categories: Potentially Eligible Historic Sites, National Register Historic Places, and Historic Trails. There are also locally important "Points of Interest" in both Counties that should be considered for future rail trail connections. These historic and locally important places can have a positive impact on the character of the rail trail. Identifying places of interest along the rail trail provides users with additional places to visit, enhancing their trail experience. Historic points of interest are mapped in Figure 2.4 on page 2-8 and are detailed in Table 2.1 on page 2-7.

There are several state or federally managed lands in the vicinity of the proposed rail trail, including the Tipton-Haynes State Historical Site, Sycamore Shoals, the John and Landon Carter House, the Watauga River Bluffs, and the North Cherokee National Forest. These sites are also shown in Figure 2.4 on page 2-8 and discussed in greater detail below. Each of these are managed by either the State of Tennessee or the US Department of Agriculture. These areas are in close enough proximity to the rail trail that they could be incorporated into the initial rail trail development or, for those slightly further away, could be connected by a future phase rail trail expansion.

Tipton-Haynes State Historical Site, Johnson City, Tennessee

Tipton-Haynes State Historical Site

The Tipton-Haynes State Historical Site is located near the beginning of the rail trail in Johnson City at 2620 South Roan Street. The farm is roughly 1.5 miles southwest of the rail trail, to the west of Interstate 26 and south of SR 91. This historical site will not be impacted by the development of the rail trail, but it could be considered for a future connection by a trail expansion.

Cherokee National Forest

The North Cherokee National Forest and Wildlife Management Area is located in Carter County approximately four miles south of the rail trail. It will not be impacted by the development of the rail trail, but it could be considered for a future connection if the rail trail is extended. The Cherokee National Forest is a destination for outdoor recreation activities, including scenic drives through the mountains, the pursuit of wildlife, whitewater rafting, and trail hiking.

Watauga River Bluffs

Watauga River Bluffs is also in Carter County roughly two miles north of the rail trail, to the west of the Watauga River. Watauga River Bluffs is a 50-acre natural area known for its most conspicuous feature- the steep slope that drops more than 200 feet to the river's edge. The river bluff natural area has been undeveloped and unoccupied since the 1950s. No direct public access has been developed, but the public can visit the area by way of the "Park 'n Fish," which is an area where a neighboring landowner allows one vehicle at a time to park and access the waterfront.

Sycamore Shoals State Historic Area

Sycamore Shoals State Historic Area is located in Carter County at 1621 West Elk Avenue (U.S. Highway 321), in Elizabethton, Tennessee. Situated on the Watauga River, the 60-acre area is just under two miles from historic downtown Elizabethton. This site is potentially close enough to the rail trail that it could be considered for a connection during the early development of the rail trail.

John and Landon Carter House

The John and Landon Carter House is located farthest to the east side of the rail trail in Carter County, to the east of US 19E. This house was built by John Carter and his son, Landon, between 1775 and 1780 on lands bought from the Cherokee Indians. It is believed to be the oldest standing frame house in the State of Tennessee and the first house to have glass windows. Carter County, Tennessee, is named for Landon Carter. Elizabethton is named in honor of his wife, Elizabeth. The house will not be impacted by the development of the rail trail, but it could be considered for a future connection if the rail trail is extended.

Cherokee National Forest, Eastern Tennessee

Appalachian Trail

The Appalachian Trail (AT) travels through Hampton, Tennessee, approximately 3.5 miles southeast of the southern terminus of the rail trail corridor in Elizabethton and follows the border of the TVA Watauga Reservoir for several miles before branching north. The AT attracts hikers from all over the world. This famous trail will not be impacted by the development of the rail trail, but a future connection between the AT and the rail trail should be considered.

Elizabethton Covered Bridge

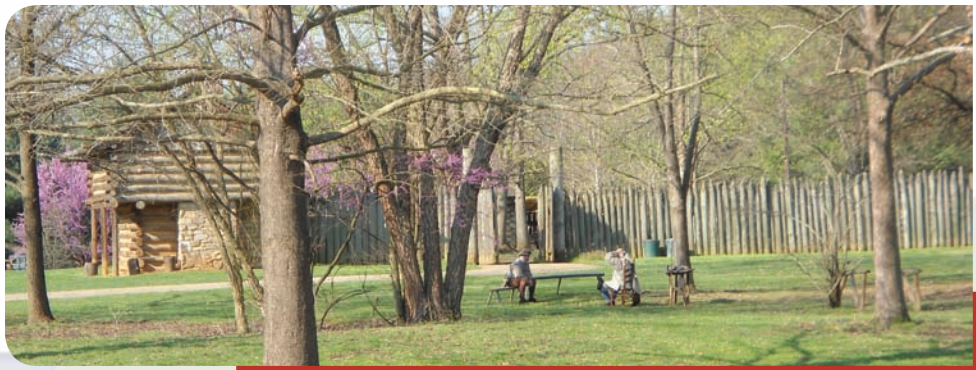
The historic Elizabethton Covered Bridge over the Doe River in downtown Elizabethton was originally constructed in 1882 and is a significant tourism destination in the community. The bridge will not be

John and Landon Carter House, Johnson City, Tennessee

impacted by the development of the rail trail, but a future connection between the Covered Bridge and the rail trail should be considered. A spur trail between the rail trail and the Covered Bridge would also provide a linkage between the rail trail and the Linear Path, increasing the overall connectivity of the greenway system.

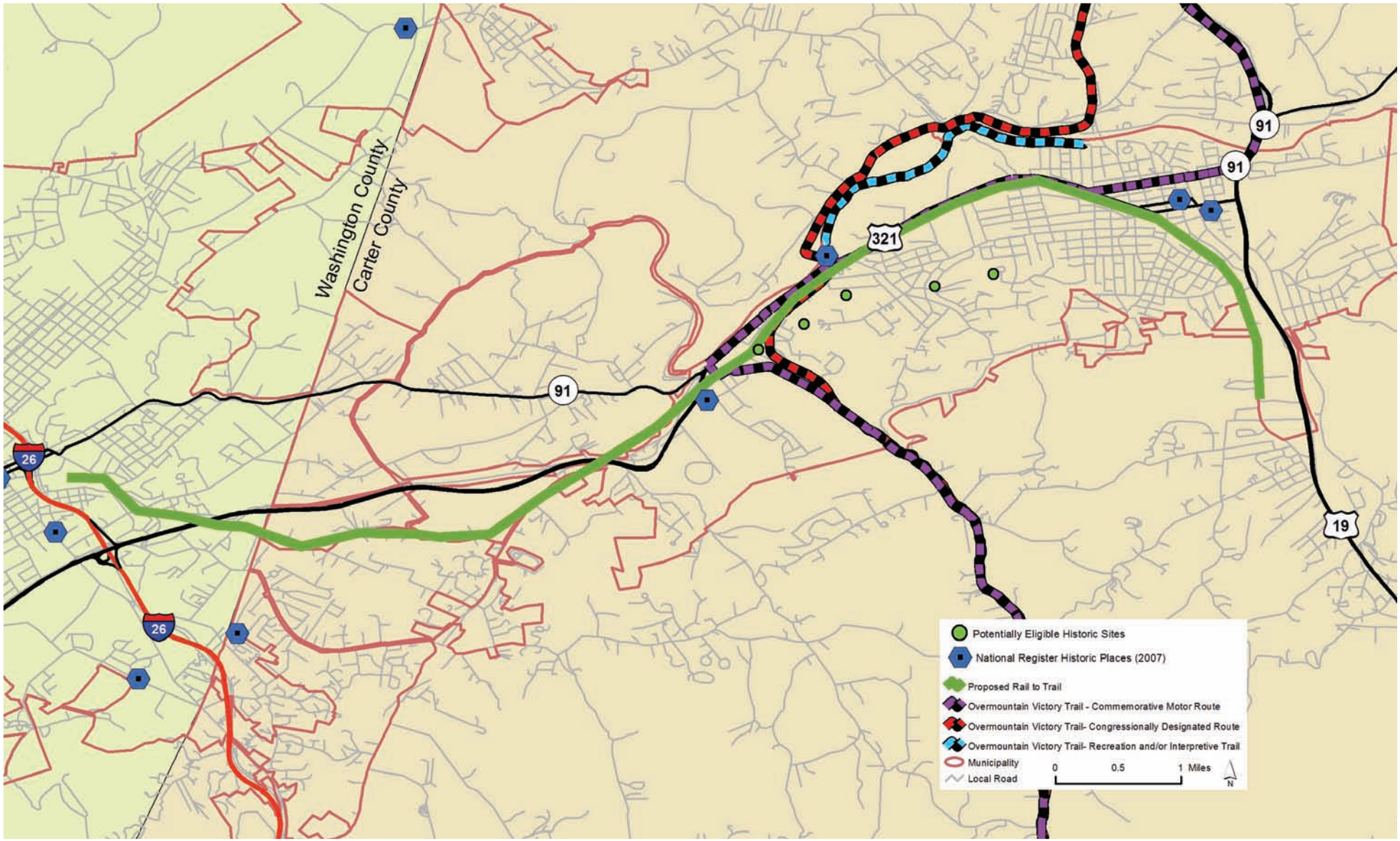
Table 2.1: Listing of Historic Places Near the Trail

Site	Designation	Type of Site
DeVault-Valentine House	National Register Historic Places	House/Building
Dugan Mill and Stone House	National Register Historic Places	House/Building
Elizabethton Historic District	National Register Historic Places	House/Building
Hunt-Henson House	National Register Historic Places	House/Building
Robins Roost	National Register Historic Places	House/Building
Sabine Hill	National Register Historic Places	House/Building
St. Paul AME Zion Church	National Register Historic Places	House/Building
Sycamore Shoals	National Register Historic Places	Park
Tipton-Haynes House	National Register Historic Places	House/Building
US Post Office	National Register Historic Places	House/Building
Bemberg Station	Potentially Eligible Historic Site	House/Building
Broad Street Bridge	Potentially Eligible Historic Site	Bridge
Burgie Place	Potentially Eligible Historic Site	House/Building
Nance Motor Company	Potentially Eligible Historic Site	House/Building
Taylor-Thomas House	Potentially Eligible Historic Site	House/Building
Overmountain Victory Trail	Commemorative Motor Route	Trail
Overmountain Victory Trail	Congressionally Designated Route	Trail
Overmountain Victory Trail	Recreation and Interpretive Trail	Trail



Sycamore Shoals State Historic Area, Elizabethton, Tennessee

Figure 2.4: Historical Points of Interest, Johnson City Rail Trail Corridor



Destinations Along the Corridor

There are well over 300 commercial destinations along the 10-mile rail trail corridor. These destinations include opportunities for all basic needs, including grocery stores, pharmacies, restaurants, and discount stores. There are several schools located within walking and bicycling distance of the rail trail. More detailed information on destinations is presented in the corridor maps in Chapter 3.

Existing Bike, Pedestrian, & Recreational Facilities

Eastern Tennessee and the communities of Johnson City and Elizabethton have an existing but disconnected network of greenways and trails. The State of Franklin Trail is a 3.3-mile multi-use trail in Johnson City, and the hiking trails on Buffalo Mountain can be reached from the south side of Johnson City. Elizabethton recently completed the 4-mile Linear Path that ends just short of Sycamore Shoals State Historic Area and the Elizabethton Covered Bridge in the downtown area. There are future plans to connect the Linear Path to Sycamore Shoals. Within an hour drive of the proposed rail trail are the Cherokee National Forest, Roan Mountain State Park, the Appalachian Trail, and the Virginia Creeper Trail. These existing facilities contribute to the recreational and active living tourism in the eastern Tennessee region, and the proposed rail trail will build on these opportunities and serve as an enhanced connection between facilities.

Infrastructure Evaluation

Roadways

In addition to local road and driveway crossings, the 10-mile rail trail corridor crosses and runs parallel to several collector and arterial roadways and highways. The rail trail corridor crosses US 321/Hwy 67 in Johnson City several times as the rail trail travels into Elizabethon. In Elizabethton, the rail trail runs parallel to US 321/Hwy 91 (Elk Avenue) before changing its course and heading south, running parallel to Hwy 67 (State Line Road) and US 19E. There are 45 official and unofficial roadway crossings along the rail corridor from Johnson City to Elizabethton. Each crossing will require pedestrian treatments to notify vehicles and ensure safe passage for pedestrians. These crossings are discussed in further detail in the corridor maps presented in Chapter 3.

Access Points

There are numerous opportunities for trailheads and access points along the rail trail corridor. Among these opportunities are the Legion Street trailhead area, several city-owned parcels that are adjacent to the rail trail corridor, Lions Field, Dixon Street Park, Happy Valley Baptist Church, the medical center near Ward Street, the Sycamore Shoals State Historic Area, and the Pine Street trailhead. These access points and trailhead areas are presented in more detail in the corridor maps presented Chapter 3.

Title VI/Environmental Justice

Introduction

Title VI of the Civil Rights Act of 1964 states that "No person in the United States shall, on the ground of race, color, or national origin be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance."

Environmental Justice Executive Order (EO) 12898, Federal Actions to Address Environmental Justice (EJ) in Minority and Low-Income Populations, clarified the need to involve minority and low-income populations in transportation decision-making processes and the need to assess the equity of transportation investments. The EO calls for identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. Low income is defined as a population whose median household income is at or below the Department of Health and Human Services' poverty guidelines.

The intent of EO 12898, and the U.S. Department of Transportation's corresponding guidance, is to ensure that these communities of concern are included in the transportation decision-making process and to ensure that they may benefit equally from the transportation system without shouldering a disproportionate share of its burdens.

A disproportionately high and adverse effect is one that is:

1. Predominantly borne by the minority or low-income population; or

Potential Rail Trail Acces Point at Lyon's Field, Elizabethton, Tennessee

Figure 2.5: Population Density, Johnson Rail Trail Corridor

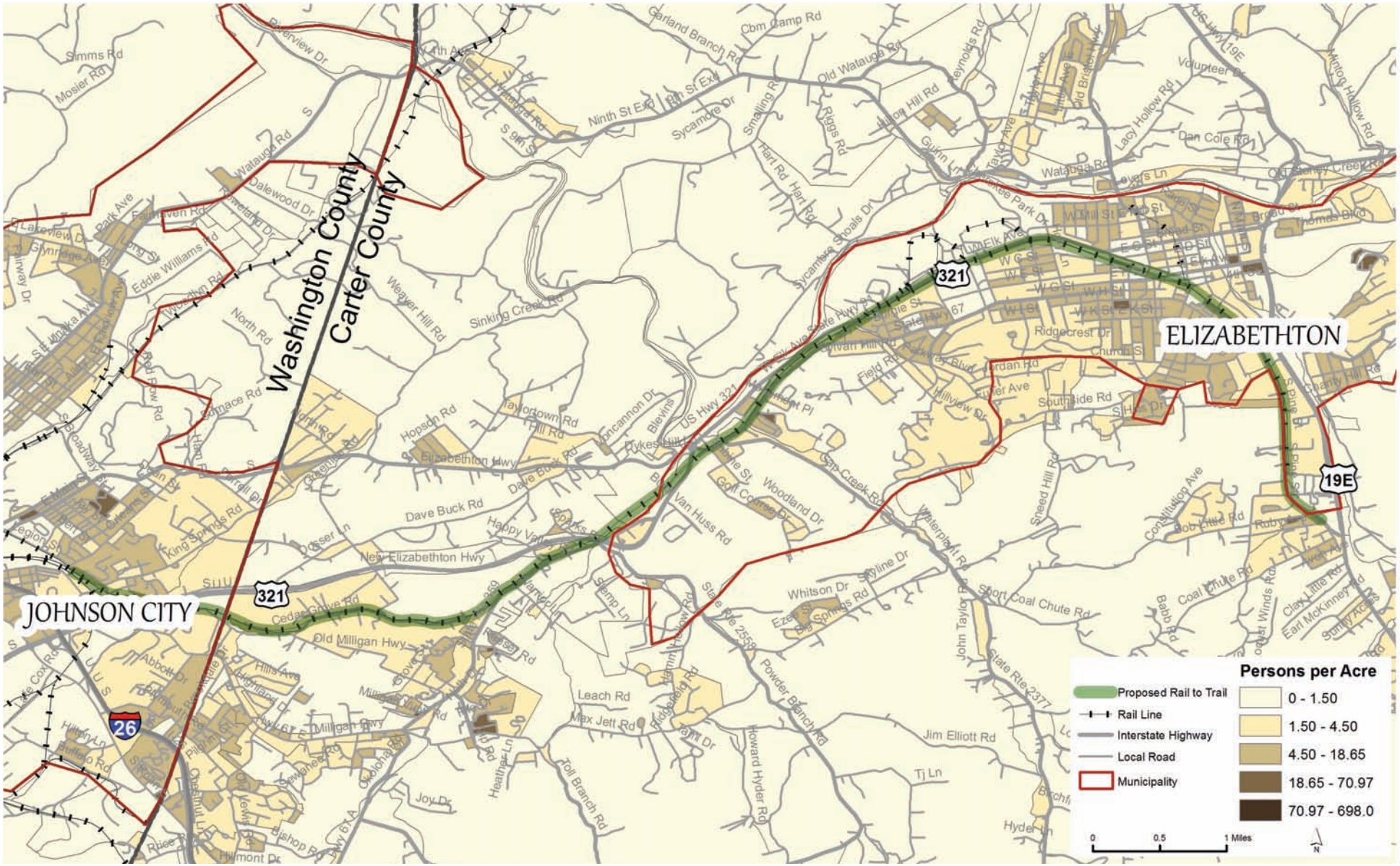


Figure 2.6: Locations of Minority Populations, Johnson City Rail Trail Corridor

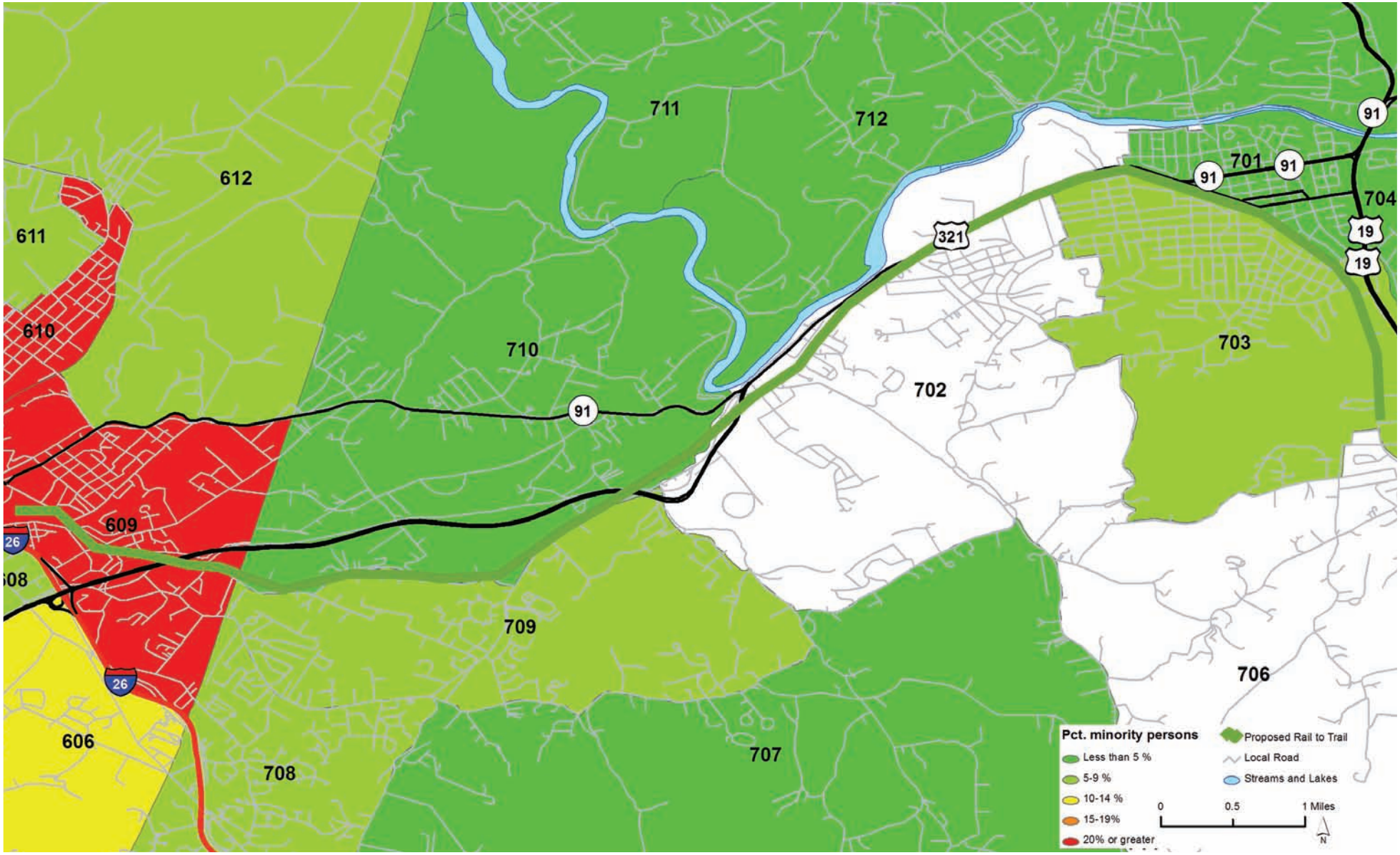


Figure 2.7: High Minority Census Tracts within ½ Mile from Trail, Johnson City Rail Trail Corridor

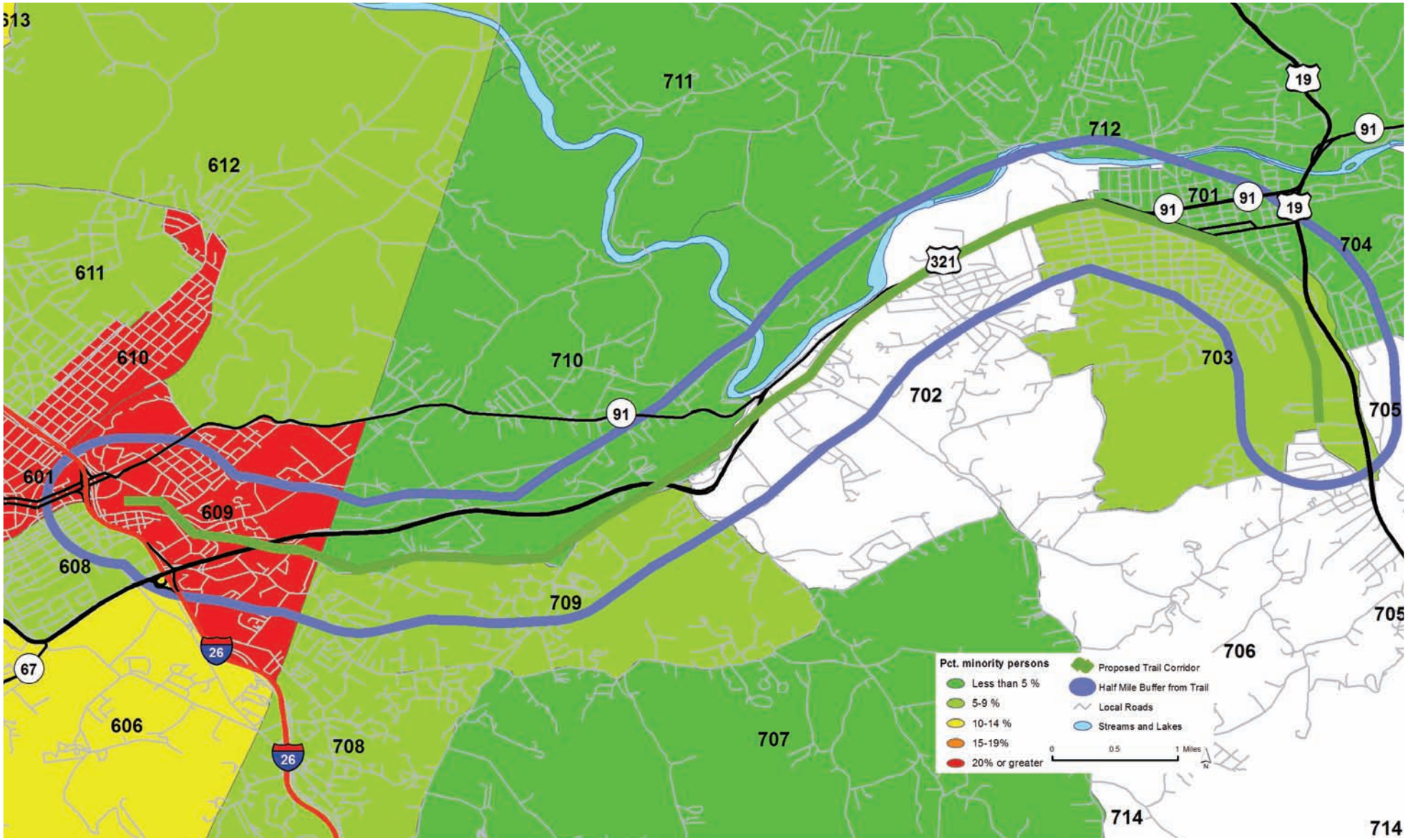


Figure 2.8: Locations of Persons in Poverty, Johnson City Rail Trail Corridor

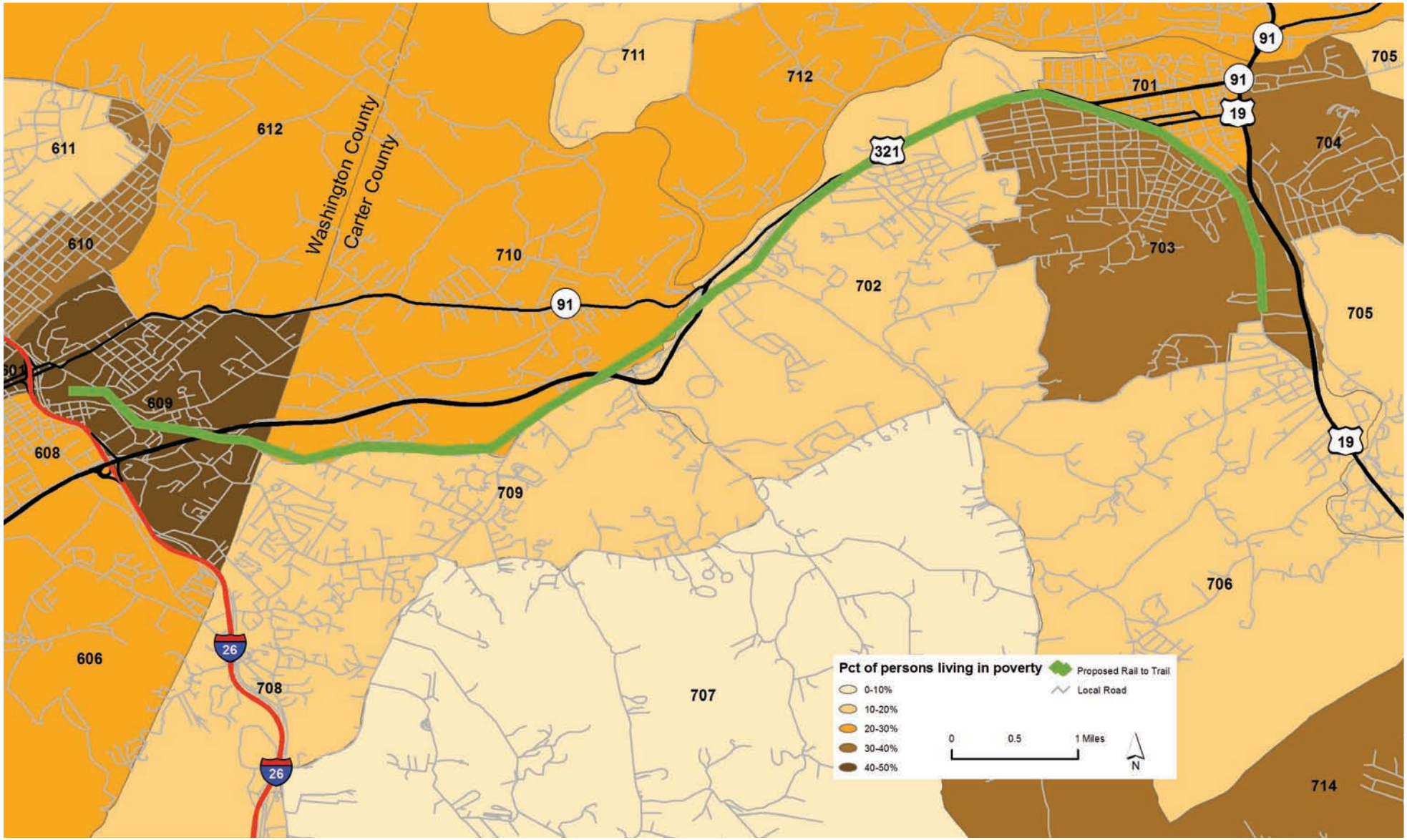


Figure 2.9: High Poverty Census Tracts within ½ Mile of Trail, Johnson City Rail Trail Corridor

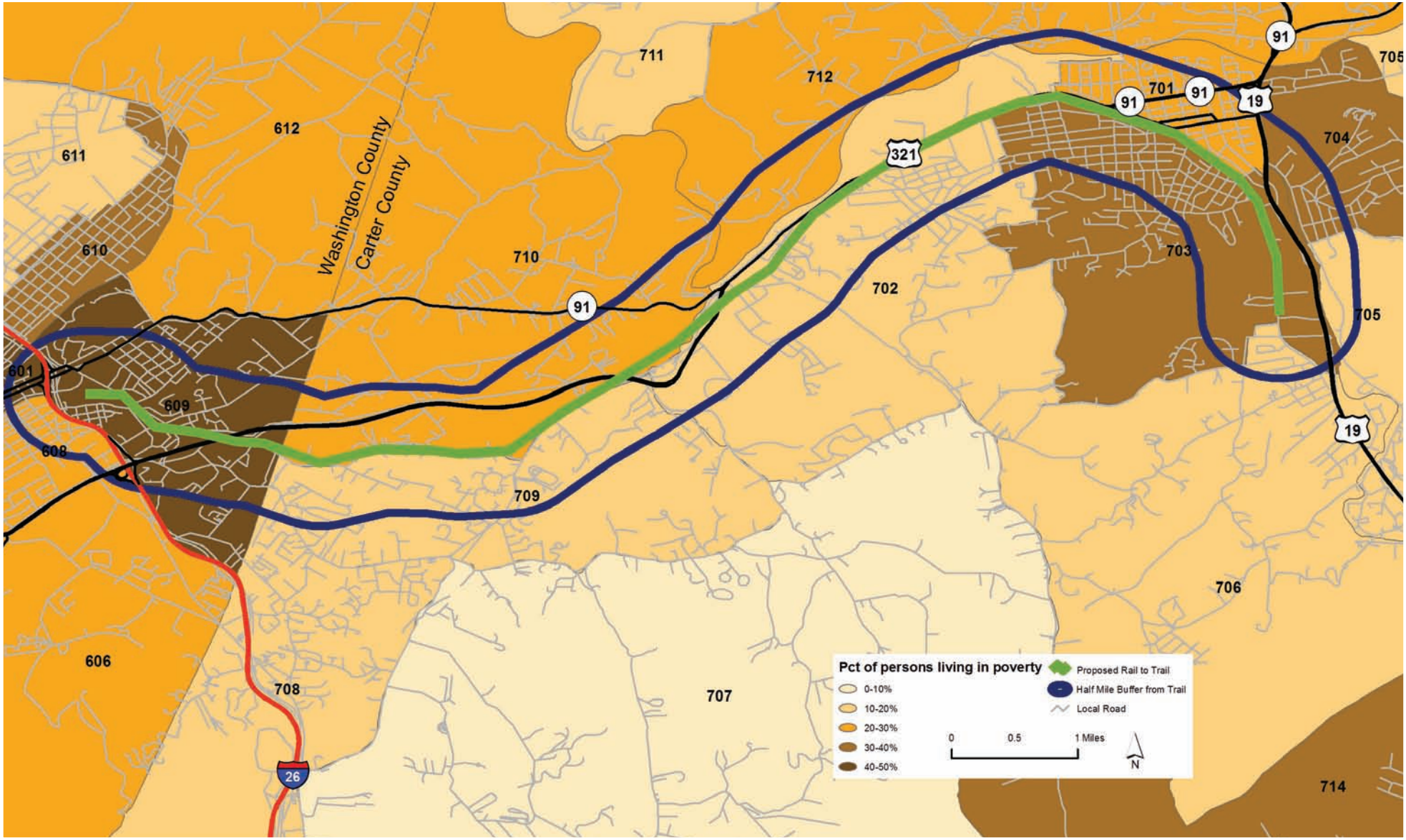
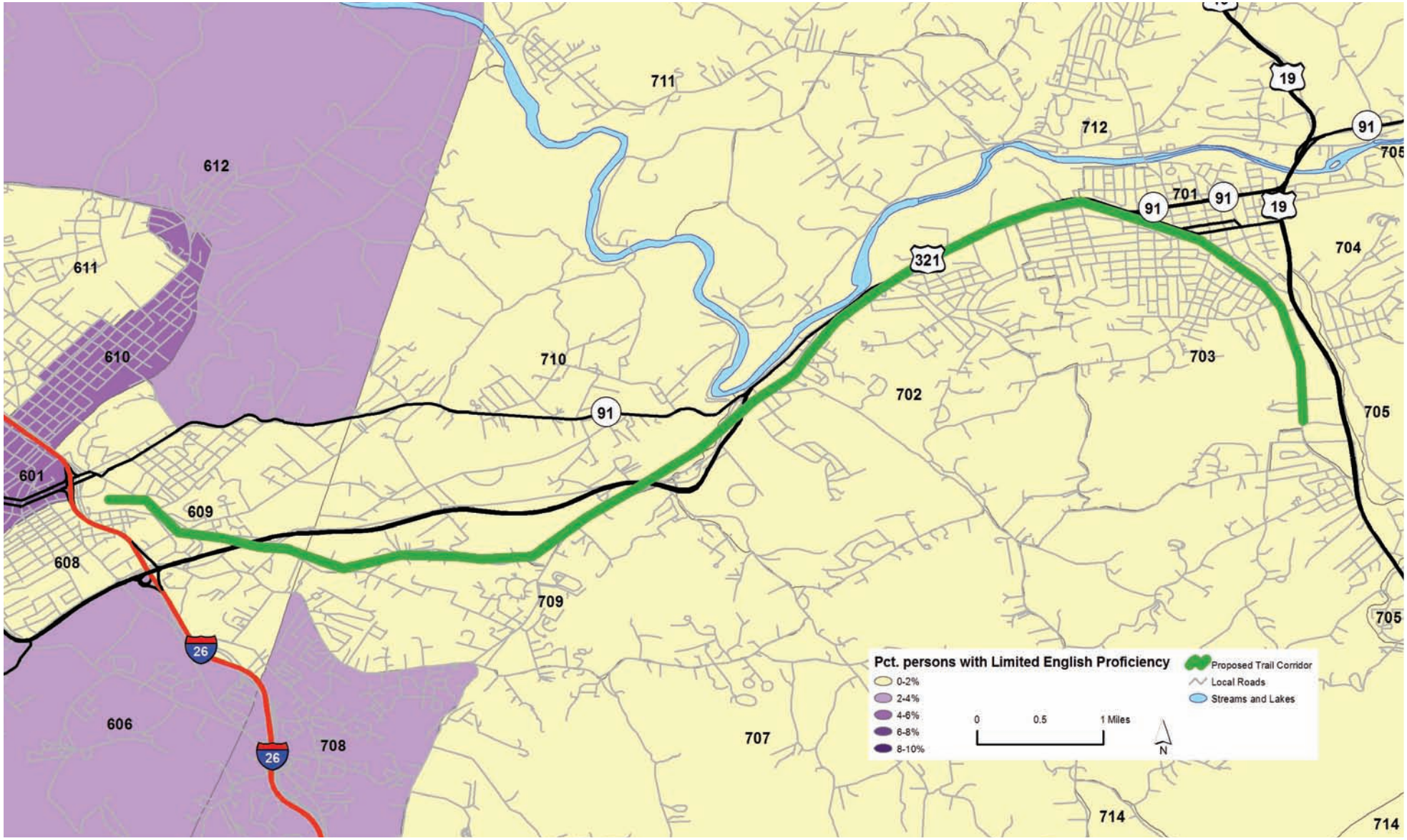


Figure 2.10: Location of Limited English Proficient Populations, Johnson City Rail Trail Corridor



2. Suffered by the minority or low-income population more severely or in greater magnitude than the adverse effect suffered by the non-protected population.

Disproportionately high and adverse effects are not determined solely by the size of the population, but rather the comparative effects on these populations in relation to either non-minority or higher income populations. In this Environmental Justice assessment, U.S. Census data was used to identify the demographics of the area in order to recognize potential "communities of concern". For the purposes of this Master Plan, communities of concern are areas where the percentage of minority population, low-income households, or limited English proficient households is greater than that of the county-wide averages of Washington or Carter Counties as the rail trail traverses.

It is important to note that impacts from transportation projects can be either positive or negative. For example, positive impacts could be improved access to a recreational trail or alternative mode of transportation. An example of a negative impact could be disruption to residents and businesses during the construction period. As the rail trail progresses through the planning and design stages, these areas should be carefully addressed.

Demographic Analysis

Population Density

Figure 2.5 on page 2-10 shows the distribution of population around the rail corridor. The cities of Johnson City and Elizabethton include total populations of 63,152 and 14,176, respectively, as of the 2010 U.S. Census. The most densely populated areas surrounding the rail trail corridor are in the downtown areas of both communities. There is additional population density in the areas near Gap Creek Road and Milligan Highway.

Minority Populations

Concentrations of minority and low-income populations are defined by Census tracts with percentages greater than the average of the overall county. The determination of what is disproportionately high and adverse human health or environmental effect is context dependent. All Census tracts include members of protected populations, and the approach used in the development of this Master Plan to identify communities of concern is only based on Census data and the proportion of protected populations that they contain. All future project development processes should include additional efforts to utilize local knowledge of individual neighborhoods to identify potential EJ populations that might have been missed during this Census-based analysis.

According to the 2010 Census, 8.5 percent of the Washington County population is considered to be minority, as is 3.6 percent of the population in Carter County. Using this threshold, if the minority population of a Census tract was greater than this amount, the level of concern can be assumed to be higher than in tracts below the threshold. As shown in Figure 2.6 on page 2-11, using this approach the rail trail crosses five Census tracts that exceed this threshold and based on this assessment should be considered potential communities of concern.

The highest concentrations of minority population of the two counties reside in a clustered area at the eastern edge of Washington County and the western edge of Carter County. The approximate rail trail right-of-way is shown as a green line in Figure 2.5. It begins in a heavily minority-populated area in Johnson City (20+ percent) and ends in an area with a lesser concentration of 5-9 percent minorities.

The Census tracts that contain 5-9 percent minority populations are shown in a medium green color and include: 604, 605.01, 611, 612, 617.01, 703, 708, and 709. The numbers increase to 10-14 percent in the yellow tracts of 605.02, 606, 608, and 613. In tract 620 the percentage of minorities increases to 19 percent and is shown in orange. The tracts shown in red have the highest percentage of minorities at 20 percent or greater and include tracts 601, 607, and 610.

Benefits and Potential Impacts to Minority Populations

Benefits to populations within the ½ mile distance include easier accessibility to the rail trail, as ½ mile is generally considered the maximum distance people are willing to walk to a destination. There are eleven Census tracts that are within ½ mile of the rail trail (the buffer is shown in blue on Figure 2.7 on page 2-12). These are the tracts that are in closest proximity to the rail trail and could conceivably experience the greatest benefit or burden from the development of the rail trail. Of the eleven tracts, ten have minority populations that are higher than the county-wide averages. To ensure convenient pedestrian or bicycling accessibility, it will be important that there is a good system of sidewalks or bikeways in place to safely access the rail trail. Potential adverse impacts could include disruption to residences or businesses during construction of the rail trail. As indicated earlier, these impacts should be taken into account as the rail trail is designed and constructed.

Persons in Poverty

According to the 2010 Census, 15 percent of the Washington County population is considered to be below the poverty level, as is 25 percent of the population in Carter County. Using this threshold, if the percentage of people living in poverty of a Census tract is greater than this amount, the level of concern can be assumed to be higher than in tracts below the threshold. As shown in Figure 2.8 on page 2-13, using this approach the rail trail crosses six Census tracts that exceed this threshold and based on this assessment should be considered potential communities of concern.

Consistent with Figure 2.7 on page 2-12, where the rail trail begins in an area with a high minority concentration, the same beginning is also a high poverty area in Johnson City (40-50+ percent). Unlike Figure 2, which ends in an area with a

lower concentration of minorities, the rail trail will end in an area that also has a significantly high concentration of persons in poverty (30-40 percent).

The rail trail crosses through areas with high percentages of people in poverty. The lowest percentage of poverty is 14 percent, shaded in peach, to the south of US 321. The highest percentage of people in poverty is found in Census tracts 601 and 609, near the western edge of the rail trail in Washington County, at over 40 percent.

Benefits and Potential Impacts to Populations Below the Poverty Level

There are eleven Census tracts that are within ½ mile of the rail trail (the buffer is shown in blue on Figure 2.9 on page 2-14). These are the tracts that are in closest proximity to the rail trail and could conceivably experience the greater benefit or burden from the development of the rail trail. Of the four tracts within the ½ mile distance of the rail trail in Washington County, all four have high poverty populations that are higher than the county-wide averages. These include tracts 601, 608, 609, and 610. Of the nine tracts within ½ mile proximity to the rail trail in Carter County, three have populations higher than the county-wide average for poverty. These include tracts 701, 703, and 704.

As indicated under the assessment of minority populations above, benefits to populations within the ½ mile distance include easier accessibility to the rail trail, as ½ mile is generally considered the maximum distance people are willing to walk to a destination. To ensure convenient pedestrian or bicycling accessibility, it will be important that there is a good system of sidewalks or bikeways in place to safely access the rail trail. Potential adverse impacts could include disruption to residences or businesses during construction of the rail trail. As indicated earlier, these impacts should be taken into account as the rail trail is designed and constructed.

Limited English Proficiency Population

The limited English proficient population is relatively small and is not adjacent to the potential rail trail location. The highest concentration of limited English proficiency population is shown in purple in Figure 2.10 on page 2-15 and is 9 percent of the total population of Census Tract 620. This tract is located in Washington County, between SR 381 and SR 34, and spans north and south of US 11 E. Neighboring tracts 601 and 610 to the east have 4-6 percent non-English proficient population. Carter County has very little of this population. However, even though these populations are not immediately adjacent to the rail trail, portions of these populations are within ½ mile of the westernmost trailhead, and special consideration should be given for language appropriate outreach regarding the project.

Summary

Although all segments of the population who live adjacent to the rail trail may endure some short-term construction related impacts related to visual changes, noise changes, and alterations in access, neither minority, low-income, or limited English proficiency populations in Washington or Carter Counties are likely to endure disproportionate impacts due to the development of the proposed rail trail. Should the development of the rail trail utilize federal funding, it will require future documentation in compliance with the National Environmental Policy Act (NEPA). During the NEPA process, a variety of issues will be evaluated, including an EJ analysis pursuant to EO 12898. In addition, the development of the NEPA document will require public participation and local coordination throughout with EJ issues to be identified and addressed.

Assessment of Existing Rail Trail Corridor

Alignment

The Johnson City Rail Trail corridor is a 10-mile stretch of inactive railroad right of way purchased for the purpose of converting it to a shared-use trail. As an integral part of the evaluation of existing physical conditions, a visual assessment of the corridor was performed on June 28, 2012. Observations were recorded and pictures taken throughout the corridor and are included in the Features Map in Appendix D. There are several underpasses, overpasses, and minor bridges within the corridor which are evaluated in Chapter 3 of this Master Plan.

The foundation of an acceptable and safe design is the selection of an appropriate "design speed". Design speed influences the basic geometry of a facility and establishes minimum horizontal clearances to obstacles and hazards. Trail corridors typically are designed with a minimum design speed of

Rail Trail Overpass, over Hwy 67 in Johnson City, Tennessee

20 miles per hour. Railroad profile grades are typically flat, and railroad horizontal curves are relatively gentle. Therefore it can be assumed that the remaining rail corridor meets general design criteria for profile grade and horizontal alignment for 20 miles per hour, making the corridor an ideal candidate for conversion to a trail facility.

Long segments of the rail trail are adjacent to existing roadways and generally mirror the roadway alignment. Within these areas, the location of the rail trail minimizes interaction between vehicles and trail users, yet it provides a safe and accessible facility.

As it relates to overpasses and vegetation, the existing vertical clearances are sufficient for trail use but may require general clearing to maintain clearances from branches and trees.

Right of Way

As a general condition, the existing rail corridor right of way varies between 50 and 60 feet with the railroad ballast centered within the right of way. There are areas where the right of way is wider, some of which can be attributed to rail spurs within the corridor.

Field Inspections of Right of Way and Easements

During the visual assessment, two clear encroachments into the rail trail right of way were identified:

- Between Lynn Avenue and North Watauga Avenue - The rail corridor is bounded by a thriving business north of the corridor and its supporting warehouse south of the corridor. This segment of the corridor is clearly in use and occupied by trucks, personal vehicles and semitrailers. At North Watauga Avenue, the corridor is fenced off as though the property owner has taken ownership of the corridor as well. This section is not feasible for use as a rail trail due to the safety issues related to heavy vehicle usage. Negotiations with the property owner are recommended to either provide a safe alternative or compensation, which could be used to provide an alternative alignment.
- 1000 West Elk Avenue, east of Hudson Drive - A historic train station (Bemberg) on this parcel encroaches into the corridor, but it is assumed to be a properly deeded and licensed encroachment.

There were no other obvious signs of unlicensed or licensed encroachments for the remainder of the corridor, except for some minor landscaping that has been placed at the entrance to the industrial site just west of Blue Ridge Road. This landscaping can easily be removed or incorporated into the rail trail aesthetics.

Parallel railroad tracks along State Line Road in Elizabethton, Tennessee

Rail corridor encroachment along W. Elk Avenue, Elizabethton, Tennessee

Rail corridor encroachment near N. Watauga Avenue, Elizabethton, Tennessee

Property Assessment Records Investigation of Right of Way and Easements

To better understand the available right of way and easements, a review of the Tennessee Property Assessor's website (http://www.assessment.state.tn.us/) was performed. Table 2.2 to the right summarizes those areas where right of way varies. Larger rights of way are typically identified as potential candidates for trailheads or rest stations along the proposed rail trail.

From the Property Assessor's website, two parcels initially raise a concern. Both are located south of Pete Hampton Drive in Elizabethton and appear to encompass the historic railroad right of way. As this project progresses forward, it is recommended that both parcels be further investigated via a review of the plat map and legal description to determine ownership of the rail right of way. The parcels in question are shown in the table and graphic below:

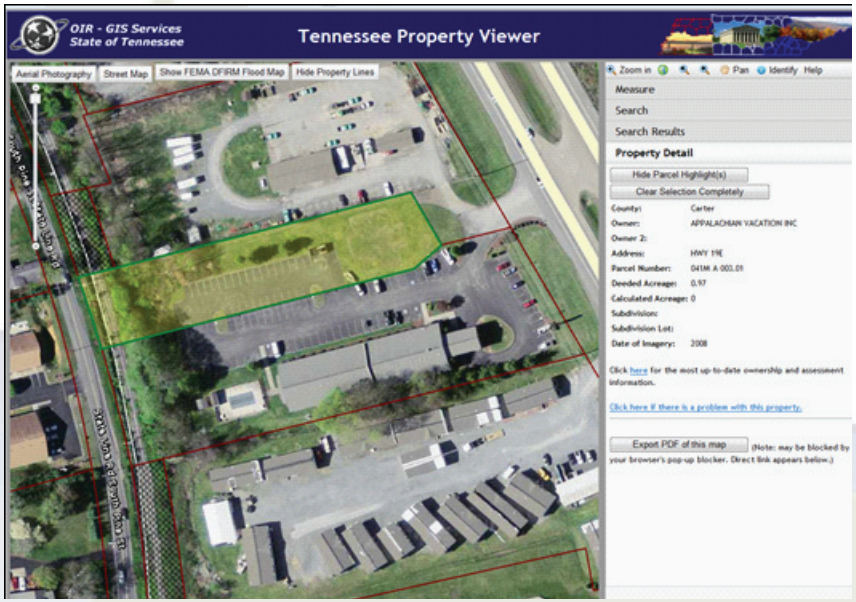


Table 2.2 Non-Standard Right of Way Width Locations

Station Begin	Station End	Length	Right of Way Width
0+00	10+00	1,000 ft	70 ft
13+00	14+00	100 ft	105 ft
14+00	17+00	300 ft	65 ft - 80 ft
22+00	25+00	300 ft	70 ft
25+00	26+50	150 ft	90 ft
32+00	39+00	700 ft	50 ft - 80 ft
39+00	44+00	500 ft	65 ft - 40 ft
44+00	45+50	150 ft	transition from sta 44+00 to sta 45+00
45+50	50+00	450 ft	95 ft - 120 ft
77+00	93+50	1,650 ft	100 ft
93+50	96+50	300 ft	transition from sta 93+50 to sta 96+50
96+50	109+00	1,250 ft	80 ft
109+00	111+00	200 ft	transition from sta 109+00 to sta 111+00
119+00	124+50	550 ft	50 ft
124+50	129+00	450 ft	50 ft - 150 ft
254+00	256+00	200 ft	100 ft - 130 ft
272+00	286+00	1,400 ft	40 ft
286+00	294+00	800 ft	50 ft from back of curb (RR is within W. Elk Ave R-O-W)
295+00	313+00	1,800 ft	30 ft to 100 ft from back of curb (RR is within W. Elk Ave R-O-W)
314+00	340+50	2,650	50 ft
340+50	341+00	50 ft	transition from sta 340_50 to sta 341_00
341+00	345+50	450 ft	85 ft
345+50	346+00	50 ft	transition from sta 345+50 to sta 346+00
346+00	349+50	350 ft	75 ft
349_50	351+50	200 ft	85 ft
351+50	373+00	2,150 ft	70 ft
373+00	378+50	550 ft	80 ft
378+50	387+50	900 ft	70 ft
378+00	382+50	450 ft	70 ft (RR remnants cut thru industrial parking lot)
389+00	391+50	250 ft	75 ft
408+00	418+50	1,050	40 ft
418+50	435+50	1,700 ft	50 ft
444+50	446+50	200 ft	railroad passes thru two (2) properties that are not in the S. Pine St ROW
446+50	466+50	2,000 ft	50 ft
480_50	498+50	1,800 ft	50 ft
498+50	499+60	110 ft	60 ft from back of curb (RR is within S. Pine St ROW)

Opportunities & Challenges Assessment

An important part of this Master Plan includes an assessment of opportunities and challenges along the rail trail corridor. Opportunities and challenges were determined based on observations in the field, Project Coordination Team feedback, and Geographic Information Systems (GIS) mapping. The maps on the preceding pages represent a corridor-wide snapshot of existing conditions and a broad-scale identification of opportunities and challenges related to implementation of a trail along the Johnson City Rail Trail corridor.

OPPORTUNITIES

Existing Foundation

For the majority of the rail trail corridor, the steel rails and wooden ties have been removed. Where the rail features have been removed, what remains is a stable ballast (crushed rock) rail bed with little evidence of washout or slope failure. This material will serve well as base material for the future rail trail.

Existing ballast on rail bed, near Happy Valley Road

Existing ballast was measured in several locations and found to be consistently 14-16 feet wide. (A typical railroad cross section is shown for reference.) In general, the ballast material is level and has minor changes in profile grade. While some of the rail removal was performed recently, there are some sections where the rail and ties were clearly removed a long time ago. In these areas, the corridor is overgrown and littered with debris, which will require minor clearing. In several sections, the rails and ties remain and will have to be removed as a part of the clearing process. At nearly every intersecting roadway, the ties and rails have either been paved over or just simply abandoned. For the most part, where the asphalt is in good condition and the rails are not visible, it may be feasible to leave the rails and ties within the intersecting roadways and thus, avoid reconstruction of sections of roadway.

Connectivity

A widespread condition observed along the corridor was the numerous connections to destinations and businesses the proposed rail trail could provide. The rail right of way (ROW) passes near or through residential neighborhoods, Harold McCormick Elementary School and Elizabethton High School, public parks including Sycamore Shoals State Historic Area and Lions Field Park, churches, historic sites, existing state bicycle routes, restaurants, medical facilities, business centers, retail areas, community centers, and unique natural areas. A rail trail connecting all of these areas would give residents and visitors greater ease of access to these places by foot and bicycle. The rail trail could serve as a commuter link between residences and places of employment in Johnson City and Elizabethton.

Access to Natural and Cultural Resources

A future rail trail along the existing rail ROW would greatly improve access to natural and cultural features for residents and visitors of all ages and abilities. The railroad corridor has expansive, natural views of pasturelands and mountains in the more rural parts of Carter and Washington Counties. In addition, the corridor intersects or passes nearby significant natural areas such as the Doe River, Buffalo Creek, and exposed geological areas. Historic features are also present near Sycamore Shoals State Historic Area and the railroad bridge over Rich Acre Road. A future rail trail along the rail corridor would not only connect visitors and residents to unique natural and historical resources, but with the addition of learning elements, such as interpretive signage and static exhibits, the rail trail could be an effective educational tool as well.

Geometric and Physical Features

The physical features of railroad corridors are typically linear, flat, and wide enough for freight travel, simultaneously making them fine candidates for shared-use trail development. The Johnson City rail trail corridor traverses many physical conditions, including streams, roadways, open fields, floodplains, and areas with steep slopes. Despite these conditions, the physical challenges are minimal along the majority of the corridor. Many of the existing trestles and structures in place can be reused as pedestrian bridges with structural and safety treatments.

Community Enhancement

The communities of Johnson City and Elizabethton can be further enhanced with the establishment of a rail trail, encouraging residents to walk or bicycle to experience destinations, nature, and each other. The proposed Johnson City Rail Trail has the potential to enhance local pride and create a sense of ownership among its residents. Programming opportunities for the future rail trail are limitless, from environmental and interpretive education, athletic events, and parades, to trail maintenance days among local nature clubs. By providing a paved "linear park" that all user groups can access safely, the rail trail could become a catalyst for community connection and involvement..

CHALLENGES

Corridor Neglect

The Eastern Tennessee Railway corridor has been out of operation since 2002. Since that time, and prior to its acquisition by Johnson City, the rail corridor has been unmaintained and subjected to dumping, vandalism, and vegetation overgrowth. These areas are occurring at several of the roadway underpasses and along areas with steep slopes. Clean-up and invasive species removal efforts will need to be undertaken to mitigate these problems.

Encroachment

From the Property Assessor's website, two parcels initially raise a concern. Both are located south of Pete Hampton Drive in Elizabethton and appear to encompass the historic rail right of way. As this project progresses forward, it is recommended that both parcels be further investigated via a review of the plat map and legal description to determine ownership of the rail right of way. The parcels in question are discussed on pages 2-18 and 2-19.

Side Slope Conditions

The range of topography along the Johnson City Rail Trail corridor will make the user experience interesting. However, steep slopes and poor sight lines exist in several areas and will need to be addressed during rail trail design, affecting development costs.

Side slope conditions directly influence the safety and feasibility of a rail trail corridor. Users of the rail trail can include cyclists, walkers, runners, skaters, the disabled, and others. When accidents occur, users can be thrown off the rail trail facility and onto the adjacent slopes. Where hazards such as deep ponds, sinkholes, steep slopes, unstable embankments, and fall hazards exist, it is incumbent on the owner of the facility to either provide shielding (guardrail, fencing, railing, etc.) or eliminate the hazard in order to minimize the danger to rail trail users. For the majority of the rail corridor, the side slopes are relatively flat and mildly vegetated, lending themselves very favorably to conversion to a rail trail facility. In urban, commercial, and industrial areas, the corridor is level or slightly elevated as compared with the existing ground, making it an ideal candidate for conversion.

There are several isolated areas where existing side slope conditions need to be shielded or repaired in order to provide a safe facility. The types of hazards observed in the field are as follows:

- Steep embankments above the corridor.
- Steep embankments below the corridor.
- Deep ponds.
- Locations where side slopes exceed 2:1 (horizontal to vertical).
    - o Will require a barrier when drop-offs exceed 2.5 feet.
- Areas of slope failure above the corridor.
    - o One location specifically identified in the structural portion of this report may require remediation due to slope instability. The cost of the remediation will vary greatly with the selected solution, depending on the expected risk of failure.

Locations where side slope conditions may merit consideration for rail trail modifications or provision of barriers to protect users from hazards are identified in the Features Maps in Appendix D. The number of locations and types of barriers will be influenced by the ultimate width of the proposed rail trail and the severity of the hazard. At bridge underpasses, safety treatments should be considered to protect trail users from falling debris. At overpasses, consideration should be given to protect the roadway below and specifically to protect users from the obvious fall hazards at bridges and abutments. Consideration should also be given to provide fencing to restrict access to roadways and waterways below.

Steep slopes, like the side slope shown above, exist in several areas along the rail trail corridor.

Intersection Geometry

The ever expanding development of rail trail facilities has resulted in numerous intersecting roadway treatments which alert both drivers and trail users to the intersection. Typical intersection treatments are provided by TDOT Standard Drawing T-M-10 (included at the end of this chapter). Other techniques, such as corralling and signal technology, can be used and should be evaluated on a case-by-case basis.

Crossings vary from urban and rural roadways to commercial entrances and private driveways. In certain instances, modifications to intersecting roadways may be necessary to provide a safe crossing. For example, an adjustment may need to be made to the raised median and stop

bars, as well as the addition of pedestrian signals for trail users.

Utility Crossings

During the field review, numerous utility crossings were observed, including both underground (water, sewer, natural gas, and communication lines) and overhead (telephone, cable, and electric lines) facilities. There was no obvious evidence of utilities running within the corridor right of way, but it is possible that some utilities are within easements. The utilities that were observed can reasonably remain in place without impacting trail users. During construction of the rail trail, consideration should be given to contacting the local utility clearinghouse to identify and mark existing facilities within the right of way.

The sale documents that were reviewed do not indicate whether the railroad had a contract with utility owners or not. As this project develops further, direct contact with the utility owners will be required to identify those within the corridor right of way and initiate easement negotiations.

An approach used with other rail trails is to encourage utility owners to utilize easements within the corridor right of way. Trail corridors can provide utility owners an uninterrupted, easily accessible stretch of land for their facilities. The greatest benefit to the utility owners is that they only have to work with one land owner rather than hundreds of individuals. By sharing the same space, utilities can help offset trail costs. As a part of an easement agreement, utility owners can be required to provide in-kind services, such as trail surfacing, general repair work, and overall maintenance of the rail trail. Alternatively, the opportunity exists for Johnson City to earn revenue via installation fees or annual fees paid by the utility.

Utility crossings exist along the Johnson City Rail Trail Corridor

Field Structure Assessments

Introduction

Field assessments were made during a field visit from June 28th through 29th, 2012. The visit consisted of walking the corridor from Alabama Street near the intersection with Legion Street in Johnson City to near the intersection of State Line Road, Route 67, and Sunshine Circle in Elizabethton. Structures over the rail corridor and those that convey the rail corridor over highways, roadways, streams, and drainage draws were visually assessed for suitability for adapting the former rail corridor to pedestrian and cycling use. The bridge assessments are presented here in order from Johnson City to Elizabethton. Bridge inspection comments and ratings are taken from "Annual Bridge Inspection Bridge Reports, FY 2008-2009" prepared by Crouch Engineering, P.C. A copy of the most recent Report is included in Appendix E of this Master Plan.

Field Structure Assessments

Structure 1 – King Springs Road

The King Springs Road overpass provides ample vertical and horizontal clearance for rail trail development without modification. While roadway noise could be a concern, it was not noted as an irritant during this visit. Consideration may be given to fencing mounted on the bridge barriers to prevent injury to trail users by objects thrown from the bridge.

Structure #1

Structure 2 – Millgan Highway

The Milligan Highway overpass provides sufficient vertical and horizontal clearance for rail trail development without modification. The bridge width shades a considerable length of trail. Depending on the hours of trail use, lighting under the bridge may be appropriate. While roadway noise could be a concern, it was not noted as an irritant during this visit. Consideration may be given to fencing mounted on the bridge barriers to prevent injury to trail users by objects thrown from the bridge.

Structure #2

Structure 3 – Over Rich Acres Road

This structure is a single span ballast deck concrete bridge on concrete breastwall abutments carrying the rail trail over Rich Acres Road. Rich Acres Road serves two residences south of the bridge and has no outlet south of the bridge. The vertical clearance of only 9'-3" reportedly prevents fire trucks from passing.

The structure shows a reasonable amount of wear for its age, including scrape marks and spalling under the bridge, presumably from tall vehicles passing or attempting to pass. The spalled concrete has exposed reinforcing steel. The condition of the bridge appears to be fair and, abrasions notwithstanding, shows no indication that prevents development of the trail. The overall rating of the bridge is 3-4 on a scale of 5. The lowest component rating of 2-3 is assigned to the ties. As the bridge carries ballast, the condition of the ties is not relevant to development of the rail trail. The spalled concrete should be patched to protect the exposed reinforcing. Fencing along the edges of the bridge should be considered for the safety of trail users and the street below.

Structure #3

Structure #4

Structure 4 – Over Sinking Creek

This structure is a single span open deck girder bridge. Large areas of spalling concrete were noticed on the abutments.

The inspection report lists the spalling concrete mentioned above, the need for a deeper cribwall at the west abutment to retain ballast, scour occurring under the east end abutment, 12 of the 24 ties in poor condition, and the bearings needing to be cleaned. The overall rating is 3-4. The repairs recommended in the inspection report and a deck suitable for trail use should be included in the development plans for the rail trail. The listed deficiencies do not prohibit adaptation for trail use. Fencing along the edges of the bridge should be considered for the safety of trail user.

Structure #5

Structure 5 – Over US 321

This bridge is a steel superstructure of two deck-girder spans and two through-girder spans. The overall rating is 4 with no pending maintenance issues listed. There is space between the ties and the through-girders (see photograph). The open space should be closed, and fencing along the edges of the bridge should be considered for the safety of trail users and the highway below. A deck suitable for trail use should be included in the development plans for the rail trail.

Structure #6

Structure 6 – Culvert

This culvert carries the railroad bed, including ballast, over a creek between the crossings of Lauderdale and Emmanuel Drives. The overall rating for the structure is 2-3 with a note that the abutments are cracking and severely leaning. The maintenance recommendation in the report is to pass a pipe through the culvert and fill in the structure. If drainage requirements can be satisfied by a pipe that would pass through the culvert, it would greatly simplify long term maintenance. Also, the embankment required for holding the pipe in place would eliminate the hazard of rail trail users falling from the existing concrete headwall.

Field Structure Assessments

Site 7 – Embankment Stability

The photograph to the right was taken from the rail corridor east of Banks Road. There is not an existing structure at this location. However, provisions for ground improvement of a retention structure will likely be required to protect the rail trail and the road above and adjacent to the embankment.

Site #7

Structure 8 – US 321

The US 321 overpass provides ample vertical and horizontal clearance for trail development without modification. While roadway noise could be a concern, it was not noted as an irritant during this visit. Consideration may be given to fencing mounted on the bridge barriers to prevent injury to trail users by objects thrown from the bridge.

Structure #8

Structure 9 – Small Drainage Structure near Happy Valley Cemetery

The backwalls of this small structure are honeycombed and spalling. It is recommended this structure be replaced with a pipe.

Structure #9

Structure #10

Structure 10 – over Buffalo Creek

This is a 140-foot-long, six-span, steel girder structure. The piers alternate between concrete and steel trestles. The inspection report notes spalling on the wingwall and abutments and poor condition of the wooden bearing blocks. The overall condition assigned to the structure is 3, with recommended maintenance items including replacement of the bearings, removing stream drift under the bridge, and patching concrete cracks and spalls.

The repairs recommended in the inspection report and a deck suitable for trail use should be included in the development plans for the rail trail. The listed deficiencies do not prohibit adaptation for trail use.

Structure #11

Structure 11 – Route US 321

The US 321 overpass just south of the Route 91/Elk Avenue intersection provides adequate vertical and horizontal clearance for the trail. The bridge width shades a considerable length of trail. Depending on the hours of trail use, lighting under the bridge may be appropriate. While roadway noise could be a concern, it was not noted as an irritant during this visit. Consideration may be given to fencing mounted on the bridge barriers to prevent injury to trail users by objects thrown from the bridge.

Structure #12

Structure 12 – over Gap Creek

This is a two-span, steel deck girder bridge. The inspection report assigns an overall condition of 4, with the only maintenance item being to clean the bearings. In addition to the recommended maintenance, a deck suitable for trail use should be included in the development plans for the rail trail.

Field Structure Assessments

Structure 13 – North of Peter Hampton Road

The existing timber span of this structure could be replaced with a reinforced concrete slab to adapt the structure for trail use. Consideration should also be given to replacing the structure with a pipe and backfill.

Structure #13

Structure 14 – North of Ruby Avenue

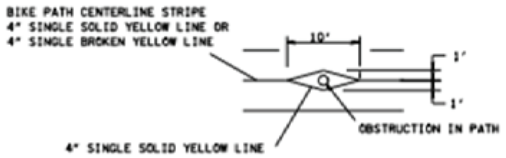
The existing timber span of this structure could be replaced with a reinforced concrete slab to adapt the structure for trail use. Consideration should also be given to replacing the structure with a pipe and backfill.

Structure #14

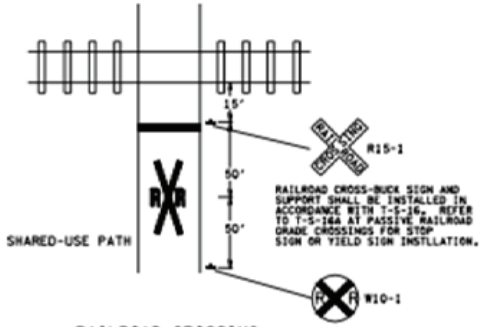
Field Structure Summary

The type of structures observed varied from small concrete and timber drainages structures a few feet across to the nearly 368 feet long, through girder structure over 321. The materials included concrete, steel and timber. The condition of the structures was found to be typical for their apparent age, prior use and current lack of maintenance. No conditions were found to indicate substantial rehabilitation to major structural elements would be required for conversion to use as a shared use trail. The concept level estimate of costs for the conversion include removal of railroad ties, concrete repairs, construction of a concrete deck, installation of handrail and installation of fencing where appropriate. For the small drainage structures, replacement with a pipe is recommended. Fencing is recommended for installation on the barrier of vehicular bridges over the trail to deflect objects thrown from the vehicles. Painting of the steel structures was not included in the estimate and is not considered critical to initial development of the trail. Painting can be expensive and difficult to estimate without testing of any coatings and consulting with local painting contractors. At the time of the inspection, steel structures were covered with rust patina, but did not appear to be suffering significant deterioration. Painting should be considered deferred maintenance to be accomplished over the next 5 to 10 years.

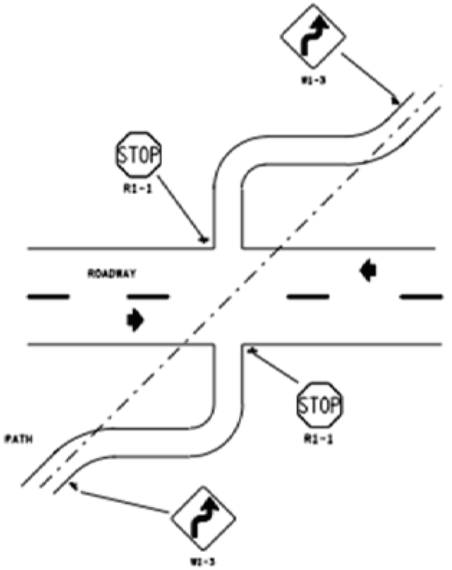
SIGN PLACEMENT ON SHARED-USE PATHS
(SEE RD-TS-8 FOR TYPICAL CROSS SECTION DETAILS)



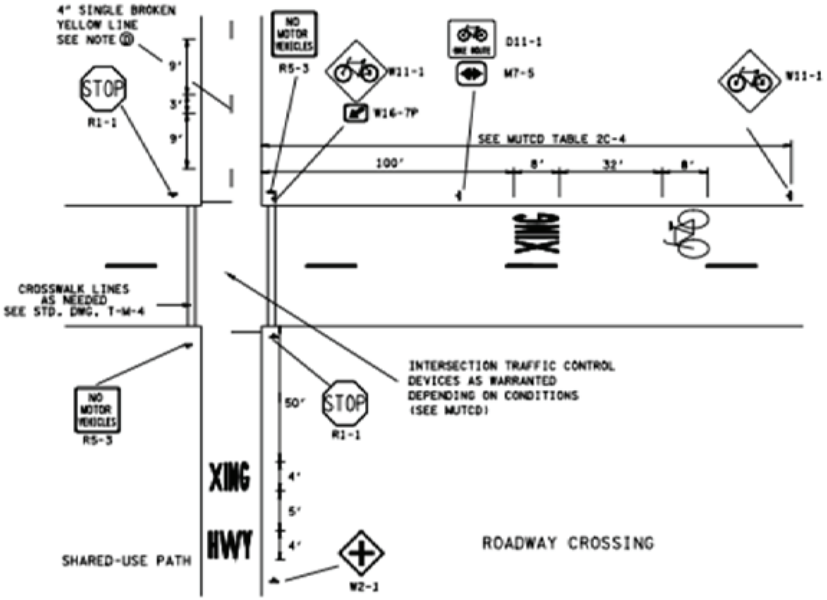
BARRIER POST STRIPING



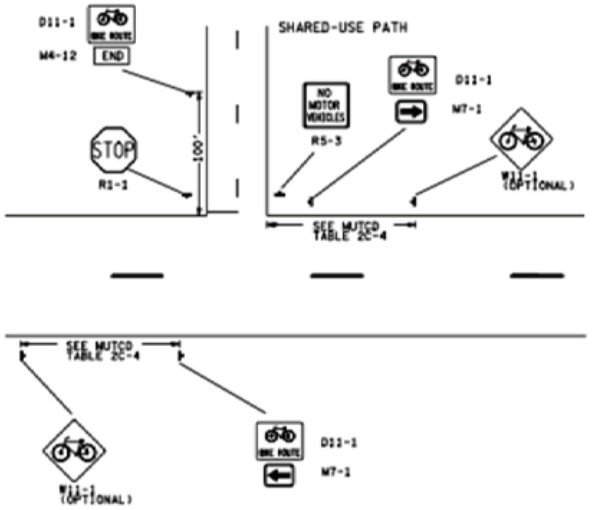
RAILROAD CROSSING



TYPICAL REDESIGN OF A DIAGONAL ROAD CROSSING



ROADWAY CROSSING



BEGINNING AND END OF A DESIGNATED BICYCLE ROUTE ON A SHARED-USE PATH

GENERAL NOTES

① WHEN OVERHEAD SIGNS ARE USED ON SHARED-USE PATHS, THE CLEARANCE FROM THE BOTTOM EDGE OF THE SIGN TO THE PATH SURFACE DIRECTLY UNDER THE SIGN SHALL BE A MINIMUM OF 8 FEET.

⑧ WHEN PLACEMENT OF STOP OR YIELD SIGNS IS CONSIDERED, PRIORITY AT A SHARED-USE PATHS/ROADWAY INTERSECTION SHOULD BE ASSIGNED WITH CONSIDERATION OF THE FOLLOWING:

1. RELATIVE SPEEDS OF SHARED-USE PATH AND ROADWAY USERS;
2. RELATIVE VOLUMES OF SHARED-USE PATH AND ROADWAY TRAFFIC; AND
3. RELATIVE IMPORTANCE OF SHARED-USE PATH AND ROADWAY.

⑨ WHEN ENGINEERING JUDGMENT DETERMINES THAT THE VISIBILITY OF THE INTERSECTION IS LIMITED ON THE SHARED-USE PATH APPROACH, INTERSECTION WARNING SIGNS SHOULD BE USED. INTERSECTION WARNING SIGNS SHOULD NOT BE USED WHERE THE SHARED-USE PATH APPROACH TO THE INTERSECTION IS CONTROLLED BY A STOP SIGN, YIELD SIGN, OR A TRAFFIC CONTROL SIGNAL.

⑩ A SOLID WHITE LINE MAY BE USED ON SHARED-USE PATHS TO SEPARATE DIFFERENT TYPES OF USERS. THE R9-7 SIGN MAY BE USED TO SUPPLEMENT THE SOLID WHITE LINE. SMALLER SIZE LETTERS AND SYMBOLS MAY BE USED ON SHARED-USE PATHS. FIXED OBJECTS ADJACENT TO SHARED-USE PATHS MAY BE MARKED WITH OBJECT MARKERS.

⑪ WHERE PASSING IS PROHIBITED USE 4" SINGLE SOLID YELLOW LINE.

⑫ THE MINIMUM SIGN SIZES FOR SHARED-USE PATHS, SHALL BE THOSE SHOWN IN TABLE 9B-1 IN MUTCD, PART 9 AND SHALL BE USED ONLY FOR SIGNS INSTALLED SPECIFICALLY FOR BICYCLE TRAFFIC APPLICATIONS. THE MINIMUM SIGN SIZES FOR BICYCLE FACILITIES SHALL NOT BE USED FOR SIGNS THAT ARE PLACED IN A LOCATION THAT WOULD HAVE ANY APPLICATION TO OTHER VEHICLES.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SIGNING AND PAVEMENT MARKINGS FOR SHARED-USE PATHS

5-1-07 | T-M-10

Chapter 2 "Existing Conditions" Information Sources

1. http://tn.gov/environment/tdg/maps/

2. http://en.wikipedia.org/wiki/Watauga_River

Rail Trail corridor crossing the Historic 1984 Bridge, Johnson City, TN

Physical Master Plan 3

Overview

This chapter presents detailed recommendations for the physical design of the Johnson City Rail Trail. The Project Coordination Team, City staff, public participants, and planning consultants worked together to develop the recommendations of this Master Plan. The recommendations take into account the impact of physical and environmental forces, and the relationships between these forces, that govern the successful creation of a trail. Special attention was given to how users will perceive the built and natural environments surrounding the rail trail, how citizens will use the rail trail, and how trail use will impact the surrounding built and natural environments. The built and natural environments were thoroughly evaluated during the existing conditions analysis presented in Chapter 2, and recommendations presented in this chapter take into account the impacts the rail trail will have on the surrounding environments.

This chapter provides information on typical trail user types, trail design, and trail surface types, and it offers recommendations for support facilities and locations, wayfinding signage, rail trail corridor enhancements, intersection crossing treatments, and trailhead areas.

Corridor Design Recommendations

User Types

A trail's surface can be the determining factor for the expected types of use and overall trail aesthetics. Paving a trail with an asphalt surface encourages use by recreational bikers, walkers, runners, skaters, and disabled citizens.

An alternative to paving the entire rail trail corridor is to partially pave, offering an asphalt surface that is desired by some users, and then transition to a more natural trail for off-road bikers, runners, and hikers.

Deciding on the surface treatment for bridges can be driven either by aesthetics or economic feasibility. Bridge surfaces could be constructed as a wooden boardwalk and be braced and prepared for a continuous asphalt surface. The decision to utilize a specific bridge surface should be made with cost, maintenance, safety, and public input in mind.

Where right of way permits, consideration can also be given to provide a natural path along the paved path for those users desiring a more natural experience. Several governing factors that will have to be considered in the selection of the surfaces for both the main trail and bridges are construction cost, maintenance cost, and expected types of use. Specific information on typical user types, the unique needs of each user type, and potential conflicts between different user types is discussed on page 3-2. One way to address potential conflicts between user types is to designate different times for allowable uses that may otherwise conflict. This "time use of separation" has benefits and drawbacks and is discussed in more detail later in this chapter.

Chapter Contents

Table 3.1 Rail Trail User Type Needs & Requirements: Pedestrians

USER TYPE: PEDESTRIANS Needs/Space Required	Potential Conflicts with Other Users
Needs and Preferences:	**Trail Etiquette:**
Needs and preferences vary depending on ability, purpose, and circumstance	May not control pets or pick up pet waste
May walk alone or in groups, with children, or with pets	Children may veer into the path of oncoming traffic, who may not be able to slow down.
May require accessibility due to disabilities	Multiple pedestrians may walk abreast, making it difficult for other users to pass.
	Disabled users may not have an obvious disability. They may also require extra courtesy when interacting with other users as the disabled may not be able to ambulate or yield off the trail as readily as other users.
Trail Dimensions:	
Width: 10 to 12 feet	
Shoulders: 2 feet	
Vertical clearance: 10 feet	
Trail Surface Type:	
Concrete:	
Typically more expensive than asphalt	
The hardest of all trail surfaces with the longest life cycle	
Withstands flooding and heavy vehicles better than asphalt	
Asphalt:	
Typically less expensive than concrete	
Joggers and runners may prefer surfaces such as asphalt or crushed gravel due to its relative "softness".	
Dyes (such as colored pigments) can be added to both concrete and asphalt trails to increase the aesthetic value of the trail itself.	

Table 3.2 Rail Trail User Type Needs & Requirements: Bicyclists

USER TYPE: BICYCLISTS Needs/Space Required	Potential Conflicts with Other Users
Needs and Preferences:	**Trail Etiquette:**
Needs and preferences vary depending on skill level and the type of trip a rider wishes to take:	Startling other trail users
Recreational bicyclists may prefer scenic, winding, off-street trails.	Running other users off the trail
Utilitarian bicyclists who ride to work or for errands may prefer direct on-street bicycle facilities.	Being faster and more mechanized than other users
Youth bicyclists, seniors, and adults new to bicycling may prefer shared-use paths.	Frightening wildlife
Experienced bicyclists (commuters, road bicyclists) may prefer bike lanes.	May not use audible warning when passing
Trail Dimensions:	
Width: 10 to 12 feet	
Shoulders: 2 feet	
Vertical clearance: 10 feet	
Trail Surface Type:	
Asphalt or Concrete:	
Thicker asphalt sections and a well-prepared subgrade will reduce deformation over time and reduce long-term maintenance costs.	
The use of concrete surfacing for paths has proven to be the most suitable for long-term use.	
Using modern construction practices, concrete provides a smooth ride with low maintenance costs.	
Concrete paths can be placed with a slip-form paver. The surface must be cross-broomed.	
Crack-control joints should be saw-cut, not troweled.	
Concrete paths may cost more to build than asphalt paths but do not become brittle, cracked, and rough with age or deformed by roots.	
Dyes (such as colored pigments) can be added to both concrete and asphalt trails to increase the aesthetic value of the trail itself.	

Trail Surface Types

Single Tread, Single Use:
Provides a separate trail tread of pathway using buffers or other barriers for each use along the same corridor.

Pros: Separates multiple uses resulting in little to no conflicts

Cons: Requires more space than allotted in a typical rail trail corridor; can be cost-prohibitive to implement.

Single Tread, Multiple Use Trails:
A single trail tread or pathway is designed to accommodate multiple users in the most common type of trail in the nation.

Pros: Multi-user trails represent the model for future rural, suburban, and urban greenways and rail trail conversions because they can accommodate a broad range of user groups within a single corridor at minimal cost.

Cons: Does not take into account increased demand for trail resources, increased usage, poor management, under-designed facilities, lack of user ethics, and disregard for the varying abilities of different trail users.

Design of Project Elements:
Tread width, surface material, intersections, signage, bridges, and amenities are associated with national minimum standards for multi-use trail design. For example, the national minimum standard for an urban trail with this type of use is a 12-foot-wide paved trail. Appendix C includes a more detailed study of project elements and the acceptable standards for shared use.

Pros: When executed properly, allows varied activities to coexist on a single tread in both urban and rural environments.

Cons: Requires careful study of unique physical constraints and specific design needs along the corridor during construction documentation.

Trail Surface Recommendation
Based on the physical site analysis, the public's expressed desires for the trail, and the metrics of shared-use trail design, specific treatments are recommended in this chapter for the Johnson City Rail Trail. Due to the proposed multiple uses of the trail, a 10 to 12-foot-wide tread is recommended for the Johnson City Rail Trail. The existing ballast can be compacted and used as a crushed stone surface (with additional stone fines added where necessary) in the interim until funding for a hardened surface becomes available. The City should monitor user types, number of users, and needs once the trail is open for public use to determine future characteristics of the trail surface. Ultimately, to serve the greatest range of users for transportation and recreation, a 10 to 12-foot-wide asphalt trail with a two-foot-wide shoulder is recommended for the Johnson City Rail Trail. Specific design characteristics of the various trail types and circumstances are detailed in the Design Guidelines (Appendix B). The Design Guidelines - developed specifically for the Johnson City Rail Trail - reflect the relevant national practices.

A trail management practice called "time of use separation" is an effective management strategy for some multi-use trails. Through this strategy, multiple trail users are permitted to access the trail at different times of the day, week, month, or year. A benefit of this strategy is that all trail users to enjoy the same facility by physically removing the potential conflict between incompatible uses. However, enforcement by the various law enforcement agencies in each jurisdiction is crucial to the success of this management practice, as is an aggressive educational campaign for trail users.

Roadway Intersections
The rail corridor crosses many formal and informal roadways in rural, suburban ,and urban environments along its 10-mile length. There are 46 crossings in total, consisting of 33 road crossings, seven driveway crossings, and six underpasses or overpasses.

Roadway crossings represent a key safety challenge for trail designers since drivers often do not expect to see bicyclists and pedestrians crossing mid-block or across streets onto which they are turning. A combination of signals and traffic controls can increase driver awareness of trail crossings. Similarly, pedestrians and cyclists traveling on trails may not notice upcoming crossings without proper signals along the trail itself. Controls in the form of signs or signals are therefore recommended along both the rail trail and the roadway at all crossings. Detailed "Rail Trail Corridor Cut-sheets" consisting of corridor descriptions, discussions of each intersection crossing, photos, and maps are presented starting on page 3-12 of this chapter. Each intersection is identified by a number that corresponds to the table on page 3-9, and the "Intersection Crossing Treatments" presented in Appendix C.

Crossing treatments are recommended in this chapter based on trail and roadway characteristics. Key roadway factors

influencing the selected treatment include the posted speed limit, traffic volume, line of sight, street width, roadway and trail geometry, and intersection configuration. The selected treatments provide a starting point for design, but they should be examined in greater detail as part of the design and implementation of each trail segment. Design guidelines for specific intersection treatment types and controls are provided in Appendix B, and Appendix C contains design concepts for three separate "driveway", "typical" and "special" intersection treatment types.

Trailheads & Special Features

Trailheads are important features that provide access to a facility. Major trailheads include restrooms, parking areas for vehicles and trailers, maps and kiosks, and sign posts for the trail and its features. Minor trailheads usually include a map or kiosk of the trail network, connections to adjacent sidewalks or bicycle facilities, and shared parking. Minor trailheads are sometimes referred to as "walk-up" trailheads.

It is important to optimize existing railroad corridor right of way width and any adjacent land uses that may be suitable for parking, rest rooms, and other support features for trail users. Proposed trailhead areas were developed at the conceptual level to explore potential opportunities for such facilities; they will require further study and design, as well as coordination with landowners, TDOT, and local development plans and ordinances.

There are three trailheads and one feature area proposed along the corridor. Where possible, Johnson City should explore opportunities for shared-use trail parking with adjacent businesses along the corridor while trailheads are being constructed. For all newly constructed trailheads, efforts should be made to source local or regional materials and use sustainable construction methods whenever possible. Sustainable construction methods and products provide long-term maintenance benefits, extended material lifespan, and are healthy for the environment. Examples include permeable paving, energy efficient structures, and localized stormwater management.

The Design Guidelines Appendix provides additional information on trailhead design, ancillary facilities, and signage. Schematic designs for the following features can be found on pages 3-49-3-52.

Legion Street Trailhead

Near the beginning of the Johnson City Rail Trail corridor in Johnson City, a parcel of unused forested land is bound by the rail trail corridor, an active rail line, and King Springs Road. The property is owned by the railroad and, because of its boundaries, was never developed. With the introduction of the Johnson City Rail Trail, the site has great potential for being developed as a major trailhead.

Its linear shape will accommodate parking for approximately 35 vehicles, a small restroom building, bicycle parking, and garden space (ideal for capturing stormwater). Vehicle access would be provided from Legion Street. For users wanting a quick stop, there is a seatwall and bicycle turnout space to the north at the trailside entrance with a kiosk.

Dixon Street Trailhead

Dixon Street Park, located in Elizabethton, is a 1.4-acre tract of open space located off US 321. The site is not currently programmed for recreation and is regularly mowed by the City of Elizabethton. The park is located south of US 321 and north of Dixon Street. There are single-family homes adjacent to the property and commercial uses off US 321. No existing park plans were identified for Dixon Street Park.

The park is ideally situated along the Johnson City Rail Trail corridor, and its current ownership by the City of Elizabethton makes Dixon Street Park an ideal candidate for a major trailhead and pocket park. Improving the open space for use would provide a natural buffer for adjacent residents and a community gathering node. There is ample parking space for approximately 50 vehicles. A larger restroom building, kiosk, and bicycle parking would provide comfort for trail users. Dixon Street Park is located approximately half way along the rail trail corridor, making it suitable for users taking shorter trips or needing a rest stop halfway along the corridor.

Potential future Pine Street Trailhead area, Elizabethton, Tennessee

Pine Street Trailhead

Where the limits of the rail trail corridor end in Elizabethton, there is an area adjacent to Pine Street with terrain that would be suitable for a trailhead. The property surrounding the trail terminus would require additional site analysis, acquisition, and clearing prior to development. There is a private residence and a drive-in movie theater adjacent to the site. An existing fence and private driveway is encroaching across the rail trail corridor and may need to be improved or redesigned to accommodate the future trailhead.

With a curvilinear parking lot layout, a 35- to 50-vehicle space parking lot could be provided with a restroom building, seating area, and garden space along Pine Street. Discussions with Nancy's Kitchen, east of the trailhead location, could provide a potential partnership for improving the parking along Pine Street across from the convenience store as well. Ample signage and potential gated entrances may be considered for this location due to its more remote location.

Overlook at former rock quarry, Elizabethton, Tennessee

Former Rock Quarry Overlook

The former rock quarry in Happy Valley offers geologic marvel and a water feature, making it an ideal candidate for an interpretive area and rest area. A viewing platform could be designed to cantilever off the rail trail and project users out and over the old quarry. Additional structural analysis and feasibility is recommended for this concept. At a minimum, safety railing and educational signage should be provided that explains the history of the quarry and surrounding geology. A seating area across from the viewing platform provides users a natural setting to rest and park their bicycles.

Wayfinding Signage

A comprehensive signage system makes a trail system memorable and creates a sense of place and ownership. Informational kiosks with maps at trailheads and other pedestrian generators can provide enough information for someone to use the trail system with little introduction. Having a consistent, unique logo, material, or design that will help guide people to and on the rail trail enhances trail navigability and identity. Gateways or entry markers at major access points with trail identity information further augments the trail experience. Strategic locations for signage along the rail trail corridor and near major intersections have been identified and are

Table 3.5 Rail Trail Corridor Intersection Crossings

Intersection Number	Intersecting Road Name	Intersection Type	Intersection Crossing Treatment Type
1	Alabama	At Grade	Special Treatment
2	E Highland	Underpass	N/A
3	Grand	Underpass	N/A
4	Rich Acres	Overpass	N/A
5	I-67	Overpass	N/A
6	Lauderdale	At Grade	Typical Treatment
7	Emmanuel	At Grade	Typical Treatment
8	Banks	At Grade	Typical Treatment
9	Osborne	At Grade	Typical Treatment
10	Residential Driveway Access	At Grade	Driveway Treatment
11	Greenlee	At Grade	Typical Treatment
12	Carter County Rd Spur	At Grade	Typical Treatment
13	Happy Valley	At Grade	Special Treatment
14	Sparks	At Grade	Typical Treatment
15	US 321	Underpass	N/A
16	I-67	Underpass	N/A
17	G	At Grade	*see notes
18	Bunton	At Grade	*see notes
19	Gap Greek Rd Extension	At Grade	*see notes
20	Legacy	At Grade	Typical Treatment
21	Ward	At Grade	Typical Treatment
22	Parkway	At Grade	Special Treatment
23	Williams	At Grade	Special Treatment

Table 3.5 Rail Trail Corridor Intersection Crossings - Continued

Intersection Number	Intersecting Road Name	Intersection Type	Intersection Crossing Treatment Type
24	Inland Container Driveway Entrance 1	At Grade	Driveway Treatment
25	Inland Container Driveway Entrance 2	At Grade	Driveway Treatment
26	Hudson	At Grade	Typical Treatment
27	Bemberg	At Grade	Special Treatment
28	Mill / McArthur	At Grade	Typical Treatment
29	Holly	At Grade	Typical Treatment
30	Roan	At Grade	Special Treatment
31	Watauga	At Grade	Typical Treatment**
32	N Lynn	At Grade	Special Treatment**
33	Elk	At Grade	Special Treatment
34	F	At Grade	Special Treatment
35	Doe	At Grade	Special Treatment
36	Cedar	At Grade	Special Treatment
37	Johnson	At Grade	Typical Treatment
38	Oak	At Grade	Typical Treatment
39	Peter Hampton	At Grade	Typical Treatment
40	Franklin Place	At Grade	Typical Treatment
41	Driveway Access Area	At Grade	Driveway Treatment
42	Industrial Parkway?	At Grade	Typical Treatment
43	Blue Ridge / Industrial	At Grade	Typical Treatment
44	Bob Little / Hatcher	At Grade	Typical Treatment
45	Residential Driveway Access	At Grade	Driveway Treatment
46	Residential Driveway Access	At Grade	Driveway Treatment

included in the corridor maps in this chapter. For the Johnson City Rail Trail, the signage system pays homage to the former railroad line by using corten steel. Corten steel weathers nicely and provides a more rustic but tasteful feel. Destinations, mile markers, and other identity markers could be stenciled into the panels identifying zones of the rail trail and may include sponsorship opportunities for local businesses or industries in support of the rail trail. Design concepts for wayfinding signage for the rail trail is presented on pages 3-8 and 3-9 of of this chapter.

At-grade crossing at Emmanuel Street, Carter County, Tennessee

Rail Trail Corridor Intersection Crossings Table Notes

*The TDOT Gap Creek Road Extension project will eliminate these rail trail corridor intersection crossings. The crossings were noted during field work and therefore have been included in this Master Plan.

**The final rail trail corridor intersection crossings treatments for each of these areas are to be determined through discussions with private commercial property owner.

Figure 3.1: Johnson City Rail Trail Gateway Signage

Figure 3.2: Johnson City Rail Trail Corridor Signage

Segment 1: Johnson City, Washington County

Segment Summary

Destinations

There are 8 to 10 destinations within walking or bicycling distance of the rail trail corridor in segment 1.

Segment Length

0.66 miles

Description

The Johnson City rail trail corridor begins at the confluence of multiple active rail lines in downtown Johnson City. The rail trail extends from Alabama Street, across Sinking Creek, to just beyond the crossing over Highway 67 for a total of 0.66 miles. Privacy fencing will be important along the corridor just west of the historic bridge overlook.

A view, looking south, of the trailhead at Alabama Street in Johnson City, Tennessee

Roadway Crossings

Crossing #1

The rail trail crossing at Alabama Street is an at-grade crossing. This area has high truck traffic and is adjacent to active rail lines. A special crossing treatment is recommended for this intersection. Separation from active rail lines is recommended as well as enhanced pavement markings.

Crossing #2

At E. Highland Street, the rail trail passes under the road. The underpass will require some improvements for safety, such as the removal of debris and the addition of pedestrian lighting.

Crossing #3

At Grand Street, the rail trail passes under the road. Pedestrian lighting, and debris removal, well as fencing mounted on the bridge barriers to prevent injury to trail users from objects thrown from the bridge in the underpass is recommended.

Crossing #4

The rail trail passes over Sinking Creek on the 1948 Historic Bridge near Rich Acres Road. This bridge crossing will require improvements such as modifying the bridge deck for trail use and adding barriers.

Crossing #5

The rail trail passes over Highway 67. The Highway 67 railroad bridge will require improvements such as modifying the bridge deck for trail use and adding barriers to enhance safety.

Destinations

Commercial Areas

There are approximately 5 commercial destinations located within 1/2 mile of segment 1.

Schools

Mountain View Elementary School is located 0.2 miles east of the rail trail.

Religious Facilities

Bible Church is located adjacent to the rail trail on the west side of the corridor.

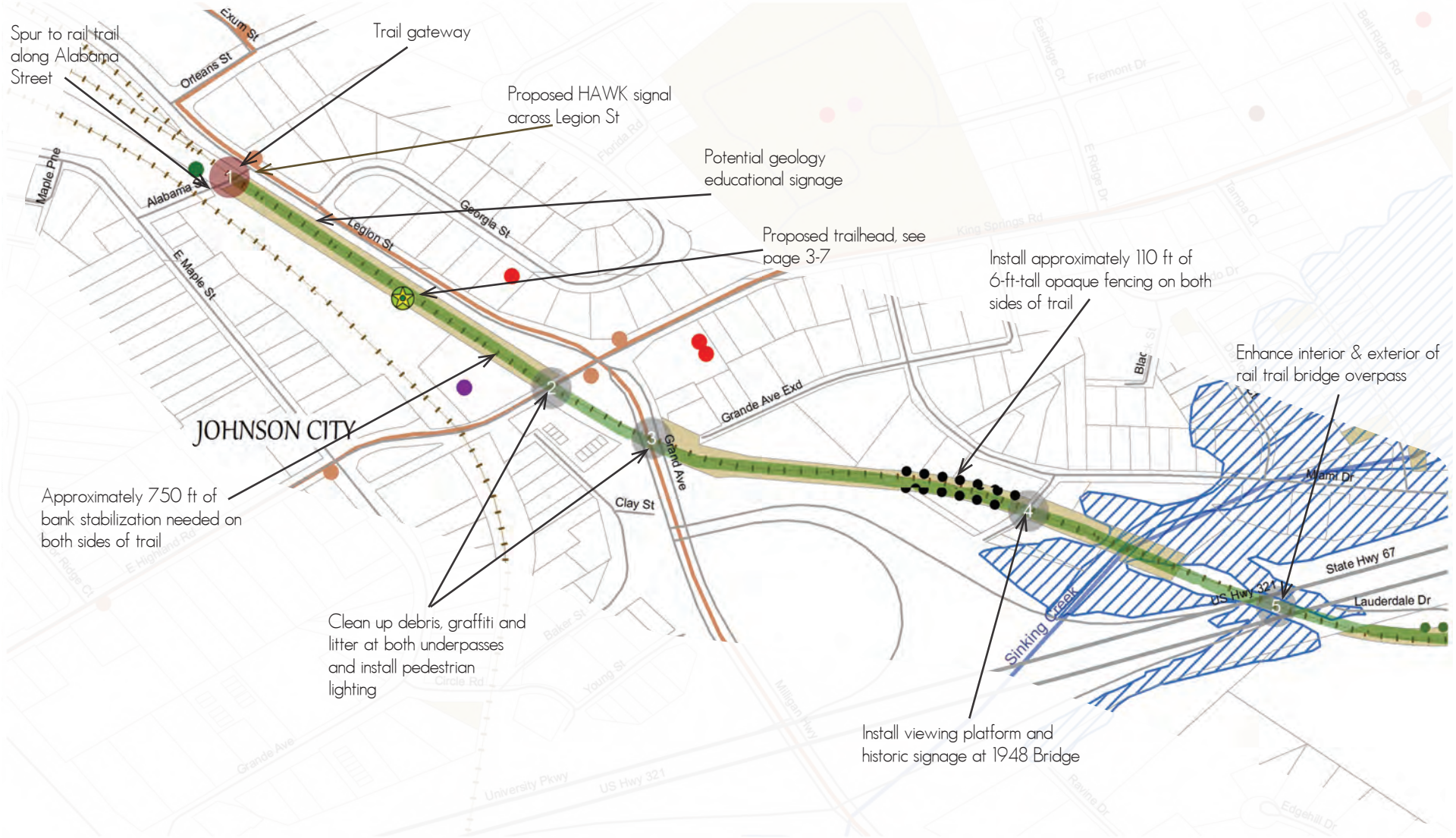
Trailheads & Special Features

Legion Street Trailhead

The trailhead along Legion Street will provide an entrance to the rail trail near the western terminus in Johnson City. A trail gateway will mark the start of the rail trail, with trailhead parking and a potential trail facility building located east of the trail gateway, along Legion Street. A rapid flash beacon (HAWK signal) across Legion Street would provide a safe crossing for all users to access the rail trail trailhead area.

1948 Historic Bridge Overlook

The 1948 Historic Bridge near Rich Acres Road is a landmark along the rail trail corridor. A viewing platform with historic signage would provide trail users with a resting point and historic information.



Corridor Overview Key Map

Destinations

- Recreational Facilities
- Religious Facilities
- All other commercial points

- Special Crossing Treatment
- Parcels
- City-owned Property
- Water Features
- Floodplain

- Typical Crossing Treatment
- Streets
- Railroad
- Rail Trail Corridor
- Bus Routes

- Underpass / Overpass
- Trailhead
- Vegetative Screening
- Opaque Fencing

N

Segment 2: Washington County/Carter County

Summary

Destinations

Approximately 10 destinations, including two religious facilities are located within 1/4 mile of the rail trail corridor.

Segment Length

0.73 miles

Description

Segment 2 of the rail trail corridor begins south of Highway 67, crossing into Carter County, traveling 0.73 miles south-southeast and ending just beyond the crossing at Emmanuel Drive. The rail trail runs parallel to Catbird Creek, providing scenic views of the waterway and rural landscape. Fencing and vegetative buffers will be important along the length of this segment to provide a buffer between the rail trail corridor and nearby private properties.

Rail trail crossing at Lauderdale Lane in Elizabethton, Tennessee

Roadway Crossings

Crossing #6

The rail trail crossing at Lauderdale Lane is an at-grade crossing. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. Sight distance might be of concern when approaching the crossing due to the geometry of Lauderdale Lane. A typical crossing treatment is recommended for this intersection.

Crossing #7

The rail trail crossing at Emmanuel Drive is an at-grade crossing. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. A typical crossing treatment is recommended for this intersection.

Destinations

Commercial Areas

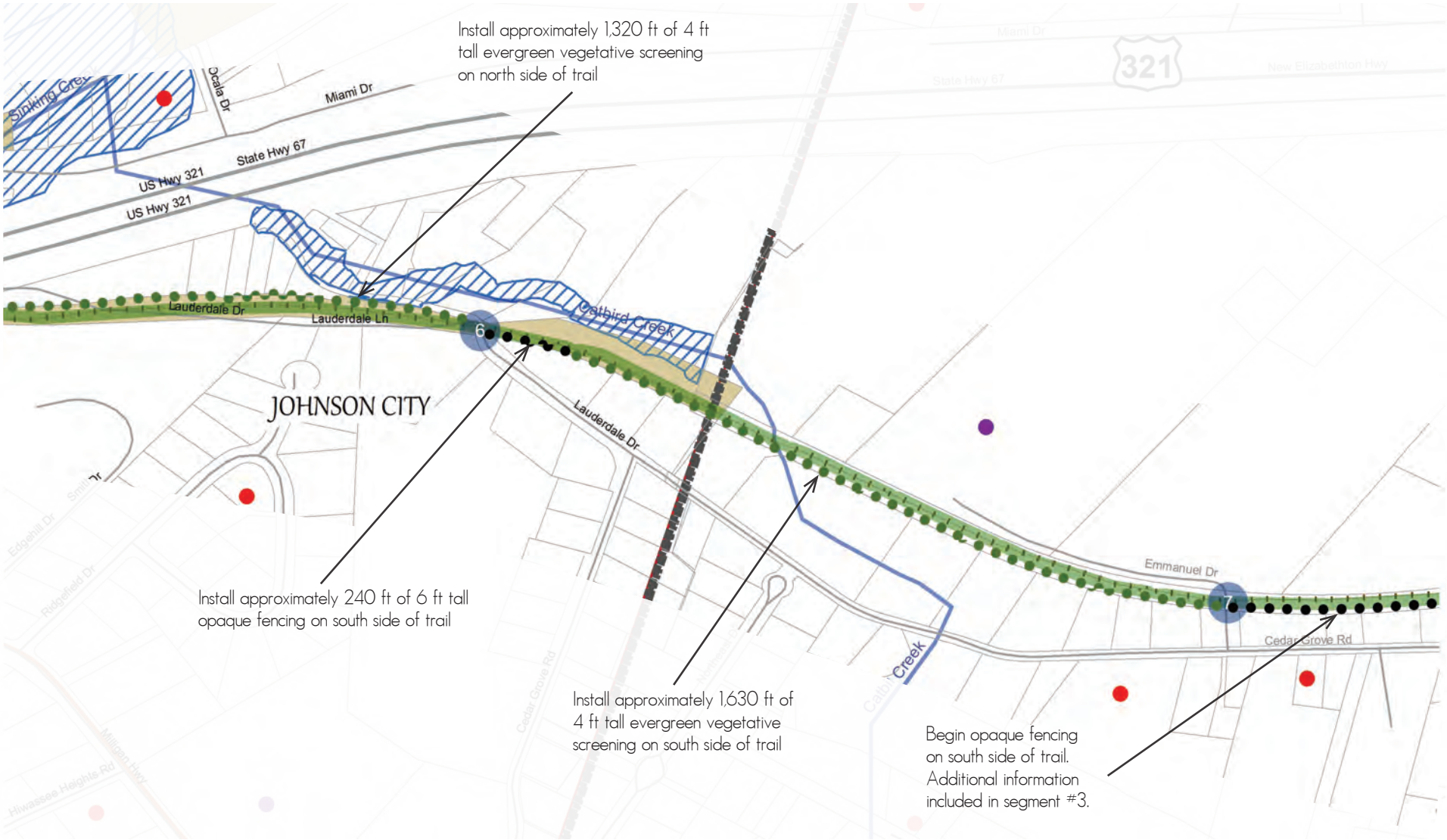
Five commercial businesses are accessible within a 1/4 mile walk or bicycle ride of the rail trail.

Religious Facilities

The Apostolic Christian Church is located just north of the corridor and is visible from the rail trail.

Proposed Rail Trail Wayfinding Signage

Figure 3.2 - Segment 2: Washington County and Carter County, Tennessee



Corridor Overview Key Map

Destinations

- Religious Facilities
- All other commercial points

- Parcels
- City-owned Property
- Water Features
- Floodplain

- Streets
- Railroad
- Rail Trail Corridor
- Municipal Boundary
- County Boundary

- Typical Crossing Treatment
- Vegetative Screening
- Opaque Fencing

N

Segment 3: Carter County

Summary

Destinations

Five destinations can be reached within 1/2 mile walk or bicycle ride of the rail trail corridor.

Segment Length

0.75 miles

Description

Segment 3 begins after Crossing #7 at Emmanuel Drive and extends 0.75 miles, ending just east of Crossing #11 at Greenlee Road. Opaque fencing will be important along the rail trail between the crossing at Emmanuel Drive and the crossing at Banks Road to provide a buffer between the rail trail corridor and nearby private properties.

Rail trail crossing at Greenlee Road, Elizabethton, Tennessee

Roadway Crossings

Crossing #8

The rail trail crossing at Banks Road is an at-grade crossing. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. Sight distance might be of concern when approaching the crossing due to the geometry of Banks Road. A typical crossing treatment is recommended for this intersection.

Crossing #9

The rail trail crossing at Osborne Road is an at-grade crossing. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. A typical crossing treatment is recommended for this intersection.

Crossing #10

The rail trail crosses a residential driveway at-grade. Consideration should be given to improvements such as enhanced pavement markings for trail users to warn of the potential conflict area. A driveway crossing treatment is recommended for this intersection.

Crossing #11

The rail trail crossing at Greenlee Road is an at-grade crossing. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. Sight distance might be of concern when approaching the western side of the crossing due to the geometry of Greenlee Road. A typical crossing treatment is recommended for this intersection.

Destinations

Commercial Areas

A few commercial locations are found within 1/4 mile of segment 3.

Religious Facilities

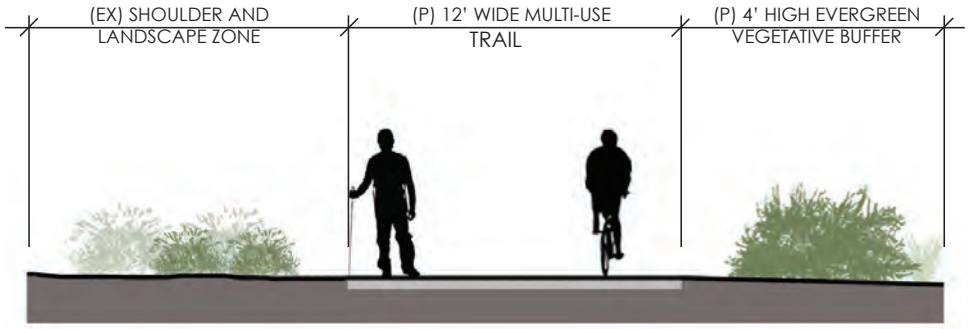
Cedar Grove Baptist Church is located very close to the rail trail crossing at Banks Road, on the south side of the corridor.

Trailheads & Special Features

Gateways

Gateway signage, trail markers and directional signage east of Osborne Road would create a gateway area, welcoming rail trail users into Happy Valley.

Proposed Rail Trail Cross-section



MULTI-USE TRAIL WITH 4' HIGH EVERGREEN VEGETATIVE BUFFER

Figure 3.3 - Segment 3: Carter County, Tennessee

Corridor Overview Key Map

Destinations

- Religious Facilities
- All other commercial points

- Parcels
- Streets
- Railroad
- Rail Trail Corridor

- Typical Crossing Treatment
- Driveway Crossing Treatment
- Opaque Fencing

N

Segment 4: Carter County

Summary

Destinations

There are no destinations along segment 4 of the rail trail corridor but a unique rock formation along the rail trail provides opportunity for a passive space feature area with interpretive signage.

Segment Length

0.80 miles

Description

Segment 4 extends 0.80 miles, starting east of the crossing at Greenlee Road and ending 0.35 miles past crossing #12. A unique rock formation along the trail before crossing #12 could be accompanied by interpretive signage, educating trail users about the geologic history of the area. Black three-board fencing in this area is recommended to provide a buffer between the rural private properties and the rail trail corridor.

Roadway Crossings

Crossing #12

The rail trail crosses a private residential road or driveway at-grade. Consideration should be given to improvements such as enhanced pavement markings for trail users to warn of the potential conflict area. A driveway crossing treatment is recommended for this intersection.

Trailhead & Special Features

Geological Feature Area

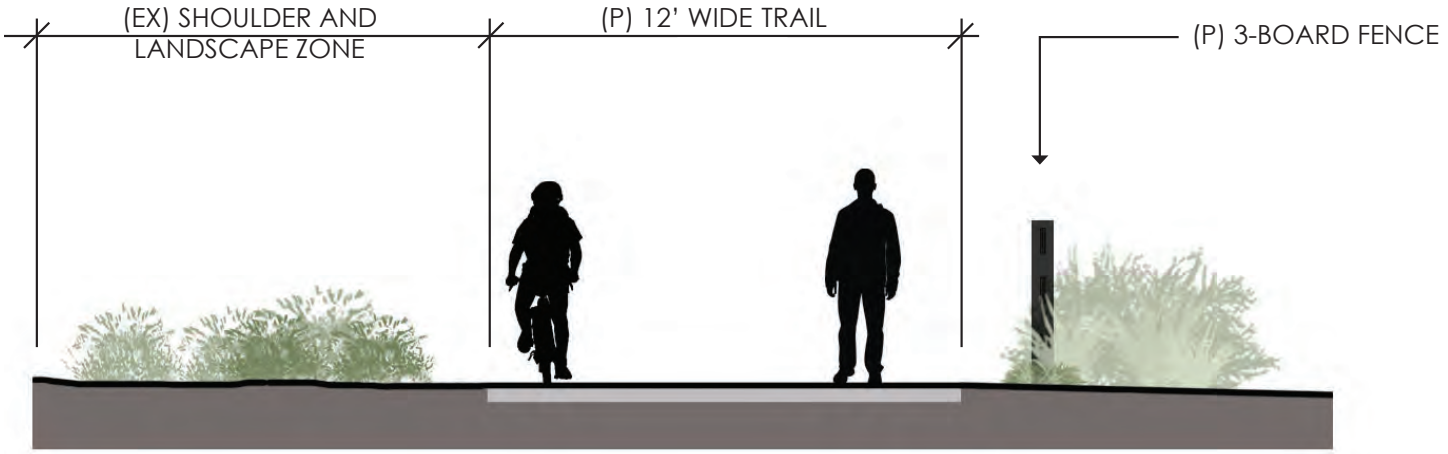
A unique rock formation along the north side of the rail trail is located on private property and presents an educational opportunity to learn the geologic history of eastern Tennessee. The private property owner should be met with to discuss the educational opportunity. Black three-board fencing may be necessary to delineate between private property and the railroad corridor right of way.

Scenic Viewshed

Select vegetative thinning along the south side of the rail trail corridor would offer rail trail users scenic views of Happy Valley. The orange arrows on the corridor map on page 3-19 illustrate the scenic viewshed area.

Geological Feature Area, Elizabethton, Tennessee

Proposed Rail Trail Cross-section



RAIL-TO-TRAIL WITH 3-BOARD FENCE

Figure 3.4 - Segment 4: Carter County, Tennessee

Parcels
Water Features
Floodplain
Streets
Railroad
Rail Trail Corridor
Driveway Crossing Treatment
Three-board Fencing

N

Segment 5: Elizabethton, Carter County

Summary

Destinations

There are five destinations within a short walk or bicycle ride of segment 5 of the rail trail, including three schools and two restaurants.

Segment Length

0.84 miles

Description

Segment 5 begins near the rock quarry and extends 0.84 miles northeast. State Route 359 runs parallel to the rail trail corridor in this segment. The rail trail intersects with three roads and parallels Buffalo Creek as it approaches Elizabethton.

Former Rock Quarry, Elizabethton, Tennessee

Roadway Crossings

Crossing #13

The rail trail crossing at Happy Valley Road is at an at-grade crossing. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. Sight distance might be of concern when approaching the eastern side of the crossing due to the adjacent driveway. A special crossing treatment is recommended for this intersection.

Crossing #14

The rail trail crossing at Sparks Road is at an at-grade crossing. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. A typical crossing treatment is recommended for this intersection.

Crossing #15

The rail trail crosses under Highway 67 Safety considerations at this underpass should include adding fencing mounted on the bridge barriers to prevent injury to trail users from objects thrown from the bridge and the addition of pedestrian lighting.

Destinations

Schools

Happy Valley Elementary School, Happy Valley Middle School, and Happy Valley High School are all located within 0.3 miles of the trail.

Trailheads & Special Features

Former Rock Quarry

A viewing platform overlooking the former Rock Quarry with interpretative signage that explains the history of the rock quarry and surrounding geology would be an attractive destination for trail users. Picnic areas, additional seating, and bicycle parking would further enhance this feature area.

Former Rock Quarry Overlook Advanced Visualization

Figure 3.5 - Segment 5: Carter County, Tennessee

Corridor Overview Key Map

Destinations

- All other commercial points

- Parcels
- City-owned Property
- Water Features
- Floodplain
- Streets
- Railroad
- Rail Trail Corridor
- Municipal Boundary
- Underpass / Overpass
- Special Crossing Treatment
- Typical Crossing Treatment

N

Segment 6: Elizabethton, Carter County

Summary

Destinations

Five to six destinations are located within 1/2 mile of the rail trail corridor, with four adjacent to the trail.

Segment Length

0.70 miles

Description

Starting near the City limit of Elizabethton, segment 6 extends northeast for 0.70 miles, ending near Lions Field. There are no road crossings on this segment, but the rail trail corridor does cross Buffalo Creek and the Elizabethton City boundary just west of Lions Field. A gateway near the Buffalo Creek crossing would mark the Johnson City / Elizabethton boundary.

Destinations

Commercial Areas

Two restaurants, Smokehouse Grill and Moma's Creekside Restaurant, are located just off of the rail trail along the south side of Buffalo Creek.

Parks

Lions Field is located along the north side of the rail trail just east of the Buffalo Creek crossing.

Trailheads & Special Features

Buffalo Creek Overlook

A viewing platform overlooking Buffalo Creek and possibly a boardwalk connecting the rail trail to the restaurants on the other side of the Creek would offer rail trail users a place to stop and enjoy the views, and a home style cooked meal. Interpretive signage at the overlook would provide information about the natural history of the creek.

Access Points

A rail trail access point from the city-owned parcel by way of a boardwalk and bridge would connect rail trail users to a parking area and the two restaurants.

Buffalo Creek Overlook Area, Elizabethton, Tennessee

Proposed Rail Trail Gateway Signage

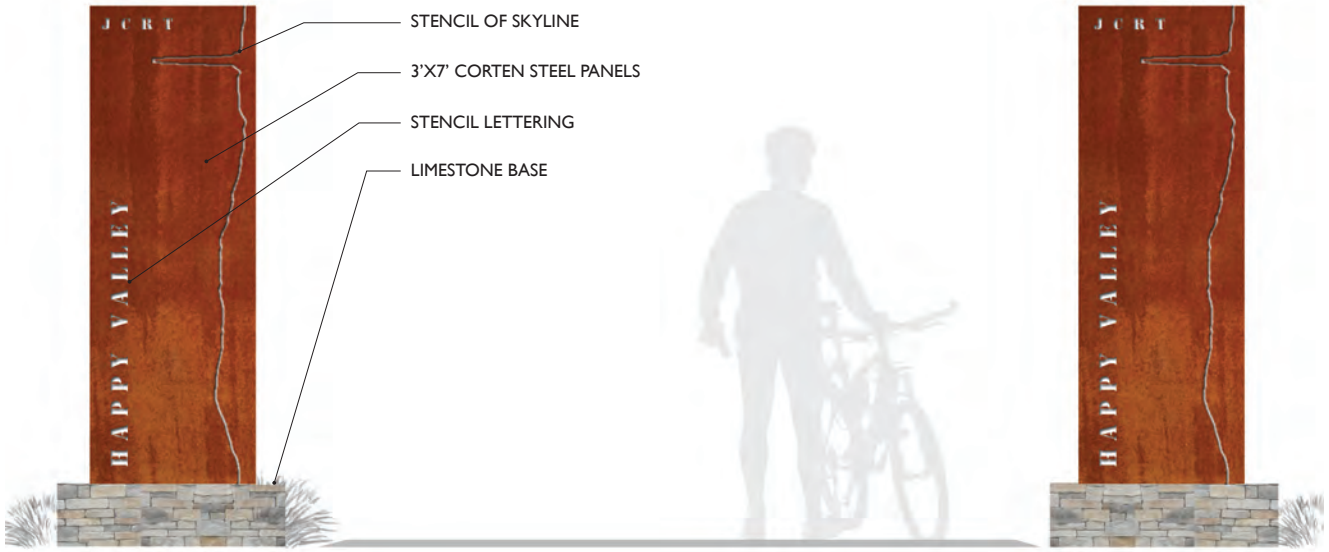
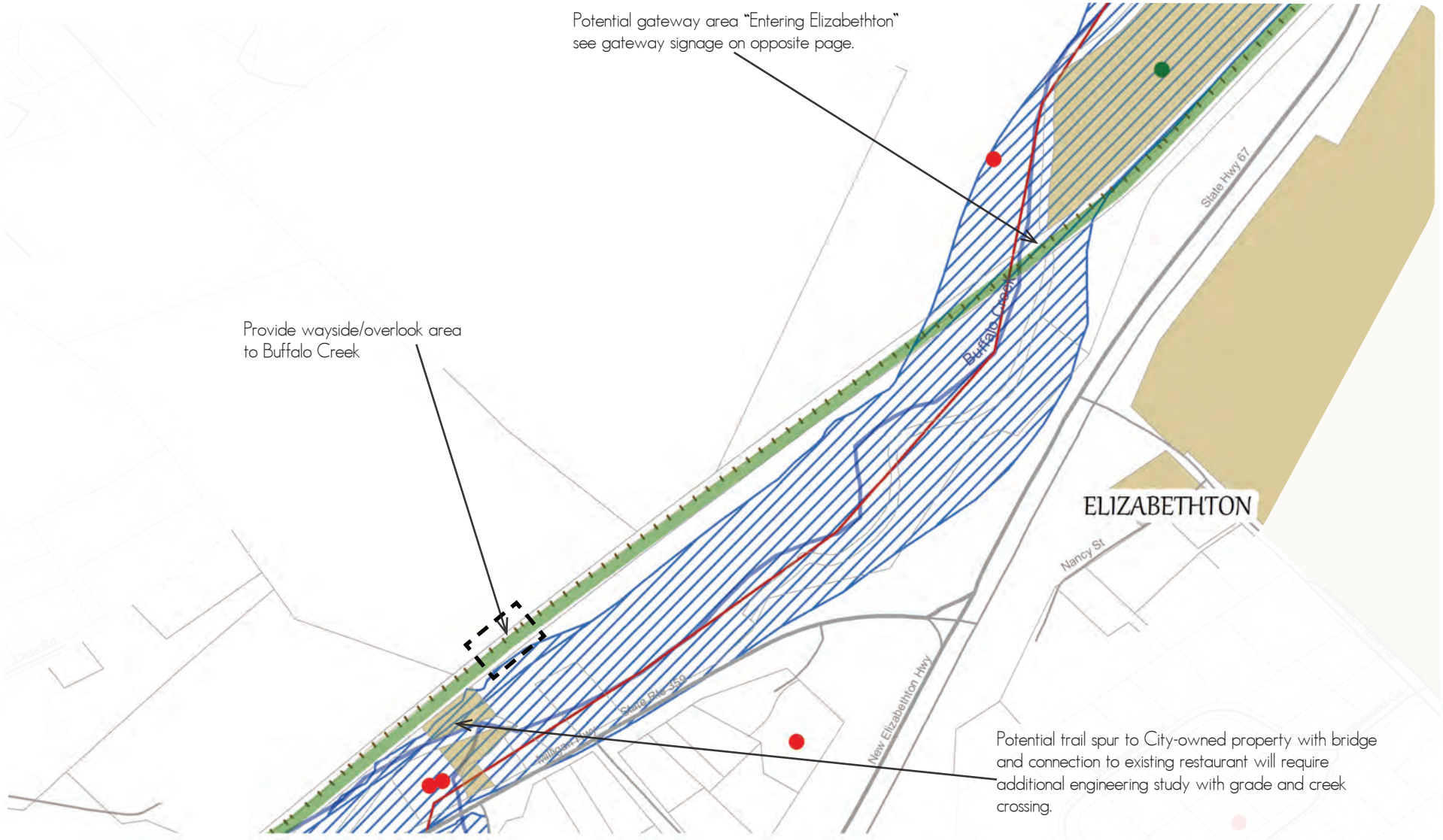


Figure 3.6 - Segment 6: Elizabethton, Carter County, Tennessee



Corridor Overview Key Map

Segment 7: Elizabethton, Carter County

Summary

Destinations

Approximately 20 destinations, including Lions Field, restaurants, a grocery store and a pharmacy are located within 1/4 mile of segment 7.

Segment Length

0.68 miles

Description

Segment 7 begins east of the Highway 67 rail trail corridor underpass and travels 0.68 miles northeast. This segment contains four road crossings as well as a water crossing at Gap Creek. Vegetative screening will be important along the rail trail between the crossing at G Street and the crossing at Gap Creek Road to provide a buffer between the rail trail corridor and nearby private properties.

Potential trailhead at Lions Field, Elizabethton, Tennessee

Roadway Crossings

Crossing #16

The rail trail crosses under Highway 67. Safety considerations at this underpass should include adding fencing mounted on the bridge barriers to prevent injury to trail users from objects thrown from the bridge and the addition of pedestrian lighting.

Crossing #17

The rail trail crossing at G Street is an at-grade crossing. Active warning beacons should be considered at this location.

The City of Elizabethton should consider permanently closing the old Gap Creek Road extension from US 321 to promote positive transportation circulation with the new extension. Public input from local residents should be obtained to determine feasibility. Additional study of this closing is recommended by the City of Elizabethton to investigate safety concerns and transportation opportunities.

Crossing #18

The rail trail crosses the terminus of Bunton Road. A typical crossing treatment should be applied at this location.

Crossing #19

The rail trail crossing at Gap Creek Road is an at-grade crossing. The TDOT SR 362/ Gap Creek Road Extension project will eliminate this rail trail corridor intersection crossing. The crossing was noted during field work and therefore has been included in this Master Plan.

Destinations

Commerical Destinations

Quick Stop Market, near crossing #17, would provide trail users access to food and snacks as they travel along the rail trail.

Creekside Nursery is adjacent to the rail trail, located along the north side of the rail trail at Bunton Road.

Religious Facilities

Watauga Point United Methodist Church and Happy Valley Baptist Church are both located within walking or bicycling distance of the trail.

Trailheads & Special Features

Lions Field Trailhead

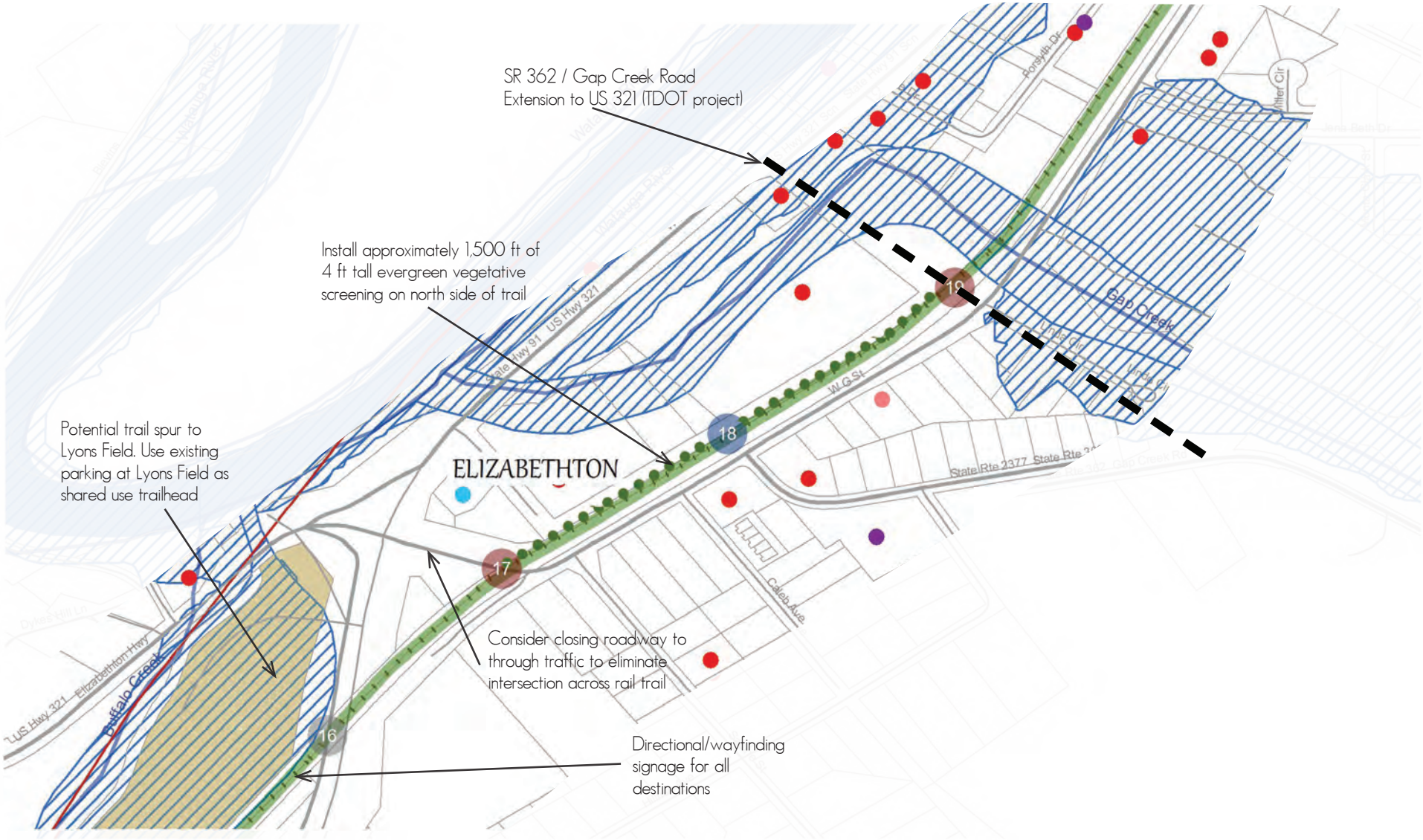
Lions Field is adjacent to the rail trail corridor. A short connection to the ball field's parking lot would provide shared use parking and a trail access point from the park. An examination of contours is needed to determine how the connection can be made ADA accessible. Wayfinding signage would communicate current location, trail distances, and nearby destinations to trail users.

Gap Creek Crossing

The rail trail users will enjoy the calming flow and gentle noise of Gap Creek as it flows under the rail trail just north of the Gap Creek Road crossing.

Rail trail crossing over Gap Creek, Elizabethton, Tennessee

Figure 3.7 - Segment 7: Elizabethton, Carter County, Tennessee



Corridor Overview Key Map

Destinations

- Grocery/pharmacy
- Health Care Services
- Religious Facilities
- All other commercial points

- Special Crossing Treatment
- Parcels
- City-owned Property
- Water Features
- Floodplain

- Typical Crossing Treatment
- Streets
- Railroad
- Rail Trail Corridor
- Municipal Boundary

- Underpass / Overpass
- Vegetative Screening

N

Segment 8: Elizabethton, Carter County

Summary

Destinations

More than 30 destinations are located within 1/4 mile of segment 8.

Segment Length

0.64 miles

Description

Segment 8 of the rail trail corridor begins near crossing #20 at Legacy Drive and continues northeast for 0.64 miles, running along the Watauga River. Vegetative screening will be important along the rail trail between the crossing at Legacy Drive and the crossing at Ward Street to provide a buffer between the rail trail corridor and nearby private properties. A vegetative buffer of native flowering shrubs along the south side of the corridor will provide a buffer between the rail trail corridor and residential homes adjacent to corridor.

Rail trail crossing at Ward Street, Elizabethton, Tennessee

Roadway Crossings

Crossing #20

The rail trail crossing at Legacy Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. A typical crossing treatment is recommended for this intersection.

Crossing #21

The rail trail crossing at Ward Street is an at-grade crossing. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. A typical crossing treatment is recommended for this intersection.

Destinations

Commercial Areas

Over 30 commercial locations are within a short walking or bicycling distance from the rail trail corridor. Nearby destinations include Powers Coffee Express located near Legacy Drive.

Grocery

A mini mart where trail users would be able to purchase food and drink is located about 1/10 of a mile from the rail trail.

Health Care

A family medical practice is located a short distance from the rail trail on West Elk Avenue.

Trailheads & Special Features

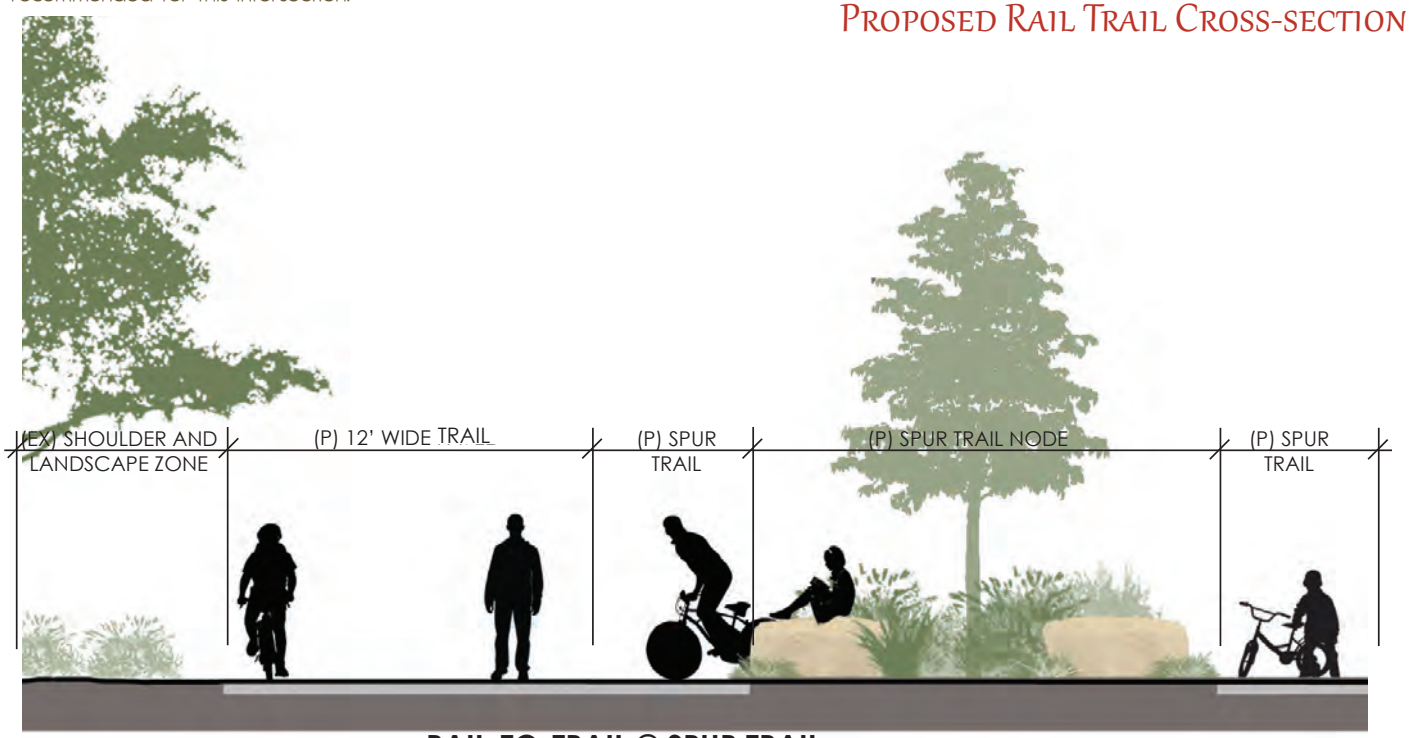
Shared Parking Trailhead

A trailhead near Happy Valley Baptist Church would provide an opportunity for shared-use parking.

Medical Center Trailhead

A trailhead near crossing #21 would connect the rail trail corridor to the medical center adjacent to the trail. Wayfinding signage at the trailhead could provide orientation, trail distances, and a list of nearby destinations.

Proposed Rail Trail Cross-section



RAIL-TO-TRAIL @ SPUR TRAIL

Figure 3.8 - Segment 8: Elizabethton, Carter County, Tennessee

Corridor Overview Key Map

Destinations

- Grocery/pharmacy
- Health Care Services
- Religious Facilities
- Schools/child care
- All other commercial points

- Parcels
- Parks
- City-owned Property
- Water Features
- Floodplain

- Typical Crossing Treatment
- Streets
- Railroad
- Rail Trail Corridor

- Vegetative Buffer
- Vegetative Screening

N

Segment 9: Elizabethton, Carter County

Summary

Destinations

Over 35 commercial destinations, four parks, two churches, and one hospital are located with 1/2-mile of the rail trail corridor.

Segment Length

0.83 miles

Description

Segment 9 begins adjacent to Sycamore Shoals State Historic Park and extends 0.83 miles northeast. This segment of the rail trail corridor provides access to several commercial and community amenities, including many parks and schools. Vegetative screening will be important along the rail trail east of the crossing at Parkway Boulevard to provide a buffer between the rail trail corridor and nearby private properties.

Rail trail near Inland Container property, Elizabethton, Tennessee

Roadway Crossings

Crossing #22

The rail trail crossing at Parkway Boulevard is an at-grade crossing. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. A special crossing treatment is recommended for this intersection.

Crossing #23

The rail trail crossing at Williams Avenue is an at-grade crossing. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area, and potentially pedestrian signals when the intersection is signalized. A special crossing treatment is recommended for this intersection.

Crossing #24

The rail trail crosses a commercial driveway at-grade. Consideration should be given to improvements such as enhanced pavement markings for trail users to warn of the potential conflict area. A driveway crossing treatment is recommended for this intersection.

Crossing #25

The rail trail crosses a commercial driveway at-grade. Consideration should be given to improvements such as enhanced pavement markings for trail users to warn of the potential conflict area. A driveway crossing treatment is recommended for this intersection.

Destinations

Commercial Areas

West Towne Square shopping center is adjacent to the rail trail and contains several restaurants and shops.

Health Care Services

Sycamore Shoals Hospital is located across West Elk Avenue, within a few minutes walk or bicycle ride from the rail trail corridor.

Parks

Sycamore Shoals State Historic Area, Joe LaPorte Jr. Recreation Area, Dixon Street Park, Watauga River, and Kiwanis Park can all be reached within a short walking or bicycling distance of the rail trail.

Schools

West Side Elementary School is located within 1/4 mile of the rail trail.

Trailheads & Special Features

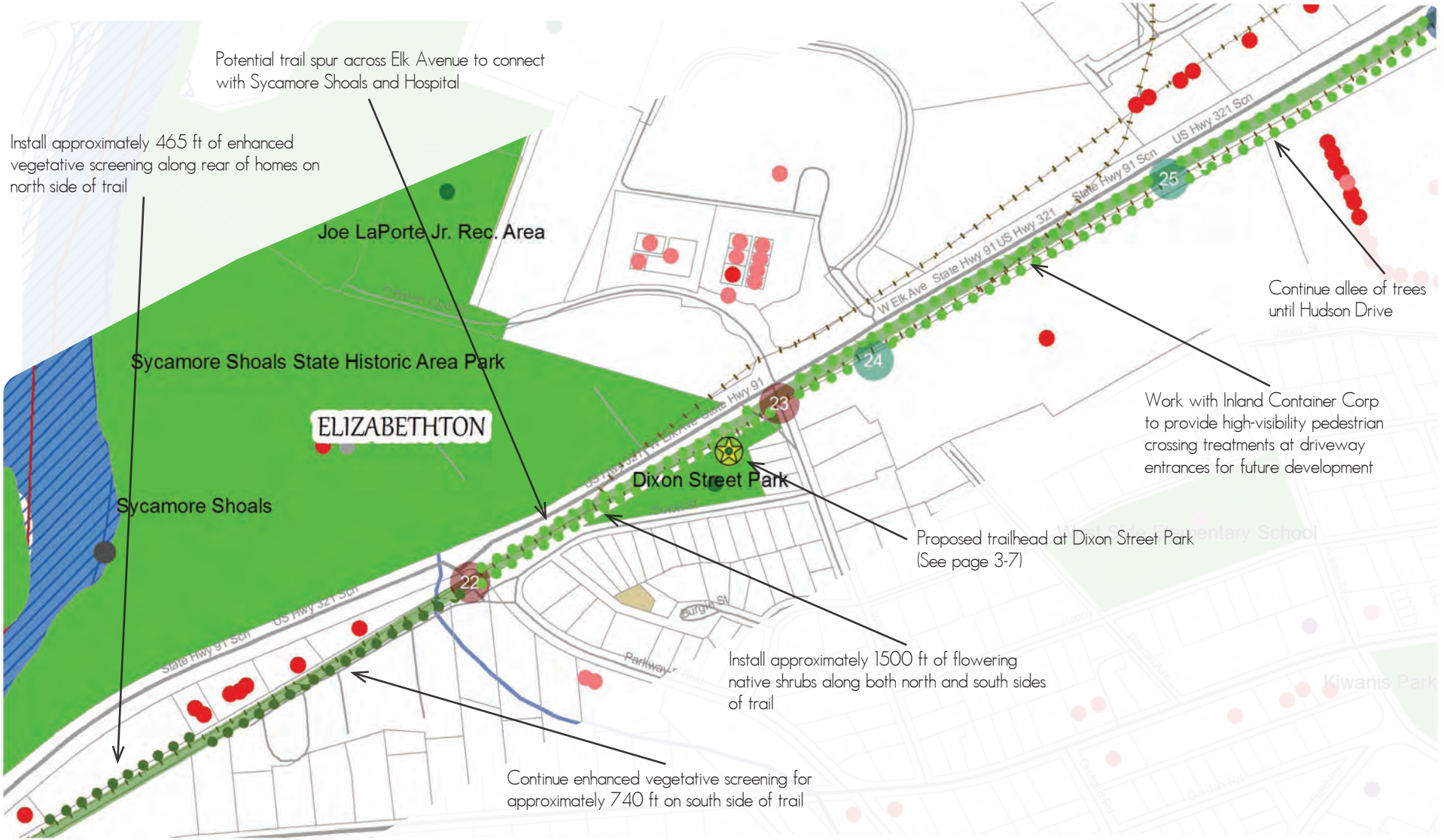
Dixon Street Park Trailhead

A trailhead at Dixon Street Park would connect the surrounding neighborhood to the rail trail and to amenities nearby. This may also be a potential location for NetTrans stop. A street tree allee would help to separate the rail trail and park from traffic on West Elk Avenue.

Sycamore Shoals State Historic Area Trailhead

A trail spur across W. Elk Avenue at Williams Avenue would connect the rail trail corridor to Sycamore Shoals State Historic Area, Sycamore Shoals Hospital and the nearby Joe LaPorte Recreation Area.

Figure 3.9 - Segment 9: Elizabethton, Carter County, Tennessee



Corridor Overview Key Map

Destinations

- Health Care Services
- Historic Sites
- Recreational Facilities
- Religious Facilities
- All other commercial points

- Parcels
- Parks
- City-owned Property
- Water Features
- Floodplain

- Special Crossing Treatment
- Streets
- Railroad
- Rail Trail Corridor

- Driveway Crossing Treatment
- Vegetative Buffer
- Vegetative Screening

- Trailhead

N

Segment 10: Elizabethton, Carter County

Summary

Destinations

Over 80 commercial destinations, including banks, grocery stores, places of worship, pharmacies and restaurants are all located within 1/2 mile of the rail trail corridor.

Segment Length

0.77 miles

Description

Segment 10 begins west of the Elizabethton High School in downtown Elizabethton and extends 0.77 miles northeast. This segment of the rail trail corridor provides access to a dense commercial area with restaurants and community amenities, including the Boys and Girls Club. The rail trail will provide connections between the residential neighborhoods south of the rail trail and the restaurants, grocery stores located along US 321. Native tree plantings along the rail trail between the Hudson Drive crossing and the Bemberg Road crossing would enhance this segment of the rail trail corridor and provide shade for rail trail users.

This segment of the rail trail corridor is highly visible and exists parallel to US 321. Opportunities for shared-use parking may be available in this area.

Rail trail crossing at Bemberg Road, Elizabethton, Tennessee

Roadway Crossings

Crossing #26

The rail trail crossing at Hudson Drive is an at-grade crossing. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. Pedestrian signals should also be considered at this crossing. A typical crossing treatment is recommended for this intersection.

Crossing #27

The rail trail crossing at Bemberg Road is an at-grade crossing. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. Pedestrian signals should also be considered. A special crossing treatment is recommended for this intersection.

Crossing #28

The rail trail crossing at McArthur Avenue / Mill Street is an at-grade crossing. This crossing is also in close proximity to a secondary road intersection. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. Pedestrian signals should also be considered. A typical crossing treatment is recommended for this intersection.

Destinations

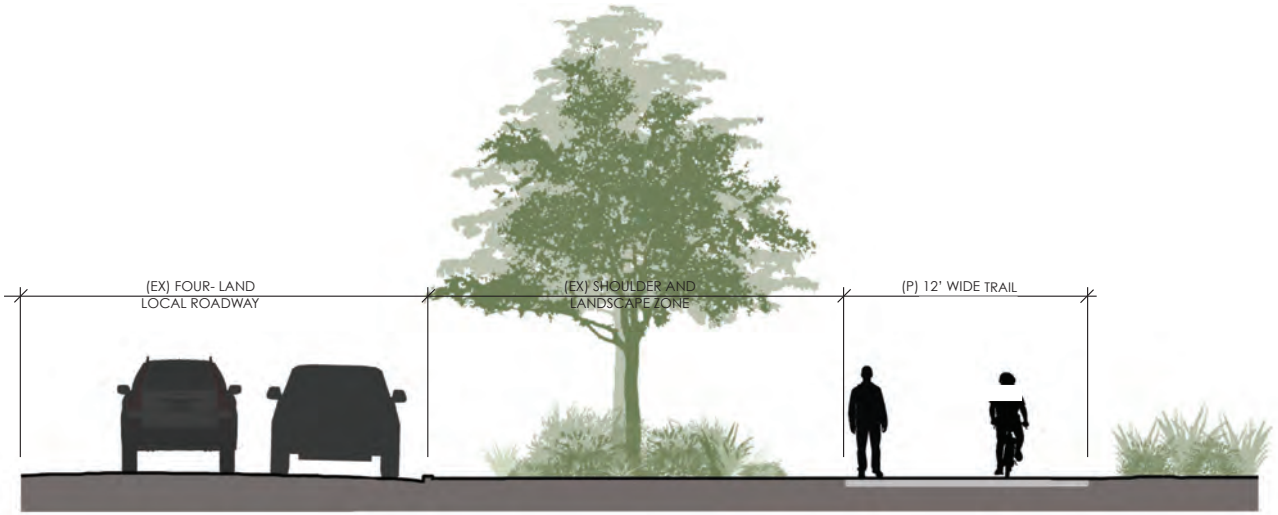
Commercial Areas

A shopping center with an Ingles, Peebles, Verizon Wireless, and other shops is located adjacent to the rail trail. Additional shops, a bank, and restaurants are located on the north side of US 321. A post office is located on the northern side of US 321.

Schools

Elizabethton High School is located adjacent to the rail trail corridor. The rail trail will offer a convenient and safe transportation option between the school and the nearby commercial areas, and allow faculty, staff and students to commute to and from school.

Proposed Rail Trail Cross-section



RAIL-TO-TRAIL @ LOCAL ROADWAY

Figure 3.10 - Segment 10: Elizabethton, Carter County, Tennessee

Corridor Overview Key Map

Destinations

- Banks
- Grocery/pharmacy
- Health Care Services
- Government Services
- Schools/child care
- All other commercial points

- Parcels
- Parks
- City-owned Property
- Water Features
- Floodplain

- Special Crossing Treatment
- Streets
- Railroad
- Rail Trail Corridor

- Vegetative Buffer

N

Segment 11: Elizabethton, Carter County

Summary

Destinations

Over 80 destinations, including the Carmon Dugger Sports Complex, the Elizabethton Recreation Center and the T.A. Dugger Junior High School are all located within 1/2 mile of the rail trail corridor.

Segment Length

0.74 miles

Description

Segment 11 begins just east of the intersection of the rail trail corridor and McArthur Avenue / N. Lynn, and extends 0.74 miles east. This segment of the rail trail provides access from residential neighborhoods to several commercial and community amenities, including several parks and the junior high school. Vegetative screening and black three-board fencing will be important along the rail trail in segment 11 to provide a buffer and to mark the boundary between the rail trail corridor and private properties located adjacent to the rail trail corridor.

Rail trail crossing at N. Roan Street, Elizabethton, Tennessee

Roadway Crossings

Crossing #29

The rail trail crossing at Holly Lane is an at-grade crossing. This crossing is in close proximity to the W. Elk Avenue intersection. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. A typical crossing treatment is recommended for this intersection.

Crossing #30

The rail trail crossing at N. Roan Street is an at-grade crossing. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. A mid-block crossing or pedestrian signals should also be considered. A special crossing treatment is recommended for this intersection.

Crossing #31

The rail trail crossing at W. Watauga Avenue is an at-grade crossing. The final trail corridor alignment for this area will be determined through discussions with private commercial property owner. Separation from the parking lot is recommended as well as enhanced markings for cross traffic and trail users. A typical crossing treatment is recommended for this intersection.

Destinations

Commercial Areas

Numerous commercial destinations such as Summers Taylor, Pizza Hut, a Credit Union, Save-A-Lot and a Dollar General are located within walking or bicycling distance of the rail trail.

Municipal Services

A drivers license center is located within 0.06 miles of the rail trail.

Parks

Carmon Dugger Sports Complex and the Elizabethton Recreation Center are both within walking or bicycling distance of the trail.

Schools

T.A. Dugger Junior High School is located within 1/4 mile of the rail trail, and can be reached by connections along Holly Lane or Roan Street.

Gateway Areas

The area surrounding Holly Lane could serve as an enhanced gateway area to historic downtown Elizabethton.

Holly Street Advanced Visualization

Figure 3.11 - Segment 11: Elizabethton, Carter County, Tennessee

Corridor Overview Key Map

Destinations

- Banks
- Grocery/pharmacy
- Health Care Services
- Recreational Facilities
- Religious Facilities
- Schools/child care
- All other commercial points

- Parcels
- Parks
- City-owned Property
- Water Features
- Floodplain
- Special Crossing Treatment
- Streets
- Railroad
- Rail Trail Corridor
- Typical Crossing Treatment
- Vegetative Buffer
- Vegetative Screening
- Three-board Fencing

N

Segment 12: Elizabethton, Carter County

Summary

Destinations

Over 150 destinations, including the Senior Citizen Park, the Harold McCormick, the Covered Bridge Park, the Linear Path, and the Cat Island Park are all located within 1/2 mile of the rail trail corridor.

Segment Length

0.83 miles

Description

Segment 12 begins adjacent to Sycamore Shoals State Historic Park and extends 0.83 miles northeast. This segment of the rail trail provides access to several commercial and community amenities, including many parks and schools. Strategic vegetative screening and black three-board fencing will be important in certain areas along the rail trail in segment 12 to provide a buffer and to mark the boundary between the rail trail corridor and private properties located adjacent to the rail trail corridor.

Rail trail near Doe Street, Elizabethton, Tennessee

Roadway Crossings

Crossing #32

The trail crossing at Lynn Avenue is an at-grade crossing. The final trail corridor alignment for this area will be determined through discussions with private commercial property owner. Separation from the parking lot is recommended as well as enhanced pavement markings for cross traffic and trail users. Active warning beacons should be considered at this location.

Crossing #33

The trail crossing at E. Elk Street is an at-grade crossing. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. A mid-block crossing with warning signals should be considered. A special crossing treatment is recommended for this intersection. Further routing study of this intersection crossing should be performed. See page 3-46.

Crossing #34

The trail crossing at F Street is an at-grade crossing. Consideration should be given to realigning the trail to perpendicularly intersect F Street. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. A special crossing treatment is recommended for this intersection. Further routing study of this intersection crossing should be performed. See page 3-47.

Crossing #35

The trail crossing at E. Doe Street is an at-grade crossing. The skewed crossing distance is not desirable. Consideration should be given to realigning the trail in this area to avoid the long crossing. Sight distance might be of concern when approaching the northwestern side of the crossing due to the approach angle. A special crossing treatment is recommended for this intersection. Further routing study of this intersection crossing should be performed. See page 3-47.

Crossing #36

The trail crossing at S. Cedar Avenue is an at-grade crossing. The skewed crossing distance is not desirable. Consideration should be given to realigning the trail in this area to avoid the long crossing. A special crossing treatment is recommended for this intersection. Further routing study of this intersection crossing should be performed. See page 3-47.

Crossing #37

The trail crossing at Johnson Avenue is an at-grade crossing. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. A typical crossing treatment is recommended for this intersection.

Destinations

Commercial Areas

The rail trail corridor is located in the historic downtown area of Elizabethton and many locally-owned restaurants, shops and services are located adjacent to the trail corridor, or are within walking or bicycling distance of the trail.

Parks

The Senior Citizen Park, the Covered Bridge Park, the Cat Island Park, and the Linear Path can all be reached within a short walking or bicycling distance of the trail.

Schools

The Harold McCormick School is located adjacent to the rail trail corridor.

Historic Point-of -Interest

Former Train Ramp & Conveyor Belt

A former train ramp and a former conveyor belt are located along the north side of the rail trail corridor. Interpretive signage detailing the history of the rail line and the probable uses of these antique features would educate rail trail users and enhance this area.

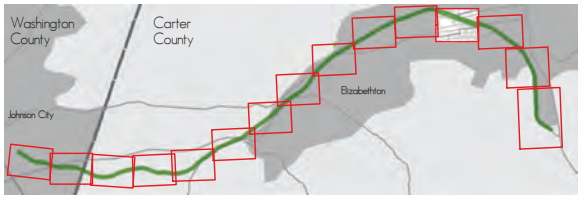
Trailheads & Special Features

Apartment Complex

A trail spur to the apartment complex would connect the residents of the apartments to the rail trail.

Figure 3.12 - Segment 12: Elizabethton, Carter County, Tennessee

Corridor Overview Key Map



Destinations

- Grocery/pharmacy
- Health Care Services
- Historic Sites
- Government Services
- Recreational Facilities
- Religious Facilities
- Schools/child care
- All other commercial points

- Parcels
- Parks
- City-owned Property
- Water Features
- Floodplain

- Special Crossing Treatment
- Streets
- Railroad
- Rail Trail Corridor

- Typical Crossing Treatment
- Vegetative Screening
- Three-board Fencing

N

Segment 13: Elizabethton, Carter County

Summary

Destinations

Several commercial destinations and an apartment complex are located within 1/2 mile of the rail trail corridor.

Segment Length

0.56 miles

Description

Segment 13 begins north of Oak Street extends 0.56 miles south, parallel to State Line Road. This segment of the rail trail corridor travels out of the historic downtown Elizabethton and into a more rural area with surrounding uses including residential neighborhoods and industrial facilities, before crossing the Elizabethton City limits. This rail trail corridor is highly visible in this area and opportunities for picnic areas may exist. Strategic vegetative screening and black three-board fencing will be important in certain areas along the rail trail in segment 13 to provide a buffer and to mark the boundary between the rail trail corridor and private properties located adjacent to the rail trail corridor.

Rail trail near Peter Hampton Drive, Elizabethton, Tennessee

Roadway Crossings

Crossing #38

The rail trail crossing at Oak Street is an at-grade crossing. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. A typical crossing treatment is recommended for this intersection.

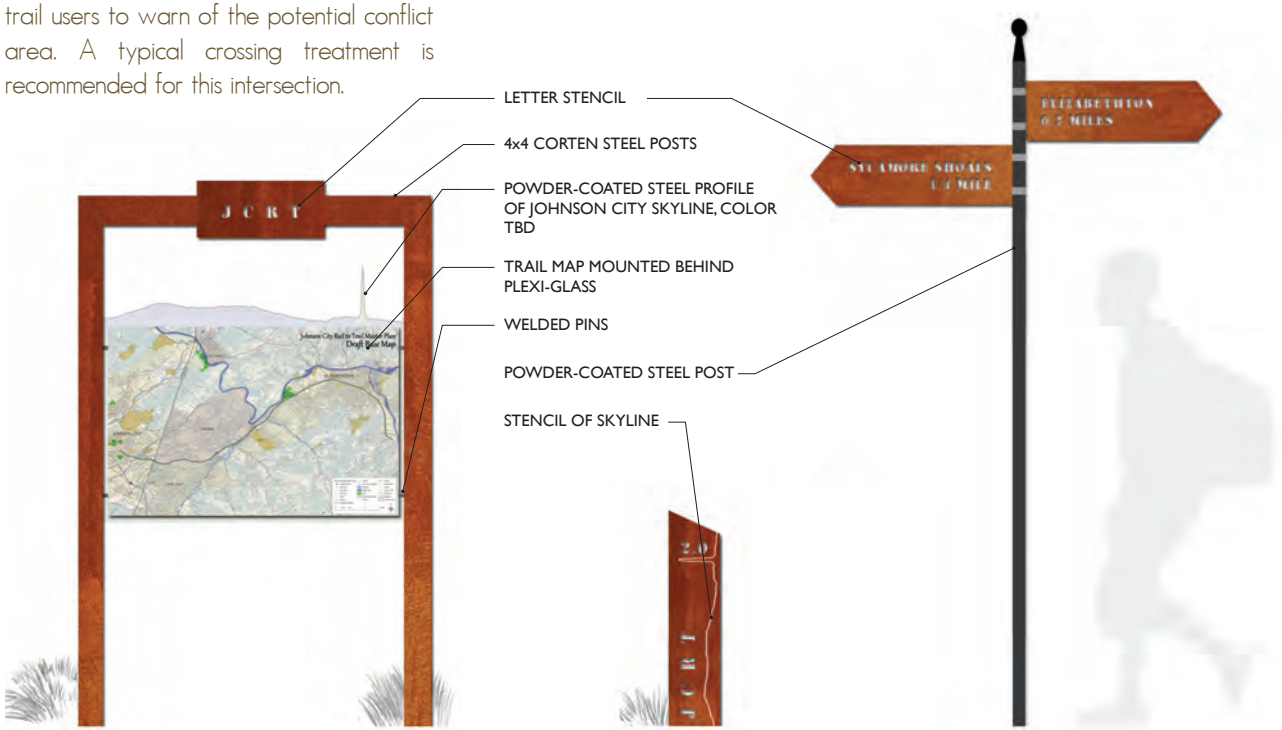
Crossing #39

The rail trail crossing at Peter Hampton Drive is an at-grade crossing. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. A typical crossing treatment is recommended for this intersection.

Destinations

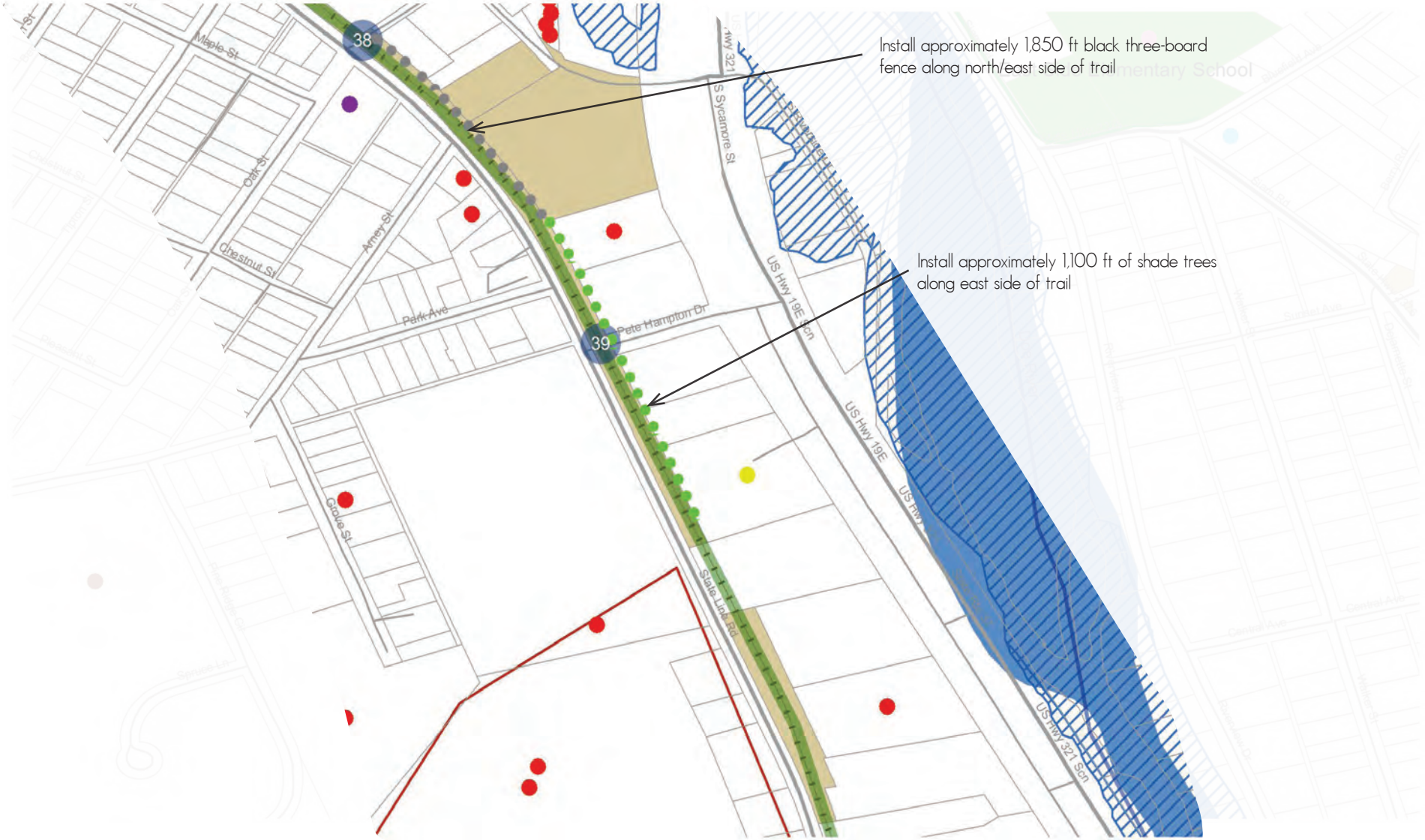
Few destinations for trail users exist along Segment 13. The trail would primarily serve as a connection between the surrounding residential neighborhoods and nearby historic downtown Elizabethton. If picnic areas are considered in this area, this segment of the rail trail corridor could function as a greenbelt or linear park serving nearby residential neighborhoods and other trail users.

Proposed Rail Trail Wayfinding Signage

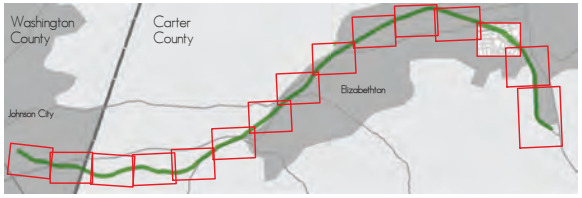


KIOSK MILE MARKER WAYFINDING

Figure 3.13 - Segment 13: Elizabethton, Carter County, Tennessee



Corridor Overview Key Map



Destinations

- Banks
- Religious Facilities
- All other commercial points

- Parcels
- City-owned Property
- Water Features
- Floodplain

- Streets
- Railroad
- Rail Trail Corridor
- Municipal Boundary

- Typical Crossing Treatment
- Vegetative Buffer
- Three-board Fencing

N

Segment 14: Elizabethton, Carter County

Summary

Destinations

Approximately 15 - 20 commercial destinations and a few industrial businesses are located within 1/2 mile of the rail trail corridor.

Segment Length

0.49 miles

Description

Segment 14 begins north of Franklin Place Drive and extends 0.49 miles south. This segment of the rail trail corridor is similar to segment 13, with surrounding uses including residential neighborhoods and industrial facilities. The rail trail corridor is highly visible in this area and opportunities for picnic areas may exist. Black three-board fencing will be important along the rail trail corridor starting at the Franklin Place Drive crossing, and extending south past the Industrial Parkway Road / Blue Ridge Road crossing to mark the boundary between the rail trail corridor and private properties located adjacent to the rail trail corridor.

Rail trail near Blue Ridge Road, Elizabethton, Tennessee

Roadway Crossings

Crossing #40

This driveway is an industrial entrance into Snap-On Tools. A typical crossing treatment is recommended for this intersection.

Crossing #41

This driveway leads to a commercial/retail shopping area. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. A typical crossing treatment is recommended for this intersection.

Crossing #42

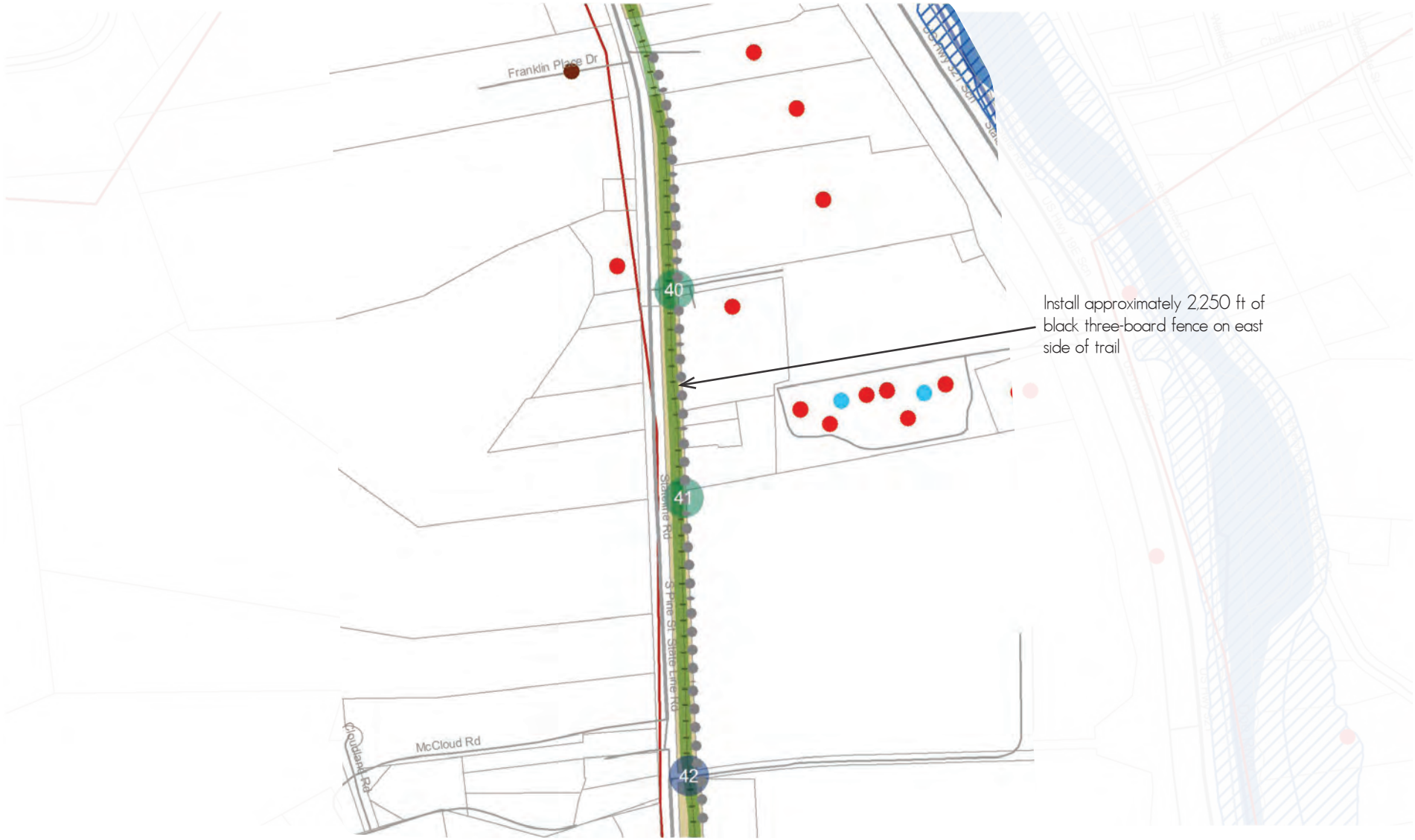
Crossing #42 is an at-grade industrial facility driveway crossing. Consideration should be given to improvements such as enhanced pavement markings for cross traffic trail users to warn of the potential conflict area. A driveway crossing treatment is recommended for this intersection.

Destinations

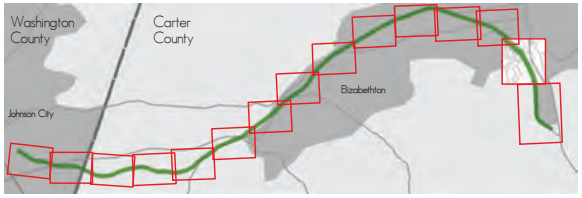
Few destinations for trail users exist along Segment 14. The trail would primarily serve as a connection between the surrounding residential neighborhoods and nearby historic downtown Elizabethton. If picnic areas are considered in this area, this segment of the rail trail corridor could function as a greenbelt or linear park serving nearby residential neighborhoods and other trail users.

Potential Passive Space Area along Rail Trail

Figure 3.14 - Segment 14: Elizabethton, Carter County, Tennessee



Corridor Overview Key Map



Destinations

- Grocery/pharmacy
- Multi-family Housing
- All other commercial points

- Parcels
- City-owned Property
- Water Features
- Floodplain

- Streets
- Railroad
- Rail Trail Corridor
- Municipal Boundary

- Typical Crossing Treatment
- Driveway Crossing Treatment
- Three-board Fencing

N

Segment 15: Elizabethton, Carter County

Summary

Destinations

There are a few commercial destinations located within 1/2 mile of the rail trail corridor, including Nancy's Kitchen at the southern termini of the rail trail corridor.

Segment Length

0.56 miles

Description

Segment 15 begins in a more suburban area of southern Elizabethton and extends 0.56 miles south-southeast. This segment of the rail trail corridor is similar to segments 13 and 14, with surrounding uses including residential neighborhoods and industrial facilities. After crossing #43 at Blue Ridge Road, the area becomes more rural with primarily residential uses on both the east and west side of the rail trail corridor. Black three-board fencing will be important along the rail trail corridor continuing from segment #14, to the crossing at Bob Little Road, to mark the boundary between the rail trail corridor and private properties located adjacent to the rail trail corridor. Strategic opaque fencing will be necessary near the residential driveway crossings to ensure the privacy of the residential properties located along the east side of the rail trail, near crossings #44 and #45.

Southern terminus of rail trail, Elizabethton, Tennessee

Roadway Crossings

Crossing #43

The rail trail crossing at Blue Ridge Road is an at-grade crossing. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. A typical crossing treatment is recommended for this intersections.

Crossing #44

The rail trail crossing at Hatcher Lane is an at-grade crossing. Consideration should be given to improvements such as enhanced pavement markings for cross traffic and trail users to warn of the potential conflict area. A typical crossing treatment is recommended for this intersection.

Crossing #45

Crossing #45 is an at-grade residential driveway crossing. A driveway crossing treatment is recommended for this intersection.

Crossing #46

Crossing #46 is an at-grade residential driveway crossing. A driveway crossing treatment is recommended for this intersection.

Destinations

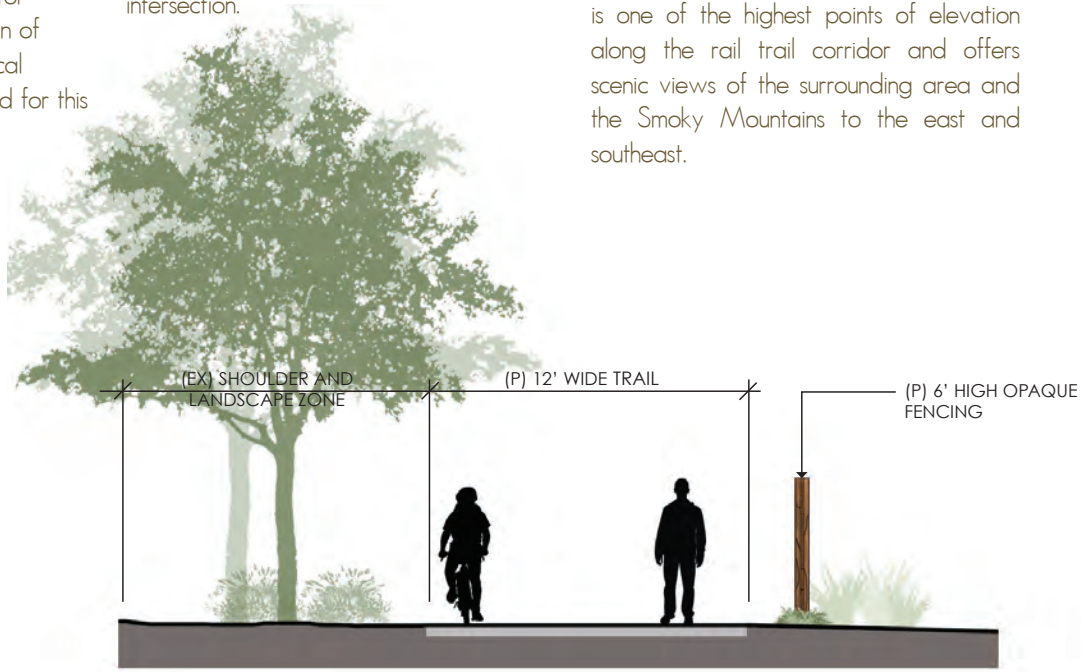
Commercial Areas

Nancy's Kitchen is located near the southern termini of the rail trail and is a popular local destination to grab quick snacks and drinks. Nancy's also serves meals that reflect the local cultural and cuisine. Nancy's would offer rail trail users a resting place, or a place to "fuel" up before enjoying a walk or bicycle ride on the rail trail.

Trailheads & Special Features

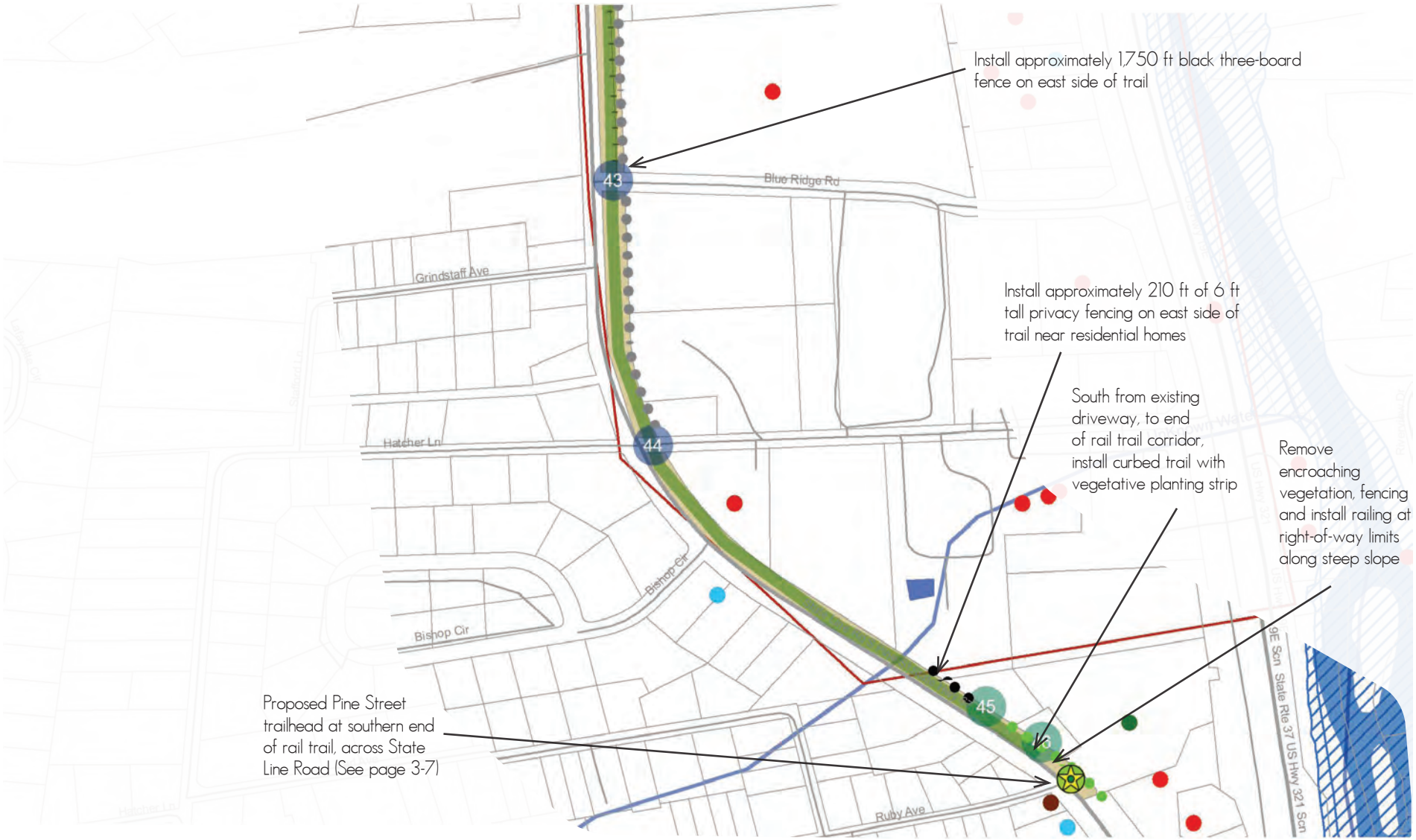
Pine Street Trailhead

A trailhead at the southern terminus of the rail trail would connect the surrounding neighborhood to the rail trail and could potentially offer a parking area. This area is one of the highest points of elevation along the rail trail corridor and offers scenic views of the surrounding area and the Smoky Mountains to the east and southeast.



MULTI-USE TRAIL WITH 6' HIGH OPAQUE FENCE

Figure 3.15 - Segment 15: Elizabethton, Carter County, Tennessee



Corridor Overview Key Map

Destinations

- Grocery/pharmacy
- Multi-family Housing
- Recreational Facilities
- All other commercial points

- Parcels
- City-owned Property
- Water Features
- Floodplain

- Streets
- Railroad
- Rail Trail Corridor
- Municipal Boundary

- Typical Crossing Treatment
- Driveway Crossing Treatment
- Trailhead

- Vegetative Buffer
- Three-board Fencing
- Opaque Fencing

N

Figure 3.16 - Example "Driveway" Intersection Crossing Treatment

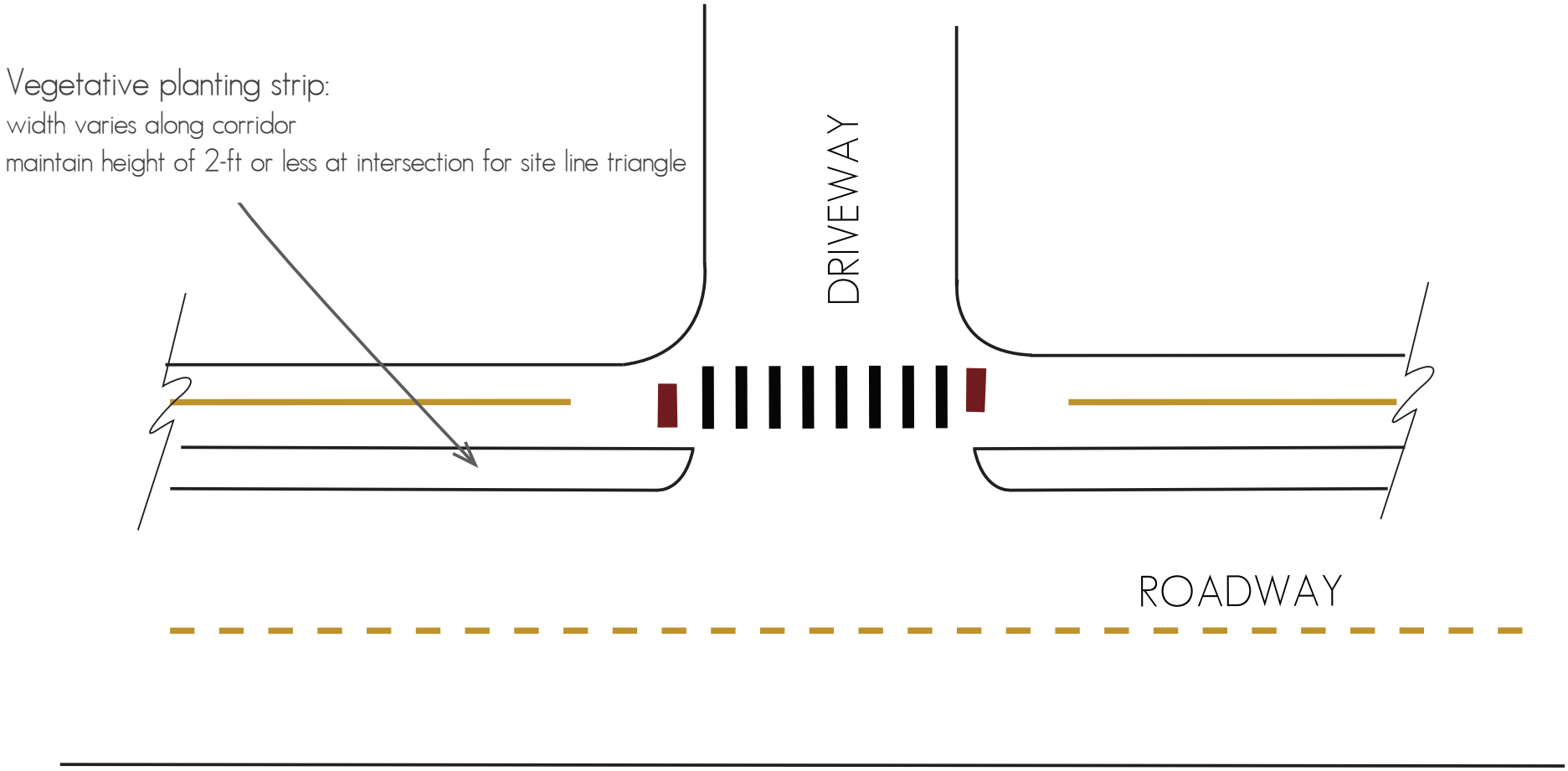


Figure 3.17 - Example "Typical" Intersection Crossing Treatment

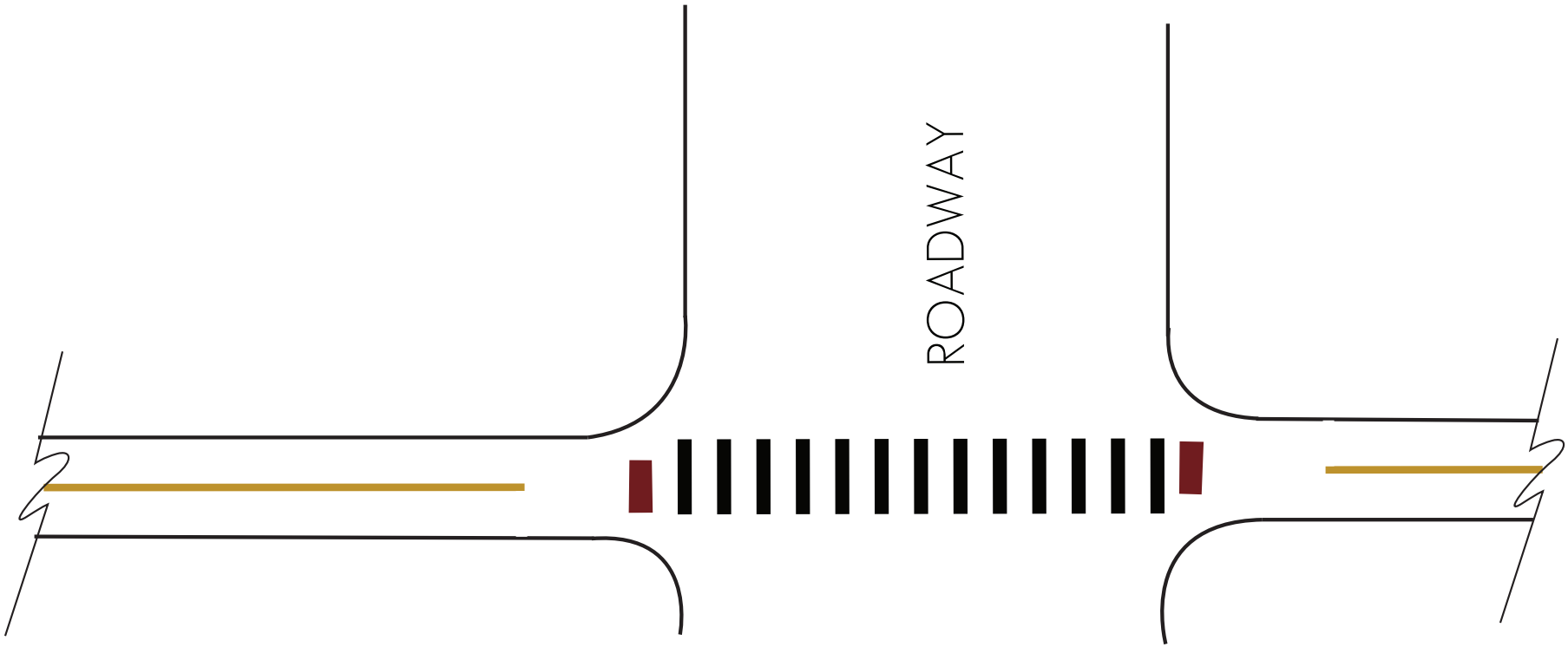


Figure 3.18 - Alabama Street, Johnson City, Tennessee

Special Intersection Crossing Treatment

Figure 3.19 - Happy Valley Road, Carter County, Tennessee

Special Intersection Crossing Treatment

Figure 3.20 - Bemberg Road, Elizabethton, Tennessee

Special Intersection Crossing Treatment

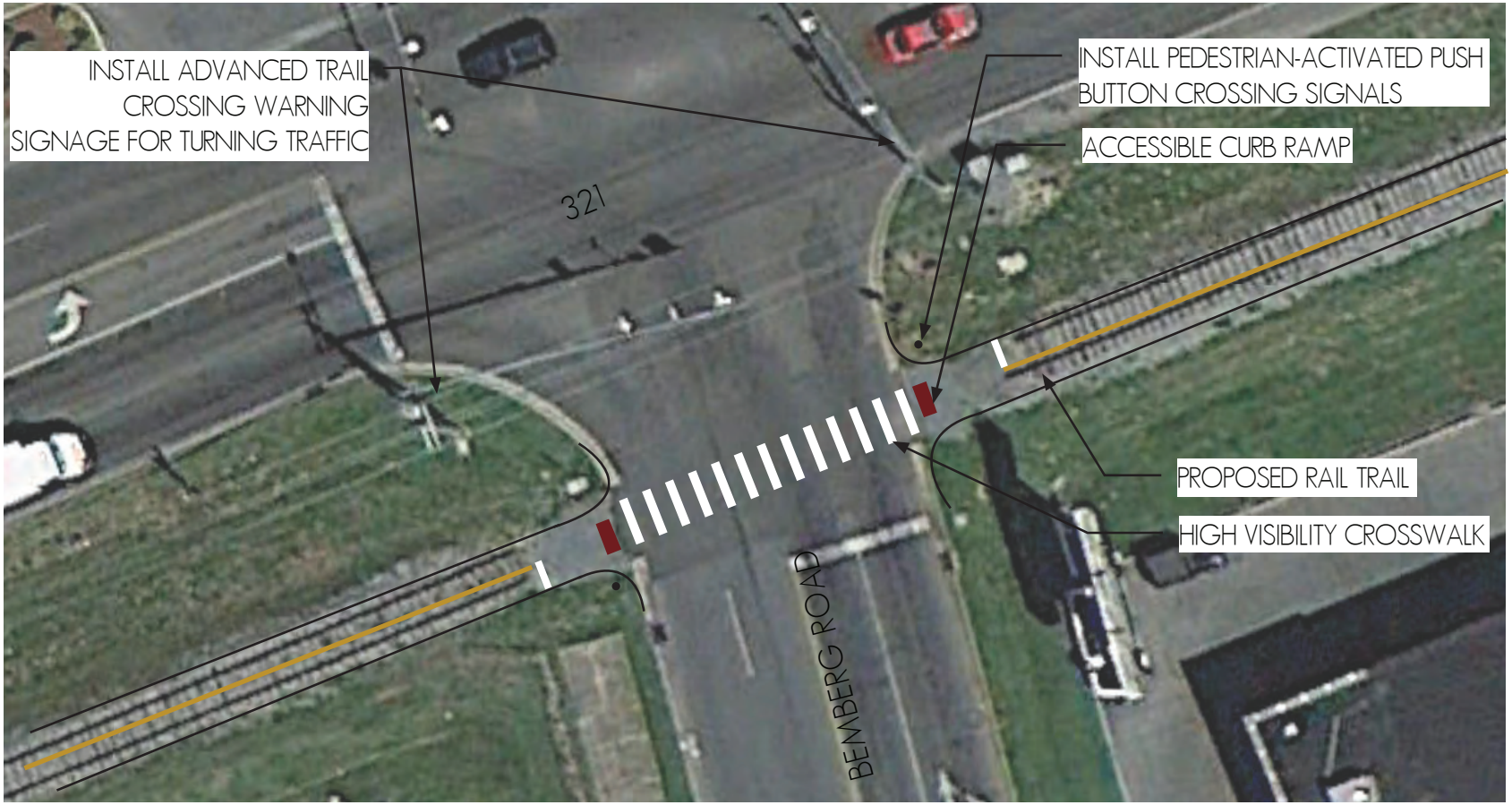


Figure 3.21 - N. Roan Street, Elizabethton, Tennessee

Special Intersection Crossing Treatment

Figure 3.22 - E. Elk Street, Elizabethton, Tennessee

Special Intersection Crossing Treatment

Figure 3.23- Doe Street, Elizabethton, Tennessee

Special Intersection Crossing Treatment

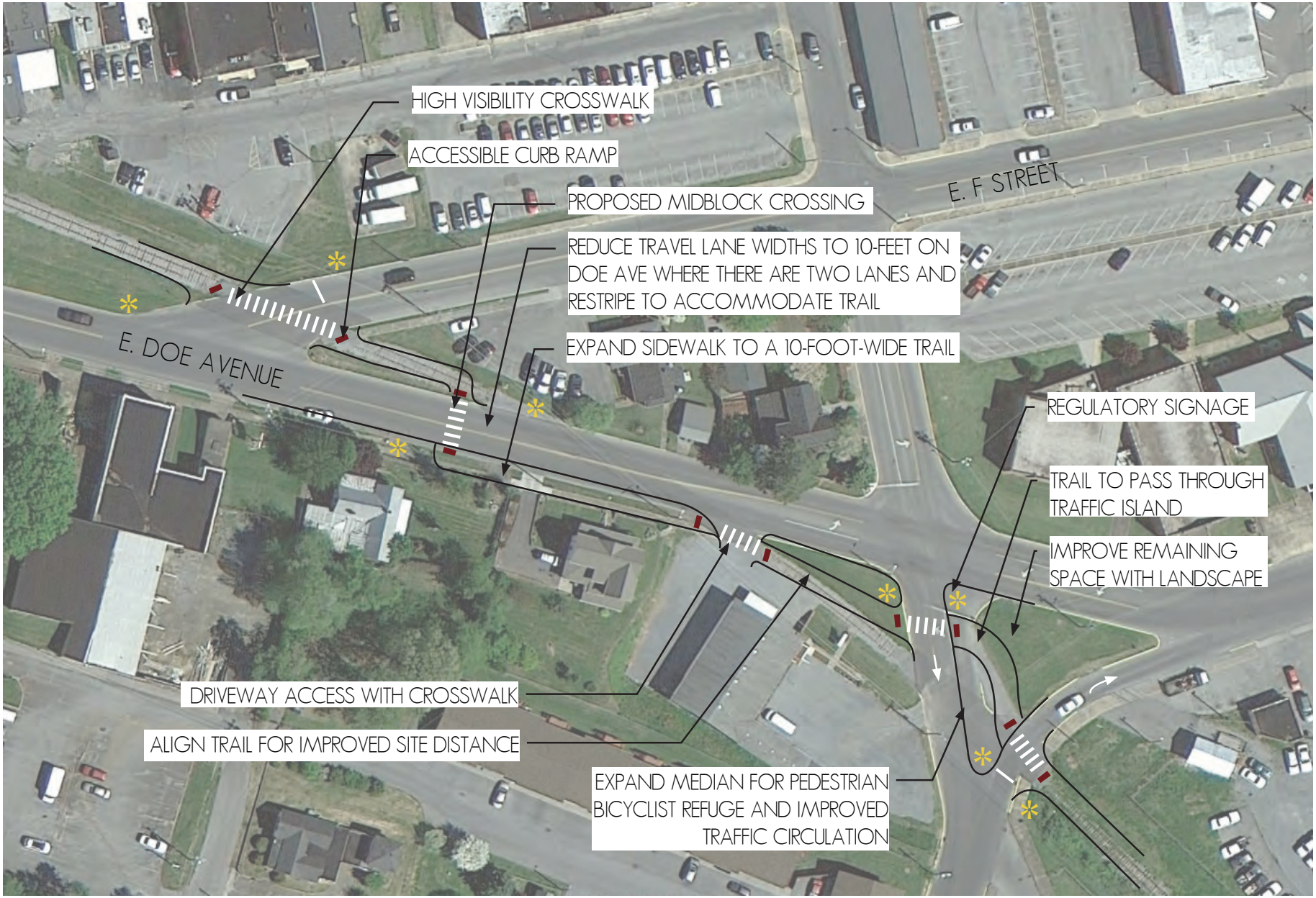
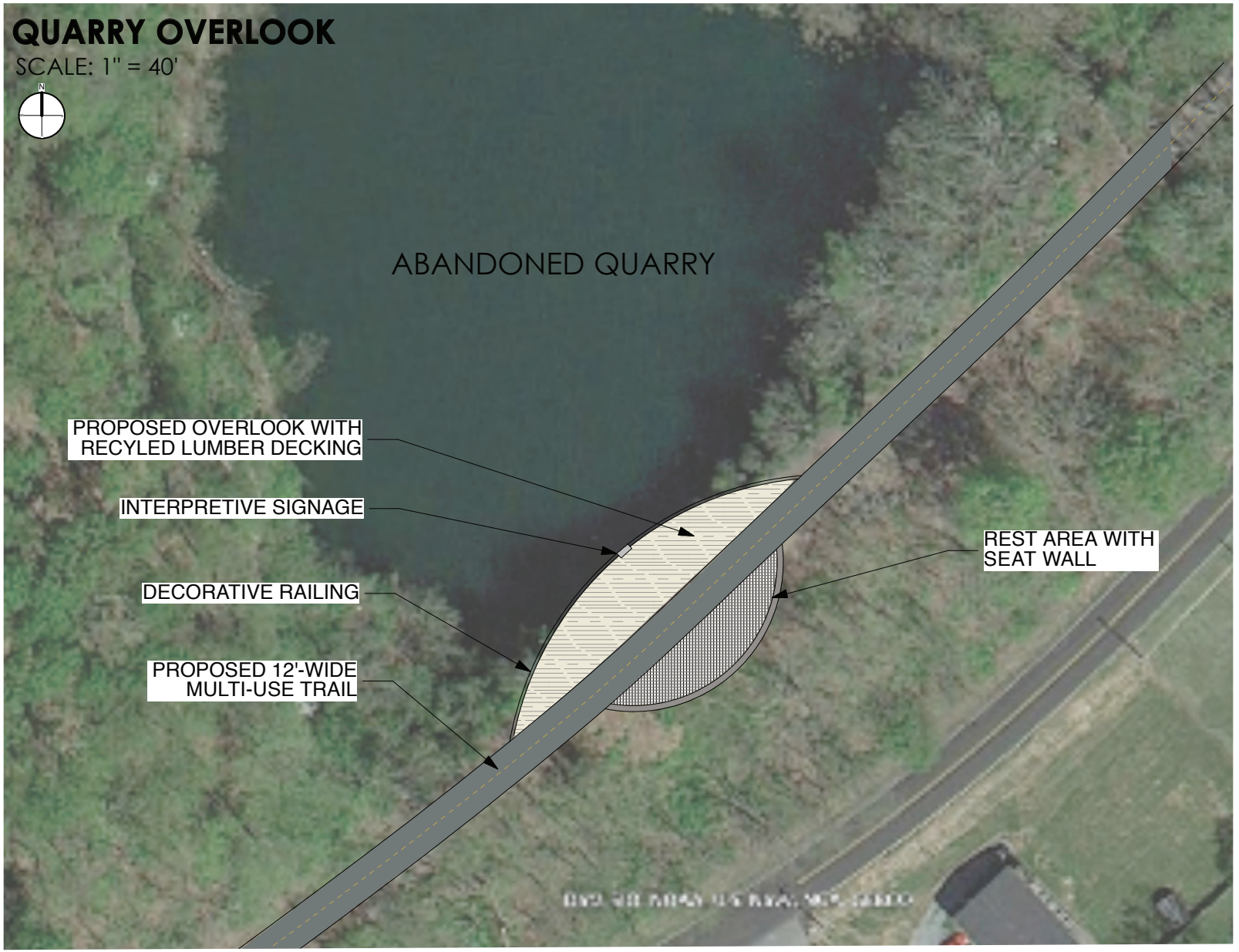
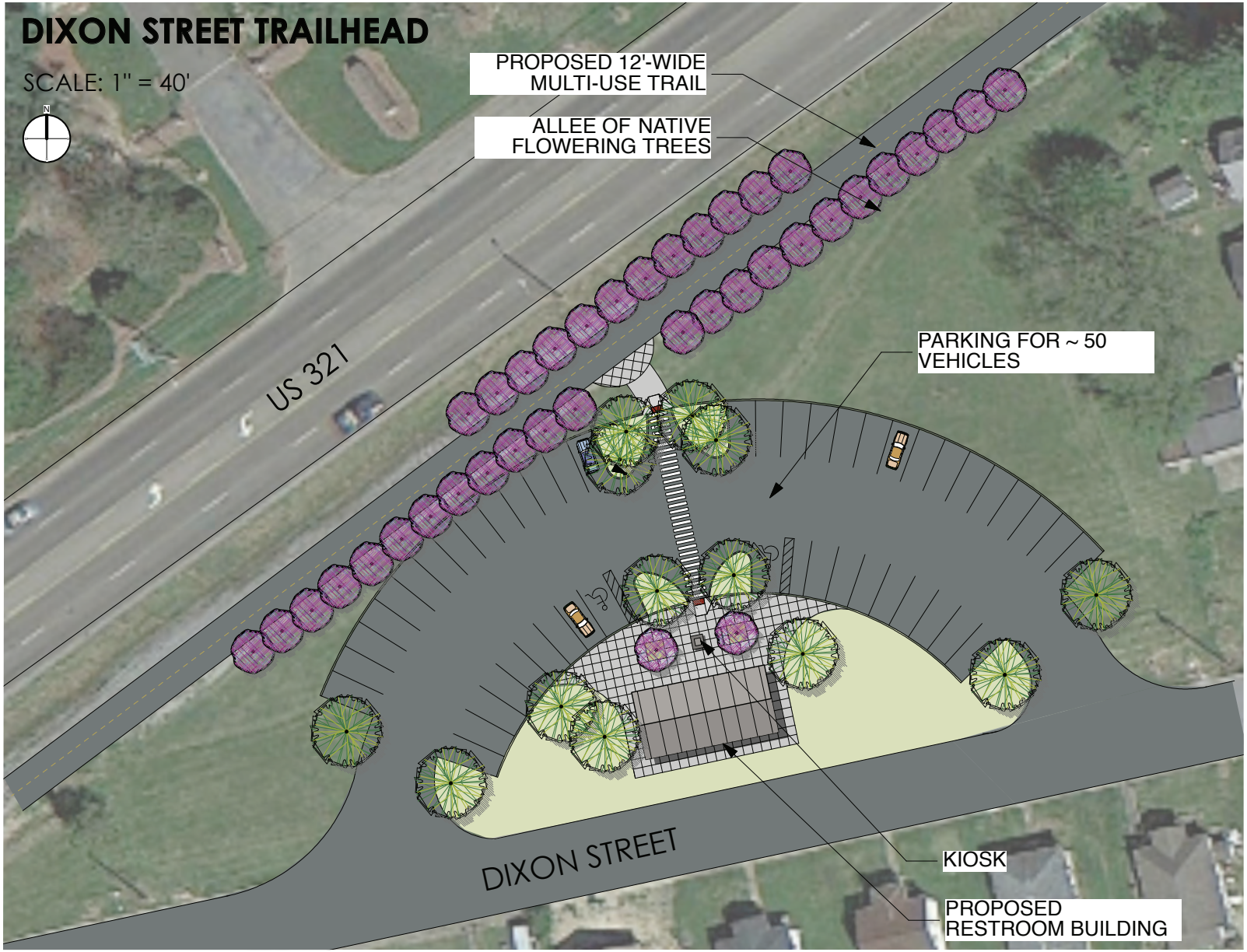


Figure 3.24 - Parkway Boulevard, Elizabethton, Tennessee

Special Intersection Crossing Treatment

Proposed Trailheads


QUARRY OVERLOOK
SCALE: 1" = 40'
N
ABANDONED QUARRY
PROPOSED OVERLOOK WITH RECYLED LUMBER DECKING
INTERPRETIVE SIGNAGE
DECORATIVE RAILING
PROPOSED 12'-WIDE MULTI-USE TRAIL
REST AREA WITH SEAT WALL


DIXON STREET TRAILHEAD
SCALE: 1" = 40'
PROPOSED 12'-WIDE MULTI-USE TRAIL
ALLEE OF NATIVE FLOWERING TREES
PARKING FOR ~ 50 VEHICLES
US 321
DIXON STREET
KIOSK
PROPOSED RESTROOM BUILDING


PINE STREET TRAILHEAD
SCALE: 1" = 50'
N
PRIVATE RESIDENCE
WORK WITH PROPERTY OWNER TO IMPROVE DRIVEWAY TO ACCOMMODATE TRAIL
DRIVE-IN THEATER
PROPOSED 12'-WIDE MULTI-USE TRAIL
THIS AREA WILL REQUIRE ADDITIONAL LAND ACQUISITION
BICYCLE PARKING
PROPOSED RESTROOM BUILDING
KIOSK
SEAT WALL
PARKING FOR ~ 50 VEHICLES
RUBY AVENUE
S. PINE STREET
POTENTIAL GARDEN AREA

Comprehensive Management Plan 4

Overview

The comprehensive management plan provides baseline information for tasks that need to be undertaken by the City of Johnson City, City of Elizabethton, Washington County, Carter County, and other partners once design development begins and the trail is opened for use. This chapter recommends a series of work items and tasks that need to be completed in order to maintain the Johnson City Rail Trail as an attractive, safe, and secure amenity. The following text defines key aspects of facility management, land management, safety, security, and emergency response and risk management.

Safety & Security

Context-sensitive trail design, clear and implementable safety and security policies, comprehensive programs, and maintenance commitments affect the measurable, as well as the perceived, safety and security of a trail.

The Johnson City MTPO should work in cooperation with the local government agencies to develop and implement a safety and security plan for the Johnson City Rail Trail. This plan should consist of well-defined safety and security policies; the identification of trail management, law enforcement, emergency, and fire protection policies; and a system that offers timely response to issues or problems related to safety and security. Important components of the safety and security plan should include:

1. Establishment of a safety coordinator
2. Preparation of a pathway safety manual
3. Establishment of user rules and regulations
4. Development of pathway emergency procedures
5. Preparation of a safety checklist for the pathway
6. Preparation of a pathway-user response form
7. A system for accident reporting and analysis
8. Regular maintenance and inspection programs
9. Site and facility development and review
10. Public information programs
11. Employee training programs for safety and emergency response
12. Ongoing research and evaluation of program objectives

Chapter Contents

Crime Prevention Through Environmental Design (CPTED) principles will be used to encourage desired behavior and discourage undesired behavior on the Johnson City Rail Trail. CPTED is defined as "the proper design and effective use of the built environment that can lead to a reduction in the fear and incidence of crime and an improvement in the quality of life." As applied to the Johnson City Rail Trail, CPTED principles will focus on access control, maximizing visibility of the trail from the surrounding community, clearly defining

pubic and private properties and intended uses, facilitating emergency response, and long-term maintenance of the trail.

Addressing safety in the design of a trail is a duty and obligation of all public

An example of a permeable fence between a trail and residential backyards (residential properties are on the right)

facility managers. As the construction documents for the Johnson City Rail Trail are completed, appropriate local and state agencies should review these plans and specifications to ensure that they meet all current safety regulations.

The plan should discourage the general public from using any segment of the Johnson City Rail Trail that is under construction. Trail segments should not be considered open for public use until a formal dedication ceremony has been staged and authorized agents of Johnson City and Elizabethton have declared the pathway open. Individuals who use pathway segments under construction without written permission from an authorized agent shall be deemed in violation of the Johnson City Rail Trail operation policy.

Crime Prevention Through Environmental Design (CPTED)

Personal safety, both real and perceived, heavily influences a trail user's decision to use a trail and a community's decision to embrace a trail system. Proper design must address both the perceived safety issues (i.e., feeling safe or fear of crime) and actual safety threats (i.e., infrastructure failure and criminal acts). Creating a safe trail environment goes beyond design and law enforcement and should involve the entire community. The most effective and most visible deterrent to illegal activity on the trail and at the trailhead will be the presence of legitimate users. Getting as many "eyes on the corridor" as possible is a key deterrent to undesirable activity.

CPTED is a proactive approach to deterring undesired behavior in neighborhoods and communities. CPTED is defined as "the proper design and effective use of the built environment that can lead to a reduction in the fear and incidence of crime and an improvement in the quality of life." The basic premise of CPTED is that the arrangement and design of buildings and open spaces can encourage or discourage undesirable behavior and criminal activity. A report prepared for the National Institute of Justice noted that "physical features influence behavior" and the "[offenders] prefer to commit crimes that require the least effort, provide the highest benefits and pose the lowest risks" . When all spaces have a defined use and the use is clearly legible in the landscape, it is easier to identify undesired behavior. The following are the four key CPTED principals:

- Natural Access Control, including the placement of entrances, exits, fencing, landscaping, hours of operation and lighting. Natural access control helps to clearly differentiate public and private space.
- Natural Surveillance, including the placement of physical features, activities, and people to maximize visibility. Natural surveillance increases the opportunity "to be seen" and thereby deters unwanted behavior.
- Territorial Reinforcement strategies put the spotlight on undesired behavior and activities, increasing the perception of being watched. Strategies include the use of physical attributes such as fences, paving materials, public art, signage, and "security" landscaping materials to convey ownership of the space along the corridor and buffer private properties. Pedestrian-scaled mile markers tagged with emergency IDs or "address" codes, along with emergency phones (where cell service is not available), are key territorial reinforcement strategies. Including pedestrian-scaled mile markers, GPS coordinates and signs are also effective strategies.
- Maintenance to allow for the continued use of the space for its intended purpose. Maintenance is an expression of ownership of a property. Unmaintained facilities indicate that there is a greater tolerance of disorder and less control by the intended users.

A safety analysis of the project area highlighted a number of potential safety issues. Table 4.1 on page 4-3 summarizes these potential safety issues.

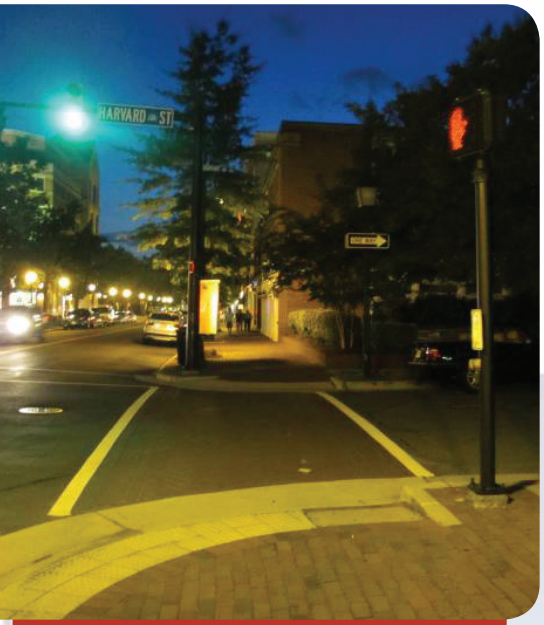
Table 4.1: Potential Safety Issues

Identified Issues	Potential Solutions
Crime	1. Manage vegetation so that corridor can be visually surveyed from adjacent streets and residences. 2. Select shrubs that grow below 2' in height and trees that branch out greater than 6' in height. 3. Utilize hostile vegetation (e.g. vegetation with thorns) to eliminate entrapment areas and control off-path usage. 4. Where lighting is required, illuminate uniformly to minimize shadowed areas and allow trail users to identify facial features from 20 yards away. 5. Place benches and other trail amenities at locations with good visual surveillance and high activity. 6. Create a "Trail Watch Program" involving local residents. 7. Proactive law enforcement of trail regulations
Equestrian Safety	1. Enforce pet "leash laws". 2. Educate cyclists to call out "passing on the left" when a horse is first spotted and as the cyclist approaches a horse. Cyclists can also use bike bells. However, bike bells should start sounding at a distance, as striking the bell when overtaking an equestrian can startle the horse. 3. Educate hikers and joggers to slow down and stop when a horse is spotted and greet the horse and rider, as horses calm when they hear a human voice.
Litter & Dumping	1. Post trail rules encouraging pack it in, pack it out etiquette. 2. Place garbage receptacles at trailheads and at regular intervals along the trail. 3. Encourage local residents to report incidents as soon as they occur. 4. Remove dumpsites as soon as possible. 5. Manage vegetation within the right-of-way to allow good visual surveillance of the trail from adjacent properties and from roadway/trail intersections.
Trail User Safety	1. Regulatory signage, including trail etiquette or "yielding" information 2. Provide mileage markers at quarter-mile increments and clear directional signage for orientation. 3. Include signage encouraging trail users to bring water.
Unwanted Vehicle Access on Trail	1. Utilize landscaping to define the corridor edge and trail, including earth berms, large boulders, and fencing. 2. Use bollards at intersections.
Vandalism	1. Select benches, bollards, signage, and other site amenities that are durable, low maintenance, and vandal-resistant. 2. Use permeable fencing wherever possible. 3. Respond through removal or replacement in rapid manner. 4. Encourage local residents to report vandalism. 5. Create a neighborhood trail watch program. 6. Maintain good surveillance of the corridor. 7. Involve neighbors in trail projects to build a sense of ownership.

Safety & Security Strategies

Community Engagement

Active and informed community members are a tremendous resource. Forming volunteer patrol groups, a trail ambassador program, and an Adopt-a-Pathway program would create strong community connections to the Johnson City Rail Trail. Volunteer patrol groups, such as the one in Anchorage, Alaska (http://bit.ly/Qn98Li) have been used successfully to assist local government by reporting on trail conditions, picking-up litter, and filing safety reports. Trail ambassadors (see this link to a program in Pennsylvania: http://bit.ly/S8biPn) can provide guidance and interpretive services, organize trail rides or walks, carry informational material, and generally promote the trail. The Adopt-A-Trail program utilizes volunteers to provide general care and maintenance of trail. Community service organizations, school classes or clubs, church groups, and businesses are often looking for outlets to support the community. Adopting trails promotes land stewardship and physical fitness and helps build community connections. More information about Adopt-A-Trail programs is included in Chapter 6 of this Master Plan. Examples of Adopt-A-Trail programs can be found in Oro Valley, Arizona (http://bit.ly/ru5mVY), the Blue Ridge Parkway, Tennessee (http://bit.ly/T5FTQh), and the City of Fort Collins, CO (http://bit.ly/RywOsF) among many others.



The illumination shown along the street above is not uniform, producing light and dark pockets along the sidewalk. The low pressure sodium lamps cast a yellow light that results in poor color rendition.

Fencing

Fencing can serve as a key design element in a trail corridor to define trail edges and delineate between public and private property. Fencing installed along the trail corridor should be permeable, where feasible, to encourage natural surveillance opportunities along the trail.

Where the trail is fenced for long stretches, intermittent openings should be located to allow trail users to enter and exit the trail. Access points to the trail should be at locations with good visibility from the surrounding neighbors.

Graffiti

Graffiti hurts communities in a number of ways and often encourages other undesired behaviors, such as loitering, littering, crime, and more graffiti. According to the Graffiti Hurts website, graffiti costs $1-$3 per year per taxpayer, and it accounts for lost revenue for transit systems, lost retail sales, and declines in property values. The appearance of graffiti is perceived as an indicator that an area is in decline. In 2007, TDOT spent more than $240,000 removing graffiti in their right-of-way.

Rapid removal of graffiti is a key component to maintaining a safe trail. Rapid removal signals to the taggers and the community that the trail is cared for and being regularly observed. Data shows that graffiti removal within 24 to 48 hours results in a nearly zero rate of recurrence.

Trail signage should include the contact number to report graffiti (e.g., "Immediately report any observed graffiti to 911").

Landscaping

Landscaping that obstructs natural surveillance and allows entrapment areas or "hiding" places should be avoided.

- All groundcover and shrubs to be trimmed to a max. 24" above ground level height.
- Trees should be trimmed up to provide a minimum of 8' of vertical clearance within the trail corridor
- Tree canopies should not obstruct pathway illumination
- Hostile landscaping material (e.g. vegetation with thorns) can be used in strategic areas to discourage off-path use and eliminate entrapment areas. Pyracantha, a native evergreen shrub with a dense thorny structure, provides a natural barrier and wildlife habitat.

Lighting

Adequate pedestrian-scaled lighting helps trail users observe their surrounding and respond to potential threats. Where lighting is installed on trails and pathways, the illumination should:

- Be adequate to identify a face up to 20 yards away.
- Have full cut-off fixtures to reduce light pollution.
- Provide uniform coverage, eliminating dark pockets.
- Provide good color rendition (the measure of light quality to replicate colors as viewed on a typical sunny day).
- Not be obstructed by tree canopies.

The use of metal halide or light emitting diode (LED) lamps are recommended, as they provide excellent color rendition. Color rendition is especially important when describing identifying features such as hair, clothing, and vehicle color. Light quality is as important as the quantity. Poor lighting, whether too bright or not bright enough, can dimish safety.

Lighting should respond to the conditions of

the site and meet the minimum standards set forth by the Illuminating Engineering Society of North America (IESNA).

At high-traffic sites (e.g. intersections) and more urban locations, a higher degree of illumination may be required. Section 7.2.13 of the Guideline for Security Lighting for People, Property, and Public Spaces notes that "Sidewalks, footpaths, and grounds supporting mass movement of persons should be illuminated to at least an average maintained illuminance of 10 lux (1 fc), with an average-to-minimum uniformity ratio not greater than 4:1 during planned use periods."[6]

Litter and Illegal Dumping

Litter along the pathway corridors should be removed by staff or volunteer effort. Litter receptacles should be placed at access points, such as trailheads, and intersections with other access points. The trail should be patrolled for litter (not in receptacles) at least once a week and after any special events held on the pathway,

Illegal dumping should be controlled by vehicle barriers, regulatory signage, and fines as much as possible. When it does occur, it must be removed as soon as possible in order to prevent further dumping. Neighborhood volunteers, friends groups, alternative community service crews, and inmate labor should be used in addition to maintenance staff.

Public Art

Public art installations contribute and enhance a community's identity and character, creating a strong "sense of place" branding. Public art incorporated into a trail network provides visual cues that a trail is "owned" and cared for by the community.

From a CPTED perspective, the use of public art in the landscape is an effective "target hardening" strategy. Public art can result in a large reduction of graffiti vandalism, and it can define trail edges, improve the appearance of the community, and discourage unwanted behaviors. More information on programming for public art is included in Chapter 6 of this Master Plan.

Murals

CPTED practices encourage the installation of murals with faux windows and human features in areas where visibility is limited due to physical or other barriers. These types of murals have a psychological effect on people, conveying the perception of being watched. Further, the depiction of athletes in a mural promotes the perception of safety and the illusion of activity. This perception can discourage undesired behaviors in an area. The National Crime Prevention Council reports that "Community paintbrush murals are rarely defaced by graffiti and instill a sense of pride among those who live nearby."

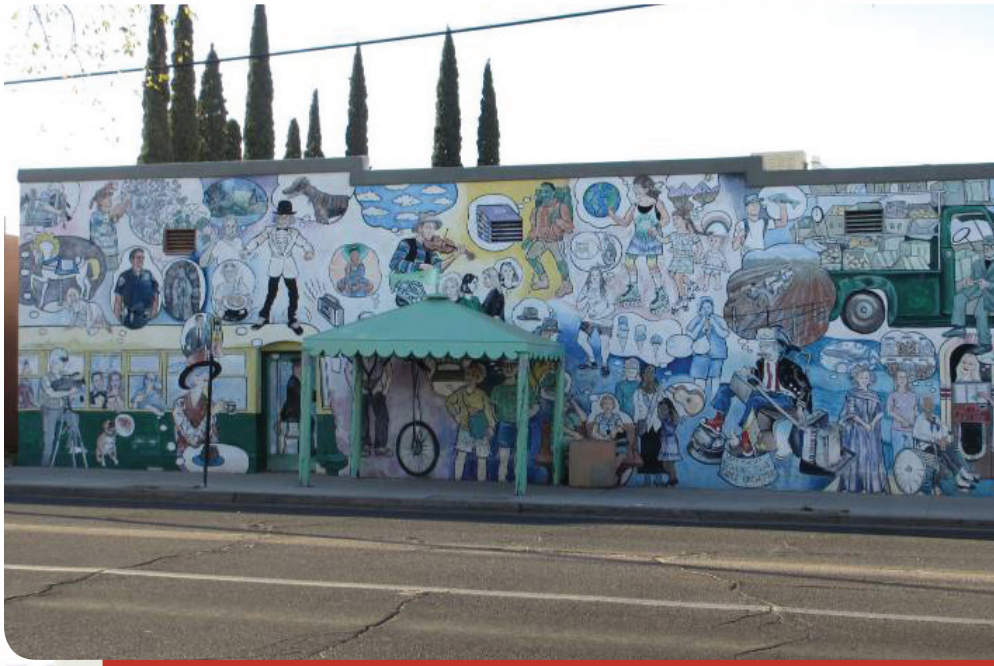
A number of buildings back the Johnson City Trail. Murals that convey windows and doors overlooking the trail, along with "eyes" on the trail, can decrease the feeling of isolation, and increase the feeling of being watched. This application also works well on underpass walls.

Seating

Trails are designed for movement, and trail users not moving along a trail can attract attention. Generally, it is desired to keep people moving on a trail. However, periodic seating nodes on long stretches of trail may be needed to accommodate senior citizens and families with small children. Care should be exercised in locating seating areas, and seating locations should have good visibility from the surrounding neighbors.

Structures

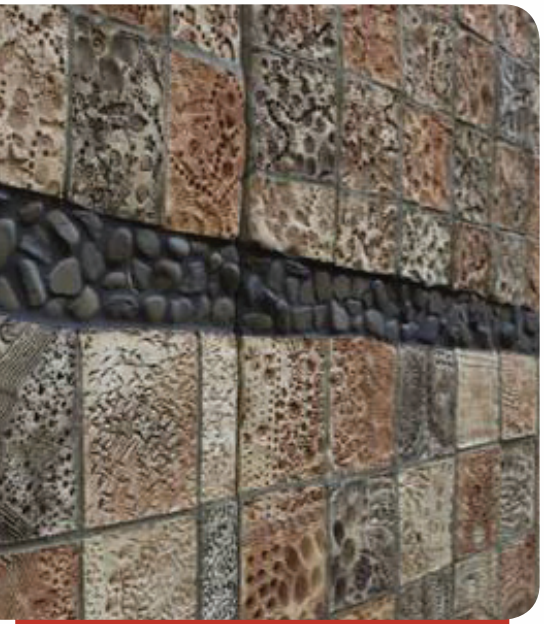
Structural solutions will be required along sections of the Johnson City Rail Trail to stabilize banks and prevent future erosion. In some of these areas, trail users will experience somewhat of a tunnel effect as the corridor edges form vertical walls. These tunneled depressions present several opportunities and constraints.



A mural on a building with no windows gives the illusion of watchfulness over the street and movement along the sidewalk.

Opportunities

Incorporating a geology wall into vertical wall structures can serve as an interpretative feature along the trail and would compliment the existing rock feature area in Carter County. A geology wall is an abstract of the layers of sediment found in the area. A geology wall that implies linear movement encourages trail users to keep moving along the wall. Since a geology wall would be in a semi-tunnel area, keeping trail users moving is desired.



An art installation that depictis the geology in the area would provide a learning opportunity and convey a sense of community pride. Art installations should be located strategically. Photo Source: http://bit.ly/RpOyh9

Constraints

Trail design in this area should encourage good visibility onto the trail from adjacent properties, and points of visibility should be encouraged when possible. Vegetation on the top and sides of the embankments should have a high priority maintenance schedule that retains an open view of the trail. Where the embankments are scalable, thorny vegetation is recommended to discourage off-path use.

Wayfinding

A comprehensive wayfinding system should be incorporated into the trail network as recommended in Chapter 3 and Chapter 6 of this Master Plan. Additionally, it is recommended that wayfinding signage at major decision points include the walking and bicycling times.

Pedestrian-scaled mile markers should be posted at one-quarter mile intervals along the trail. The mile markers should include either a GPS coordinate or an address identification number as mutually agreed upon by the City of Johnson City, Washington County, Carter County, and the City of Elizabethton. GPS coordinates or an address identification number are needed to assist emergency responders in locating trail users in need of assistance.

911 Dispatch

The Enhanced 911 dispatch systems are administered at the county level through the Washington County and Carter County Emergency Communications Districts. Both districts use the same software and are able to support both an addressing and a GPS coordinating system.

The Director of the Washington County Emergency Communications District and a GIS technician were contacted regarding what technologies were used to administer E911 in the county. Washington County currently dispatches for Johnson City. By adding the Johnson City Rail Trail as a "street" and coordinating with Johnson City, Elizabethton, and Carter County, "addresses" can be assigned along the trail that would coincide with 1/4 mile markers and any street intersections. Washington County Emergency Communications can also support GPS coordinates.

Carter County uses the same software technology. Since a majority of the trail corridor is in Elizabethton and Carter County's jurisdiction, it is feasible to implement an addressing project for the entire trail corridor if undertaken at the same time Washington County assigns addressing. It is recommended that the corridor coordinates be assigned in GIS prior to undertaking a cell phone service test.

Depending on jurisdictional boundaries, the coordinates where cell phone calls were being made would dispatch the appropriate officer.

Site-Specific Strategies

Private Home, Carter County
Figure 4.1

The Johnson City Rail Trail would pass near the home shown in the photo. This home is located in Carter County, near Banks Road. Permeable fencing between the trail and home would benefit both the homeowner and trail users to increase natural surveillance opportunities. The vegetation in the right should be trimmed back to eliminate any hiding spots and open up the views between the top of the embankment and the trail. Thorny vegetation could be used on the embankment to discourage "off-path" activities.

Steep Slopes, Near Banks Road
Figure 4.2

The embankment, shown in the photo to the right, is on the proposed alignment of the Johnson City Rail Trail. The embankment would require stabilization. The vertical nature of a stabilization treatment would provide an opportunity to create an interpretative feature along the trail., as shown in the After photo. The interpretative feature could portray local geology or ecology, the regional watershed, or even bank erosion.

US 321 Underpass
Figure 4.3

The Johnson City Rail Trail would go beneath the underpass shown in the photo at right. Safety improvements would include planting thorny vegetation around the underpass support columns and along

Figure 4.1 Private Home, Carter County

Figure 4.2 Steep Slopes near Banks Road could be treated with a creative art display such as the one shown below.

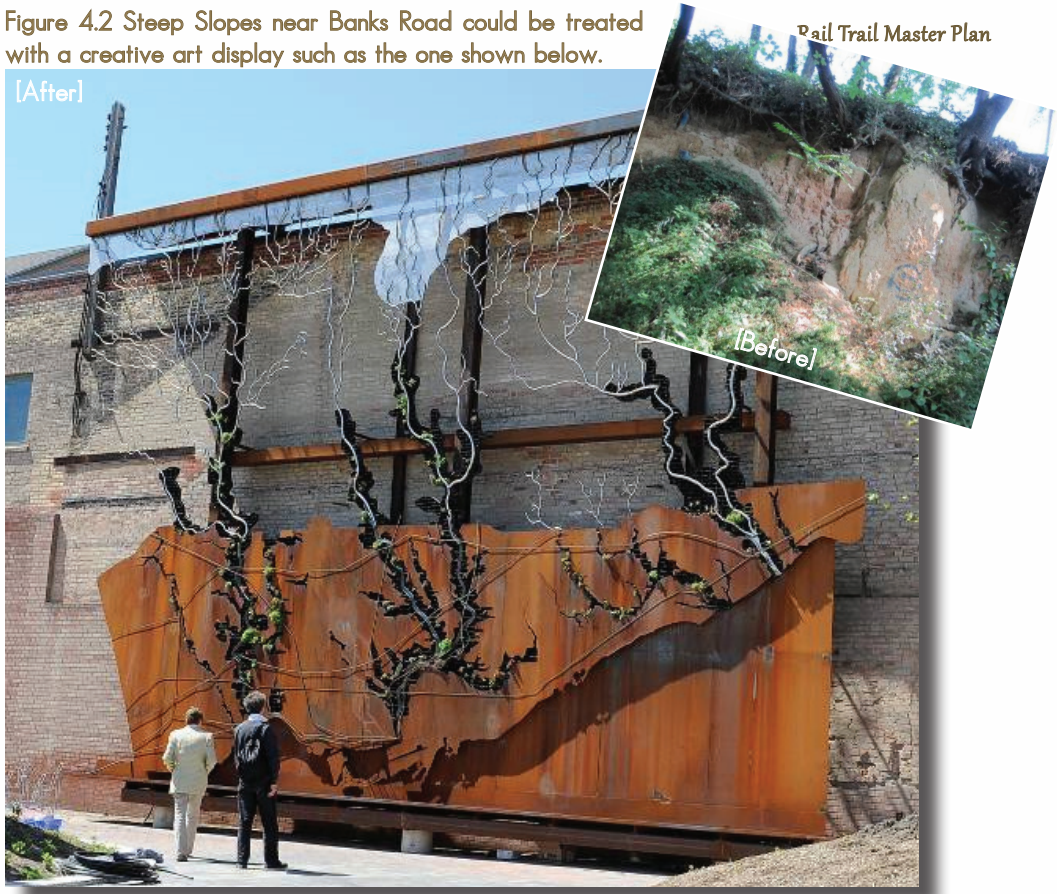
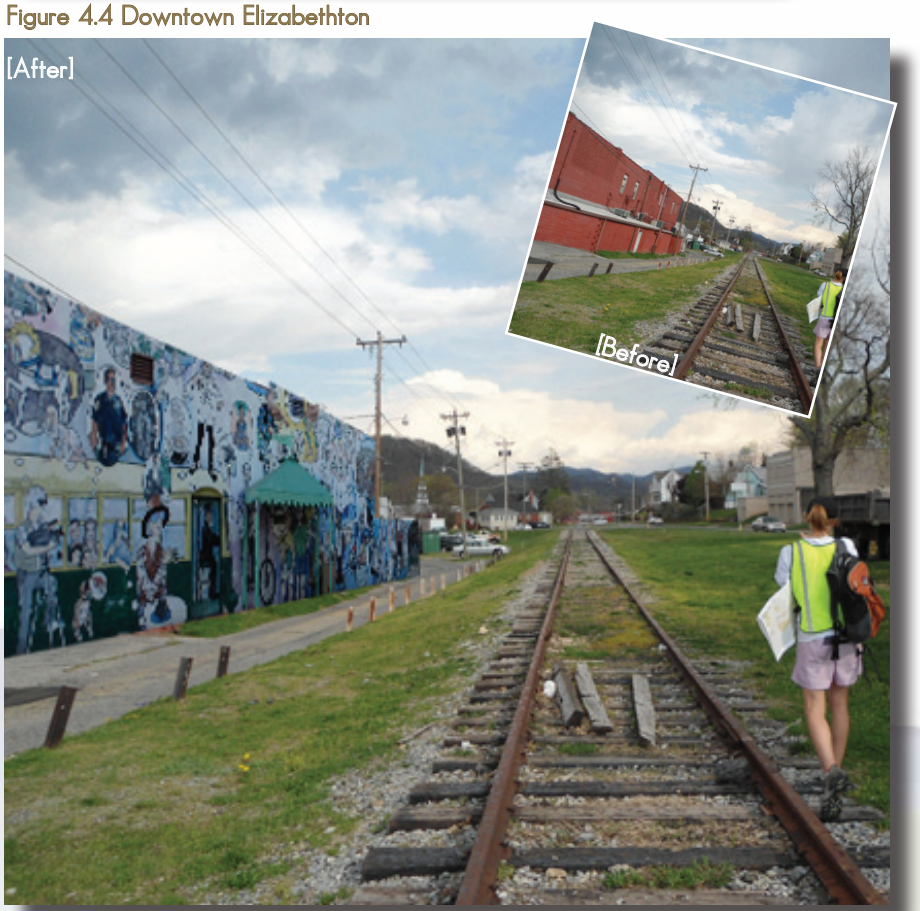


Figure 4.3 US 321 Underpass

Figure 4.4 Downtown Elizabethton



the embankment on both sides of the underpass to eliminate hiding spots and lighting if trail users are unable to identify a face from 20 yards away during daylight hours. The second improvement may be most applicable on overcast days.

Downtown Elizabethton Figure 4.4

Where windowless buildings back the trail, painting murals with human facial features and faux windows lend the perception to trail users that the trail is being watched. The Before photo shows the existing conditions, while the After photo shows a photo simulation of a mural on the red brick wall.

Embankment Area in Johnson City, near Legion Street Trailhead Figure 4.5 (see page 4-9)

There are sections of the trail where embankments semi-enclose the trail on both sides. At these locations an open, overhead trellis treatment with native vegetation could be installed to provide interest and variety along the trail. The trellis would ideally be wide enough for the support columns not to encroach into the trail or the trail shoulders, but narrow enough to allow light to pass onto both sides of the trail. The vertical clearance should be 12 feet to maintain an open feeling and allow for equestrian use of the trail. Depending on the type of foliage used, lighting may be required to enable trail users to identify a face from 20 yards away during daylight hours.

Risk Management & Liability

The design, development, management, and operation of the Johnson City Rail Trail must be carefully and accurately executed in order to provide a resource that protects the health, welfare, and safety of the public.

Liability most often occurs when a facility has been under-designed for the intended volume of use, when management of the facility is poor, or when unexpected accidents occur because the trail manager failed to recognize the possibilities of a potentially hazardous situation. To reduce the exposure to liability, the City of Johnson City and Elizabethton and its partners should have in place the following measures prior to opening the first phase of the trail:

1. A complete maintenance program that provides the appropriate duty or level of care to greenway users,
2. A risk management plan that appropriately covers all aspects of the trail, and
3. A comprehensive working knowledge of public use laws and recent case history applicable in Tennessee.

Public use of the Johnson City Rail Trail should be covered under existing City, County, and State of Tennessee policies for the use of park land and public spaces. The Cities of Johnson City and Elizabethton are charged with the care of the trail and should exercise reasonable care in the construction of all trail facilities to reduce hazards, public nuisances, and life-threatening situations. The Johnson City Rail Trail is available for public use as defined by the hours of operation policy; therefore, any individual found using the trail outside the normal hours of operation would not be covered by the City of Johnson City and Elizabethton policies for public use.

Operation & Maintenance Program

An ongoing maintenance program is critical to ensure long-term success of the Johnson City Rail Trail. The maintenance strategy needs to be in place and operating resources identified before trail development begins.

Operations and maintenance refers to specific day-to-day tasks and programs performed to assure resources and facilities are kept in good, safe, usable condition. This begins with sound design, durable components, and a comprehensive management plan. The management plan should be embraced by the entities responsible for maintaining the trail network at the beginning of the implementation process. In addition, community groups, residents, business owners, developers, and other stakeholders should be engaged in the long-term stewardship of the resources preserved and enhanced by the Johnson City Rail Trail.

Routine and Remedial Maintenance

The tables on 4-11 and 4-12 include the general routine and remedial maintenance responsibilities for the Johnson City Rail Trail facility. A government staff member should be designated as the main contact for the maintenance of trail facilities near any roadway right-of-way. This staff member should coordinate with the appropriate departments to conduct maintenance activities in the field. Funding for an ongoing maintenance program should be included in the responsible agency's operating budget or Capital Improvements Program.

Maintenance needs will depend upon many factors, including trail surface type, the use of paint or thermoplastic for markings, and traffic volumes. The City of Johnson City or Elizabethton Public Works Departments, Parks and Recreation Departments, and the TDOT should make immediate repairs to any trail facilities that are damaged or have hazardous conditions. A local staff member in charge of maintenance should set up a free maintenance hotline for users to provide information about spot maintenance needs in the urban area. Appendix E includes more detail regarding costs and responsibilities.

Trail Facility Management and Administration

A memorandum of agreement (MOA) should be established between the City of Johnson City, City of Elizabethton, Washington County, and Carter County for management, operations, and maintenance of the Johnson City Rail Trail. The primary purpose of this agreement is to ensure that the public's health and safety are protected during the normal use of the trail. The Johnson City Rail Trail should be classified under this agreement as a "linear park" and maintained in a manner that is consistent with other park and trail facilities.

Administrative Structure

For a successful trail facility to be developed, it is critical for those involved in the operations and management of the Johnson City Rail Trail to understand their role in supporting and managing the trail. The Johnson City Rail Trail will be developed and maintained by the City of Johnson City. Figure 4.6 on page 4-10 illustrates the organizational structure for operating and managing the future rail trail. Listed below are the key departments and organizations that will play a role in the implementation, maintenance, and management of the trail.

Johnson City MTPO

Coordination for transportation grant funding. In the event additional coordination is needed for other roles, the Johnson City MTPO could serve as a facilitator of meetings, especially if it involves the Mayors or City Managers of each jurisdiction.

Non-Transportation related park and recreation grants City of Johnson/City of Elizabethton utilizing the grant services of the First Tennessee Development District. They currently serve this role for both cities.

Johnson City Parks and Recreation Department

Scheduling events, marketing, etc.

Elizabethton Parks and Recreation Department

Same as above, but with a coordination role with Johnson City Parks and Recreation Department on scheduling events. Jointly, volunteers could be coordinated for various tasks, such as guided trail walks, seasonal clean ups, etc. Coordination meetings could also be shared between the two departments. The MTPO can facilitate these meetings to get things started.

Police Departments

At present each department will patrol their own jurisdictions, just as they do now. Again, the MTPO can facilitate the meetings to get things started.

Johnson City Public Works and Elizabethton Public Works

Johnson City Public Works Department would have the overall responsibility for the trail maintenance, with a supporting role from the Elizabethton Public Works Department. The MTPO will be the facilitator for this shared role.

Staffing Needs

In addition to funding for routine and non-routine maintenance activities, it is recommended that additional staffing needs be considered during the annual budgeting process. These additional staffing needs include a Trail Coordinator who would be responsible for implementing the trail maintenance management system and coordinating volunteers responsible for trail maintenance. It is recommended that this new position be a full-time staff person supervised by the Johnson City MTPO. It is recognized that adding additional staff may not be immediately possible, and in many small-to-medium sized communities the duties and responsibilities of the Trail Coordinator are handled by existing City staff until additional staff can be hired.

Suggested Assignments

The Operations and Maintenance Tables on pages 4-11 and 4-12, respectively, suggest tasks for the key players involved in implementation of the Johnson City Rail Trail. Actual roles and tasks may vary, depending on how this plan is implemented over time and the -ongoing level of interest and involvement by specific stakeholders. Appendix E includes additional information on safety and security measures and policies, operations, and maintenance of the Johnson City Rail Trail.

Figure 4.6 Organizational Chart for Johnson City Rail Trail

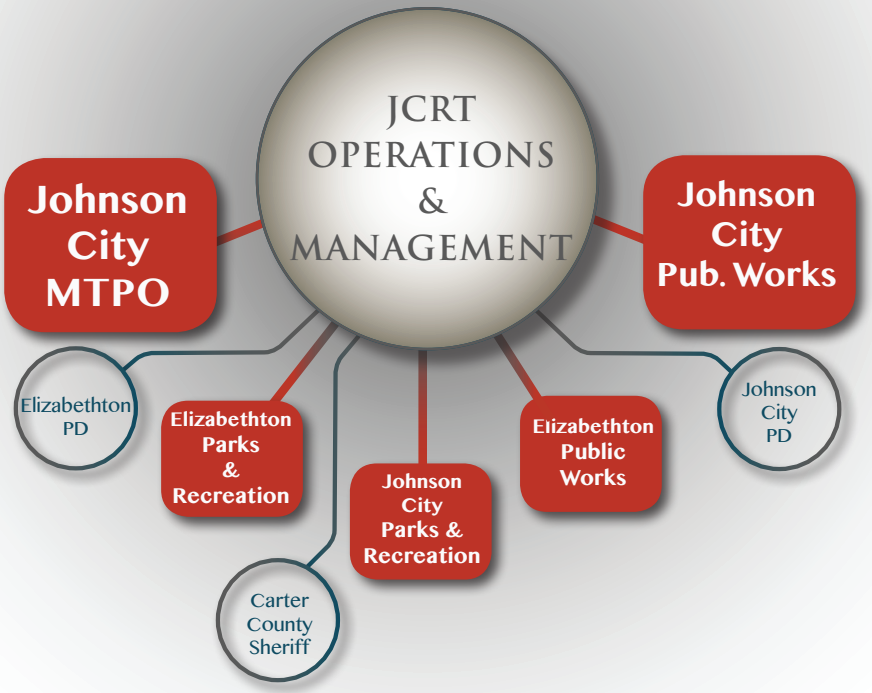


Table 4.2 Operations Tasks

Task	Responsible Party	Description
Task: Interagency Design Review Coordination between and commitment of agencies responsible for trail facilities is crucial to complete the following routine maintenance tasks. Department managers; planners, designers, and engineers; police and fire rescue workers; and field maintenance personnel should be consulted in the design and review process.	MTPO	Establish a coordinating committee with representatives from each of the participating agencies and stakeholders.
		Identify an entity to provide on-going oversight, coordination, and leadership for the overall network.
		Review critical public and private sector projects that might impact the trail, bicycle, and pedestrian projects as they come on line.
		Pursue grants and cooperative agreements
		Monitor operations and maintenance and other advocacy functions now and over the years to come.
		Review accident and crime reports, and take the necessary up-front actions on a case-by-case basis to ensure that trail, bicycle, and pedestrian facilities do not deteriorate due to safety concerns, crime, or fear of criminal activity.
Task: Accurate and Organized Record Keeping Good record-keeping techniques are essential to a comprehensive operations and maintenance program. This information can be used to eliminate overlap or gaps in maintenance services provided, identify levels of use, and prioritize management needs.	MTPO	Daily activities
		Schedule of routine (and remedial) maintenance tasks
		Hazards, incidents, safety issues observed, and action taken
		Inspection reports
		Annual maintenance budget, pursuing various funding sources
		Projected costs for subsequent years (short-, medium-, and long-term) to reflect on project phasing as shown in the Recommendations section
		Internal working database for existing, planned, or proposed projects for trail system
Task: Program Development	MTPO and Parks & Recreation	Update informational signage (rules and regulations) to communicate proper usage of all network facility types.
		Update directional signage to integrate trail, bicycle, and pedestrian systems and as new projects are implemented.
		Update user maps to reflect any additions or changes to the systems or overall network and also reference the connections between trail, bicycle, and pedestrian facilities.
Task: General Operations	MTPO	Provide contact information and institute an agency response for facility users to report questions, comments, concerns, or complaints regarding the trail
		Continue to provide and establish new public education and citizen participation programs for network users.
		Pursue development of an easy to use management manual and training program, and incorporate it into existing and new maintenance programs and procedures within the participating agencies.

Table 4.3 Maintenance Tasks

Task	Responsible Party	Description
Task: Facility Maintenance Basic housekeeping of trail facilities will ensure that the network is clean and functional and will also improve the life of each facility. Volunteer efforts should be utilized in the performance of this maintenance task.	Public Works	Tree and shrub trimming and pruning
		Mowing of vegetation
		Mulching and edging
		Invasive species control
Task: Facility Repair or Replacement All facilities will require repair or replacement at one time or another. The time between observation and repair or replacement will depend on whether the needed repair is deemed a hazard, to what degree the needed repair will affect the safety of the user, and whether the needed repair can be performed by an in-house maintenance crew or if it is so extensive that the needed repair must be done by outside entities or replaced completely. Some repairs are minor, such as repainting or resurfacing, and can be done in conjunction with other capital projects, such as repaving the adjacent street.	Public Works	Replenish gravel, mulch, or other materials
		Repaint/restripe/stain
		Repave/seal
		Replace asphalt or concrete
		Remove encroaching debris along paved trail/sidewalk edges
		Regrade to prevent or eliminate low spots and drainage issues
		Add culverts, bridges, boardwalks, retaining walls, etc., to prevent or eliminate drainage/erosion issues
		Reroute trail, if necessary, to avoid environmentally sensitive or overused areas and any safety issues
Task: Seasonal Maintenance Seasonal tasks should be performed as needed. When conditions cannot be improved to provide for safe use, the facility should be closed to prevent the risk of injury to facility users. Designated maintenance crews will remove leaf debris, snow, ice, etc., from all network facilities as soon as possible. Leaf debris is potentially hazardous when wet, and special attention should be given to facilities with heavier usage. Ice control and the removal of ice build-up is a continual factor because of the freeze-thaw cycle. Ice control is most important on grade changes and curves. Ice can be removed or gravel/ice melt applied. After the ice is gone, leftover gravel should be swept as soon as possible	Public Works	Remove leaf litter from network facilities via raking, blowing, mulching, etc. as needed to sustain the safe usability of all network facilities and prevent any storm water drainage or erosion issues
		Remove snow and ice from network facilities, via shoveling, picking, salt, sand, etc. as soon as possible after storm
Task: Habitat Enhancement and Control Habitat enhancement and control can improve aesthetics, help prevent erosion, and provide for wildlife habitat. Habitat control involves mitigation of damage caused by wildlife.	Public Works	Plant vegetation, such as trees and shrubs
		Take preventative measures to protect landscape features from wildlife, such as installing fencing around sensitive or newly planted plant materials
		Apply herbicide to eliminate any problem plant species, such as poison ivy, kudzu, etc.
		Apply herbicide to maintain facility edges and prevent encroaching vegetation, such as along trails and sidewalks
		Deter interaction between facility users and facility inhabitants, such as feeding the wildlife, etc.

Trail Implementation: Role of the Private Sector

Private organizations can play a significant role in the development and management of trail systems; local, regional, and national organizations provide various types of help. Local organizations can make in-kind donations, volunteer labor, and construct and maintain sections of a trail. Regional and national organizations can provide similar types of support including the provisioning of grants and other funding schemes. When new businesses or sub-divisions are constructed near or adjacent to a trail facility, they may agree to share responsibility in supporting operations and maintenance, as well as providing access and dedicating open space. To various degrees, partnerships between other private, public, and non-profit agencies can also be formed in creating a diversified, stable support system for the trail network. There are a variety of ways in which some of these occur and below are a few examples:

Adopt-a-Trail Program:

Private organizations and other volunteers can take on maintenance and other responsibilities of particular trail sections; for example, the Tennessee Eastman Hiking and Canoeing Club helps maintain sections of the nearby Appalachian Trail.

In-kind Donations:

Materials and labor can be donated for specific trail projects.

Trust Fund/Endowments:

Endowments can include a mixture of funds from private and public sources

Grants:

Numerous grants of various amounts are available.

Miscellaneous other Opportunities:

There are various micro-campaigns, such as auctions, bake sales, and other community level approaches. The ideas for fundraising are unlimited.

In North Carolina, Blue Cross Blue Shield recently funded the construction of parts of trail systems and other facilities in three different cities as part of their Get Outside North Carolina! program. This initiative was created to help reduce obesity and health problems related to physical inactivity. In 2012, Blue Cross Blue Shield supported over $1 million worth of trail projects in Wilmington, Raleigh, and Charlotte.

Blue Cross Blue Shield's Tennessee Health Foundation also provides support for community projects, including ones related to curtailing obesity. The following website provides further information: http://www.bcbst.com/about/community/TN-health-foundation/

Other organizations located in northeastern Tennessee or nationwide that provide resources for trail systems and community programs include the following:

- (Tennessee) Mountain States Health Alliance - Mountain States Foundation - http://www.mountainstatesfoundation.org/
- (National) Bikes Belong Grant Program - http://www.bikesbelong.org/grants
- (National) The Kodak American Greenways Program - http://www.conservationfund.org/kodak_awards
- (National) REI Grants - http://www.rei.com/about-rei/grants02.html
- (National) Robert Wood Johnson Foundation - http://www.rwjf.org/grants/

After a trail is constructed, other developments adjacent to or nearby may take place and affect trail usage. Agreements can be established for new neighborhood, subdivision, and business development in such areas to help support trail maintenance, operations, and access. This type of support may include annual fees, in-kind donations, and day-to-day operations and maintenance responsibilities.

It is important to pursue support from a variety of private sources at the local, regional, and national levels. Supporting organizations can also include a mosaic of partnerships between public and non-profit agencies. By diversifying the support base, a community can ensure the longevity and reliability of a trail system. This will help in marketing the trail system and its supporting organizations, creating a community-wide sense of ownership and enthusiasm toward it, and serving as a vital component of an active, healthy community.

Rail Trail corridor near Happy Valley Road, Elizabethton, TN

Development Plan 5

Phasing Plan

The Master Plan for the Johnson City Rail Trail considers the proposed rail trail as one complete, linear project with specific trailheads and access points. The design and construction phases should also view the conversion of the rail corridor to a rail trail as one complete project if possible. While the desired outcomes and anticipated benefits of trail development will not be fully realized until the project is complete, social and economic impacts can begin to be felt by the community as soon as construction commences. In addition, significant cost savings can be gained by designing, permitting, and constructing the trail as a single project. For these reasons it is recommended the trail be developed, if possible, as a single phase.

However, it is likely that financial constraints will require the rail trail to be completed in several sections as funding becomes available. The Johnson City Rail Trail will traverse two counties and two local municipalities, with one mile in Johnson City and nine miles in Carter County and Elizabethton. The phasing strategy proposed in this chapter represents realistic goals for project implementation, assuming there is regional support and cooperation. Regardless of available funds or willing parties, it is necessary to prioritize construction of the trail into functional segments of development.

The following criteria was used as a guide to prioritize segments of trail for development:

- Point-to-point connections, to avoid trail "dead-ends"
- Service areas and population density
- Overall number of connections to public property and commercial areas
- Safety
- Public support
- Ease of construction
- Development costs

Chapter Contents

Trail development photo from Grand Canyon National Park Service
http://www.flickr.com/photos/grand_canyon_nps/

Those sections that fulfilled multiple criteria were given higher priority. The criteria should be revisited when closer to implementation. It is important to note that the phasing plan for physical development is contingent upon the successful completion of responsibility for trail operations and maintenance by Johnson City and Elizabethton. No public facilities can be developed until these tasks have been completed. Table 5.1 shows the phases broken out by segments and total lengths.

The Johnson City Rail Trail will likely be constructed in phases.

Table 5.1 Johnson City Rail Trail Phasing Plan

Description	Segment(s)	Length
Phase 1: Johnson City to Lions Field	1 through 7	4.5 miles
Phase 2: Lions Field to EHS	7 through 10	2.25 miles
Phase 3: EHS to Hattie Street	10 through 11	1.25 miles
Phase 4: Hattie Street to State Line Road	12 through 15	2.5 miles

Opinion of Probable Costs

Tables on the following pages indicate development costs by phase. Detailed budgetary cost estimates for both design and construction of the proposed Johnson City Rail Trail are summarized in Table 5.2. More detailed cost by segment are included in Appendix D. A total cost summary for structural improvements is presented first, followed by a similar summary for each segment.

All cost estimates should be considered with the following notes and limitations in mind:

- This "Opinion of Probable Cost" (OPC) should not be considered a guaranteed maximum cost, but instead is a professional opinion of probable construction costs at the time of this study. Costs should be revisited every two years and updated accordingly. It should be anticipated that bids and actual costs will vary from this OPC.
- The "Cost Factor", as utilized, is a percentage of calculated costs, which is added to the subtotal. The Cost Factor helps compensate for unknown elements or conditions, variations in quantities used, and other unforeseen circumstances.
- A separate "Contingency Fund" should be developed above and beyond the total figure in the OPC. This fund will provide for modifications to the design, higher than anticipated costs, and other program alterations after construction initiation.

Table 5.2 Johnson City Rail Trail Cost by Phasing Plan

Description	Length	Cost
Phase 1	4.5 miles	$3.1 million
Phase 2	2.25 miles	$850,450
Phase 3	1.25 miles	$389,048
Phase 4	2.5 miles	$871,162
TOTAL	10 miles	$5.2 million

Implementation Schedule

Every trail project is unique, and, therefore, it is important to develop an implementation schedule that will meet the needs of the community while also taking into account budgetary constraints. Significant streamlining occurs when various phases of construction are consolidated into larger projects, and design and permitting for the entire project can be reviewed as one project. In the event that the Johnson City Rail Trail project is not able to be funded as a single construction project and must be phased by section, a general schedule for the implementation of a single phase or section can be seen by looking at "typical" time frames for the various processes that projects must go through. These time frames are generally consistent, regardless of the size of a particular project. The general schedule presented at right is based on similar greenway project schedules. Since some of these processes occur simultaneously, the times listed are not cumulative. Items considered to be on the "critical path" are shown in the second column from the right.

PHASE 1
Project Summary

NO.	ITEM	QTY.	UNIT	COST	EXTENSION
A.	**EARTHWORK, DEMOLITION, CLEARING + EROSION CONTROL**				
1	Clearing + Grubbing (includes litter and vandalism removal)	25,345	LF	$3.00	$76,035.00
2	Silt Fence (Each Side)	50,190	LF	$3.00	$150,570.00
3	Fine Grading (0-5 cu ft/lf)	25,345	LF	$4.28	$108,476.60
4	Construction Entrance	3	EA	$3,000.00	$7,500.00
5	Bank Stabilization	1,699	LF	$4.28	$7,271.72
6	Hydroseeding	25,345	LF	$0.32	$8,110.40
	Total Earthwork, Demolition, Clearing + Erosion Control				***$357,963.72***
B	**GENERAL CONSTRUCTION**				
7	6" Base Course (Where Required)	10,100	LF	$13.33	$134,633.00
8	4-'0" high Black 3-board Fence	1,056	LF	$25.00	$26,400.00
11	6'-0" high opaque fencing	1,490	LF	$20.00	$29,800.00
12	4'-0" high evergreen vegetative screening	3,701	LF	$50.00	$185,025.00
13	Retaining Walls	0	SFF	$45.00	$0.00
14	Curb and Gutter	0	LF	$12.00	$0.00
	Total General Construction				***$375,858.00***
C.	**STRUCTURES AND SPECIAL FEATURES**				
15	Lighting and Wiring of Overpasses and Underpasses	10	LS	$11,000.00	$104,500.00
16	Rehabilitation of Existing Structures (see separate costing information for structures)	8	LS	Varies	$1,455,800.00
18	Gateways	6	EA	$1,180.00	$6,490.00
19	Special Features (e.g., trailheads, overlooks, trail curbs, etc.)	1	EA	Varies	$45,000.00
20	Interpretive/Gateway Signage	5	EA	$1,800.00	$9,000.00
21	Kiosks	2	EA	$2,500.00	$5,000.00
22	Mile Markers	39	EA	$325.00	$12,675.00
23	Tree Planting	0	EA	$500.00	$0.00
24	Enhanced Shrub Layer	0	LF	$50.00	$0.00
	Trash/Recycle Receptacles	3	EA	$350.00	$875.00
	Benches	3	EA	$450.00	$1,125.00
	Total Structures and Special Features				***$1,640,465.00***
D.	**SAFETY TREATMENTS**				
26	Detectable Warning Mat	24	EA	$175.00	$4,200.00
27	Signage (Traffic Control, Directional)	40	EA	$250.00	$10,000.00
28	Bank Stabilization/Retaining Wall	0	LF	$40.00	$0.00
29	Intersection Treatment (Unsignalized Crossing with curb ramp, curb improvements and crosswalk	15	EA	$5,525.00	$82,875.00
30	Intersection Treatment 2 (Signalized Crossing - Countdown Signal Only)	0	EA	$10,020.00	$0.00
31	Raised Crosswalk	0	EA	$7,000.00	$0.00
32	Intersection Treatment 2 (Signalized Crossing - HAWK)	1	EA	$52,500.00	$52,500.00
33	Black wrought iron fencing along steep slopes	0	LF	$90.00	$0.00
	Total Safety Treatments				***$149,575.00***
E.	**OTHER**				
34	Registered Land Survey	25,345	LF	$2.00	$50,690.00
	Total Other				***$50,690.00***
	SUBTOTAL ALL AREAS				$2,574,551.72
	COST FACTOR		20%	Contingency	$514,910.34
	GRAND TOTAL ALL AREAS				$3,089,462.06

SUMMARY OF PROBABLE COSTS

	CATEGORY	% OF TOTAL	TOTAL
A.	**Earthwork, Demolition, Clearing + Erosion Control**	**12%**	**$357,963.72**
B.	**General Construction**	**12%**	**$375,858.00**
C.	**Bridges and Special Features**	**53%**	**$1,640,465.00**
D.	**Safety Treatments**	**5%**	**$149,575.00**
E.	**Other**	**2%**	**$50,690.00**
	COST FACTOR	**17%**	**$514,910.34**
	GRAND TOTAL ALL AREAS	**100%**	**$3,089,462.06**

PHASE 2
Project Summary

NO.	ITEM	QTY.	UNIT	COST	EXTENSION
A.	**EARTHWORK, DEMOLITION, CLEARING + EROSION CONTROL**				
1	Clearing + Grubbing (includes litter and vandalism removal)	11,591	LF	$3.00	$34,773.00
2	Silt Fence (Each Side)	22,300	LF	$3.00	$66,900.00
3	Fine Grading (0-5 cu ft/lf)	11,591	LF	$4.28	$49,609.48
4	Construction Entrance	2	EA	$3,000.00	$4,500.00
5	Bank Stabilization	0	LF	$4.28	$0.00
6	Hydroseeding	11,591	LF	$0.32	$3,709.12
	Total Earthwork, Demolition, Clearing + Erosion Control				***$159,491.60***
B	**GENERAL CONSTRUCTION**				
7	6" Base Course (Where Required)	5,400	LF	$13.33	$71,982.00
8	4-'0" high Black 3-board Fence	0	LF	$25.00	$0.00
11	6'-0" high opaque fencing	0	LF	$20.00	$0.00
12	4'-0" high evergreen vegetative screening	2,099	LF	$50.00	$104,925.00
13	Retaining Walls	0	SFF	$45.00	$0.00
14	Curb and Gutter	0	LF	$12.00	$0.00
	Total General Construction				***$176,907.00***
C.	**STRUCTURES AND SPECIAL FEATURES**				
15	Lighting and Wiring of Overpasses and Underpasses	1	LS	$11,000.00	$5,500.00
16	Rehabilitation of Existing Structures (see separate costing information for structures)	1	LS	Varies	$64,000.00
18	Gateways	1	EA	$1,180.00	$590.00
19	Special Features (e.g., trailheads, overlooks, trail curbs, etc.)	0	EA	Varies	$0.00
20	Interpretive/Gateway Signage	0	EA	$1,800.00	$0.00
21	Kiosks	0	EA	$2,500.00	$0.00
22	Mile Markers	16	EA	$325.00	$5,200.00
23	Tree Planting	184	EA	$500.00	$92,000.00
24	Enhanced Shrub Layer	2,540	LF	$50.00	$127,000.00
	Trash/Recycle Receptacles	1	EA	$350.00	$175.00
	Benches	1	EA	$450.00	$225.00
	Total Structures and Special Features				***$294,690.00***
D.	**SAFETY TREATMENTS**				
26	Detectable Warning Mat	17	EA	$175.00	$2,975.00
27	Signage (Traffic Control, Directional)	18	EA	$250.00	$4,500.00
28	Bank Stabilization/Retaining Wall	0	LF	$40.00	$0.00
29	Intersection Treatment (Unsignalized Crossing with curb ramp, curb improvements and crosswalk	9	EA	$5,525.00	$46,962.50
30	Intersection Treatment 2 (Signalized Crossing - Countdown Signal Only)	0	EA	$10,020.00	$0.00
31	Raised Crosswalk	0	EA	$7,000.00	$0.00
32	Intersection Treatment 2 (Signalized Crossing - HAWK)	0	EA	$52,500.00	$0.00
33	Black wrought iron fencing along steep slopes	0	LF	$90.00	$0.00
	Total Safety Treatments				***$54,437.50***
E.	**OTHER**				
34	Registered Land Survey	11,591	LF	$2.00	$23,182.00
	Total Other				***$23,182.00***
	SUBTOTAL ALL AREAS				$708,708.10
	COST FACTOR		20%	Contingency	$141,741.62
	GRAND TOTAL ALL AREAS				$850,449.72

SUMMARY OF PROBABLE COSTS

	CATEGORY	% OF TOTAL	TOTAL
A.	**Earthwork, Demolition, Clearing + Erosion Control**	**19%**	**$159,491.60**
B.	**General Construction**	**21%**	**$176,907.00**
C.	**Bridges and Special Features**	**35%**	**$294,690.00**
D.	**Safety Treatments**	**6%**	**$54,437.50**
E.	**Other**	**3%**	**$23,182.00**
	COST FACTOR	**17%**	**$141,741.62**
	GRAND TOTAL ALL AREAS	**100%**	**$850,449.72**

PHASE 3
Project Summary

NO.	ITEM	QTY.	UNIT	COST	EXTENSION
A.	**EARTHWORK, DEMOLITION, CLEARING + EROSION CONTROL**				
1	Clearing + Grubbing (includes litter and vandalism removal)	5,940	LF	$3.00	$17,820.00
2	Silt Fence (Each Side)	12,000	LF	$3.00	$36,000.00
3	Fine Grading (0-5 cu ft/lf)	5,940	LF	$4.28	$25,423.20
4	Construction Entrance	0	EA	$3,000.00	$0.00
5	Bank Stabilization	0	LF	$4.28	$0.00
6	Hydroseeding	5,940	LF	$0.32	$1,900.80
	Total Earthwork, Demolition, Clearing + Erosion Control				***$81,144.00***
B	**GENERAL CONSTRUCTION**				
7	6" Base Course (Where Required)	3,000	LF	$13.33	$39,990.00
8	4-'0" high Black 3-board Fence	0	LF	$25.00	$0.00
11	6'-0" high opaque fencing	0	LF	$20.00	$0.00
12	4'-0" high evergreen vegetative screening	1,185	LF	$50.00	$59,250.00
13	Resurface Access Road	775	LF	$22.00	$17,050.00
14	Curb and Gutter	775	LF	$12.00	$9,300.00
	Total General Construction				***$125,590.00***
C.	**STRUCTURES AND SPECIAL FEATURES**				
15	Lighting and Wiring of Overpasses and Underpasses	0	LS	$11,000.00	$0.00
16	Rehabilitation of Existing Structures (see separate costing information for structures)	0	LS	Varies	$0.00
18	Gateways	1	EA	$1,180.00	$1,180.00
19	Special Features (e.g., trailheads, overlooks, trail curbs, etc.)	775	EA	Varies	$38,750.00
20	Interpretive/Gateway Signage	1	EA	$1,800.00	$1,800.00
21	Kiosks	0	EA	$2,500.00	$0.00
22	Mile Markers	9	EA	$325.00	$2,925.00
23	Tree Planting	64	EA	$500.00	$32,000.00
24	Enhanced Shrub Layer	0	LF	$50.00	$0.00
	Trash/Recycle Receptacles	0	EA	$350.00	$0.00
	Benches	0	EA	$450.00	$0.00
	Total Structures and Special Features				***$76,655.00***
D.	**SAFETY TREATMENTS**				
26	Detectable Warning Mat	9	EA	$175.00	$1,575.00
27	Signage (Traffic Control, Directional)	10	EA	$250.00	$2,500.00
28	Bank Stabilization/Retaining Wall	0	LF	$40.00	$0.00
29	Intersection Treatment (Unsignalized Crossing with curb ramp, curb improvements and crosswalk	5	EA	$5,525.00	$24,862.50
30	Intersection Treatment 2 (Signalized Crossing - Countdown Signal Only)	0	EA	$10,020.00	$0.00
31	Raised Crosswalk	0	EA	$7,000.00	$0.00
32	Intersection Treatment 2 (Signalized Crossing - HAWK)	0	EA	$52,500.00	$0.00
33	Black wrought iron fencing along steep slopes	0	LF	$90.00	$0.00
	Total Safety Treatments				***$28,937.50***
E.	**OTHER**				
34	Registered Land Survey	5,940	LF	$2.00	$11,880.00
	Total Other				***$11,880.00***
	SUBTOTAL ALL AREAS				$324,206.50
	COST FACTOR		20%	Contingency	$64,841.30
	GRAND TOTAL ALL AREAS				$389,047.80

SUMMARY OF PROBABLE COSTS

	CATEGORY	% OF TOTAL	TOTAL
A.	**Earthwork, Demolition, Clearing + Erosion Control**	**21%**	**$81,144.00**
B.	**General Construction**	**32%**	**$125,590.00**
C.	**Bridges and Special Features**	**20%**	**$76,655.00**
D.	**Safety Treatments**	**7%**	**$28,937.50**
E.	**Other**	**3%**	**$11,880.00**
	COST FACTOR	**17%**	**$64,841.30**
	GRAND TOTAL ALL AREAS	**100%**	**$389,047.80**

PHASE 4
Project Summary

NO.	ITEM	QTY.	UNIT	COST	EXTENSION
A.	**EARTHWORK, DEMOLITION, CLEARING + EROSION CONTROL**				
1	Clearing + Grubbing (includes litter and vandalism removal)	12,882	LF	$3.00	$38,646.00
2	Silt Fence (Each Side)	25,500	LF	$3.00	$76,500.00
3	Fine Grading (0-5 cu ft/lf)	12,882	LF	$4.28	$55,134.96
4	Construction Entrance	2	EA	$3,000.00	$6,000.00
5	Bank Stabilization	0	LF	$4.28	$0.00
6	Hydroseeding	12,882	LF	$0.32	$4,122.24
	Total Earthwork, Demolition, Clearing + Erosion Control				***$180,403.20***
B	**GENERAL CONSTRUCTION**				
7	6" Base Course (Where Required)	6,200	LF	$13.33	$82,646.00
8	4-'0" high Black 3-board Fence	9,657	LF	$25.00	$241,425.00
11	6'-0" high opaque fencing	210	LF	$20.00	$4,200.00
12	4'-0" high evergreen vegetative screening	550	LF	$50.00	$27,500.00
13	Retaining Walls	0	SFF	$45.00	$0.00
14	Curb and Gutter	0	LF	$12.00	$0.00
	Total General Construction				***$355,771.00***
C.	**STRUCTURES AND SPECIAL FEATURES**				
15	Lighting and Wiring of Overpasses and Underpasses	0	LS	$11,000.00	$0.00
16	Rehabilitation of Existing Structures (see separate costing information for structures)	2	LS	Varies	$4,000.00
18	Gateways	1	EA	$1,180.00	$1,180.00
19	Special Features (e.g., trailheads, overlooks, trail curbs, etc.)	0	EA	Varies	$0.00
20	Interpretive/Gateway Signage	3	EA	$1,800.00	$5,400.00
21	Kiosks	1	EA	$2,500.00	$2,500.00
22	Mile Markers	16	EA	$325.00	$5,200.00
23	Tree Planting	44	EA	$500.00	$22,000.00
24	Enhanced Shrub Layer	0	LF	$50.00	$0.00
	Trash/Recycle Receptacles	2	EA	$350.00	$700.00
	Benches	2	EA	$450.00	$900.00
	Total Structures and Special Features				***$41,880.00***
D.	**SAFETY TREATMENTS**				
26	Detectable Warning Mat	32	EA	$175.00	$5,600.00
27	Signage (Traffic Control, Directional)	37	EA	$250.00	$9,250.00
28	Bank Stabilization/Retaining Wall	0	LF	$40.00	$0.00
29	Intersection Treatment (Unsignalized Crossing with curb ramp, curb improvements and crosswalk	16	EA	$5,525.00	$88,400.00
30	Intersection Treatment 2 (Signalized Crossing - Countdown Signal Only)	0	EA	$10,020.00	$0.00
31	Raised Crosswalk	0	EA	$7,000.00	$0.00
32	Intersection Treatment 2 (Signalized Crossing - HAWK)	0	EA	$52,500.00	$0.00
33	Black wrought iron fencing along steep slopes	210	LF	$90.00	$18,900.00
	Total Safety Treatments				***$122,150.00***
E.	**OTHER**				
34	Registered Land Survey	12,882	LF	$2.00	$25,764.00
	Total Other				***$25,764.00***

SUBTOTAL ALL AREAS		$725,968.20
COST FACTOR	20% Contingency	$145,193.64
GRAND TOTAL ALL AREAS		$871,161.84

SUMMARY OF PROBABLE COSTS

	CATEGORY	% OF TOTAL	TOTAL
A.	**Earthwork, Demolition, Clearing + Erosion Control**	**21%**	**$180,403.20**
B.	**General Construction**	**41%**	**$355,771.00**
C.	**Bridges and Special Features**	**5%**	**$41,880.00**
D.	**Safety Treatments**	**14%**	**$122,150.00**
E.	**Other**	**3%**	**$25,764.00**
	COST FACTOR	**17%**	**$145,193.64**
	GRAND TOTAL ALL AREAS	**100%**	**$871,161.84**

Budget Estimates for Maintenance of the Johnson City Rail Trail

The Rails-To-Trails Conservancy reports that average operations and maintenance costs are approximately $1,500 per mile (for both paved and non-paved trails); however, this is an estimate, as factors such as usage intensity, the amount of volunteer labor used, geographical location, and specific activities included in the budget can affect annual per mile operations and maintenance costs.

The examples provided starting on page F-4 of Appendix E, "Operations and Management", highlight typical rail trail operations and maintenance costs along with other context-dependent activities. Each rail trail, such as Johnson City's, will have its unique operations and maintenance activities and costs, but careful planning can help identify and prepare for these in creating a successful rail trail system. For budgeting purposes, a range can be estimated using comparable trail projects and estimating trail use and location. The maintenance budget for the Johnson City Rail Trail can be estimated in the range of $3,000 to $5,000 per mile, or $30,000-50,000 per year.

Table 5.3 Estimated Project Timeline

Process	Description	Critical Path Tasks (mos)	Concurrent Tasks (Mos)
RFQ	Request for Qualifications and Consultant Selection	3	
Contracting	Contracting between the City and the Consultant	2	
Survey	Detailed survey of the project area	2	
Preliminary Design	Preliminary Design of the Project	3	
Review	Review of Preliminary Design by Regulatory Agencies	3	
Permits	Application for local, state, federal permits		18
Final Design	Final Design of the project		2
Review	Review of Final Design by Regulatory Agencies		1
CD's	Preparation of Construction Documents	2	
Bidding	Soliciting public bids for the project	2	
Contracting	Contracting between the City and the Builder	1	
Construction	Construction of the rail trail	8 - 18	
TOTAL TIME FOR ONE PHASE OF DESIGN/CONSTRUCTION: 26-36 MONTHS			

Funding Strategies

Generally, greenways and trails are funded through a combination of local, state, and federal sources. Many funding programs require a minimum local match depending on the type of funding utilized. In some instances communities have successfully leveraged grant money from private foundations or state programs as a match for other funding sources. In-kind technical support is also available from federal and state agencies, such as the National Park Service.

Greenway and trail proponents should pursue a variety of funding sources for construction. Reliance on a single funding source can lead to a boom/bust cycle of construction as funding levels shift with the political winds. Appendix C "Funding Strategies" provides comprehensive information on funding programs that are typically used in Tennessee for trail development, spur trail connections, or for the implementation of associated trail features and amenities.

Analysis of Economic and Social Impact of Trail Development 6

Introduction

When considering the level of dedication in time and valuable resources that it takes to create a walkable and bikeable community, it is also important to assess the immense value of alternative transportation modes.

The City of Johnson City has purchased the 10-mile railroad corridor, formerly known as "Tweetsie" or the Eastern Tennessee/ Western North Carolina Railroad, with the intent to preserve the transportation corridor as a multi-use trail. The proposed rail trail, which will traverse portions of Washington County and Carter County, will provide users with a dedicated path separated from motorized traffic.

Trails and greenways that offer opportunities for bicycling and walking provide a wide range of impacts to individuals, their communities, and the surrounding environment. This chapter summarizes the many types of impacts that can be gained by implementing the Johnson City Rail Trail. The social and economic impacts are categorized according to the direct impacts that the development of a rail trail will have on health, transportation, property values, tourism and economic development, education, and environmental stewardship in Washington and Carter Counties. In addition to the discussion of social and economic impacts of the rail trail, potential programmatic initiatives are included and should be considered for implementation by the City, further enhancing the positive impacts of the rail trail on the community.

Economic Impacts of Trail Development

Trails and greenways can be viewed as linear parks or green spaces and are important place-making amenities that influence the economies of communities in a wide variety of ways. Because of their impact, the construction of trails and greenways has become catalysts for revitalization and growth in communities all across the country.

Increased Physical Activity and Lower Health Risks

Physical activity level has been identified as a key indicator of health, with lower physical activity rates associated with an increased risk for many different diseases and health conditions. Measures that provide opportunities for physical activity are increasingly important in Tennessee, where more than 68% of the population is overweight or obese.[1] The lack of physical activity in children and youth has been identified as one of the greatest risk factors for obesity, diabetes, and heart disease, in childhood and later in life.[2] It also ranks as the third-highest cause of preventable death in the United States, behind only tobacco use and poor nutrition.[3]

The Centers for Disease Control and Prevention recommend at least 150 minutes (2.5 hours) of moderate exercise each week, yet many people do not have convenient access to places where they can be physically active. A rail trail connecting

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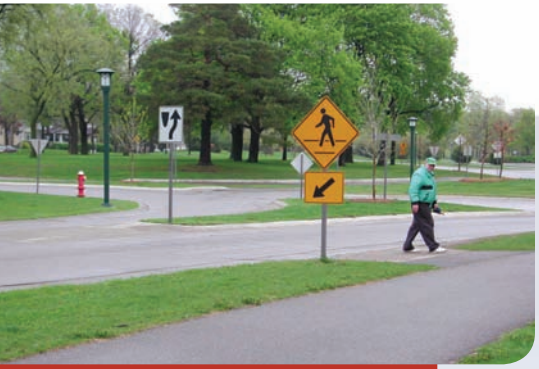
neighborhoods to basic needs, schools, and downtown areas will offer walking and bicycling opportunities for individuals, families and groups. Walking and bicycling are some of the most basic forms of physical activity, and the construction of a dedicated path separated from motorized traffic for these activities would help to better connect communities to convenient recreation and exercise options. These connections also make it possible to take short trips without needing to get in the car, thereby incorporating physical activity into daily life. Regular physical activity such as bicycling and walking:[4]

- Reduces the risk and impact of cardiovascular disease and diabetes.
- Reduces the risk of some types of cancer.
- Controls weight.
- Improves mood.
- Reduces the risk of premature death.



Using trails for physical activity creates healthy lifestyles.

The CDC reports that "30 minutes of moderately intense exercise" is equivalent to:

- 1.5 miles of walking; or
- 5 miles of bicycling; or
- 1 less slice of pizza.

In a 2008 study, adolescents who bicycle were found to be 48% less likely to be overweight in young adulthood.[5] Walking and bicycling have been shown to have longevity benefits as well. An adult cyclist typically has a level of fitness equivalent to someone 10 years younger,[6] and a life expectancy two years longer than average.[7] Being physically active for even 10 minutes at a time can produce health benefits[8] A study on the Charlotte LYNX rail line found that nearby residents who switched from driving to light rail were on average six pounds lighter than nearby residents who continued to drive, due to walking to and from transit stops.[9] These health benefits and other benefits of walking and bicycling were found to outweigh the risks by as much as 77 to 1.[10]

Lower Health Care Costs

The health and well-being benefits of increased physical activity also have a positive impact on individual and societal health costs. While obesity itself is not a disease covered by medical insurance, it can lead to other medical problems that are covered by insurance and are very costly to treat. Walking and bicycling act as preventative measures against obesity and other conditions, potentially saving individuals and families thousands of dollars on health care. A Portland, Oregon, study on the benefits of bicycle projects found that by 2040, Portland's investment of $138-605 million in bicycling will have saved $388-594 million in health care costs and $7-12 billion in statistical lives.[11] Developing the Johnson City Rail Trail and providing future spur trail connections to other existing trails and nearby neighborhoods will provide safe and accessible physical activity opportunities and help to mitigate the physical health, health care, and well-being costs of lack of exercise.

Increased Property Values

Dedicated multi-use trails are in high demand. Trails provide communities with a valuable amenity that translates into increased housing values. According to the National Association of Homebuilders, trails are consistently ranked one of the most important community amenities by prospective homebuyers, above golf courses, parks, security, and others.[12] 70% of Americans say that multi-use trails in their community is important to them,[13] and two-thirds of homebuyers consider the walkability of an area in their purchase decision.[14] This preference for communities that accommodate walking and bicycling is reflected in property values across the country.[15]

A study of over 90,000 U.S. home sales found that improved walking conditions correlated with higher housing prices

in 13 of the 15 housing markets studied, controlling for other factors that influence housing value. The results showed that houses in walkable neighborhoods have property values $4,000 to $34,000 higher than houses in areas with average walkability.[16] In Apex, NC, the Shepard's Vineyard housing development added $5,000 to the price of 40 homes adjacent to the regional greenway – and those homes were still the first to sell.[17] A similar study in Ohio found that the Little Miami Scenic Trail increases single-family home property values by $7.05 for every foot closer a property is located to the trail.[18]

Projecting the economic impacts of

"Greenways and pedestrian trails have been shown to increase the value of adjacent properties by as much as 5 to 20%."

individual private properties along the Johnson City Rail Trail corridor was beyond the scope for this master plan; however, similar benefits can likely be anticipated once the trail is complete. These cases show the tangible economic benefits that the rail trail has for homeowners and the premium that people are willing to pay to live in places that accommodate walking and bicycling.

Tourism & Economic Development

Communities are realizing the economic potential of trails as highly desirable destinations that bring dollars into the places they serve. In addition to preserving critical open space and providing important transportation options, trails and greenways attract visitors from near and far—visitors who facilitate job growth in tourism-related opportunities like restaurants, local stores, and lodging.

Investing in greenways and trails also stimulates the local economy by generating tourism revenue, supporting local business, and creating jobs.[19,20,21] Many tourists seek out places that they can experience outside of their cars, where they feel comfortable walking and bicycling to explore a new area. While there are already existing trails in both Johnson City and Elizabethton that attract visitors to the area, the rail trail will create linkages between the existing trails and increase the connected mileage of the overall greenway system, thus strengthening the region as a tourism destination. The Johnson City Rail Trail extends through downtown Elizabethton where many existing businesses are located adjacent to the corridor. These businesses will reap the benefits of new bicycle activity and foot traffic on the rail trail, and it is possible that existing businesses will expand their consumer models to offer goods and services specific to rail trail users. Items such as bottles of water, snacks, bicycle tire patch kits, batteries, and local maps could be integrated into commercial retail across Elizabethton.

A 1993 survey of 38 businesses along the Cape Cod Rail Trail in Massachusetts found that 24% of the business owners cited the rail trail as one reason they opened or acquired their business[50]. This same survey found that 60% of the businesses expanded their business, and of those, one-half considered the rail trail a prominent factor in this decision.[22]

Rail-to-Trails on the Schuylkill River Trail in Pennsylvania reports "the average trail user spends $9.07 per trip on soft goods (beverages, snacks, restaurant meals, etc.), amounting to $3,628,000 contributed annually in local economies"[51]. An estimated 1,400 jobs are created or supported each year with expenditures from bicycle tourists. Moreover, quality bicycling conditions played a major part in many tourists' choice of destination and duration of stay: 43% of visitors surveyed considered bicycling in their decision to vacation in the Outer Banks, while 53% reported bicycling as a major factor in deciding to return to the area in the future. 12% decided to stay in the area longer because of the quality of local bicycle facilities, with an average extension of four days.

A group of cyclists leave the Atlantic & Yadkin Rail Trail and travel into downtown Greensboro, NC to seek out a lunch stop.

Similar tourism benefits are seen elsewhere in the state and around the country. As seen in Table 6.1, an economic impact analysis of the proposed Hendersonville-to-Brevard Ecusta Rail Trail in NC, estimates that the future rail trail will:[23]

- Support 180 jobs
- Generate $1.2 million per year in tourism revenue
- Attract 1,600 new exercisers and 20,000 new visitors to the area each year
- Generate $22 million in property value increases
- Yield $5 million per year in health care cost reductions

In San Antonio, Texas, the River Walk has surpassed the Alamo as the most popular attraction for the city's $3.5 billion tourism industry. This downtown network of walkways was created for just $425,000.[24]

The 141-mile Great Allegheny Passage (GAP) trail that stretches from Pittsburgh, Pennsylvania, to Cumberland, Maryland, generated $40 million in revenue from trail users in 2008, and an additional $7.5 million in wages were attributed to the GAP.[25] These projects show the potential for relatively low-cost walking and bicycling improvements to generate a high return on investment, attracting homebuyers, workers, and visitors who increase local revenue and support jobs and businesses year after year.

"Nothing Compares to the Simple Pleasure of a Bike Ride"

(John F. Kennedy)

Table 6.1: Job Creation by Project

Project	Jobs Created and/or Supported
$1M on road construction	7 jobs
$1M on bicycle facilities	11-14 jobs
Ecusta Rail Trail	180 jobs
Outer Banks paths and shoulders	1,400 jobs
Great Allegheny Passage trail	$7.5 million in wages

Source: Ecusta Rail Trail Planning Study and Economic Impact Analysis. (2012).

Table 6.2: Trip Distances

Trip Distances	% of Trips	Cumulative % of Trips	Minutes to Walk	Minutes to Bicycle
1 mile or less	28	28	15	5
1.1 – 2 miles	13	41	30	10
2.1 – 3 miles	9	50	45	15

Source: U.S. Department of Transportation and Federal Highway Administration. (2009). National Household Travel Survey.

"THE TRUE CHARM OF PEDESTRIANISM DOES NOT LIE IN THE WALKING, OR IN THE SCENERY, BUT IN THE TALKING…THE SCENERY AND THE WOODSY SMELLS ARE GOOD TO BEAR IN UPON A MAN AN UNCONSCIOUS AND UNOBTRUSIVE CHARM AND SOLACE TO EYE AND SOUL AND SENSE; BUT THE SUPREME PLEASURE COMES FROM THE TALK."

(MARK TWAIN)

Transportation

According to the 2011 Bicycle and Pedestrian Safety Survey, at least 60% of Tennesseans would walk or bike more for daily trips if walking and bicycling conditions were improved in their community. With appropriate accommodations, walking and bicycling can provide alternatives to driving for commuting to work, running errands, or making other short trips. Half of all trips made in the U.S. are three miles or less, yet 72% of these short trips are automobile-based (see Table 6.2 on this page).[26] Many of these could easily be made by walking or bicycling on the rail trail because it will be a safe, efficient, and convenient facility that connects citizens and visitors to many basic needs.

Reduced Vehicle Miles Traveled (VMT) & Congestion

Taking short trips by foot or by bike can help to greatly reduce motor vehicle miles driven and traffic congestion. Under the Nonmotorized Transportation Pilot Program, bicycling and walking investments averted an estimated 32 million driving miles in four pilot communities between 2007 and 2010.[27] These individual changes in travel behavior can add up to produce significant societal benefits. An individual who shifts 160 annual trips (about three per week) averaging 2.4 miles from driving to bicycling reduces congestion costs to other road users by approximately $216 in urban areas and about $108 in rural settings.[28] Traffic on arterials and other streets, such as Elk

Avenue in Elizabethton, can be mitigated as people use the network of existing sidewalks and trails that will connect to the Johnson City Rail Trail and enable users to access more destinations. Parking lots can also be made less congested by reducing crowding, circling, and waiting for open spots, as more people replace their two- to three-mile automobile trips with bicycle trips.

Affordable Transportation Options & Cost-Efficient Projects

Walking and bicycling are among the most affordable forms of transportation. According to an annual study conducted by the American Automobile Association (AAA), the average cost of owning and operating one car for one year is $8,946, while walking is virtually free, and owning and operating a bicycle for one year costs approximately $120.[29,30] Chapter 2 of this Master Plan contains an Environmental Justice analysis that identifies populations of minorities, populations of people living in poverty, and areas of limited English proficiency within one-half mile of the rail trail corridor. These populations would benefit from more affordable transportation options. Another indicator that can be included in the analysis of economic impacts of trail development is vehicle ownership. Table 6.3 presents the number of households without access to a vehicle located adjacent to the rail trail corridor. Over 2,000 households surveyed in the 2010 U.S. Census do not have access to a vehicle and are located in Census tracts that are adjacent to the rail trail. These members of the community will significantly benefit from the development of the rail trail as it will provide them with a transportation corridor to access basic needs. Future spur trails that branch out into the Census tracts listed in Table 6.3 should be considered in the near term future to increase access to basic needs for the households with no vehicle access.

In addition to the personal savings costs of walking and bicycling, these transportation options also produce a number of benefits for other drivers and society as a whole. A study from the Victoria Transport Policy Institute found that replacing a single car trip with a bike trip saves individuals and society $2.73 per mile in gas costs, congestion reduction, vehicle cost savings, roadway cost savings, parking cost savings, energy conservation, air pollution reduction, and traffic safety improvements.[31] These benefits and the relatively low construction and maintenance costs make walking and bicycling projects some of the most cost-effective transportation investments possible.[32,33] For the cost of one mile of four-lane urban highway ($50 million), an entire network of facilities for a mid-sized city could be built,[34] providing feasible travel options that increase the overall efficiency of our transportation system.

According to the U.S. Census Bureau, there are more than 60 million Americans who do not drive because they are not old enough. Another 30 million adults are not licensed to drive for a variety of reasons, including economics, age, disability, and choice. Eight

Bicycling is an affordable form of transportation, and for many people, it is their primary means of transportation.

Table 6.3 Vehicle Ownership by Census Tract

Census Tracts within 1/2 Mile of Rail Trail	Total Households Surveyed	Households with No Vehicle Access	Households with Access to 1 or More Vehicles
Census Tract 701, Carter County	790	93	697
Census Tract 702, Carter County,	1564	138	1426
Census Tract 703, Carter County	2203	255	1948
Census Tract 704, Carter County	879	84	795
Census Tract 705, Carter County	1961	85	1876
Census Tract 708, Carter County	1403	77	1326
Census Tract 709, Carter County	1316	9	1307
Census Tract 710, Carter County	1279	70	1209
Census Tract 711, Carter County	807	110	697
Census Tract 712, Carter County	1686	55	1631
Census Tract 601, Washington County	1501	367	1134
Census Tract 606, Washington County	3062	201	2861
Census Tract 608, Washington County	1353	226	1127
Census Tract 609, Washington County	2311	163	2148
Census Tract 610, Washington County	1031	86	945

million Americans above the age of 60 do not have a driver's license,and there are other licensed drivers who choose not to drive.[35] If there are 90+ million non-drivers in the United States, then providing trails to increase mobility for these 90+ million non-drivers will offer a safe, efficient, and desirable place to ride a bike, enhance environmental conditions, decrease traffic congestion, improve overall health, and contribute to a greater sense of community.

Environmental Stewardship

Reduction in Vehicle Emissions & Fuel Consumption

Providing a rail trail for walking and bicycling can help to reduce automobile dependency, which in turn leads to a reduction in vehicle emissions – a benefit for Tennesseans and the surrounding environment. As of 2003, 27% of U.S. greenhouse gas emissions are attributed to the transportation sector, and personal vehicles account for almost two-thirds (62%) of all transportation emissions.[36]

Multi-use trails connect people with the natural environment.

Primary emissions that pose potential health and environmental risks are carbon dioxide, carbon monoxide, volatile organic compounds (VOCs), nitrous oxide (N_2O), and benzene. Children and senior citizens are particularly sensitive to the harmful affects of air pollution, as are individuals with heart or respiratory illnesses. Increased health risks such as asthma and heart problems are associated with vehicle emissions.[37]

Decreasing the dependency on daily motor vehicle trips and increasing the availability of alternative travel methods such as bicycling and walking can reduce emissions and assist in improving air quality. Replacing two miles of driving each day with walking or bicycling will, in one year, prevent 730 pounds of carbon dioxide from entering the atmosphere.[38] The 10-mile rail trail will enable citizens to consider replacing two miles of driving with walking or bicycling because the rail trail links neighborhoods to important basic needs destinations, such as grocery stores, schools, retail areas, and parks. Other studies have likewise shown air quality benefits as a result of increased walking and bicycling rates and reduced vehicle miles traveled:

- As of 2008, roughly 9.5% of all U.S. trips are made by walking or bicycling. A modest increase in walking and bicycling to 13% of all trips would save 3.8 billion gallons of gasoline each year and reduce CO_2 emissions by 33 million tons. A substantial increase in walk and bike rates to 25% of all trips would save 10.3 billion gallons of gasoline and prevent 91 million tons of CO_2 emissions.[39]
- Minneapolis-St. Paul, MN: If bicycles were used for half of the short trips made on good weather days, the Twin Cities could prevent 300 deaths and save $57 million in annual medical costs due to reduced air pollution and increased physical activity. Collectively, 11 major Midwest cities would save $7 billion in medical costs each year and prevent 1,100 deaths.[40]
- A 5% increase in the walkability of a neighborhood is associated with a per capita 32.1% increase in active travel, 6.5% fewer miles driven, 5.6% fewer grams of nitrous oxide (N_2O) emitted, and 5.5% fewer grams of volatile organic compounds (VOCs) emitted.[41]

By providing a variety of balanced transportation choices, citizens of Washington and Carter Counties will also have a sense of contributing to the solution of reducing air and noise emissions.

Improved Water Quality and Wildlife Habitat

There are a multitude of environmental benefits from trails, greenways, and open spaces that help to protect the essential functions performed by natural ecosystems. Multi-use trails are often included as part of greenway or green space corridors, offering transportation options while also contributing to environmental quality. Green space corridors help link fragmented tracts of land to provide larger habitats for wildlife while also protecting sensitive natural features, natural processes, and ecological integrity. These tracts of open space also contribute to cleaner air by preserving stands of plants that create oxygen and filter air pollutants such as ozone, sulfur dioxide, carbon monoxide, and airborne particles of heavy metals. Vegetation within the green space corridors also creates a buffer to protect streams, rivers, and lakes, preventing soil erosion and filtering pollution caused by agricultural and roadway runoff.[42] Trails that are built within green space corridors give bicyclists, pedestrians, and other non-motorized trail users access to these natural areas and provide safe off-road facilities for walking and bicycling. These corridors also provide opportunities for restoring wildlife habitat in areas that have been previously disturbed.

Energy Conservation and Independence

According to the National Association of Realtors and Transportation for America, 89% of Americans believe that transportation investments should support the goal of reducing energy use.[43] The transportation sector currently accounts for 71% of all U.S. petroleum use, with 40% of daily trips made within two miles or less and

28% less than a mile.[44] Providing alternative modes of travel has the potential to reduce dependency on foreign oil and promote more energy-efficient transportation choices in communities. Most of the short trips made in the U.S. and in Tennessee are single-occupancy vehicle trips, and in Washington and Carter Counties those trips could be made on foot or by bike on the rail trail.

Signage programs inform people of nearby destinations and can be used as educational tools along the rail trail. [45]

Social Impacts of Trail Development

The Johnson City Rail Trail will serve as a link to the outdoors, providing residents of Washington and Carter Counties easily accessible opportunities for community building, recreation, education, exercise and transportation. A multi-use trail is a facility that is available to all income groups, all neighborhoods, and all community groups, regardless of background and experiences. The households discussed on page 6-5 with no access to a vehicle will benefit from the development of the rail trail because it will offer a safe and reliable transportation option. Many residents will take pride in the trail, as it will become part of their daily, weekly, or monthly lives, and it will allow them to access basic needs and interact with neighbors without automobile dependence.

Community Building

Educational Opportunities

By bringing the inactive ET/WNC rail corridor back to life- a corridor which at one time played a crucial part in the region's economy- rail trail users will have a chance to rediscover the regional history of the built and natural environments.

Wayfinding signage programs that promote the historical and cultural value of a community are placemaking tools and inform trail users of important nearby destinations. Examples from Oregon and from Sycamore Shoals State Historic Area are shown here on page 6-7. As an educational and informational tool, an interpretive signage program along the rail trail has been recommended in Chapter 3 and is designed to inform trail users about the history of the former "Tweetsie" railroad and the history of the Eastern Tennessee region. In strategic locations, such as the former rock quarry and the rock feature area, the signage program will educate trail users on the geologic and hydrologic history of these features. Additional historical information should be incorporated into the signage program as trail programming progresses over time.

Similarly, a greenway can serve as a hands-on environmental classroom for people of all ages to learn historical information and experience natural landscapes, furthering environmental awareness. Local schools and community groups will be able to incorporate outdoor learning activities into their curriculums and expose children to the experience of outdoor education. According to the book Last Child in the Woods: Saving Our Children From Nature-Deficit Disorder, by Richard Louv, a reduction in time spent outside seems to increase behavioral problems, anxiety, depression, and attention deficit disorder, whereas more time outside increases an understanding of the natural world, relieves stress, and reduces undesirable behaviors. All subjects or curriculum can be presented in an outdoor classroom. Outdoor classrooms also provide alternatives for all to gain a better knowledge of what natural resources are and to understand the interconnectedness of these resources. Opportunities are available in an outdoor classroom to educate youth on the importance of taking care of the environment.[46]

Teaching proper bicycle safety skills to children and young adults will give them the confidence that they need to ride bicycles on the rail trail.

Bicycle Education & Skills

ADULTS

Bicycle Skills Training Courses should be developed and offered to adult cyclists of all levels who wish to learn bicycling technique, how to navigate busy roads and complex junctions, and how to teach their children the proper and safe way to ride a bicycle. Courses that are taught as a series of three-hour, on-bike classes on the weekends would most likely be convenient for the majority of adults. The League of American Bicyclists offers excellent resources on proper bicycling practices and have League Cycling Instructors (LCIs) that teach courses to suit the needs of any cyclist.

Public art along trails enhances the trail users' experience and promotes local artists.[47]

YOUTH

Bicycle Skills Training Courses should be developed and offered as part of summer camps or as an independent summer camp to youth cyclists of all levels to teach bicycling technique and how to navigate busy roads and complex junctions. These trainings could range from one-time, three-hour intensive trainings to a week-long series of daily, two-hour trainings as part of summer camps, to full-week bike adventure camps. The youth courses could also be incorporated into the physical education curriculum in elementary schools and middle schools, which would guarantee that a high percentage of the youth population in Johnson City and Elizabethton are taught proper and safe handling of a bicycle. The Parks and Recreation Departments of both Johnson City and Elizabethton should partner with community centers or the Boys and Girls Club to initiate adult and youth bicycle education and skills classes that can be attended in the evenings during the week or on the weekends.

LAW ENFORCEMENT

Bicycle education courses should be taught by law enforcement officers to law enforcement officers to give all officers the tools they need to properly enforce the traffic and parking laws as they relate to bicyclists and pedestrians. Carter County, for example, is already patrolling on bicycle. Individuals from their department could offer insight or lessons learned from their own experiences to other interested jurisdictions. The course curriculum should include information on the "rules of the road" for bicyclists, as well as the traffic laws for motorists. The course should be a combination of classroom instruction and field practice. The program will also be useful to police departments for educational outreach to the bicycle community or other organizations. Incorporating skills training and certification for officers who wish to patrol on bicycle could also be included in these courses.

Bicycle Repair Programs

Bike repair programs encourage the learning of technique and create feelings of empowerment in participants in the program. Many programs teach bike safety, maintenance, and on-road skills and have encouraged more people to bicycle for exercise, transportation, and leisure. In addition, these programs have increased the visibility of bicycling in communities. Community bike-repair programs take different forms, but typically they are run by local community groups. These groups acquire used bicycles, often through donations, that are repaired by volunteers who are offered training for the repairs and an option to volunteer for earn-a-bike programs. Bicycle repair programs and bicycle co-ops successfully train citizens in proper bicycle maintenance for the simple trade of sweat equity. Citizens can bring in their own bicycle and learn how to perform maintenance and repairs and, in return, offer their time to perform maintenance and repairs on donated bicycles that will be distributed back out into the community.

Public Art Program

Art is one of the best ways to strengthen the connection between neighbors, community members, business owners, and local officials. Across America and elsewhere, public green or open spaces are being dedicated to local or regional art. Artists are employing a remarkably wide range of creative strategies to foster awareness of public spaces and are lending or donating pieces of art in support of the community initiative.

In 2004, American Trails launched "Artful Ways", a new partnership with the National Park Service Rivers and Trails Program, the USDA Forest Service, and the Bureau of Land Management. Artful Ways will encourage creative ways of enhancing trail interpretation and trail-related facilities on National Recreation Trails using temporary and permanent site-based art. Johnson City should consider initiating a similar program for the Johnson City Rail Trail and partner with local artists to create engaging public art pieces for display at deliberate locations along the rail trail.

Art Walks

To compliment the public art program, Johnson City should work with the local artists to plan and promote "Art Walks on the Trail", a series of events during which local artists may display pieces of their work for sale. An "Art Walk on the Trail" event should be planned on a segment of trail that is accessible from a trailhead. The proposed shared-use parking area at Lions Field would provide adequate parking and trailhead facilities, and the area is accessible by a short bicycle trip from downtown Elizabethon. These events would raise awareness of the Johnson City Rail Trail, attract people to the facility,

create opportunities to socialize and meet new people, and promote local artists. Artists would benefit from the increased public exposure, especially those who do not have their own gallery or store front to display and sell their work.

Bicycle Parking Supports Local Establishments

Both Johnson City and Elizabethton should update local zoning, licensing, and permit processes that designate the types and numbers of bicycle parking required at private employment and retail facilities. These facilities should offer bicycle parking in safe, well-illuminated areas near entrances. Providing secure bicycle parking is a key ingredient in efforts to encourage bicycling as a form of transportation. Placing long-term bicycle parking at transit stations provides opportunities for multi-modal travel and supports alternative transportation choices. Adequate and safe places to park bicycles will draw rail trail users into downtown areas to perform any number of activities that stimulate the local economy, such as shopping or enjoying a meal at a local establishment, running an errand at the post office, or returning a library book. More information on bike parking guidelines can be found in Appendix B.

Recreational Community Activities: Weekend Walkabouts

Weekend Walkabouts are recreational community activities occurring regularly that promote community building, environmental stewardship, walking, and physical activity, while also bringing attention to the new rail trail. Weekend Walkabouts can be held either monthly from May to October or quarterly to include one walk per season, depending on community momentum and leadership. Weekend Walkabouts should be scheduled and held along different stretches of the rail trail. The events' walking routes should highlight safe and inviting places to connect to the rail trail and should be 3 miles or less in length. These events are ideal for individuals, families, and seniors.

Weekend Walkabouts may be organized based on themes for each walk, such as an architectural tour or a "Steeple Chase" tour (visiting historic churches located in close proximity to the rail trail). The tour could focus on the rail trail connections to parks, neighborhoods, or schools, or it could focus on the public art that will be located along the rail trail as part of the public art program. To generate added marketing potential, community leaders, artists, historians, or local celebrities could be chosen to lead each walk. For each event, at least one volunteer should be positioned at both the front and the rear of the walking group. The pace should remain at 2-2.5 miles per hour or less. A refreshment break with water should be offered at the halfway point for any walk of two or more miles.

Race Event Opportunities

Recreational running races are extremely popular community building events. Local area events and races- such as the BlueGrass Half Marathon, Indian Trail Intermediate First Annual Fun Run, Columbus Day Adventure Run, and the Up & At 'Em Turkey Trot 5K Run & Family Walk- already exist and help to foster community spirit. Johnson City should reach out to the organizations that plan and promote existing runs to determine if there are opportunities for partnership and rerouting race courses to run segments of a race on the rail trail. If rerouting part of an existing event is not possible, Johnson City should plan and host a community race or fun run on the rail trail. National Running Day takes place in June every year, and planning a new community event for an upcoming National Running Day would generate excitement in Johnson City and Elizabethton. Successful national examples of recreational community events are the "Susan G. Koman Race for the Cure", Ragnar Relay races, and the Warrior Dash. Obstacle courses such as the Warrior Dash and the Tough Mudder have become increasingly popular events around the country and should be considered in future programming initiatives for the rail trail. A more traditional event such as a triathlon should also be considered in future programming for the rail trail, as the cycling or running segment of the event could easily be planned on the rail trail.

Race events draw visitors to the area, spurring tourism-related benefits, and create a sense of local community pride.

The first step to developing a community race is to meet with a local running store such as Foot RX Running, located in Johnson City. Most running stores will assist with promotion and planning of a race and have member email list-serves that they use to send information. It is important to reach out to local running groups as they would most likely be willing to help plan and promote the event- in addition

to competing in the event! Very often a running store can supply timing equipment, but if this is not available, volunteers can be placed at the finish line and can collect runner bib numbers as runners cross the finish line. If a sound system is desired, the City could solicit quotes from local event planning companies. In many cases, a local company will supply staff and equipment for an event free of charge in exchange for marketing and advertisement opportunities along the race course or in race promotion materials.

Trail clean-up days preserve the natural environment and help with the overall management and maintenance of the trail.[48]

Race day volunteers are important for a successful event. One method to gain volunteer support is to reach out to schools, community centers, and churches to determine if there is any interest in contributing volunteers. For example, volunteers from the cross country team at Elizabethton High School could provide assistance by organizing runners at the start line, and they could even kick-off the race as the first runners to cross the start line. It is important to remember the importance of local partnerships and volunteers in creating a successful community event. Partnerships and volunteer opportunities engage citizens, creating a sense of pride and ownership for everyone involved.

Advertising on existing running store or running group websites, brochures, stickers, flyers, t-shirts, local television and radio stations, and in the local paper will help promote the upcoming event. It is important to get the event on as many local event calendars as possible, including the City's online calendar, the Chamber of Commerce's online calendar, local church calendars, and any other relevant local and national online calendars (such as Runners World), as appropriate. Creative marketing and promotion is essential for the success of any event.

Environmental Stewardship

Adopt-A-Trail Programs assist with maintaining, enhancing, and monitoring the trails and trailheads all over the country. Volunteers are utilized as part of the program and can be assigned segments of the rail trail. Anyone with an interest in trails and the outdoors can volunteer for the program. Individuals, families, businesses, community and service organizations, churches, schools, and scout troops are all examples of volunteers. Creating an Adopt-A-Trail program provides an opportunity for all members of the community to be actively involved in conservation and preservation. Through this program, local community groups and businesses could have to option of making a donation that is used for trail clean-up and maintenance. Helping to maintain and enhance the rail trail improves the resource for all to enjoy. The effort brings trail and nature enthusiasts closer to the environment and their community. Volunteers will enjoy the time they spend outdoors and the personal satisfaction gained through volunteerism. Volunteer activities could include:

- Keeping the trail surface free of sticks, rocks and other debris.
- Pruning small limbs from the trail corridor.
- Cleaning debris from benches, bridges, and stairs.
- Litter clean-up.
- Cleaning waterbars and drainage ditches.
- Reporting trees across the trail, erosion problems, suspicious or illegal activities, vandalism, & safety issues.

Standards, guidelines, and more information on Adopt-A-Trail programs can be obtained through the Appalachian Mountain Club website: http://www.outdoors.org/conservation/trails/volunteer/adopt/index.cfm.

Walking or Bicycling Poster Contest

This fun and interactive local competition educates and engages students about the variety of benefits the rail trail provides Washington and Carter Counties. The poster contest should include an educational component that teaches students how the rail trail impacts the health, transportation, environment, and economies of the communities it traverses. A field trip to the rail trail should be planned for the class before the poster contest to inspire and excite the children. Each year the Cities should coordinate with the school districts to schedule the contest and develop the "scoring" criteria for the posters. Students in grades four, five, or six would be the best age group for this contest, and the school districts should determine which grade (or grades) should participate. Once the details of the contest have been clearly defined, the students should be tasked with creating a poster that highlights the benefits and value of using the rail trail. Students could be asked to include their favorite memory from the class' rail trail field trip. A selection panel made up of the participating school districts will choose the winner of the contest. After the announcement of the winning entry, the poster should be incorporated into the trailhead signage and put on display for a predetermined amount of time.

Walking and Bicycling Groups

Community walking or bicycling groups are dedicated to promoting, motivating and encouraging members to walk or bike for the health of it; to improve their quality of life by

living active and healthy lifestyles; and fostering the spirit of fellowship and having fun along the way to better health and fitness. Most groups are open to all ages and abilities; however, some schedule different events offering more or less strenuous options for group members. In some communities, groups even offer "singles" bicycle rides which connect single adults with other people who enjoy the same activity. Many groups are formed with the goals of increased physical activity, enjoying good company, meeting new people, and finding pleasure in exploring new places in the community in a non-competitive environment – "Go at your own pace". Members celebrate health, fun, and the social benefits of physical activity by providing a variety of exercise and social events. There are several existing walking and bicycling clubs in Johnson City and Elizabethton, and a map of the rail trail with trailhead areas and connections to other trails and parks should be developed and distributed to the existing groups.

Walking School Buses and Bicycle Trains[49]

A walking school bus is a group of children walking to school with one or more adults. If that sounds simple, it is, and that's part of the beauty of the walking school bus. It can be as informal as two families taking turns walking their children to school or as structured as a route with meeting points, a timetable, and a regularly rotated schedule of trained, trustworthy volunteers.

A variation on the walking school bus is the bicycle train, in which adults supervise children riding their bikes to school. The flexibility of the walking school bus or bicycle train makes it appealing to communities of all sizes with varying needs.

When beginning a walking school bus or bicycle train, remember that the program can always grow. It often makes sense to start with a small bus or train and see how it works. Pick a single neighborhood that has a group of parents and children who are interested. It's like a carpool—without the car—with the added benefits of exercise and visits with friends and neighbors. For an informal bus:

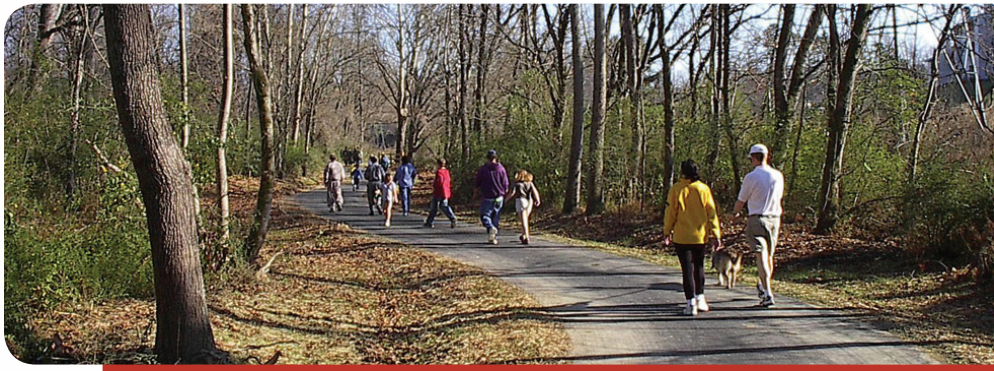
- Invite families who live nearby to walk or bike.
- Pick a route and take a test trip.
- Decide how often the group will walk or bike together.

Success with a simple walking school bus or bicycle train may inspire a community to build a more structured program. This may include more routes, more days of walking, and more children. Such programs require coordination, volunteers, and potentially attention to other issues, such as safety training and liability. The school principal and administration, law enforcement, and other community leaders will likely be involved.

First, determine the amount of interest in a walking school bus or bicycle train program. Contact potential participants and partners, such as parents and children; principal and school officials; law enforcement officers; and other community leaders.

The Centers for Disease Control and Prevention recommend one adult for every six children. If children are age 10 or older, fewer adults may be needed. If children are ages four to six, one adult per three children is recommended.

A good time to begin is during International Walk to School Week, which takes place every October. Walk or bike and look for ways to encourage more children and families to be involved. There are numerous neighborhoods located near or adjacent to the Johnson City Rail Trail, and at least three schools are located within 1/2 mile walking or bicycling distance of the rail trail. These conditions work well with the creation of walking school buses or bicycle trains. Johnson City should meet with representatives of the school system to begin discussing the development of this community program. There may be a "local champion" who already walks or bicycles with their child to school. School teachers or a principal may know of such a person, and Johnson City or Elizabethton should reach out to an existing local champion for their buy-in and support of a walking school bus or bicycle train.



Citizens and visitors will appreciate a well-planned, well-maintained trail that provides access to the natural environment and to their basic needs.

National Bike Month and Walk to School Day Support/Participation

National Bike Month is an opportunity to celebrate the unique power of the bicycle and the many reasons people choose bicycles as their mode of transportation or for recreation.

The schools located along, or in close proximity to the Rail Trail, should support, and as much as possible, encourage students, teachers and staff to participate in National Bike Month activities.

The Johnson City MTPO, in partnership with Johnson City and Elizabethton should

encourage employers and school systems to offer incentives to employees and students who participate in National Bike Month activities and Walk to School Day events to promote initiative and reward their participation. For example, the Johnson City MTPO should encourage school districts to partner with parents to organize bicycling trains and walking school buses for the children who will participate in Walk to School Day. Each group of students should be led safely to school by a parent or teacher volunteer. Additionally, the State should also encourage employers to allow flexible work days to employees participating in National Bike Month.

Summary

The benefits of fully accommodating pedestrians and bicyclists by providing a connected system of greenways and trails are diverse and substantial. While the increased safety of a separated multi-use path and increased physical activity are the most apparent benefits to many, greenways and trails that are viewed as linear community gathering places and are managed as such, contribute valuable health, economic, transportation, education, and environmental stewardship benefits to the communities of Johnson City and Elizabethon. In some ways, economic impacts can be directly, monetarily quantified in terms of upfront investment and return on investment, documented increases in property values, and new commerce developing adjacent to trails. However, as presented in this chapter, there are numerous indirect economic impacts that cannot be monetarily quantified. Additionally, social impacts are more difficult to quantify as greenways and trails provide opportunities for people to interact with one another outside of work and their immediate neighborhood, and interpersonal connections are truly "priceless". Positive interaction (such as through exercising, strolling, or even just saying "hello") among people from a wider community helps to build trust and awareness of others, which strengthens the overall sense of community. No dollar figure can be placed on "strengthening the overall sense of community," but there are researched, proven, and documented national trends that report greater numbers of people are choosing to live in areas that are more walkable and bikeable.

Endnotes

Chapter 6: "Analysis of Economic and Social Impacts" Footnotes

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Public Engagement A

Overview

Public engagement involves numerous components to spread awareness of the rail trail plan and to ensure a variety of local perspectives containing essential insight are appropriately incorporated into the plan. Various mediums and resources must be constructed so that all members of Johnson City, Elizabethton, and the surrounding areas have the opportunity to participate. Some people prefer or only have the resources to communicate in person, in writing, and/or electronically. The public engagement components included the following:

- Project Coordination Team Meetings
- Events: June 2012 - Blue Plum Festival June 2012 Covered Bridge Festival
- Spring 2013 public open house
- Adjacent property owner involvement
- Project comment forms
- Railbanking information flyer
- Benefits of trails information flyer
- Project information cards

Project Coordination Team Meetings

The Project Coordination Team (PCT) was involved throughout the planning process. During the kick-off meeting, the group reviewed and provided feedback on the project website, project comment form, established a value statement and goals for the plan, and discussed the timeline and schedule of the planning process. Members of the PCT worked with the consultant team to mark up rail corridor maps to identify potential problem areas and solutions. Input from the PCT is reflected throughout the recommendations of this planning document.

Events

In June 2012, two events were attended by project staff. The first opportunity was a booth during the Blue Plum Festival in downtown Johnson City. This initial public involvement event sought to gather preliminary input from citizens to assist in the development of draft recommendations for the plan. The next opportunity for public engagement took place during the Covered Bridge Festival in Elizabethon during the weekend of June 9th and 10th, 2012. Like the Blue Plum Festival, this event sought to gather preliminary input from citizens to assist in the development of draft recommendations for the plan. The festivals provided important avenues to connect with a diverse group of people in the area.

Spring 2013 Public Open House

In the spring of 2013, a public open house was held to promote and receive community input on draft recommendations. Preliminary recommendations in large format boards and on educational displays were presented at this event. Citizens contributed to recommendations by providing feedback and discussions regarding the proposed rail trail design, features, and amenities.

At all meetings, events, and open house workshops, public input was obtained in the form of map markups, written comments, verbal question and answer sessions, and discussions between citizens, consultant staff and representatives of the PCT. In

Appendix Contents

addition, a hardcopy public comment form was distributed for hand written responses during each meeting. These were important opportunities to connect to a wide range of citizens in the area.

Local residents visit the project tent at the Blue Plum Festival.

Adjacent Property Owner Outreach

A specific comment form was developed to obtain information from adjacent property owners along the corridor. To maximize the number of responses that were received from the property owners, comment forms were mailed via regular mail. The Consultant team compiled the responses to the comment form and facilitated meetings with the property owners willing to participate to discuss specific opportunities, challenges and strategies regarding the planning, design and construction of the future rail trail.

Project Resources

A number of resources were developed to enhance project awareness and participation. These tools also played a significant role in ensuring all members of the general public would have the opportunity to participate.

Project Website

A project website was developed to provide further project information, another avenue for public input, maps, contact information, and additional resources

Railbanking Information Flyer

This flyer was developed to provide information on the meaning of railbanking, its history and background, the process, and how it pertains to the Johnson City Rail Trail project. This information was disseminated through various public involvement opportunities as well as the project website.

Benefits of Trails Information Flyer

This flyer was developed to provide information on benefits of the project. It discusses the project background as well as benefits related to economics, health, quality of life, crime and safety, and environment. This information was also disseminated through various public involvement opportunities as well as the project website.

Project Information Cards

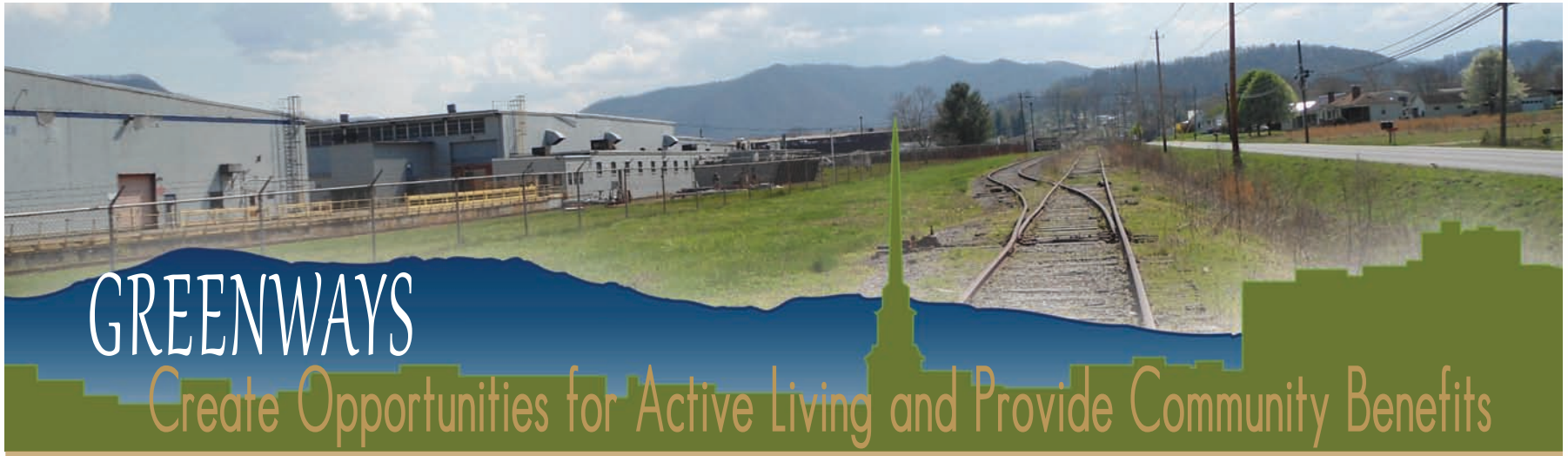
These information cards were designed to spread awareness of the project as well as where further information and project contacts could be found.

With a diverse general public having access to different avenues of communication opportunities, these public engagement components provided mediums through which all voices of the Johnson City and Elizabethton community could be heard.

Public Comment Form

A comment form was developed and made available in both hardcopy and online formats. The comment form was available online throughout the duration of the project. To maximize responses to the online form, the web address was distributed at public meetings, advertised in press releases, sent out to local interest groups, and included on flyers that were distributed around the City. Over 345 people completed the comment form.

Results of the comment form were collected and tabulated by the Consultant to provide insight into local residents' values and opinions about the project. The results are included beginning on page A-6 of this Appendix.



GREENWAYS

Create Opportunities for Active Living and Provide Community Benefits

Our Trail, When Completed...

- Connects Elizabethton to Johnson City.
- Will be 10 miles in length with a level surface (the average slope of the surrounding corridor is 1.6% to 2.3%; however the trail itself is estimated to be around 1% or less).
- Provides an alternate means of transportation to schools like Harold J. McCormick Elementary School in Elizabethton and East Tennessee State University.
- Provides an opportunity for family, neighbors and friends to enjoy our region.

Economic Benefits

- In general, greenways and pedestrian trails have been shown to increase the value of adjacent properties by as much as 5 to 20%.
- Tourism creates jobs and puts money into local economies. Demand from greenway tourism often provides business opportunities, locations and resources for commercial activities such as recreation equipment rentals and sales, lessons, and other related businesses.

Sources:

Martin, W., Ludden, T., Furaseth, O., and Nixon, S. (2004). Preliminary assessment of crime risk along greenways in Charlotte, NC 1994-2004, Unpublished UNC-Charlotte study.

"County of San Diego, California, Five-Year Strategic Plan- Appendix C" and other resource documents - found online from American Trails: http://www.americantrails.org/resources/benefits/index.html

Health & Quality of Life Benefits

- Greenways improve quality of life for families by:
  - providing "quality time" with family in a safe and close to home environment; and
  - encouraging and facilitating opportunities for exercise; and
  - creating positive life-long experiences; and teaching respect and and a greater appreciation for the environment.
- 30 minutes of "***moderately intense exercise***" is equivalent to:
  - 1.5 miles of walking; or
  - 5 miles of bicycling; or
  - 1 less slice of pizza.
- Walking, like other exercise, can help achieve a number of important health benefits including:
  - lowered low-density lipoprotein (LDL) cholesterol (the "bad" cholesterol); and
  - higher high-density lipoprotein (HDL) cholesterol (the "good" cholesterol); and
  - lowered blood pressure.

Crime & Safety: Community Examples

- A study in ***Charlotte, North Carolina,*** examined properties neighboring the 14 Charlotte greenways between 2000 and 2003, and found the rates of property crimes to be either insignificantly different, or LOWER, than the rates in surrounding neighborhoods.
- A safety/trail-related crime study for ***Seattle's Burke-Gilman*** trail found that the trail did not lead to increased levels of burglaries or vandalism near the trail. Police attributed results to the absence of automobiles and presence of more pedestrians.

Environmental Benefits

Greenways promote natural resource management strategies that ensure environmental preservation, quality of life and economic development by:

- providing a "buffer" between the built and natural environments, protecting plant and animal species; and
- allowing passive recreational use and educational access to protected areas; and
- providing an alternative mode of transportation; and
- encouraging cleaner air by decreasing air pollution created by automobiles; and
- preserving culturally and historically valuable areas; and
- protecting and linking fragmented habitats.

RAILBANKING

Preserving Transportation Corridor Opportunities

History and Background

- U.S. railroad development peaked in 1916, but by the 1950s and 1960s began a slow decline due to competetition from the trucking industry.
- With deregulation in 1980, the U.S. experienced rail line abandonment en masse.Congress adopted the railbanking provisions of the National Trails System Act in 1983 to protect corridors for future use.
- To date, the act has helped preserve 4,431 miles of rail corridor in 33 states
- These innactive railroad routes survive but are repurposed for other - potentially temporary - trail uses.
- Although rare, should the railroad company seek to re-establish service, the trail managing agency is entitled to fair market compensation.

Contact:

Mr. Glenn K. Berry, Johnson City MTPO
glennberry@jcmpo.org

What is Railbanking?

A voluntary agreement between a railroad company and a local public agency allowing an out-of-service rail corridor to be used as as a trail until or unless the company decides to use the corridor for rail service in the future. Railbanking usually involves the sale of property to local entities with buy-back provision for the railroad company. Such agreements are sactioned by U.S. Surface Transportation Board.

Process

Railbanking occurs during the time period when the railroad company notifies the U.S. Surface Transportation Board of its intent to abandon a line. Trail proponents negotiate with company representatives to purchase a deed, similar to any land acquisition. If the negotiations are successful, the corridor is officially "railbanked" with the Surface Transportation Board. Once rails are removed, trail proponents can begin developing a non-motorized trail facility along the corridor.

What is the Status of Johnson City's Railbanking Project?

- The East Tennesse Railway (ETRY) was granted permission to abandon its segment of railine between milepost 1.2 in Johnson City and milepost 11.2 at the end of the line in Elizabethon in Washington and Carter Counties by the U.S. Surface Transportation Board in June 2011.
- The decision authorizes an interim trail use/ railbanking agreement negotiated between ETRY and Johnson City.
- The Tennessee State Historic Preservation Office review the proposed trail and determined it will not adversely affect historic resources.
- ETRY has begun to remove the tracks from the rail line and will complete the project by June 2013.
- Johnson City is currently conducting the master plan development process.

More Information:

Visit the Rails-To-Trails Conservancy resource on railbanking: http://bit.ly/eeO4w0

Visit the Surface Transportation Board website: http://www.stb.dot.gov/stb/public/resources_railstrails.html

PUBLIC COMMENT FORM for the RAIL TRAIL MASTER PLAN

1. How important to you is creating more greenways in your community? (Select one.)

Very Important | Important | Not Important

2. What is your preferred greenway transportation mode?

Walking | Biking | Wheelchair/mobility assistance device
Rollerblading | Other (please specify) _____

3. What is the primary reason that you currently use trails in your community? (Select all that apply.)

Exercise/Fitness | Getting to and from destinations
Socializing | Walking the dog | Environmental Education
Meditation/Respite | I don't use trails
Other (please specify) _____

4. In your opinion, what are the most important benefits and uses of a greenway system? (Select all that apply.)

Alternative Transportation | Community-building and events
Health/Exercise | Connectivity to surrounding area
Outdoor Recreation | Habitat and environmental protection
Economic stimulation/tourism | Education and interpretation
Other (please specify) _____

5. What destinations would you most like to get to by greenway? (Rank your top 3 choices.)

Place of Work _____ School_____ College/University_____
Restaurants_____ Public Transportation _____ Shopping_____
Parks_____ Entertainment _____ Other Greenways _____
Libraries or Recreation Centers_____ Other _____

6. What do you think are the biggest factors that discourage greenway use? (Rank your top 3 choices.)

Lack of safe connections to greenways _____
Motor vehicle traffic _____ Lack of interest _____
Lack of information about existing greenways _____
Unsafe street crossings _____ Lack of time _____
Lack of nearby destinations _____
Personal safety concerns _____

7. What amenities are most important to you for greenways? (Select all that apply.)

Benches | Directional signs | Greenway maps/kiosks
Interpretive signs (featuring local history/environment)
Drinking fountains | Adequate lighting | Trash cans
Pet waste stations | Restrooms
911 call boxes | Bicycle racks
Other (please specify)_____

8. The intersection of what two streets is closest to your home?

_____

9. How far/long would you be willing to walk to access the following destinations? (Select one answer per destination.)

Place of work	*5 min*	*10 min*	*15 min*	*20 min*	*25 min*	*30 min*
Shopping	*5 min*	*10 min*	*15 min*	*20 min*	*25 min*	*30 min*
School	*5 min*	*10 min*	*15 min*	*20 min*	*25 min*	*30 min*
Restaurants	*5 min*	*10 min*	*15 min*	*20 min*	*25 min*	*30 min*
Parks	*5 min*	*10 min*	*15 min*	*20 min*	*25 min*	*30 min*
Downtowns	*5 min*	*10 min*	*15 min*	*20 min*	*25 min*	*30 min*

10. How far/long would you be willing to bike to access the following destinations? (Select one answer per destination.)

Place of work	*10 min*	*15 min*	*20 min*	*25 min*	*30 min*
Shopping	*10 min*	*15 min*	*20 min*	*25 min*	*30 min*
School	*10 min*	*15 min*	*20 min*	*25 min*	*30 min*
Restaurants	*10 min*	*15 min*	*20 min*	*25 min*	*30 min*
Parks	*10 min*	*15 min*	*20 min*	*25 min*	*30 min*
Downtowns	*10 min*	*15 min*	*20 min*	*25 min*	*30 min*

11. Would you use a greenway trail that connects Downtown Johnson City and Downtown Elizabethton?

Yes | No

Please feel free to elaborate on your answer _____

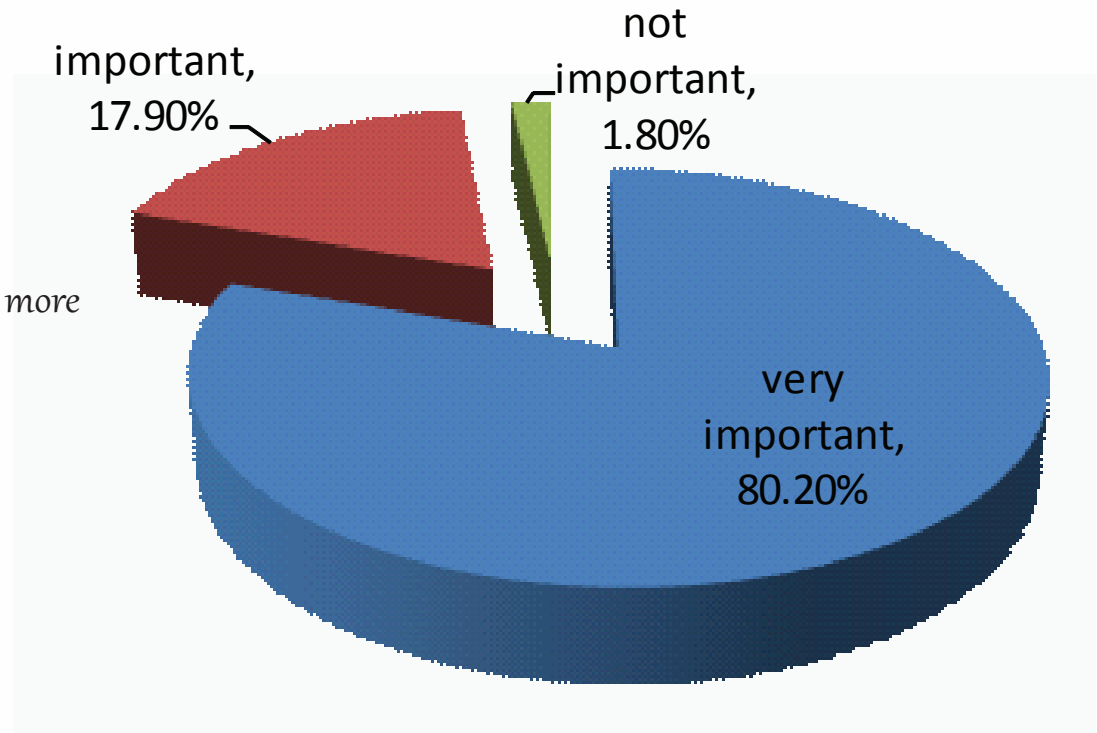
_____

THANK YOU FOR YOUR TIME AND RESPONSES.
YOUR INPUT IS VERY VALUABLE TO THE RAILS TO TRAIL MASTER PLAN PLANNING PROCESS.

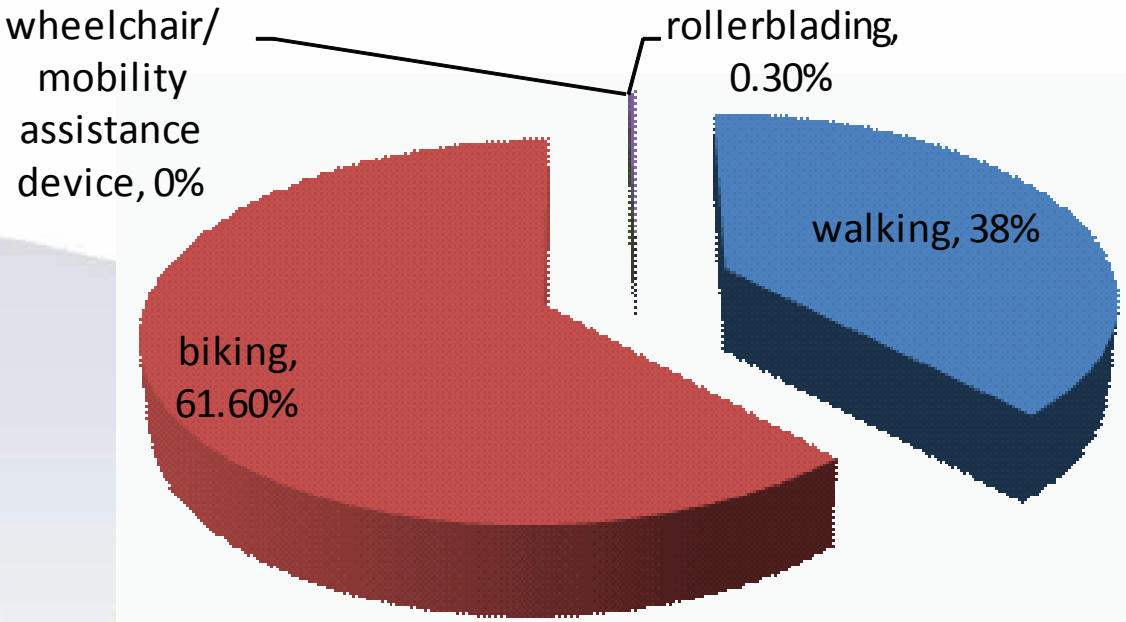
For More Information or Questions, Please Contact: Mr. Glenn K. Berry, Johnson City MTPO, glennberry@jcmpo.org
Please Return Comment Form to: Mr. Glenn K. Berry, 137 West Market Street Johnson City, TN 37604
Please Visit the Project Website: http://johnsoncityrailstotrails.weebly.com

PUBLIC COMMENT FORM RESPONSES

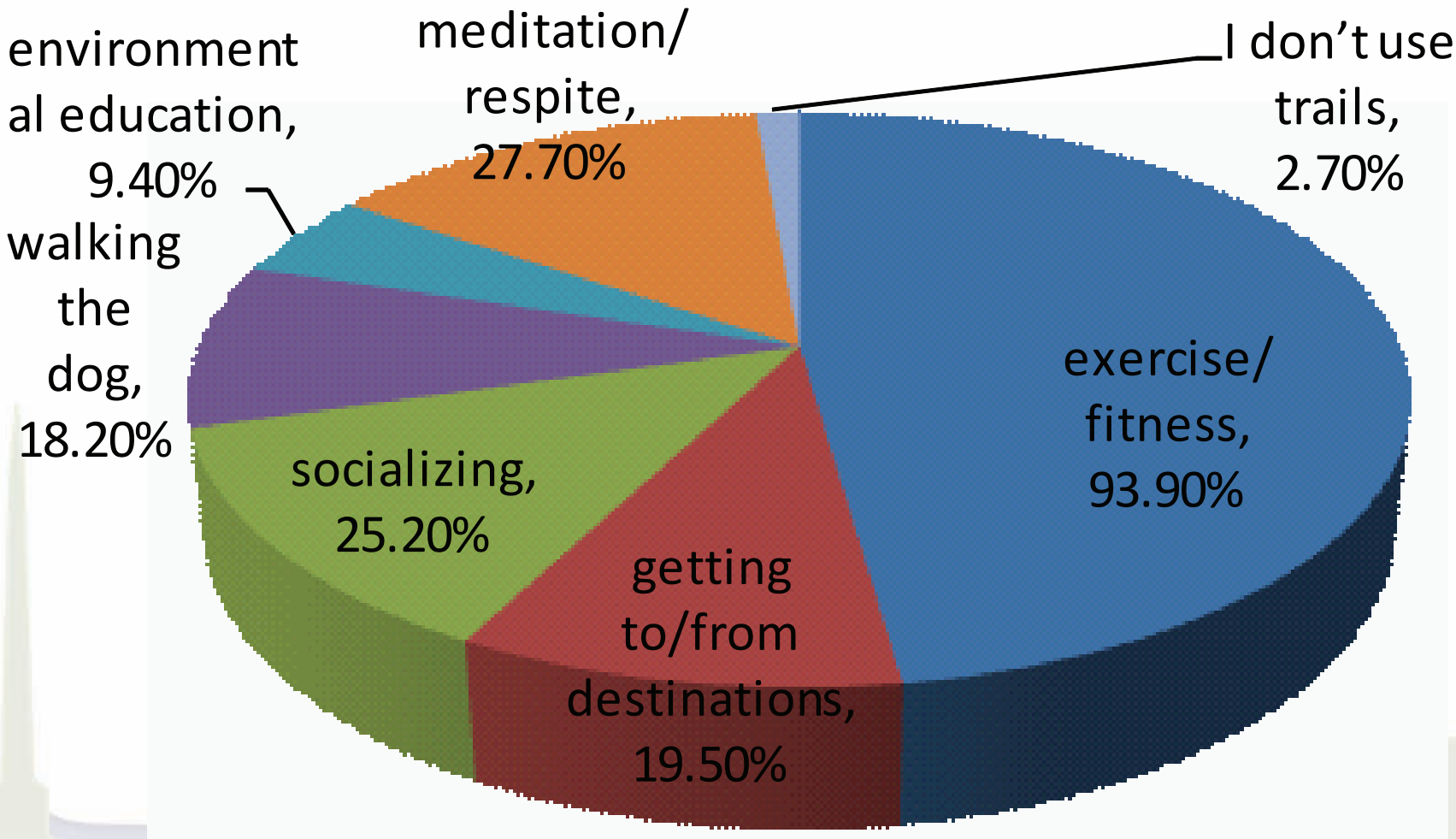
How important to you is creating more greenways in your community?



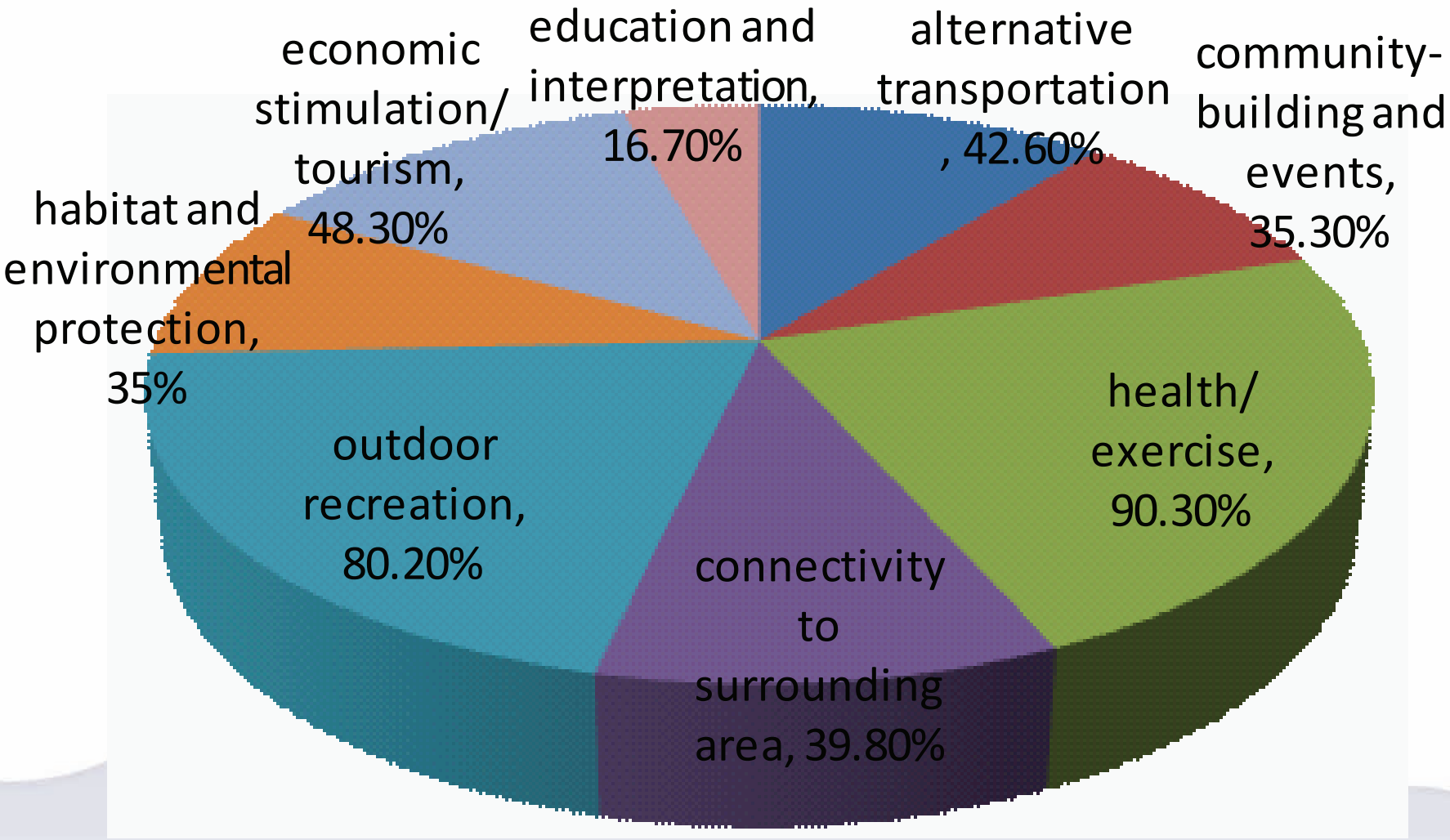
What is your preferred greenway transportation mode?



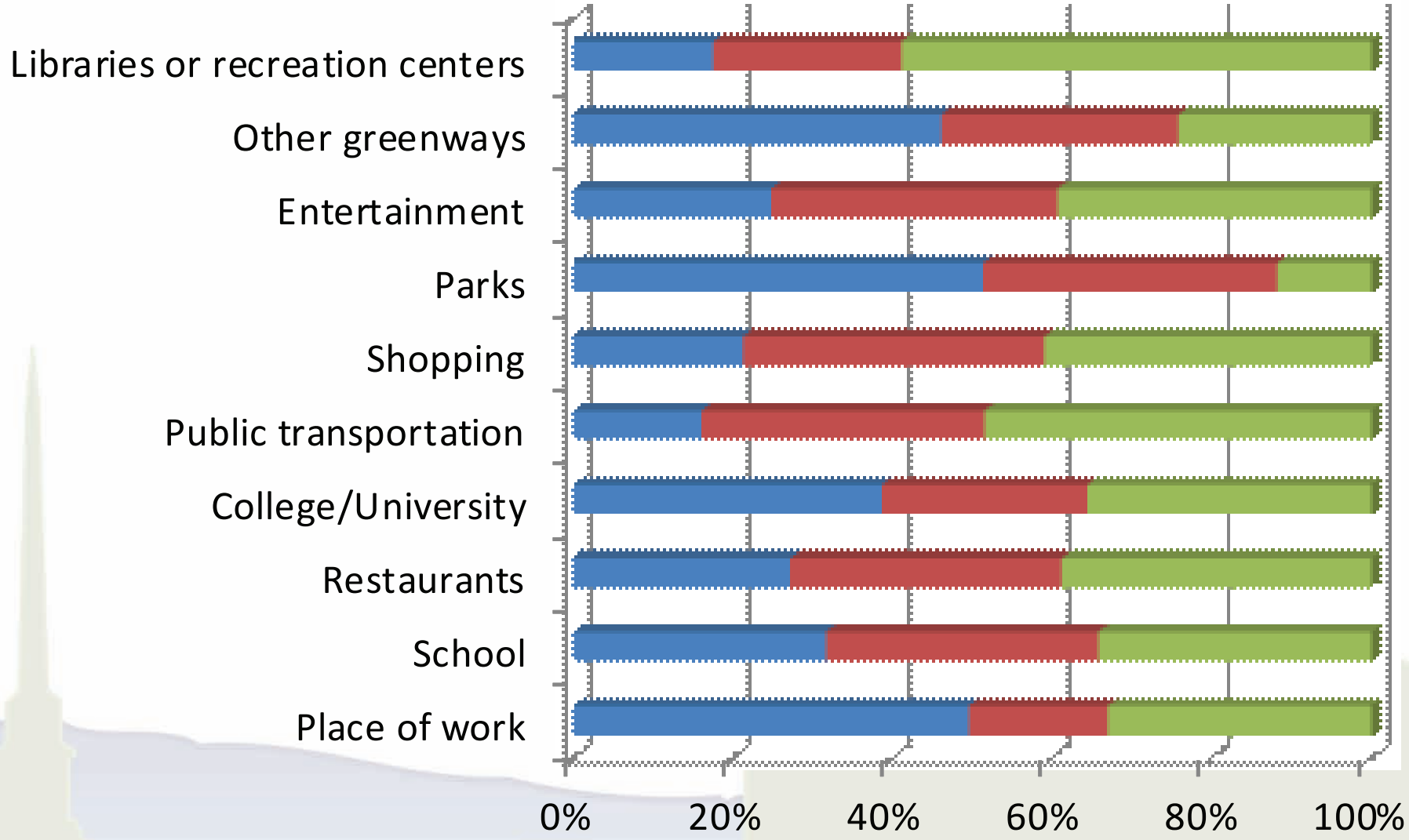
What is the primary reason that you currently use trails in your community? (Select all that apply.)



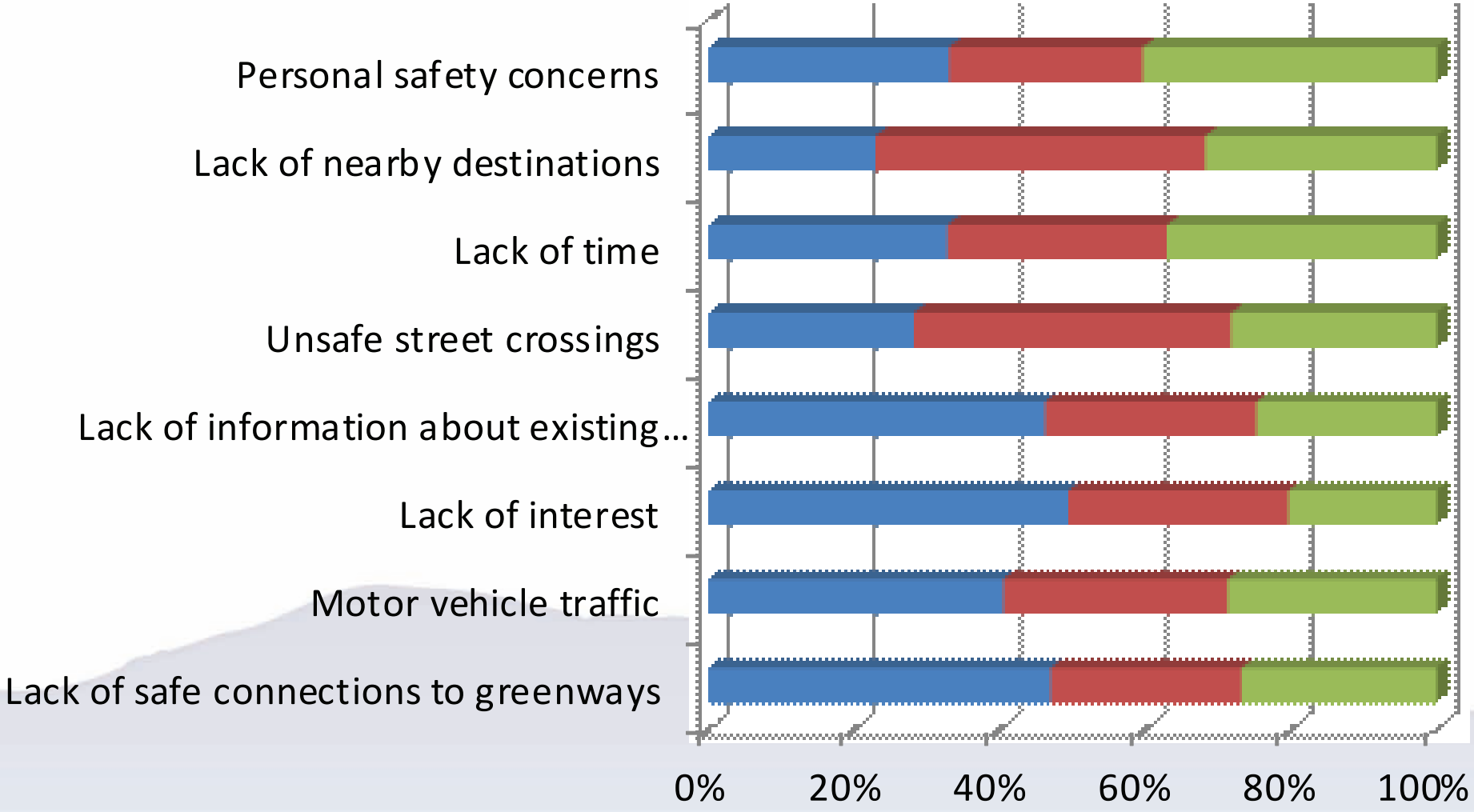
In your opinion, what are the most important benefits and uses of a greenway system? (Select all that apply.)



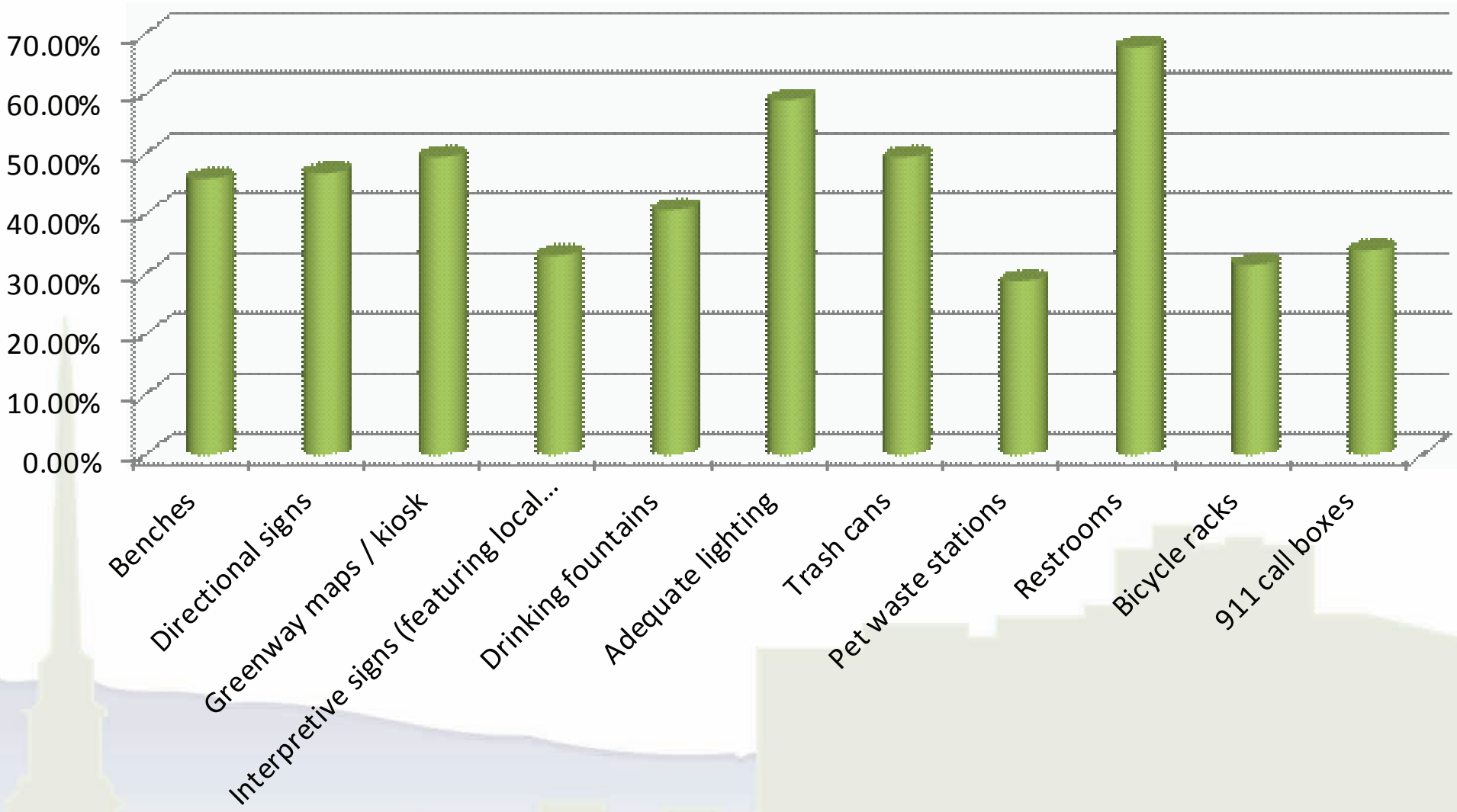
What destinations would you most like to get to by greenway? (Rank your top 3 choices.)



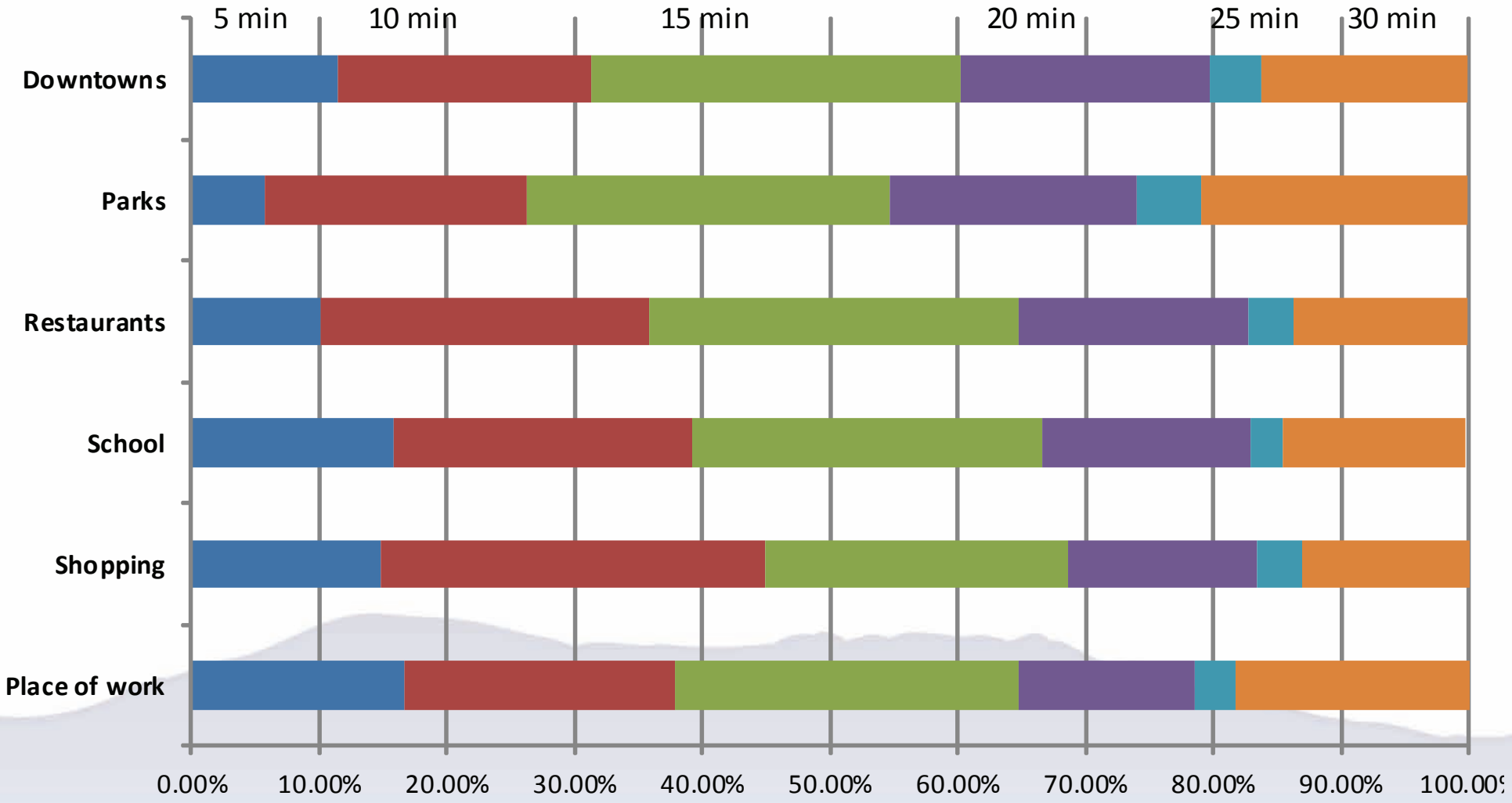
What do you think are the biggest factors that discourage greenway use? (Rank your top 3 choices.)



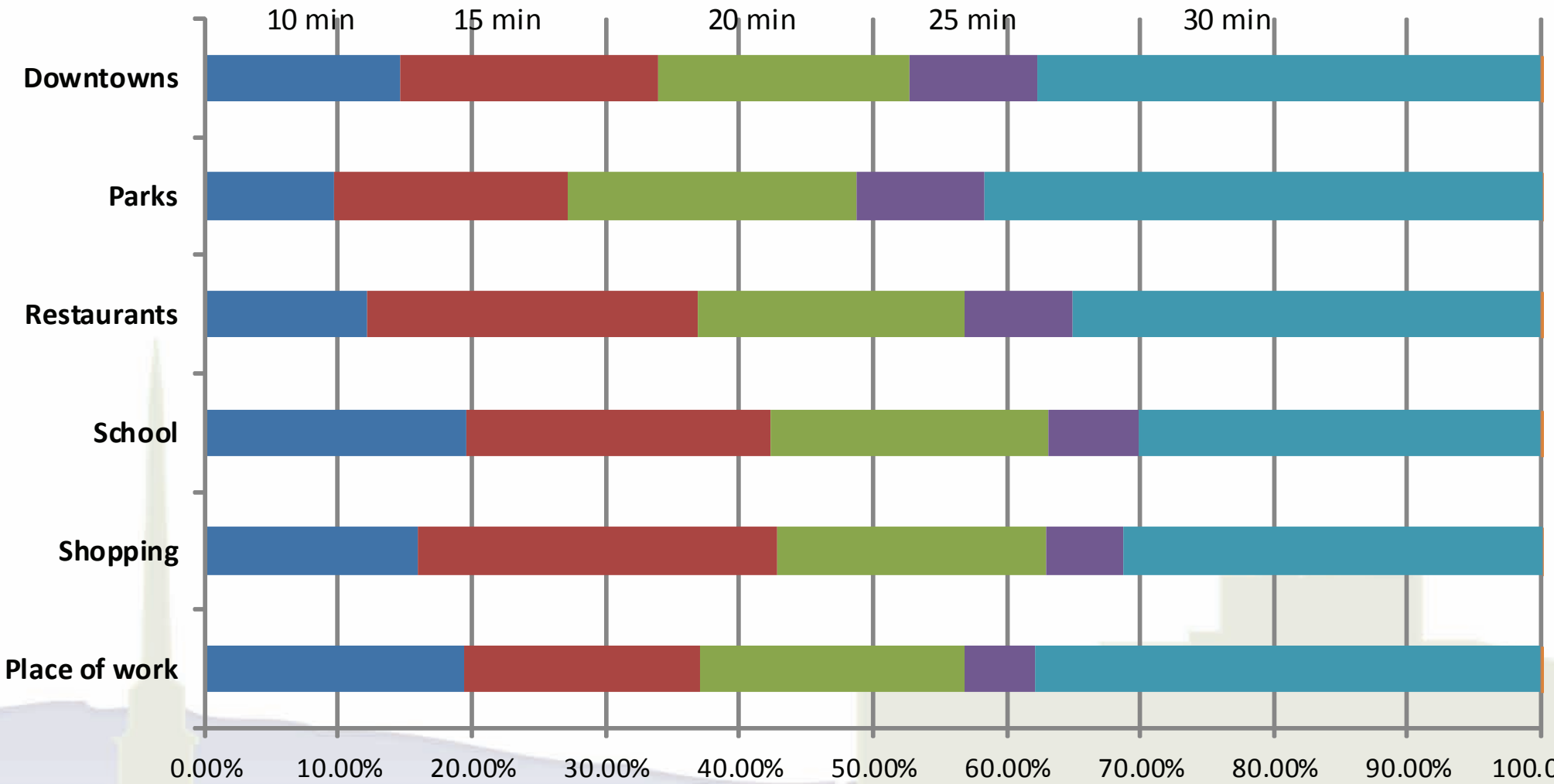
What amenities are most important to you for greenways? (Select all that apply.)



How far/long would you be willing to walk to access the following destinations? (Select one answer per destination.)



How far/long would you be willing to bike to access the following destinations? (Select one answer per destination.)



The intersection of what two streets is closest to your home?

E Holston Ave. & Wall St
Cedar Grove Rd/ Greenlee
Broadway and Watauga
cherokee and university parkway
university parkway and market
Milligan highway and New Elizabethton highway
Indian Ridge Rd./Market Street
Lamont/ university pkwy
Gap Creek and Ave G
Boones Creek/Highland Church
Lone oak and Cherokee roads
W. Walnut and Matson
martin farm and old lewis
Milligan Hwy and Gov. Alf Taylor Rd
walnut/roan
Boones creek and highland church
Highway 81 N and Skyline Rd (Jonesborough)
Sevier and State of Franklin
Watauga x Lamont
w g street and woodland
Knob creek and Camelot
Ridgeway & Forest
Lamont and Hillcrest
Market St. and State of Franklin
Market St. and State of Franklin
(I live in NC and work in Johnson City)
E Unaka Avenue and Baxter Street
east oakland street
E. Mountain View Road and Timberlake
Carroll creek road and roan street
Indian Ridge Rd. and Market Street
University Parkway & Cherokee Drive
Arlington Dr and The Milligan Highway
Roan & Princeton
east 9th ave / wellborne
east 9th ave / wellborne
katies way, crouch road
Knob Creek and State of Franklin
Lamont and Winter
lakeview/watauga
Milligan and old Lewis rd
Marboro Dr. and Deepwood Dr.
Cedar Grove Road and Milligan Highway
Beasley St, Cedar Ave elizabethton
State of Franklin and Mountain Home Dr
watauga and lamont
Stateline Road and Bob Little Road outside of Elizabethton
Brightridge Dr and Lamont St, Kingsport
Stoney CreekRd. & Broad St Ext.
Elk ave. Williams ave eluzabethton
Williams ave & G St, Elizabethton
milligan HW and hiwassii HT DR
Fall Creek Rd and Emory Church Rd. (Kingsport)
Bishop Rd. adn Okalona Rd.
broad and elm
aa deakins, hugh cox, gray
Broad Street / SR37 in Elizabethton.
Lakeshore Dr./Lakewood Dr. Kingsport
States of Franklin and Mountainview
Elk ave-main st-Elizabethton
Princeton Road and E. Oakland Avenue
GRAY STATION ROAD AND TANGENCY DRIVE
Sugartree Road & Dogwood
moreland drive and summerville road (Kingsport)
Winter and lamont
Shelby Street and Spring Street
East D and Elm, Elizabethton
Carroll Creek Rd & North Roan St
N. Main & 10th St. Erwin , Tn.
Siam rd and 19e in elizabethton
EMBREVILLE AND JA RAMSEY
magnolia ave and va st
Carroll Creek and Roan Street
Memorial Boulevard
Roan Street & Carroll Creek Rd
Lebanon, McIntosh
Cherokee & Paty
Dont live in the area-- only work here
US 11W and Crown Colony
19E AND HWY 91
Haire Town and Pleasant Valley Rd.
boones creek and roan
Hwy 91/ Hurley Hollow Road
sunset and Knob Creek Road
Lynn Avenue, Elk avenue
oakland, roan
South Roan and W Pine St

Do not live in the city.
Austin Springs and Oakland
state route 75 and state route 81
S. Roan and Chestnut Lane
Fordtown road and Dark Hollow
Milligan Hwy. & Warrior Ln.
parkway blvd & w G street
OAKLOHONA TO MILLIGAN HWY
E E Street & Armed Forces Dr. Elizabethton, TN
Hudson Ave and Elk Ave
Watauga Road Lynn Avenue. Elizabethton
live in Kingsport
CEDAR GROVE & EMMANUEL DR
west g street and hgw 67
Winner Street -- Earl Williams Road
Roan Street-Elk Avenue
West E Street & Bemberg Road
G Street and Legacy St in Elizabethton
lynn ave. and f st.
Highway 67 & Powder Branch Road, Elizabethton, TN
pine hill/orchard rd
knob creek road/market street - johnson city
Happy Valley Rd, Milligan Hwy
Division Street and Field Road in Elizabethton
West G St & McQueen St
SIAM RD & FAIRLANE DR
Broad and Elm
Parkway Blvd and Elk Avenue
west g st and parkway blvd
Cedar Street
Coal Chute and Centerview, not close to a greenway.
Carter Blvd and Division
Fredricksburg/Sharpesburg
S.Roan and Plymouth
Office - East Elk and Lynn
Hudson & G Street Elizabethton
Elk and bemberg
Broad and 421 Bristol hwy
broad and 19e
West G St & Allen Ave
LYNN AVE. AND ELK AVE.
Okolona and Milligan Hwy
West G street Division Street
Peters hollow and huskins hill rd
Milligan Highway and Woodland Drive
G Street & Sabine
State Line Road Coal Chute Road
siam rd. & riverview dr.
Milligan Highway and Cedar Grove Road
West G Street & Holly Lane, Elizabethton, TN
g st pkwy blvd
Bember and W Elk
Hwy 67 and 19E in Elizabethton
Allen Ave. & G Street
Siam Road and Abby Lane
Idk
Broad and 19 E
Stonewall Jackson Drive - Over Mountain Drive
gap creek and west g street
Parkway Blvd and Elk Ave
Sunrise Drive & Dawn Drive
Southside Road and Dugger Road
Broad Street / 19 E
Allan Ave. and Jordan Road
Sunrise
Ferguson Avenue/Wet I Street
hattie and cedar
I live on a dead end gravel road outside city limits.
Mountcastle drive and roan street
I live on Donna Avenue in Elizabethton so I am very close to the Gap Creek area of the trail.
Marbleton and Erwin hwy
Milligan Highway & Cedar Grove
Colonial Heights - Lebanon and Kendericks Creek
West Locust st and South Roan st
Oakland and forest
Oakland and forest
Fordtown Road and Dark Hollow
Boones creek highway and old grey station
Webb Road, Aberlea Valley Circle
Swadley Rd and Plymouth Rd
Paddle creek and country Meadow Circle
181- Suncrest Drive, Gray TN
Knob creek and sunset
None
Oakland & Lakeview

The intersection of what two streets is closest to your home? (answers continued)

milligan hwy/ cedar grove rd.

Beginning of the trail in Johnson City. Live in Gray.

Cecil Gray and N. Greenwood

West Market Street/University Parkway, Johnson City, TN

st of franklin/greenwood dr

Elk Ave and Elizabethton Highway-We live on the proposed trail and can access the trail with our horses and bikes from our property as on-half mile of the trail is on our property.

wilbur dam rd and bowers lane in carter county

Oakland, Unaka

Cherokee Road and University Parkway

Carroll Creek @ Timberlake

West G St & Roan St. (Elizabethton, tn)

holston and wall

Roan and eleventh

West Maple and Boyd streets

Antioch and Walnut

Milligan/Old Lewis Rds.

Alabama/ Legion

Hwy 321 and hwy 61

claude simmons and knob creek Johnson city.

im in VA

Mill Spring Road and Jim Range Road

Cedar Grove Road and Greenlee Road

Powder Branch and Milligan

claude simmons and knob creek

W Walnut & St of Franklin

W Market and Watauga

Highland avenue and w watauga

S. greenwood and anitoch

Lakeview and Oakland

Milligan Hwy/ Cedar Grove Rd

Watagua Ave. and State of Franklin

walnut and state of franklin

Shawnee and Osprey Point

knob creek and estate drive. (Sunset and Knob Creek is the largest intersection).

chilhowie & crown

North Roan and Woodbriar Dr.

Keefauver Road & Boones Creek Highway

North Roan St and Old Gray Station Rd.

west market north roan

Highway 19-E and Rt. 143

State of Franklin & Walnut

Sunset and woodside drive

Bobby Hicks Highway and Old Gray Station Road

East c and Elm.

State of Franklin & university pkwy

Highland/Watauga or Watauga/State of Franklin

N.Roan and Browns Mill Road

Wynn Dr. and Fairridge Rd.

Roan Street and Carol Creek

Beechwood Drive and Meadowview court

Elk Ave. and Parkway Blvd.

County Farm Road and Couch Road

Hiwassee Heights Drive Milligan Highway

Milligan Hwy and Hiwassee Hgts Dr.

Milligan Hwy and Hiwassee Hgts Dr.

Boones Creek Rd & Chestnut Ridge Rd

Alabama

W.G St. Eliz.

Elk avenue and bemberg drive

I live in Bristol VA. I would be riding this trail for fun with friends like we do the Creeper Trail in Damascus

W. Locust St. & Ernest St.

Glen Oaks Dr and Old Gray Station

I-81 and I-26 exchange

N/A

Beasley and Cedar (Elizabethton)

Unaka and Boone

Oakland & Watauga

Weaver Pike/Volunteer Parkway

North Roan and Boones Creek Road

Carroll Creek N Roan

John B Dennis Stone Drive

State of Franklin and University Parkway

Plymouth rd and South Roan St.

Oak Lane Hemlock Lane

Elk Ave & G St.

University Parkway and State of Franklin

Lamont and University Pkwy

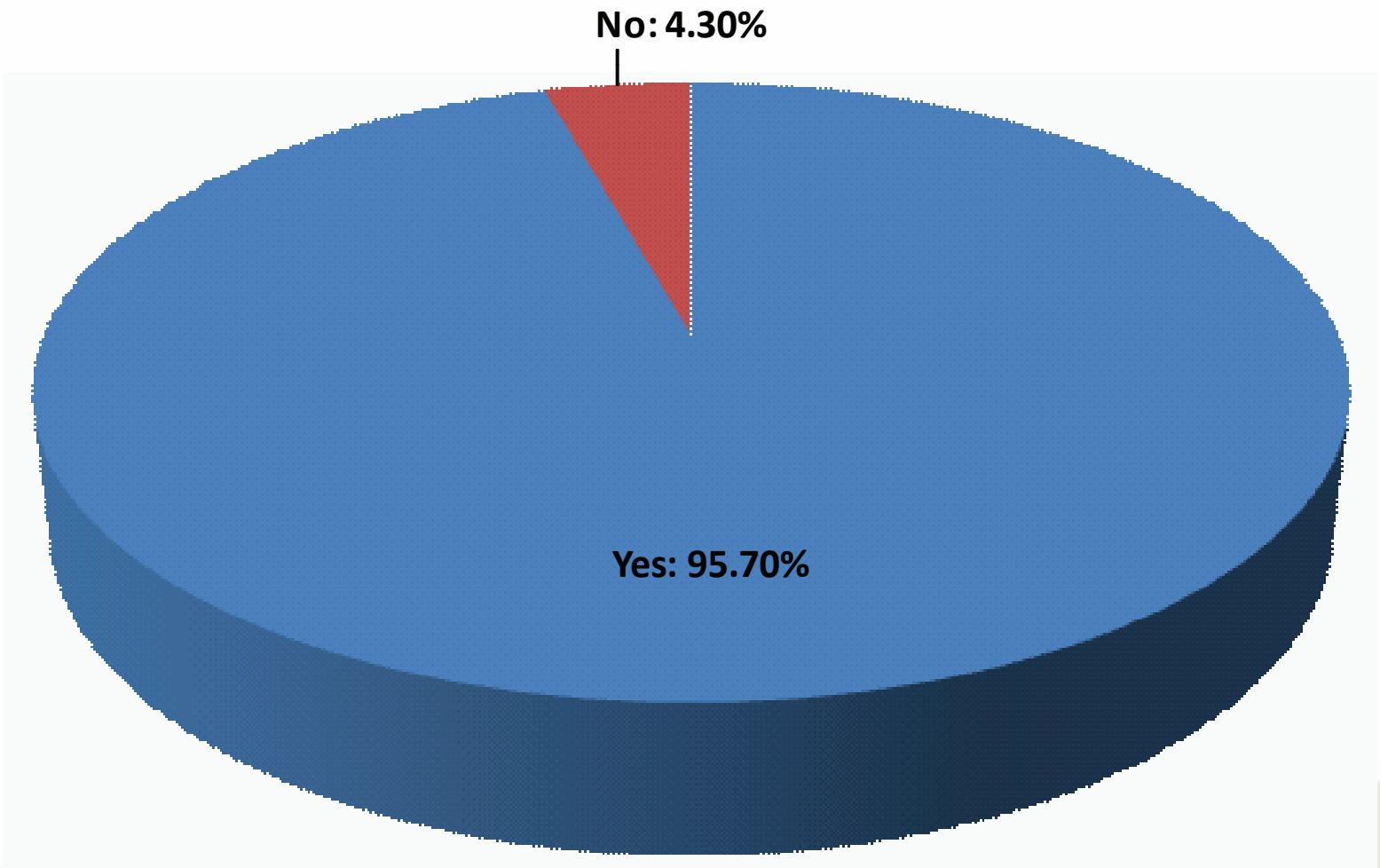
North Roan St And Carmol Dr

North Roan and Boone's Creek Road

Walnut & Matson

D st Pine st

Would you use a greenway trail that connects Downtown Johnson City and Downtown Elizabethton?



Johnson City Rail Trail Master Plan

Connecting Our Region Through Health, Play and Livability

Purpose of the Master Plan:

- Present an evaluation of existing conditions along the rail line corridor.
- Offer detailed recommendations for development of this rail corridor to a viable trail for the region.
- Evaluate the social and economic impacts of a 10-mile trail corridor that will connect downtown Johnson City and downtown Elizabethton.

Learn More About the Project:

http://johnsoncityrailstotrails.weebly.com

Project Contact:
Mr. Glenn Berry
Johnson City MTPO
glennberry@jcmpo.org

Design Guidelines B

INTRODUCTION

This technical handbook is intended to assist the City of Johnson City in the selection and design of bicycle facilities. The following chapters pull together best practices by facility type from public agencies and municipalities nationwide. Within the design chapters, treatments are covered within a single sheet tabular format relaying important design information and discussion, example photos, schematics (if applicable), and existing summary guidance from current or upcoming draft standards. Existing standards are referenced throughout and should be the first source of information when seeking to implement any of the treatments featured here.

Guiding Principles

The following are guiding principles for these design guidelines:

- **The walking and bicycling environment should be safe.** All bicycling and walking routes should be physically safe and perceived as safe by all users. Safe means minimal conflicts with external factors, such as noise, vehicular traffic and protruding architectural elements. Safe also means routes are clear and well marked with appropriate pavement markings and directional signage.
- **The pedestrian and bicycle network should be accessible.** Sidewalks, shared-use paths, bike routes and crosswalks should permit the mobility of residents of all ages and abilities. The pedestrian and bicycle network should employ principles of universal design. Bicyclists have a range of skill levels, and facilities should be designed with a goal of providing for inexperienced/recreational bicyclists (especially children and seniors) to the greatest extent possible.
- **Pedestrian and bicycle network improvements should be economical.** Pedestrian and bicycle improvements should achieve the maximum benefit for their cost, including initial cost and maintenance cost, as well as a reduced reliance on more expensive modes of transportation. Where possible, improvements in the right-of-way should stimulate, reinforce and connect with adjacent private improvements.
- **The pedestrian and bicycle network should connect to places people want to go.** The pedestrian and bicycle network should provide continuous direct routes and convenient connections between destinations such as homes, schools, shopping areas, public services, recreational opportunities and transit. A complete network of on-street bicycling facilities should connect seamlessly to existing and proposed shared-use paths to complete recreational and commuting routes.
- **The walking and bicycling environment should be clear and easy to use.** Sidewalks Shared-use paths and crossings should allow all people to easily find a direct route to a destination with minimal delays, regardless of whether these persons have mobility, sensory,

or cognitive disability impairments. All roads are legal for the use of pedestrians and bicyclists (except freeways, from which each is prohibited unless a separate facility on that right of way is provided). This means that most streets are bicycle facilities and should be designed, marked and maintained accordingly.

- **The walking and bicycling environment should be attractive and enhance community livability.** Good design should integrate with and support the development of complementary uses and should encourage preservation and construction of art, landscaping and other items that add value to communities. These components might include open spaces such as plazas, courtyards and squares, and amenities like street furniture, banners, art, plantings and special paving. These along with historical elements and cultural references, should promote a sense of place. Public activities should be encouraged and the municipal code should permit commercial activities such as dining, vending and advertising when they do not interfere with safety and accessibility.
- **Design guidelines are flexible and should be applied using professional judgment.** This document references specific national guidelines for bicycle and pedestrian facility design, as well as a number of design treatments not specifically covered under current guidelines. Statutory and regulatory guidance may change. For this reason, the guidance and recommendations in this document function to complement other resources considered during a design process, and in all cases sound engineering judgment should be used.

NATIONAL STANDARDS

The Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD) defines the standards used by road managers nationwide to install and maintain traffic control devices on all public streets, highways, bikeways, and private roads open to public traffic. The MUTCD is the primary source for guidance on lane striping requirements, signal warrants, and recommended signage and pavement markings.

To further clarify the MUTCD, the FHWA created a table of contemporary bicycle facilities that lists various bicycle-related signs, markings, signals, and other treatments and identifies their official status (e.g., can be implemented, currently experimental). See Bicycle Facilities and the Manual on Uniform Traffic Control Devices.[1]

1 Bicycle Facilities and the Manual on Uniform Traffic Control Devices. (2011). FHWA. http://www.fhwa.dot.gov/environment/bikeped/mutcd_bike.htm

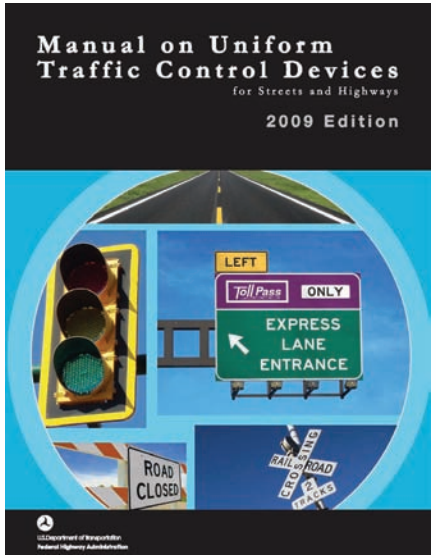
Bikeway treatments not explicitly covered by the MUTCD are often subject to experiments, interpretations and official rulings by the FHWA. The MUTCD Official Rulings is a resource that allows website visitors to obtain information about these supplementary materials. Copies of various documents (such as incoming request letters, response letters from the FHWA, progress reports, and final reports) are available on this website.[2]

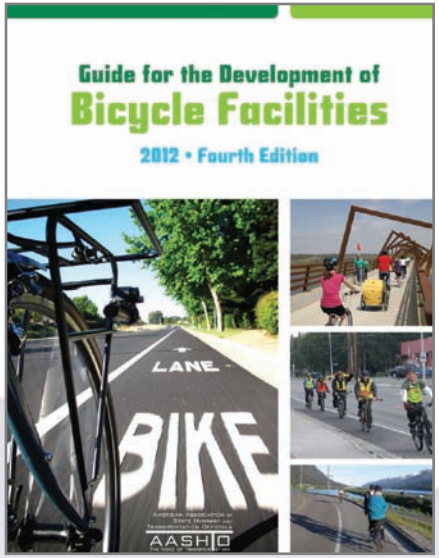
American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, updated in June 2012 provides guidance on dimensions, use, and layout of specific bicycle facilities. The standards and guidelines presented by AASHTO provide basic information, such as minimum sidewalk widths, bicycle lane dimensions, detailed striping requirements and recommended signage and pavement markings.

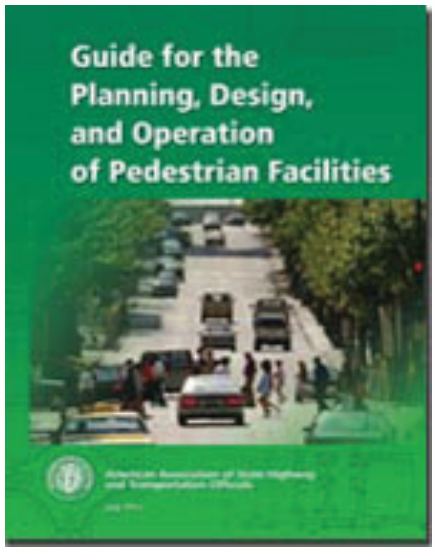
Offering similar guidance for pedestrian design, the 2004 AASHTO Guide for the Planning, Design and Operation of Pedestrian Facilities provides comprehensive guidance on planning and designing for people on foot.

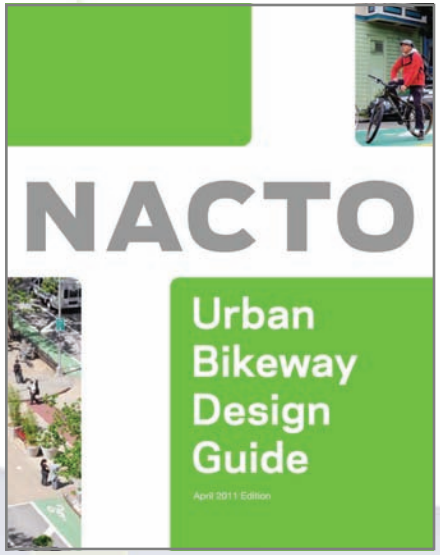
The National Association of City Transportation Officials' (NACTO) 2012 Urban

2 MUTCD Official Rulings. FHWA. http://mutcd.fhwa.dot.gov/orsearch.asp









Bikeway Design Guide[3] is the newest publication of nationally recognized bikeway design standards, and offers guidance on the current state of the practice designs. The NACTO Urban Bikeway Design Guide is based on current practices in the best cycling cities in the world. The intent of the guide is to offer substantive guidance for cities seeking to improve bicycle transportation in places where competing demands for the use of the right of way present unique challenges. All of the NACTO Urban Bikeway Design Guide treatments are in use internationally and in many cities around the US.

Meeting the requirements of the Americans with Disabilities Act (ADA) is an important part of any bicycle and pedestrian facility project. The United States Access Board's proposed Public Rights-of-Way Accessibility Guidelines[4] (PROWAG) and the 2010 ADA Standards for Accessible Design[5] (2010 Standards) contain standards and guidance for the construction of accessible facilities. This includes requirements for sidewalk curb ramps, slope requirements, and pedestrian railings along stairs.

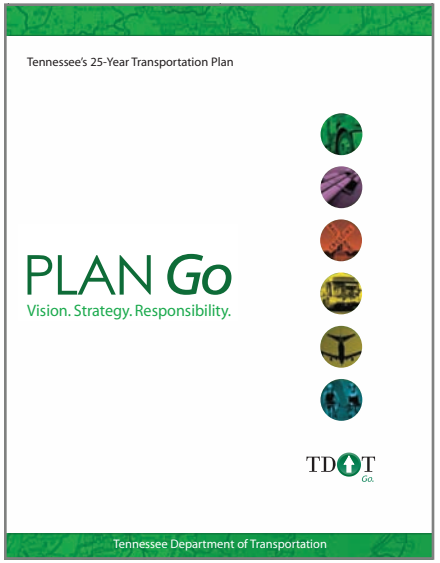
Some of these treatments are not directly referenced in the current versions of the AASHTO Guide or the MUTCD, although many of the elements of these treatments are found within these documents. In all cases, engineering judgment is recommended to ensure that the application makes sense for the context of each treatment, given the many complexities of urban streets.

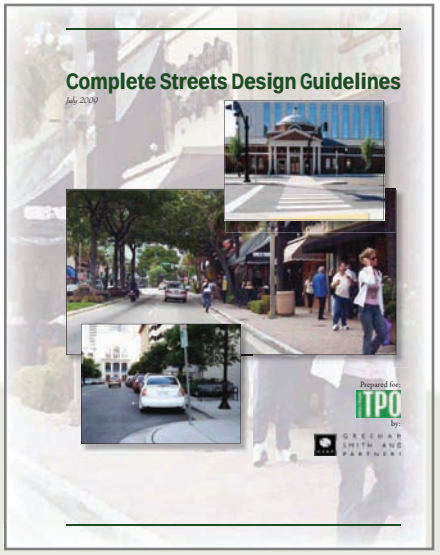
LOCAL STANDARDS

Current design guidelines for bicycle and pedestrian facilities in the State of Tennessee are outlined in the Bicycle and Pedestrian Element of Tennessee's 2005 Long Range Transportation Plan, PLAN Go.[6] See Section 8.3.1 for bicycle treatments and off-street paths, and Section 8.3.2 for pedestrian treatments.

An update of the statewide transportation plan is currently underway. At the time of writing, it is unclear if design standards for bicycle and pedestrian facilities will be updated.

An additional local resource for bicycle and pedestrian design is the Knoxville Regional Transportation Planning Organization's Complete Streets Guide[7], which provides guidance for multi-modal streets and crossing treatments.





3 http://nacto.org/cities-for-cycling/design-guide/
4 http://www.access-board.gov/prowac/
5 http://www.ada.gov/2010ADAstandards_index.htm

6 http://www.tdot.state.tn.us/plango/pdfs/plan/BicyclePed.pdf
7 http://www.tdot.state.tn.us/bikeped/completes-treets.pdf

TYPES OF BICYCLISTS

It is important to consider bicyclists of all skill levels when creating a non-motorized plan or project. Bicyclist skill level greatly influences expected speeds and behavior, both in separated bikeways and on shared roadways. Bicycle infrastructure should accommodate as many user types as possible, with decisions for separate or parallel facilities based on providing a comfortable experience for the greatest number of people.

The bicycle planning and engineering professions currently use several systems to classify the population, which can assist in understanding the characteristics and infrastructure preferences of different bicyclists. The most conventional framework classifies the "design cyclist" as Advanced, Basic, or Child[1].

A more detailed understanding of the US population as a whole is illustrated in the figure at right. Developed by planners in Portland, OR[2] and supported by data collected nationally since 2005, this classification provides the following alternative categories to address varying attitudes towards bicycling in the US:

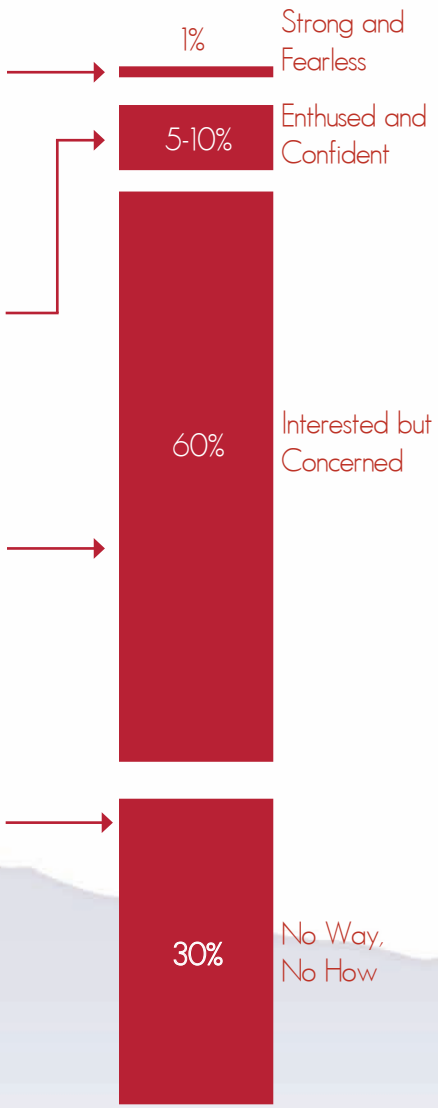
- Strong and Fearless (approximately 1% of population) – Characterized by bicyclists that will typically ride anywhere regardless of roadway conditions or weather. These bicyclists can ride faster than other user types, prefer direct routes and will typically choose roadway connections -- even if shared with vehicles -- over separate bicycle facilities such as shared use paths.

- Enthused and Confident (5-10% of population) - This user group encompasses bicyclists who are fairly comfortable riding on all types of bikeways but usually choose low traffic streets or shared use paths when available. These bicyclists may deviate from a more direct route in favor of a preferred facility type. This group includes all kinds of bicyclists such as commuters, recreationalists, racers and utilitarian bicyclists.

- Interested but Concerned (approximately 60% of population) – This user type comprises the bulk of the cycling population and represents bicyclists who typically only ride a bicycle on low traffic streets or shared-use paths under favorable weather conditions. These bicyclists perceive significant barriers to their increased use of cycling, specifically traffic and other safety issues. These people may become "Enthused & Confident" with encouragement, education and experience.

- No Way, No How (approximately 30% of population) – Persons in this category are not bicyclists, and perceive severe safety issues with riding in traffic. Some people in this group may eventually become more regular cyclists with time and education. A significant portion of these people will not ride a bicycle under any circumstances.

Typical Distribution of Bicyclist Types



1 Selecting Roadway Design Treatments to Accommodate Bicycles. (1994). Publication No. FHWA-RD-92-073

2 Four Types of Cyclists. (2009). Roger Geller, City of Portland Bureau of Transportation. http://www.portlandonline.com/transportation/index.cfm?&a=237507

DESIGN NEEDS OF BICYCLISTS

The purpose of this section is to provide the facility designer with an understanding of how bicyclists operate and how their bicycle influences that operation. Bicyclists, by nature, are much more affected by poor facility design, construction and maintenance practices than motor vehicle drivers. Bicyclists lack the protection from the elements and roadway hazards provided by an automobile's structure and safety features. By understanding the unique characteristics and needs of bicyclists, a facility designer can provide quality facilities and minimize user risk.

Bicycle as a Design Vehicle

Similar to motor vehicles, bicyclists and their bicycles exist in a variety of sizes and configurations. These variations occur in the types of vehicle (such as a conventional bicycle, a recumbent bicycle or a tricycle), and behavioral characteristics (such as the comfort level of the bicyclist). The design of a bikeway should consider reasonably expected bicycle types on the facility and utilize the appropriate dimensions.

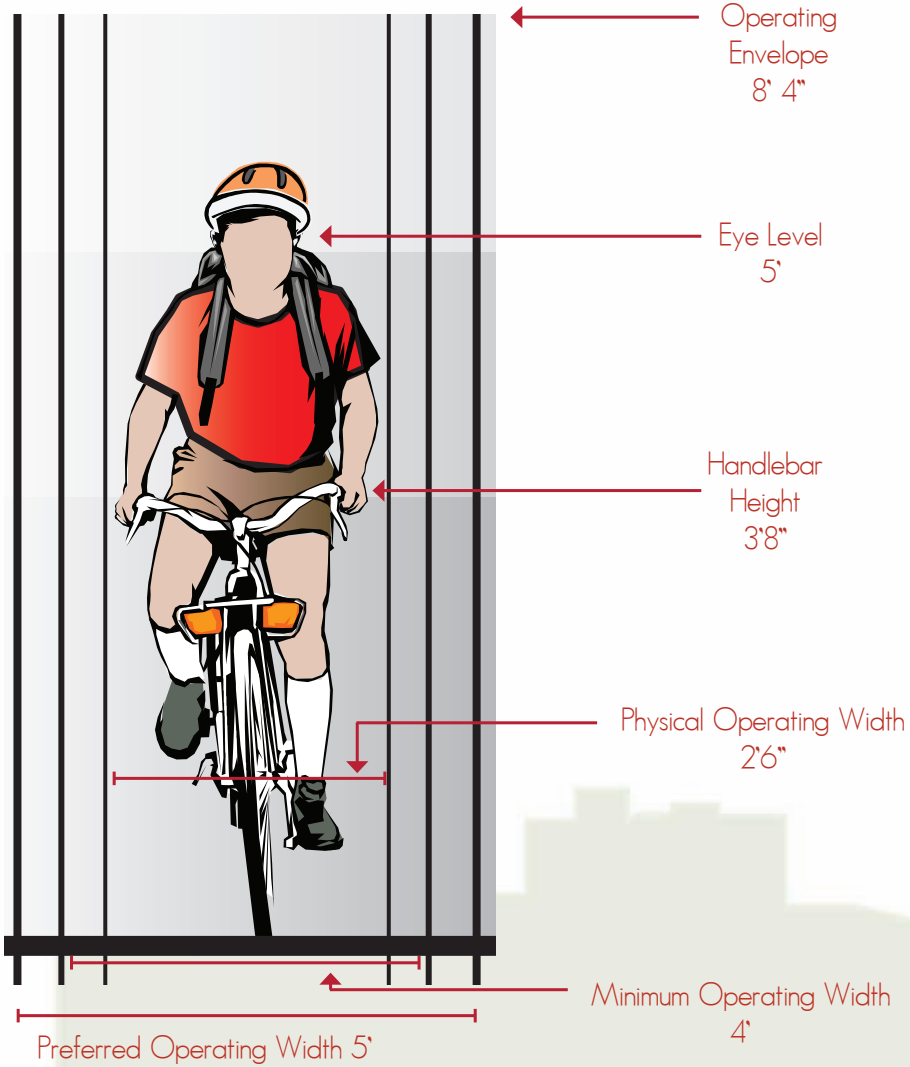
The figure at right illustrates the operating space and physical dimensions of a typical adult bicyclist, which are the basis for typical facility design. Bicyclists require clear space to operate within a facility. This is why the minimum operating width is greater than the physical dimensions of the bicyclist. Bicyclists prefer five feet or more operating width, although four feet may be minimally acceptable.

In addition to the design dimensions of a typical bicycle, there are many other commonly used pedal-driven cycles and accessories to consider when planning and designing bicycle facilities. The most common types include tandem bicycles, recumbent bicycles, and trailer accessories. The figure and table on the following page summarize the typical dimensions for bicycle types.

Design Speed Expectations

The expected speed that different types of bicyclists can maintain under various conditions also influences the design of facilities such as shared use paths. The tables on the following page provide typical bicyclist speeds for a variety of conditions.

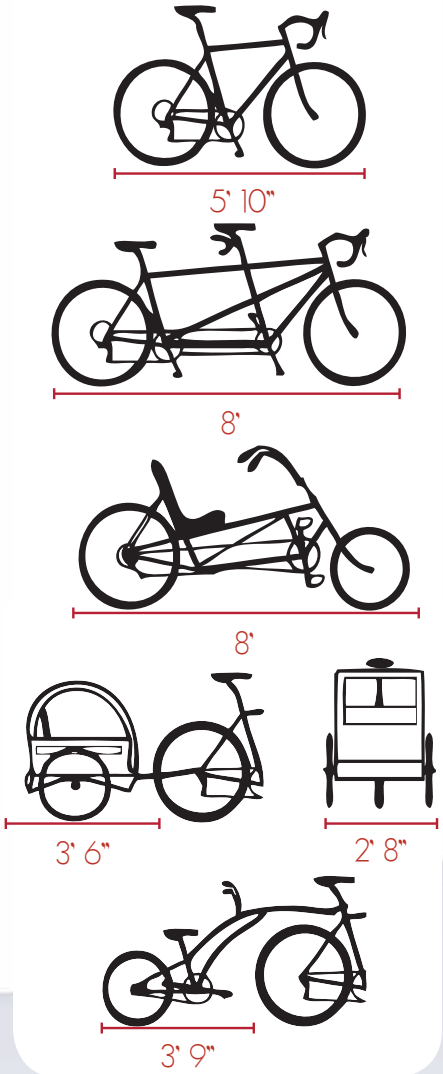
Standard Bicycle Rider Dimensions



Source: AASHTO Guide for the Development of Bicycle Facilities, 3rd Edition

BICYCLE AS DESIGN VEHICLE

Typical Dimensions



Source: AASHTO Guide for the Development of Bicycle Facilities, 3rd Edition *AASHTO does not provide typical dimensions for tricycles.

Typical Dimensions

Bicycle Type	Feature	Typical Dimensions
Upright Adult Bicyclist	Physical width	2 ft 6 in
	Operating width (Minimum)	4 ft
	Operating width (Preferred)	5 ft
	Physical length	5 ft 10 in
	Physical height of handlebars	3 ft 8 in
	Operating height	8 ft 4 in
	Eye height	5 ft
	Vertical clearance to obstructions (tunnel height, lighting, etc)	10 ft
	Approximate center of gravity	2 ft 9 in - 3 ft 4 in
Recumbent Bicyclist	Physical length	8 ft
	Eye height	3 ft 10 in
Tandem Bicyclists	Physical length	8 ft
Bicyclist with child trailer	Physical length	10 ft
	Physical width	2 ft 8 in

Design Speed Expectations

Bicycle Type	Feature	Typical Speed
Upright Adult Bicyclist	Paved level surfacing	15 mph
	Crossing Intersections	10 mph
	Downhill	30 mph
	Uphill	5 -12 mph
Recumbent Bicyclist	Paved level surfacing	18 mph

*Tandem bicycles and bicyclists with trailers have typical speeds equal to or less than upright adult bicyclists.

BICYCLE FACILITY CLASSIFICATION

Description

Consistent with bicycle facility classifications throughout the nation, these Bicycle Facility Design Guidelines identify the following classes of facilities by degree of separation from motor vehicle traffic.

There are no 'hard and fast' rules for determining the most appropriate type of bicycle facility for a particular location – roadway speeds, volumes, right-of-way width, presence of parking, adjacent land uses, and expected bicycle user types are all critical elements of this decision. Studies find that the most significant factors influencing bicycle use are motor vehicle traffic volumes and speeds. Additionally, most bicyclists prefer facilities separated from motor vehicle traffic or located on local roads with low motor vehicle traffic speeds and volumes. Because off-street pathways are physically separated from the roadway, they are perceived as safe and attractive routes for bicyclists who prefer to avoid motor vehicle traffic. Consistent use of treatments and application of bikeway facilities allow users to anticipate whether they would feel comfortable riding on a particular facility, and plan their trips accordingly.

Shared Roadways are bikeways where bicyclists and cars operate within the same travel lane, either side by side or in single file depending on roadway configuration. The most basic type of bikeway is a signed shared roadway. This facility provides continuity with other bicycle facilities (usually bike lanes), or designates preferred routes through high-demand corridors.

Shared Roadways may also be designated by pavement markings, signage and other treatments including directional signage, traffic diverters, chicanes, chokers and /or other traffic calming devices to reduce vehicle speeds or volumes. Such treatments often are associated with Bicycle Boulevards.

Separated Bikeways, such as bike lanes, use signage and striping to delineate the right-of-way assigned to bicyclists and motorists. Bike lanes encourage predictable movements by both bicyclists and motorists.

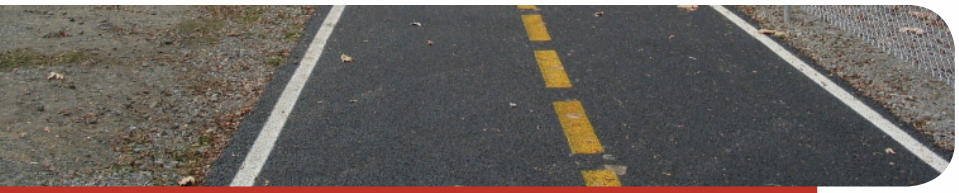
Cycle Tracks are exclusive bike facilities that combine the user experience of a separated path with the on-street infrastructure of conventional bike lanes.

Shared Use Paths are facilities separated from roadways for use by bicyclists and pedestrians.

GREENWAYS AND OFF-STREET FACILITIES

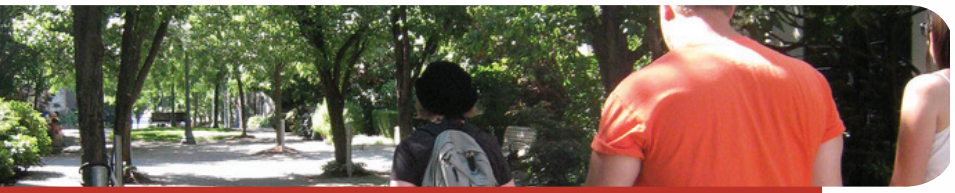
A greenway (also known as a shared-use path) allows for two-way, off-street bicycle use and also may be used by pedestrians, skaters, wheelchair users, joggers, equestrians, and other non-motorized users. These facilities are frequently found in parks, along rivers, beaches, and in greenbelts or utility corridors where there are few conflicts with motorized vehicles. Path facilities can also include amenities such as lighting, signage, and fencing (where appropriate).

This section covers general design practices, trails in abandoned rail corridors, accessways/spur trails, vegetative buffers, trail edge definition, drainage and erosion control, equestrian use on trails, trail amenities, trailheads, and maintenance management.



General Design Practices

Trails in Abandoned Rail Corridors



Accessways/Spur Trails

Vegetative Buffers

Trail Edge Definition

Drainage and Erosion Control

Equestrian Use on Trails

Trail Amenities

Trailheads

GENERAL DESIGN PRACTICES

Description

Shared use paths can provide a desirable facility, particularly for recreation, and users of all skill levels preferring separation from traffic. Bicycle paths should generally provide directional travel opportunities not provided by existing roadways.

Guidance

Width

- 8 feet is the minimum allowed for a two-way bicycle path and is only recommended for low traffic situations.
- 10 feet is recommended in most situations and will be adequate for moderate to heavy use.
- 12 feet is recommended for heavy use situations with high concentrations of multiple users. A separate track (5' minimum) can be provided for pedestrian use.
- If police and maintenance vehicles will be driven on the JCRT trail, the trail should be 12' in width or greater to prevent trail edges from crumbling. 10' wide trail edges tend to crumble, as tires compress trail edges

Lateral Clearance

- A 2 foot or greater shoulder on both sides of the path should be provided. An additional foot of lateral clearance (total of 3') is required by the MUTCD for the installation of signage or other furnishings.

Overhead Clearance

- Clearance to overhead obstructions should be 8 feet minimum, with 10 feet recommended.

Striping

- When striping is required, use a 4 inch dashed yellow centerline stripe with 4 inch solid white edge lines.
- Solid centerlines can be provided on tight or blind corners, and on the approaches to roadway crossings.

Discussion

The AASHTO Guide for the Development of Bicycle Facilities generally recommends against the development of shared use paths along roadways. Also known as "sidepaths", these facilities create a situation where a portion of the bicycle traffic rides against the normal flow of motor vehicle traffic and can result in wrong-way riding when either entering or exiting the path.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

FHWA. (2009). Manual on Uniform Traffic Control Devices.

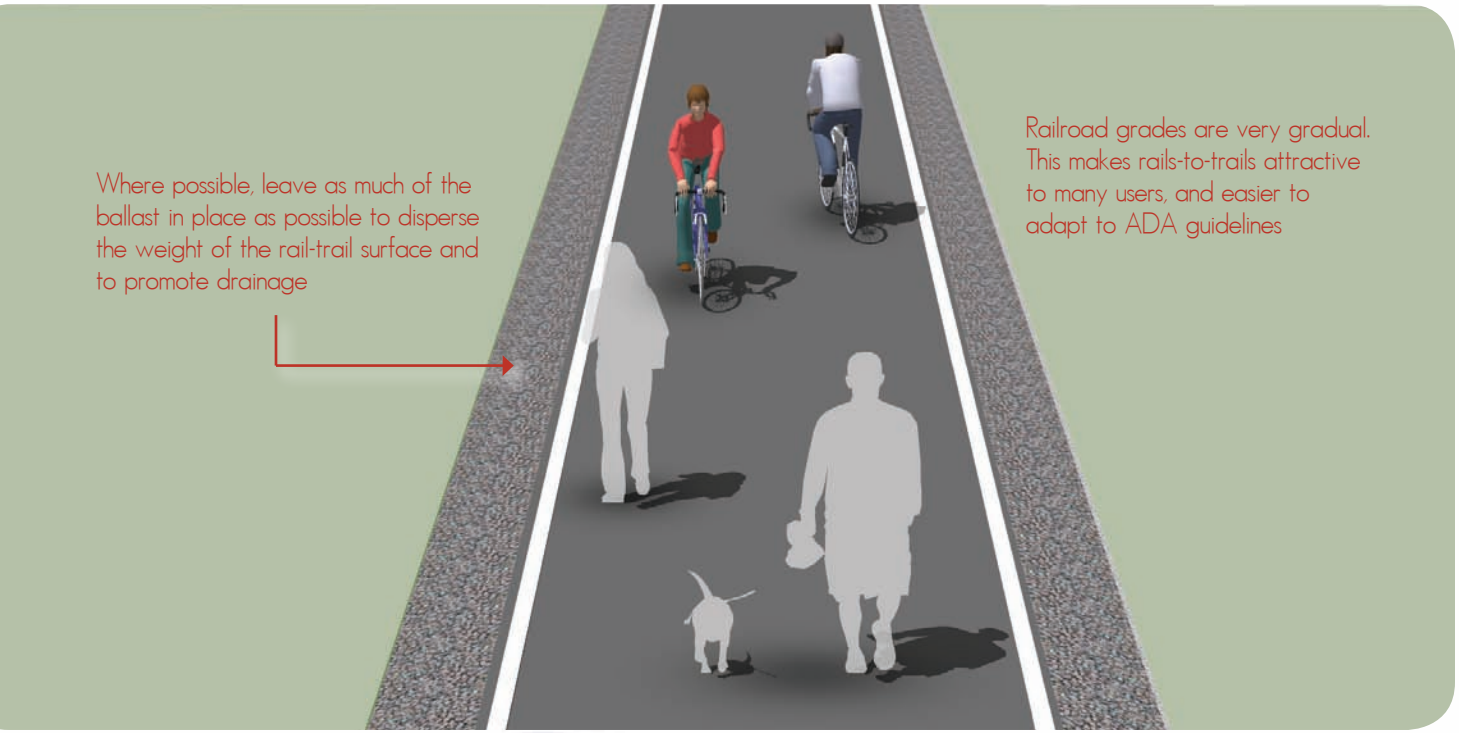
Flink, C. (1993). Greenways: A Guide To Planning Design And Development.

TDOT. (2005) PLAN Go: Bicycle and Pedestrian Element.

GREENWAYS IN ABANDONED RAIL CORRIDORS

Description

Commonly referred to as Rails-to-Trails or Rail-Trails, these projects convert vacated rail corridors into off-street paths. Rail corridors offer several advantages, including relatively direct routes between major destinations and generally flat terrain. In some cases, rail owners may rail-bank their corridors as an alternative to a complete abandonment of the line, thus preserving the rail corridor for possible future use. Municipalities should acquire abandoned rail rights-of-way whenever possible to preserve the opportunity for trail development.



Guidance

Greenways in utility corridors should meet or exceed general design practices. If additional width allows, wider paths, and landscaping are desirable.

Access Points

- Any access point to the path should be well-defined with appropriate signage designating the pathway as a bicycle facility and prohibiting motor vehicles.

Path Closure

- Public access to the greenway may be prohibited during the following events:
  - Canal/flood control channel or other utility maintenance activities
  - Inclement weather or the prediction of storm conditions

Discussion

Similar to railroads, public access to flood control channels or canals is undesirable by all parties. Hazardous materials, deep water or swift current, steep, slippery slopes, and debris all constitute risks for public access. Appropriate fencing may be required to keep path users within the designated travel way. Creative design of fencing is encouraged to make the path facility feel welcoming to the user.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

FHWA. (2009). Manual on Uniform Traffic Control Devices.

Flink, C. (1993). Greenways: A Guide To Planning Design And Development.

TDOT. (2005) PLAN Go: Bicycle and Pedestrian Element.

ACCESSWAYS/SPUR TRAILS

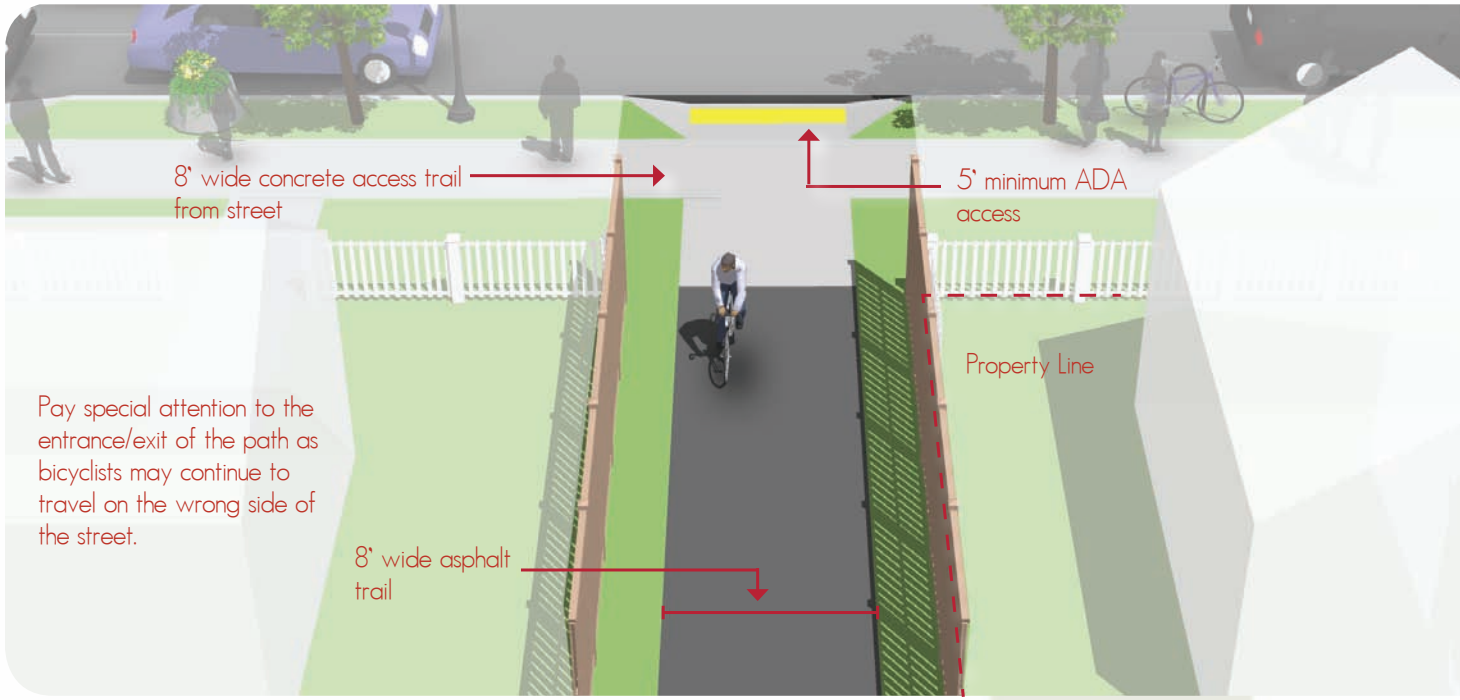
Description

Neighborhood accessways provide residential areas with direct bicycle and pedestrian access to parks, trails, greenspaces, and other recreational areas. They most often serve as small trail connections to and from the larger trail network, typically having their own rights-of-way and easements.

Additionally, these smaller trails can be used to provide bicycle and pedestrian connections between dead-end streets, cul-de-sacs, and access to nearby destinations not provided by the street network.

Guidance

- Neighborhood accessways should remain open to the public.
- Trail pavement shall be at least 8' wide to accommodate emergency and maintenance vehicles, meet ADA requirements and be considered suitable for multi-use.
- Trail widths should be designed to be less than 8' wide only when necessary to protect large mature native trees over 18" in caliper, wetlands or other ecologically sensitive areas.
- Access trails should slightly meander whenever possible.



Discussion

Neighborhood accessways should be designed into new subdivisions at every opportunity and should be required by City/County subdivision regulations.

For existing subdivisions, Neighborhood and homeowner association groups are encouraged to identify locations where such connects would be desirable. Nearby residents and adjacent property owners should be invited to provide landscape design input.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

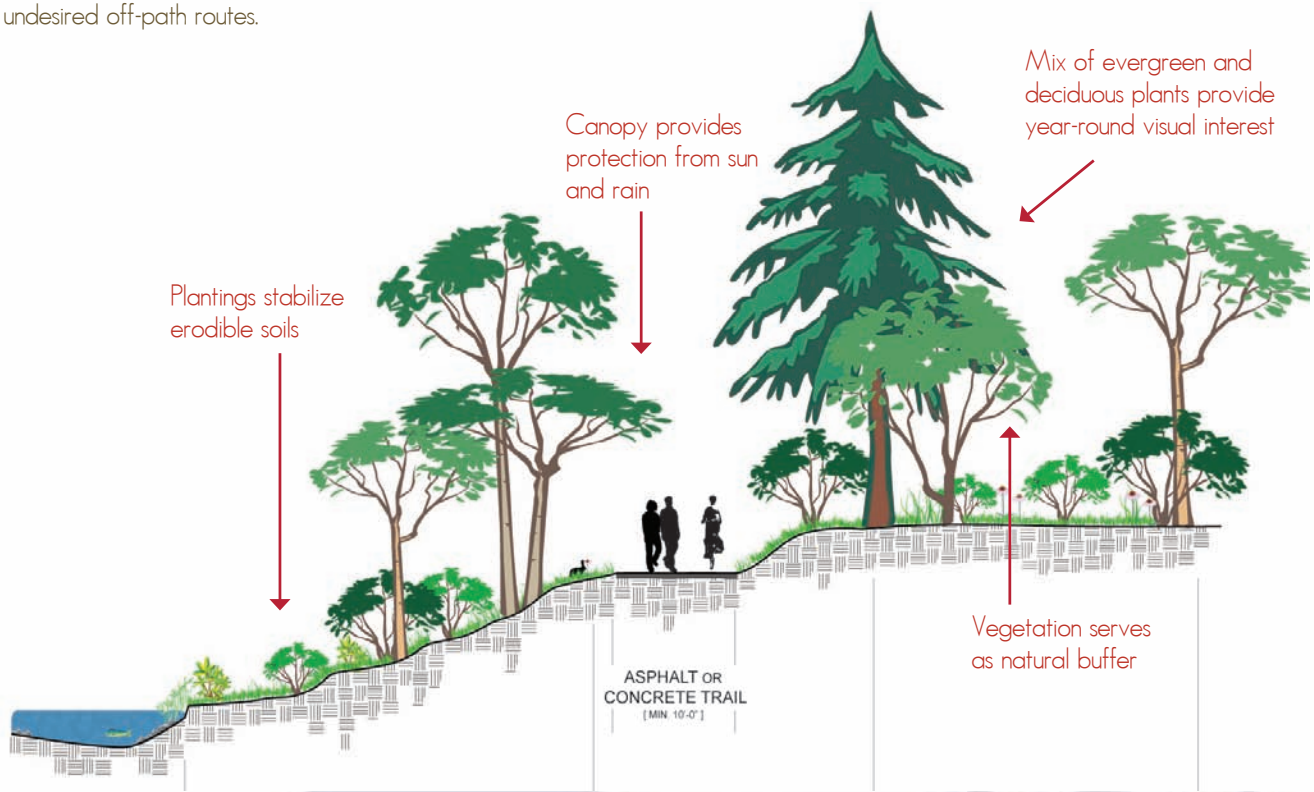
FHWA. (2009). Manual on Uniform Traffic Control Devices.

FHWA. (2006). Federal Highway Administration University Course on Bicycle and Pedestrian Transportation. Lesson 19: Greenways and Shared Use Paths.

VEGETATIVE BUFFERS

Description

Landscape features, including trees and shrubs along paths, can enhance the visual environment and improve the path user experience. Trees and shrubs can also shade users from sun and shelter users from rain. When possible, landscaping is the first choice for creating separation between the trail and adjacent properties. Vegetative buffers create a natural privacy screen, provide habitat for wildlife, and stabilize erodible soils. Select landscaping material (e.g. vegetation with thorns) can deter unwanted access or exit points, entrapment areas, and undesired off-path routes.



Guidance

- All groundcover and shrubs to be trimmed to a maximum of 24" above ground level height.
- Where vegetative screens are recommended to provide privacy for private properties, they are not to exceed 4' in height.
- Trees should be trimmed to provide a minimum of 8' of vertical clearance.
- Tree canopies should not obstruct pathway illumination
- Select and place trail vegetation to provide seasonal comfort: shade in the warmer months and sunlight in colder months.
- Design the buffer with a combination of evergreen and deciduous plants for year-round interest.

Discussion

Select plant species based on the desired effect or function along trail segments. For example, consider the use of plant species that assist with stormwater management along trail edges. In some situations, vegetative buffers alone may not create the desired degree of separation. Where separation is desired to protect users from hazardous materials, deep water or swift currents, or steep slopes, consider additional treatments. See Trail Edge Definition for more information.

Materials and Maintenance

Use native plant species and plants appropriate to the region that are already adapted to the local soil and climate.

Keep the vegetation buffer maintained so that it does not impede views or interfere with trail circulation.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

Flink, C., Searns, R., and Olka, K. (2001). Trails for the Twenty-First Century: Island Press (2nd ed.)

Flink, C., & Searns, R. (1993). Greenways: A Guide To Planning Design And Development.

USDA, Forest Service. (2007). Trail Construction and Maintenance Notebook.

TRAIL EDGE DEFINITION

Description

Vegetation, topography, ditches, fencing, railings, or walls may be used to clearly mark trail edges. Such features serve multiple purposes, including:

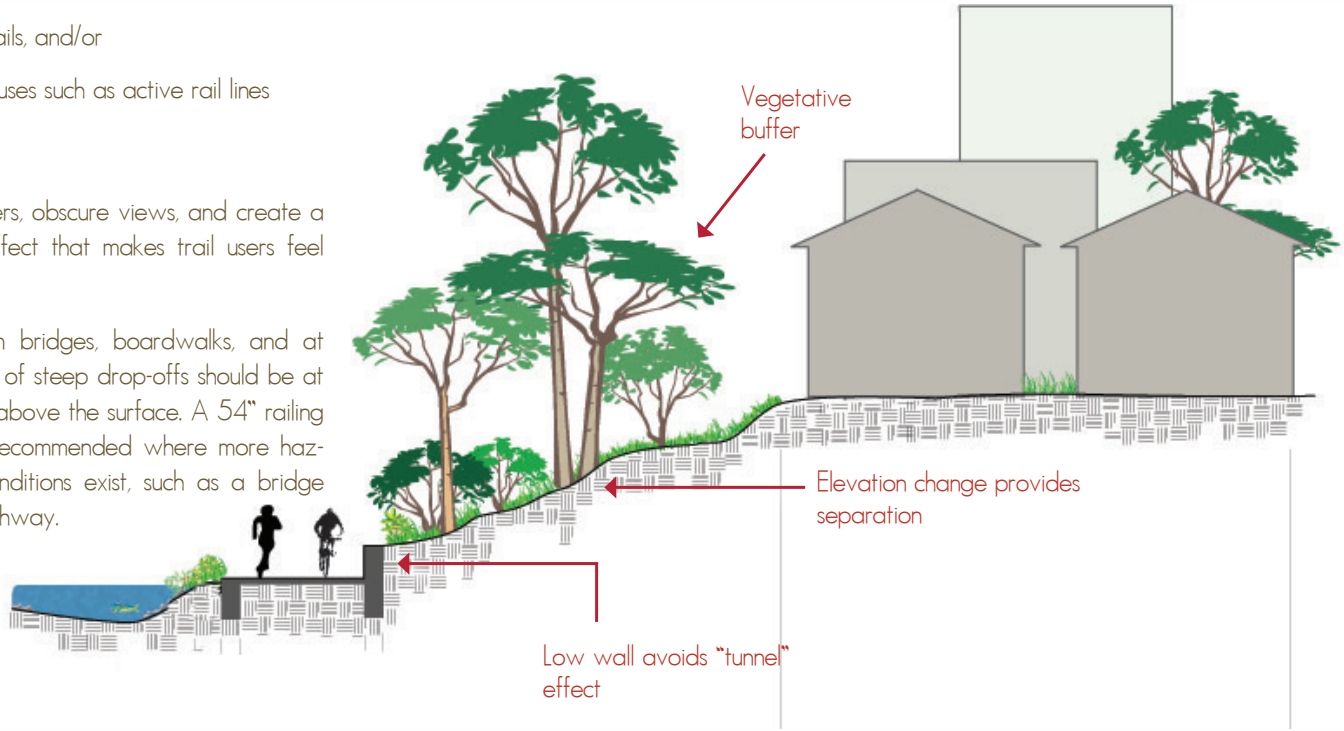
- Providing visual separation/privacy screens
- Delineating public space from private property adjacent to the trail
- Discouraging the development of informal access trails, and/or
- Separating users from hazardous drop-offs or land uses such as active rail lines

Guidance

If separation is desired purely for privacy reasons, vegetative buffers or the use of topography are recommended where possible. For physical separation aimed at preventing trespassing or guarding against hazardous slopes, consider the use of topography, ditches, semi-transparent fencing or railings, and hostile vegetation.

Fencing should strike a balance between adjacent residents' privacy and informal surveillance of the trail. Permeable fencing of four feet tall or less can provide a barrier sufficient to denote property boundaries or to deter most access. Opaque fencing or walls can degrade the experience of trail users, obscure views, and create a "tunnel" effect that makes trail users feel trapped.

Railings on bridges, boardwalks, and at the edges of steep drop-offs should be at least 42" above the surface. A 54" railing height is recommended where more hazardous conditions exist, such as a bridge over a highway.



Discussion

Wildlife passage and safety for trail users are important factors in determining appropriate trail edge treatments. Although the public often perceives fencing as a means of providing safety by prevention of unwanted access, fencing that blocks visual access completely can have the opposite effect by impairing informal trail surveillance. Trail segments adjacent to active rail lines may require fencing, at the discretion of the owner and operator of the rail corridor.

Materials and Maintenance

Use native plant species to reduce maintenance costs and enhance local identity. When possible, consider using locally sourced materials for fencing such as timber from trees native to the region.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

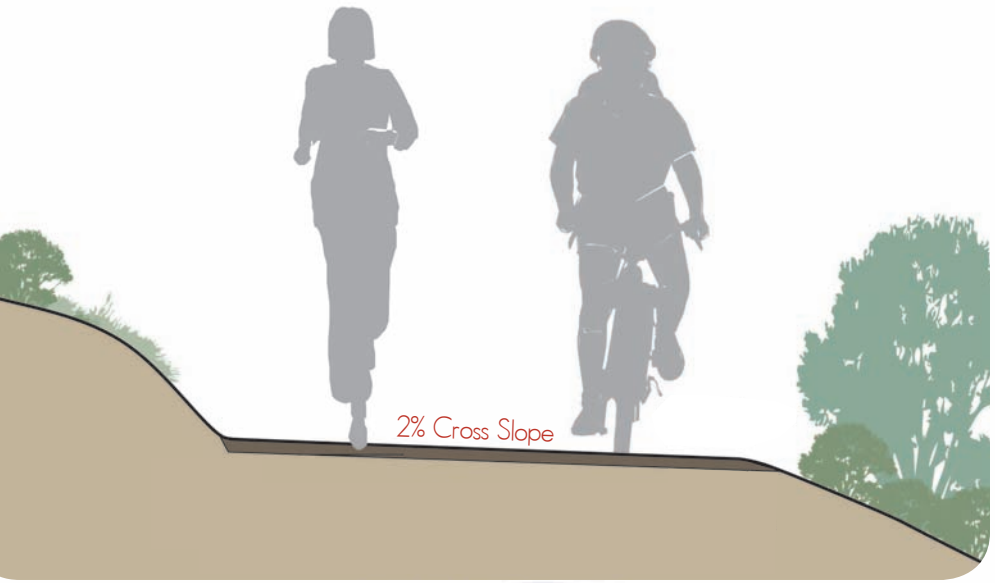
FHWA. (2006). Federal Highway Administration University Course on Bicycle and Pedestrian Transportation. Lesson 19: Greenways and Shared Use Paths.

USDA, Forest Service. (2007). Trail Construction and Maintenance Notebook.

DRAINAGE & EROSION CONTROL

Description

Drainage and erosion control is necessary to maintain a stable walkway and trail surface. Following land contours helps reduce erosion problems, minimizes maintenance and increases comfort levels on all trail types.



Guidance

Paved Surfaces

A 2% cross slope will resolve most drainage issues on a paved path and should be used for both the trail and its shoulders. A maximum 1:6 slope may be used for the shoulders although 2% is preferred. For sections of cut where uphill water is collected in a ditch and directed to a catch basin, water should be directed under the trail in a drainage pipe of suitable dimensions.

Natural Surfaces

Erosion will occur on natural surface trails. Natural surface trails should be designed to accommodate erosion by shaping the tread to limit how much erosion occurs and to maintain a stable walkway and trail surface. The goal is to outslope the trail so that water sheets across, instead of down, its tread.

Designing trails with rolling grades is the preferred way to build sustainable natural surface trails. "Rolling grade" describes the series of dips, crests, climbs and drainage crossings linked in response to the existing landforms on the site to form a sustainable trail.

Frequent grade reversals (grade dips, grade brakes, drain dips or rolling dips) are a critical element for controlling erosion on sustainable trails. A general rule-of-thumb is to incorporate a grade reversal every 20 to 50 linear feet along the trail to divide the trail into smaller watersheds so the drainage characteristics from one section won't affect another section.

Discussion

Grade reversals have the added benefit of adding interest to any trail. Retaining walls or other structural elements may also be required for stable construction and to protect the trail from erosion and flood damage.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

Additional References and Guidelines

Flink, C. (1993). Greenways: A Guide To Planning Design and Development.

USDA, Forest Service. (2007). Trail Construction and Maintenance Notebook.

National Park Service. (2007). Guide to Sustainable Mountain Trails.

EQUESTRIAN USE ON TRAILS

Description

Recreational trails are shared-use paths. Many trails are open to use by equestrians in addition to pedestrians, cyclists and other non-motorized users. Multi-use trails may be designed to have a single tread for all users or multiple treads to separate uses that might conflict. Pedestrians and equestrians are often compatible as they both accept unpaved surfaces and move at relatively slow speeds. Bicyclists and horses may have conflicts. Road cyclists prefer a hard, smooth surface which is not ideal for horses. The faster speed and quiet operating nature of cyclists and natural flight reaction of horses lead many trail designers to recommend separating those on bikes from equestrians.

Guidance

Width

A horse on a single track requires a minimum of 1.5 feet of tread width and 5.5 feet horizontal clear width to accommodate horse and rider.

Preferred width for moderate trail development in a rural area is 6 feet of tread with 3 foot shoulders on each side (12 feet total). In developed areas, treads may be as wide as 12 feet with 3 foot shoulders (18 feet total).

Vertical Clearance

10 feet minimum, 12 feet preferred.

Separation

In corridors where adequate right-of-way is available, trail users may be separated by vegetated buffers, elevation changes, or distinctive surfaces suitable to each user group.

Barriers

The accepted height for most equestrian barriers is fifty-four inches. Solid barriers significantly limit an animal's peripheral vision and sense of security and thus are not recommended.

Crossings

Push-button signal actuators mounted at elevated heights for riders (between six and eight feet above the ground), enable equestrians to stop cross traffic. Equestrian crossing signs may be used to alert other road and trail users of the likely presence of equestrians.

Signage provides guidance about separate treads

Discussion

Tread width will vary by context and user volumes.

Trails that intersect with roadways are subject to AASHTO guidelines with respect to sight and stopping distance. When trail corridors are constrained, an expanded trail shoulder may double as an equestrian facility. When bollards are used to deter vehicular access, five foot horizontal spacing is recommended for equestrian passage.

Materials and Maintenance

Trail tread or surface should be stable. While it may or may not be paved, a trail surface should be solid, obstacle free and should stay in place. Appropriate trail surfaces include: compacted native soil, decomposed granite or crusher fine material.

Additional References and Guidelines

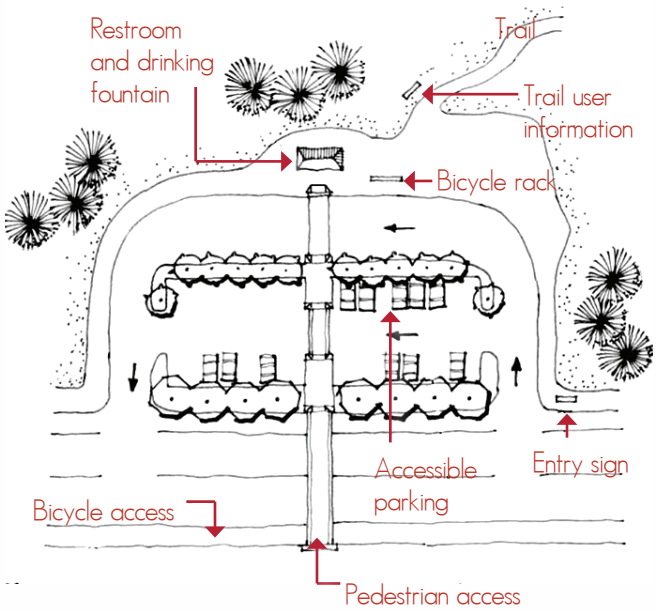
U.S. Department of Agriculture, Forest Service, Technology & Development Program in cooperation with USDOT, FHWA. (2007). Equestrian Design Guidebook for Trails, Trailheads and Campgrounds.

Wood, G. (2007) Recreational Horse Trails in Rural and Wildland Areas: Design, Construction,and Maintenance.

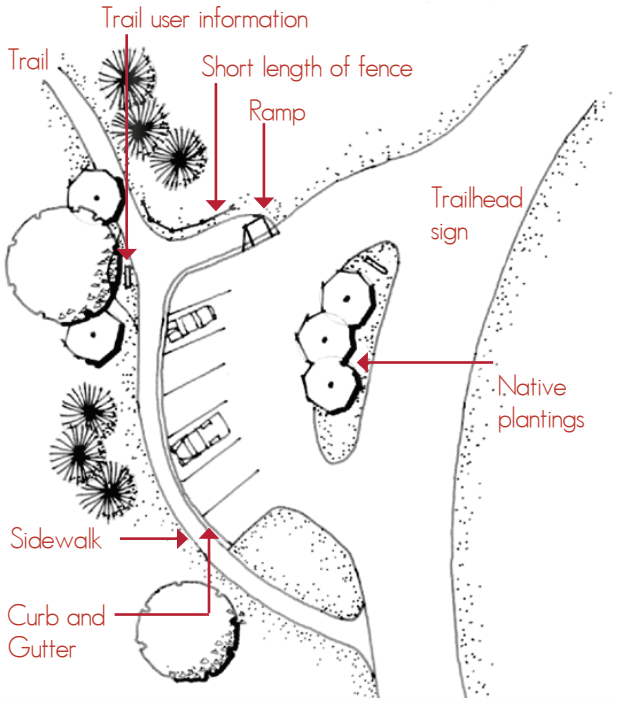
TRAILHEADS

Description

Good access to a path system is a key element for its success. Trailheads serve the local and regional population arriving to the path system by car, transit, bicycle or other modes. Trailheads provide essential access to the shared-use path system and include amenities like parking for vehicles and bicycles, restrooms (at major trailheads), and posted maps.



Major Trailhead



Minor Trailhead

Guidance

- Major trailheads should include automobile and bicycle parking, trail information (maps, user guidelines, wildlife information, etc.), garbage receptacles and restrooms.
- Minor trailheads can provide a subset of these amenities.

Discussion

Trailheads with a small motor vehicle parking area should additionally include bicycle parking and accessible parking.

Neighborhood access should be achieved from all local streets crossing the path. No parking needs to be provided, and in some situations "No Parking" signs will be desirable to minimize impact on the neighborhood. See Accessways / Spur Trails for neighborhood connection guidance.

Materials and Maintenance

Trailhead signage and lighting will require regular maintenance. Major trailheads will require regular servicing.

Additional References and Guidelines

AASHTO. (1999). Guide for the Development of Bicycle Facilities.

TRAIL AMENITIES

Description

Seating, lighting, interpretive areas, overlooks, and public art are examples of trail amenities that enhance the user experience. Such elements may increase user comfort, improve user safety, enhance trail aesthetics, or provide place-based educational experiences focused on local history, culture, and ecosystems.

Guidance

Seating

Provide benches at key rest areas and viewpoints. Benches should include back support and sturdy handrails. A bench should normally be 16-20" above ground, with a seating depth of 18-20". The length should vary between 60-90". Provide wheelchair access alongside benches, at least a 30-by-48-inch area for adequate maneuvering. Care should be exercised in locating seating areas and seating locations should have good visibility from the surrounding neighbors

Trail Lighting

Adequate pedestrian-scaled lighting helps trail users observe their surrounding and respond to potential threats. Consider locating pedestrian-scale lighting at the entrances and exits of bridges and undercrossings, near public gathering areas along the greenway, at trail access points, and near bicycle racks. Use continuous lighting along the trail only if night usage is desired and permitted, it is acceptable to residents living along or near the trail, and it will not disturb wildlife.

Where lighting is installed on trails and pathways, the illumination should:

- Be adequate to identify a face up to 20 yards away.
- Provide uniform coverage, eliminating dark pockets.
- Provide good color rendition.
- Not be obstructed by tree canopies

Interpretive Areas and Overlooks

Locate interpretive installations and signs near key points of interest along the trail corridor. Interpretive areas should provide information about the local history, culture, or natural environment. Signs at overlooks may point out important natural and built environment features in the viewshed.

Public Art

Public art installations contribute and enhance a community's identity and character, creating a strong "sense of place" branding. Public art incorporated into a trail network provides visual cues that a trail is "owned" and cared for by the community.

Discussion

The use of retaining walls as seat walls is one way in which non-obtrusive amenities can be included. More informal seating opportunities such as picnic tables may exist along a trail or near an access points. Set all furnishings adequately back from the edge of bike paths to allow uses to fully remove themselves and their bicycles from the flow of traffic on the pathway.

Materials and Maintenance

Use full cut-off, energy-efficient lighting that is IDA Approved Dark Sky Friendly to avoid excess light pollution and save costs. Lighting along full trail corridors requires a significant commitment to maintenance.

Additional References and Guidelines

Flink, C., Searns, R., and Olka, K. (2001). Trails for the Twenty-First Century: Island Press (2nd ed.)

Flink, C. (1993). Greenways: A Guide To Planning Design And Development.

TDOT. (2005) PLAN Go: Bicycle and Pedestrian Element.

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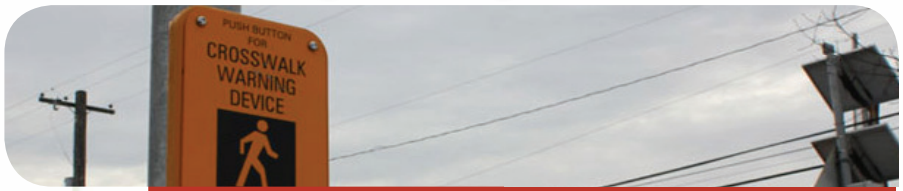
Path/Roadway Crossings

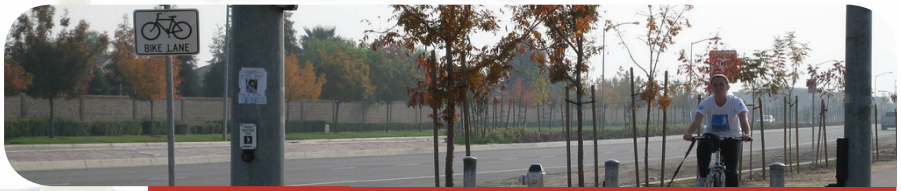
Path/roadway crossings can create potential conflicts between path users and motorists, however, well-designed crossings can mitigate many operational issues and provide a higher degree of safety and comfort for path users. This section covers a variety of crossing treatments for both pedestrians and bicyclists. The following pages provide detailed information and guidelines for the application of each treatment.

Marked/Unsignalized Crossings



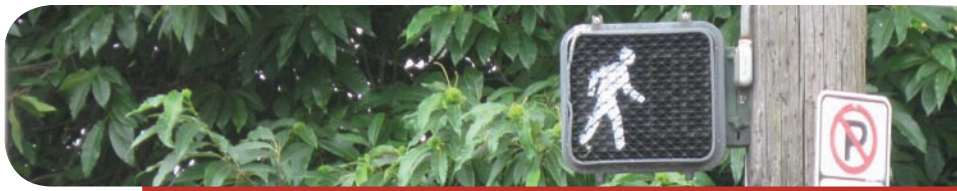
Active Warning Beacons

Signalized/Controlled Crossings



Route Users to Signalized Crossings

Bicycle Detection and Actuation



Accommodating Pedestrians at Signalized Crossings

Marked Crosswalks

Hybrid Beacon for Mid-Block Crossing

Median Refuge Islands

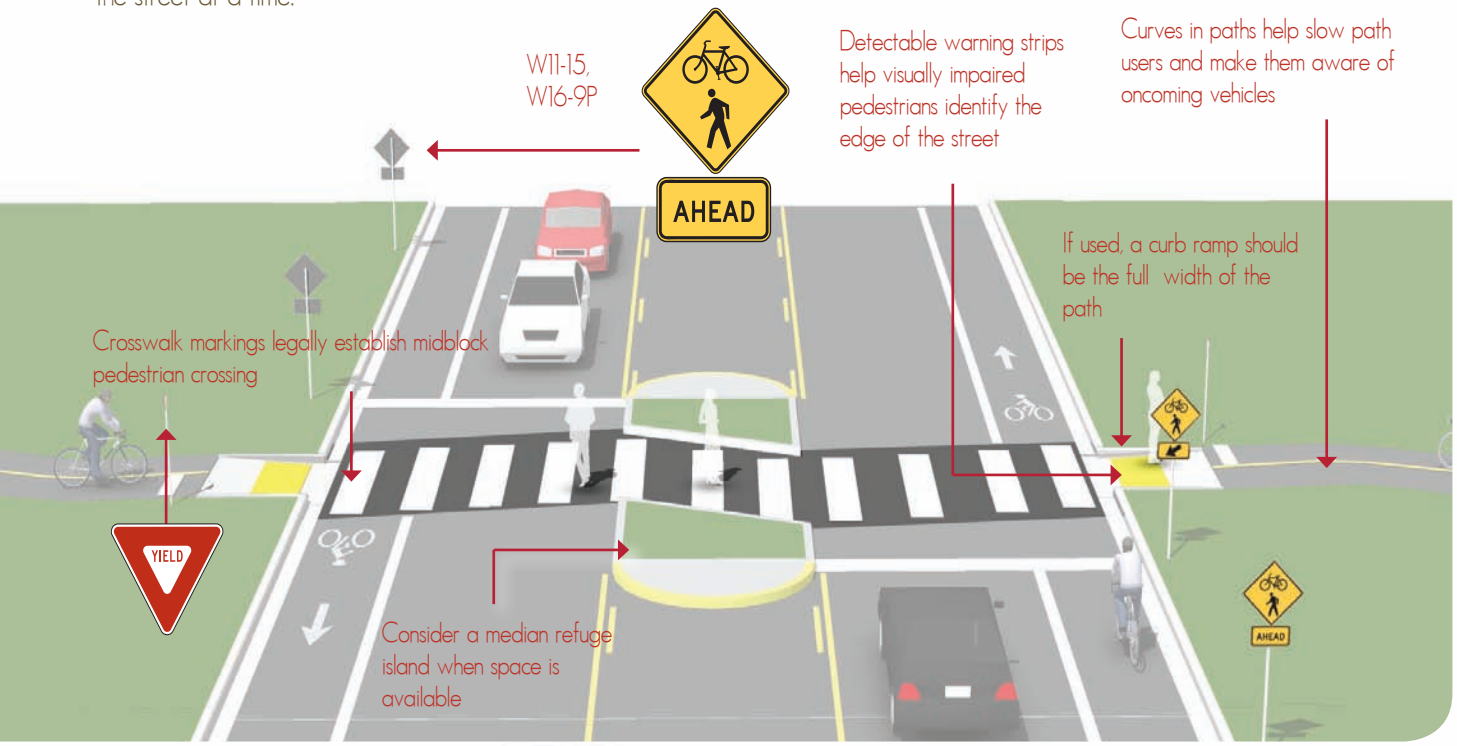
ADA Compliant Ramps

Overcrossings

MARKED/UNSIGNALIZED CROSSINGS

Description

A marked/unsignalized crossing typically consists of a marked crossing area, signage and other markings to slow or stop traffic. The approach to designing crossings at mid-block locations depends on an evaluation of vehicular traffic, line of sight, pathway traffic, use patterns, vehicle speed, road type, road width, and other safety issues such as proximity to major attractions. When space is available, using a median refuge island can improve user safety by providing pedestrians and bicyclists space to perform the safe crossing of one side of the street at a time.



Guidance

Maximum traffic volumes

- ≤9,000-12,000 Average Daily Traffic (ADT) volume
- Up to 15,000 ADT on two-lane roads, preferably with a median
- Up to 12,000 ADT on four-lane roads with median

Maximum travel speed

- 35 MPH

Minimum line of sight

- 25 MPH zone: 155 feet
- 35 MPH zone: 250 feet
- 45 MPH zone: 360 feet

Discussion

Unsignalized crossings of multi-lane arterials over 15,000 ADT may be possible with features such as sufficient crossing gaps (more than 60 per hour), median refuges, and/or active warning devices like rectangular rapid flash beacons or in-pavement flashers, and excellent sight distance. For more information see the discussion of active warning beacons.

On roadways with low to moderate traffic volumes (<12,000 ADT) and a need to control traffic speeds, a raised crosswalk may be the most appropriate crossing design to improve pedestrian visibility and safety.

Materials and Maintenance

Locate markings out of wheel tread when possible to minimize wear and maintenance costs.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

FHWA. (2009). Manual on Uniform Traffic Control Devices.

TDOT. (2005) PLAN Go: Bicycle and Pedestrian Element.

ACTIVE WARNING BEACONS

Description

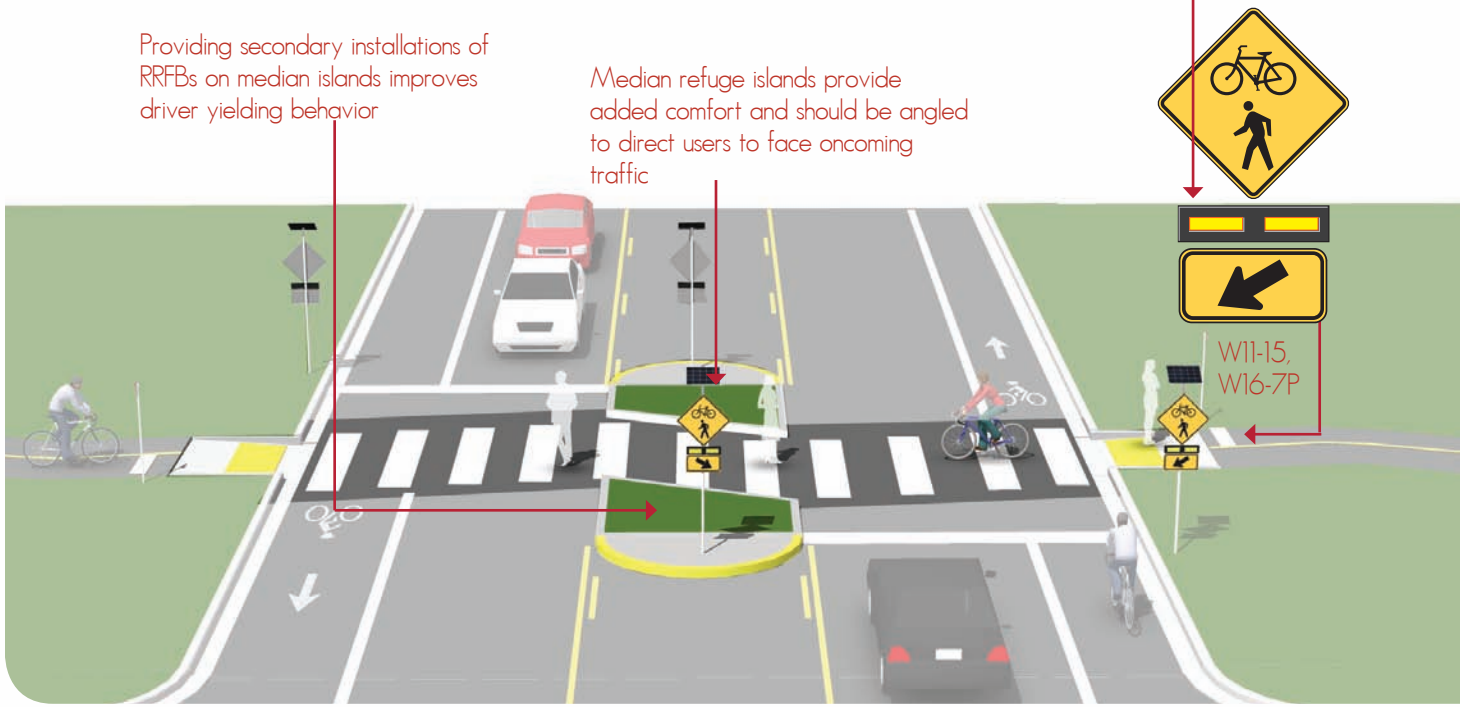
Enhanced marked crossings are unsignalized crossings with additional treatments designed to increase motor vehicle yielding compliance on multi-lane or high volume roadways.

These enhancements include pathway user or sensor actuated warning beacons, Rectangular Rapid Flash Beacons (RRFB) shown below, or in-roadway warning lights.

Guidance

Guidance for Marked/Unsignalized Crossings applies.

- Warning beacons shall not be used at crosswalks controlled by YIELD signs, STOP signs, or traffic control signals.
- Warning beacons shall initiate operation based on user actuation and shall cease operation at a predetermined time after the user actuation or, with passive detection, after the user clears the crosswalk.



Discussion

Rectangular rapid flash beacons show the most increased compliance of all the warning beacon enhancement options.

A study of the effectiveness of going from a no-beacon arrangement to a two-beacon RRFB installation increased yielding from 18 percent to 81 percent. A four-beacon arrangement raised compliance to 88%. Additional studies of long term installations show little to no decrease in yielding behavior over time.

Materials and Maintenance

Locate markings out of wheel tread when possible to minimize wear and maintenance costs. Signing and striping need to be maintained to help users understand any unfamiliar traffic control.

Additional References and Guidelines

NACTO. (2012). Urban Bikeway Design Guide.

FHWA. (2009). Manual on Uniform Traffic Control Devices.

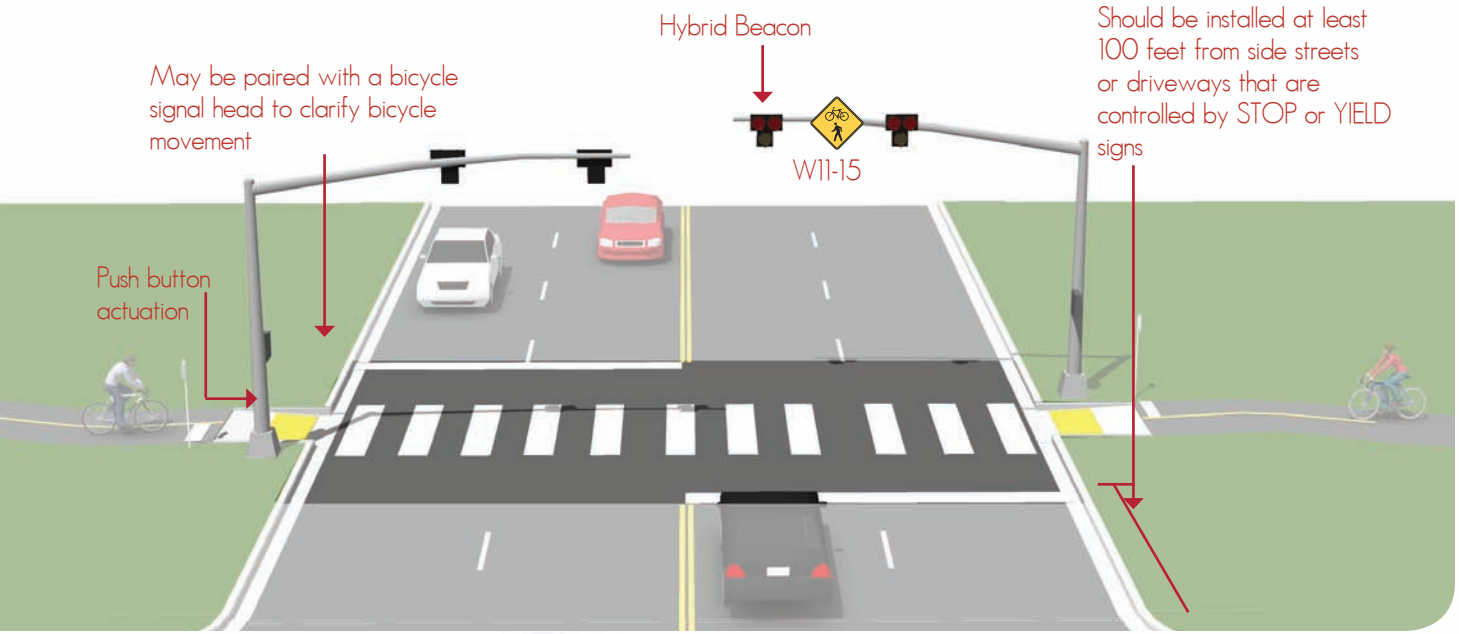
FHWA. (2008). MUTCD - Interim Approval for Optional Use of Rectangular Rapid Flashing Beacons (IA-11).

TDOT. (2005) PLAN Go: Bicycle and Pedestrian Element.

SIGNALIZED/CONTROLLED CROSSINGS

Description

Signalized crossings provide the most protection for crossing path users through the use of a red-signal indication to stop conflicting motor vehicle traffic. The two types of path signalization are full traffic signal control and hybrid signals. A full traffic signal installation treats the path crossing as a conventional 4-way intersection and provides standard red-yellow-green traffic signal heads for all legs of the intersection. Hybrid beacon installation (shown below) faces only cross motor vehicle traffic, stays dark when inactive, and uses a unique 'wig-wag' signal phase to indicate activation. Vehicles have the option to proceed after stopping during the final flashing red phase, which can reduce motor vehicle delay when compared to a full signal installation.



Guidance

Hybrid beacons (illustrated here) may be installed without meeting traffic signal control warrants if roadway speed and volumes are excessive for comfortable path crossings.

Full traffic signal installations must meet MUTCD pedestrian, school or modified warrants. Additional guidance for signalized crossings:

- Located more than 300 feet from an existing signalized intersection
- Roadway travel speeds of 40 MPH and above
- Roadway ADT exceeds 15,000 vehicles

Discussion

Shared-use path signals are normally activated by push buttons but may also be triggered by embedded loop, infrared, microwave or video detectors. The maximum delay for activation of the signal should be two minutes, with minimum crossing times determined by the width of the street. Each crossing, regardless of traffic speed or volume, requires additional review by a registered engineer to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity and safety.

Materials and Maintenance

Hybrid beacons are subject to the same maintenance needs and requirements as standard traffic signals. Signing and striping need to be maintained to help users understand any unfamiliar traffic control.

Additional References and Guidelines

FHWA. (2009). Manual on Uniform Traffic Control Devices.

NACTO. (2012). Urban Bikeway Design Guide.

TDOT. (2005) PLAN Go: Bicycle and Pedestrian Element.

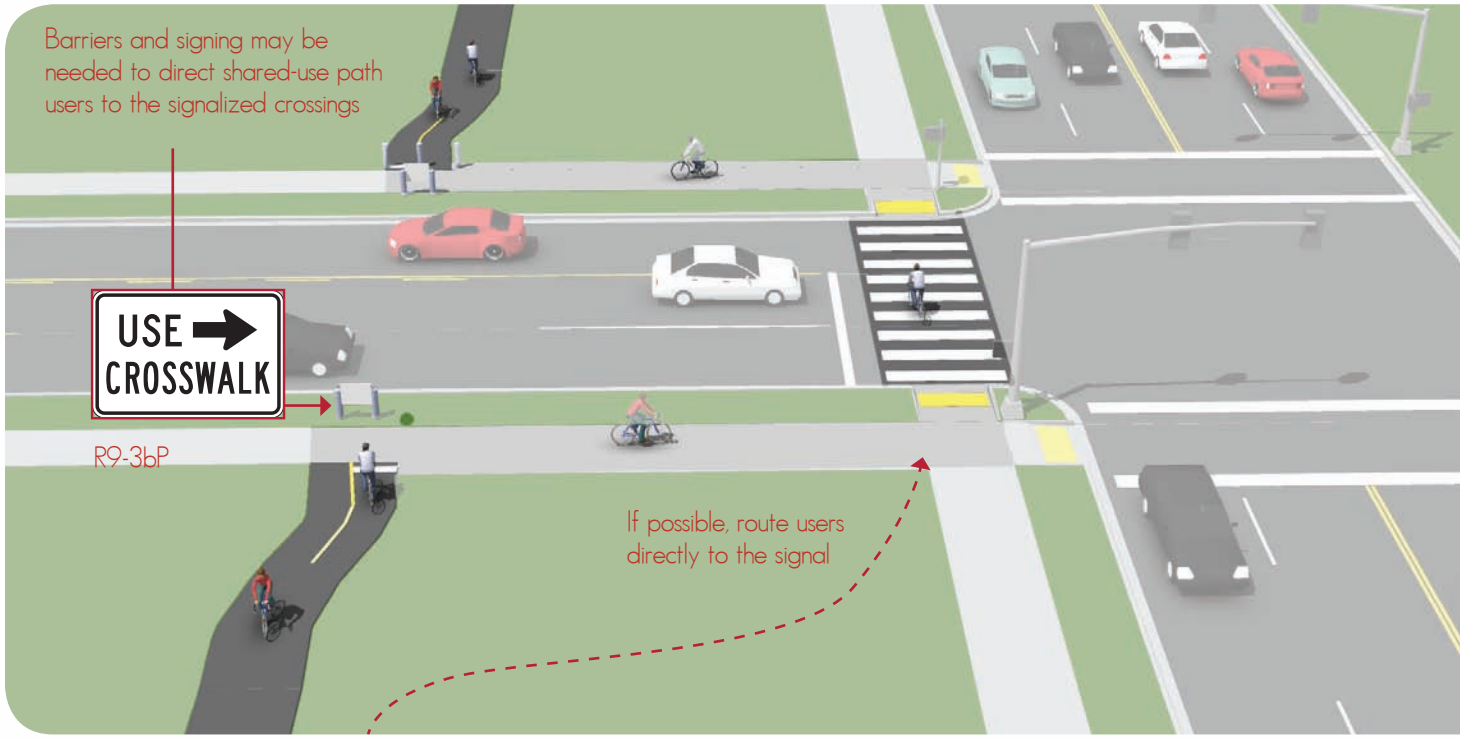
ROUTE USERS TO SIGNALIZED CROSSINGS

Description

Path crossings within approximately 400 feet of an existing signalized intersection with pedestrian crosswalks are typically diverted to the signalized intersection to avoid traffic operation problems when located so close to an existing signal. For this restriction to be effective, barriers and signing may be needed to direct path users to the signalized crossing. If no pedestrian crossing exists at the signal, modifications should be made.

Guidance

Path crossings should not be provided within approximately 400 feet of an existing signalized intersection. If possible, route path directly to the signal.



Discussion

In the US, the minimum distance a marked crossing can be from an existing signalized intersection varies from approximately 250 to 660 feet. Engineering judgement and the context of the location should be taken into account when choosing the appropriate allowable setback. Pedestrians are particularly sensitive to out of direction travel and jaywalking may become prevalent if the distance is too great.

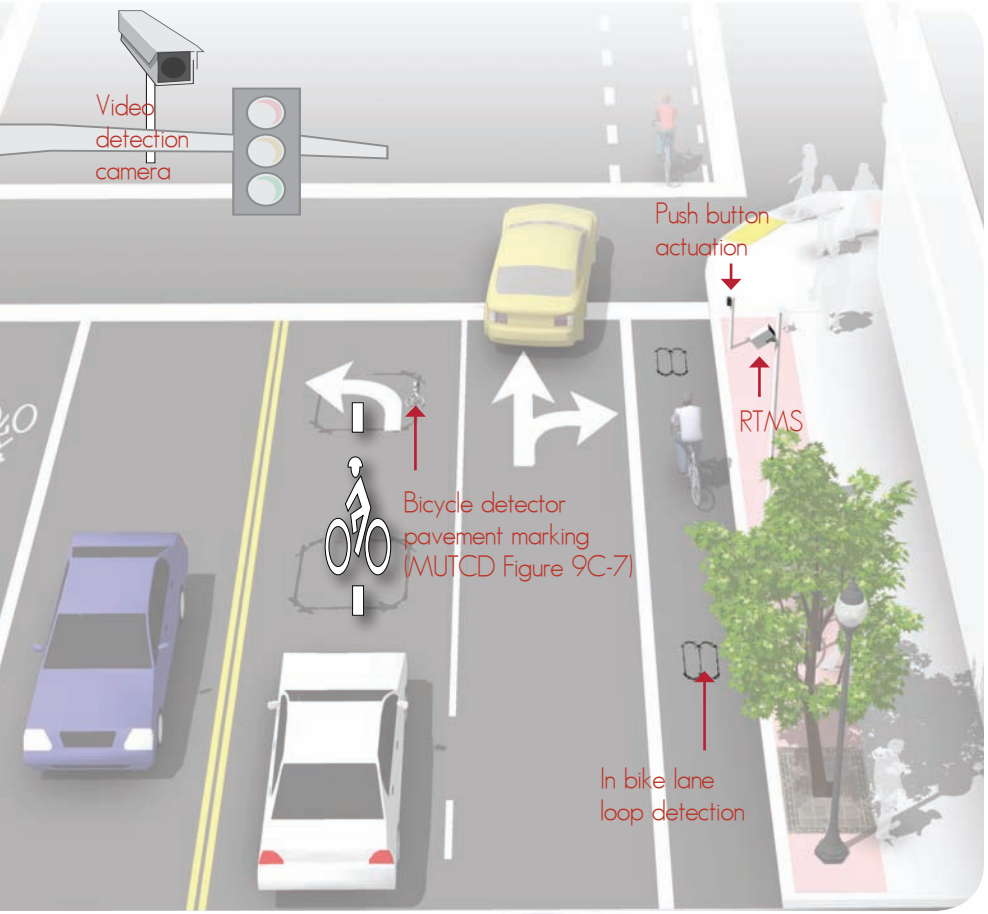
Materials and Maintenance

If a sidewalk is used for crossing access, it should be kept clear of snow and debris and the surface should be level for wheeled users.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
AASHTO. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.

Bicycle Detection and Actuation



Description

Push Button Actuation

User-activated button mounted on a pole facing the street.

Loop Detectors

Bicycle-activated loop detectors are installed within the roadway to allow the presence of a bicycle to trigger a change in the traffic signal. This allows the bicyclist to stay within the lane of travel without having to maneuver to the side of the road to trigger a push button.

Loops that are sensitive enough to detect bicycles should be supplemented with pavement markings to instruct bicyclists how to trip them.

Video Detection Cameras

Video detection systems use digital image processing to detect a change in the image at a location. These systems can be calibrated to detect bicycles. Video camera system costs range from $20,000 to $25,000 per intersection.

Remote Traffic Microwave Sensor Detection (RTMS)

RTMS is a system which uses frequency modulated continuous wave radio signals to detect objects in the roadway. This method marks the detected object with a time code to determine its distance from the sensor. The RTMS system is unaffected by temperature and lighting, which can affect standard video detection.

Discussion

Proper bicycle detection should meet two primary criteria: 1) accurately detects bicyclists and 2) provides clear guidance to bicyclists on how to actuate detection (e.g., what button to push, where to stand).

Bicycle loops and other detection mechanisms can also provide bicyclists with an extended green time before the light turns yellow so that bicyclists of all abilities can reach the far side of the intersection.

Materials and Maintenance

Signal detection and actuation for bicyclists should be maintained with other traffic signal detection and roadway pavement markings.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

FHWA. (2009). Manual on Uniform Traffic Control Devices.

NACTO. (2012). Urban Bikeway Design Guide.

Accommodating Pedestrians at Signalized Crossings

Description

Pedestrian Signal Head

Pedestrian signal indicators demonstrate to pedestrians when to cross at a signalized crosswalk. All traffic signals should be equipped with pedestrian signal indications except where pedestrian crossing is prohibited by signage.

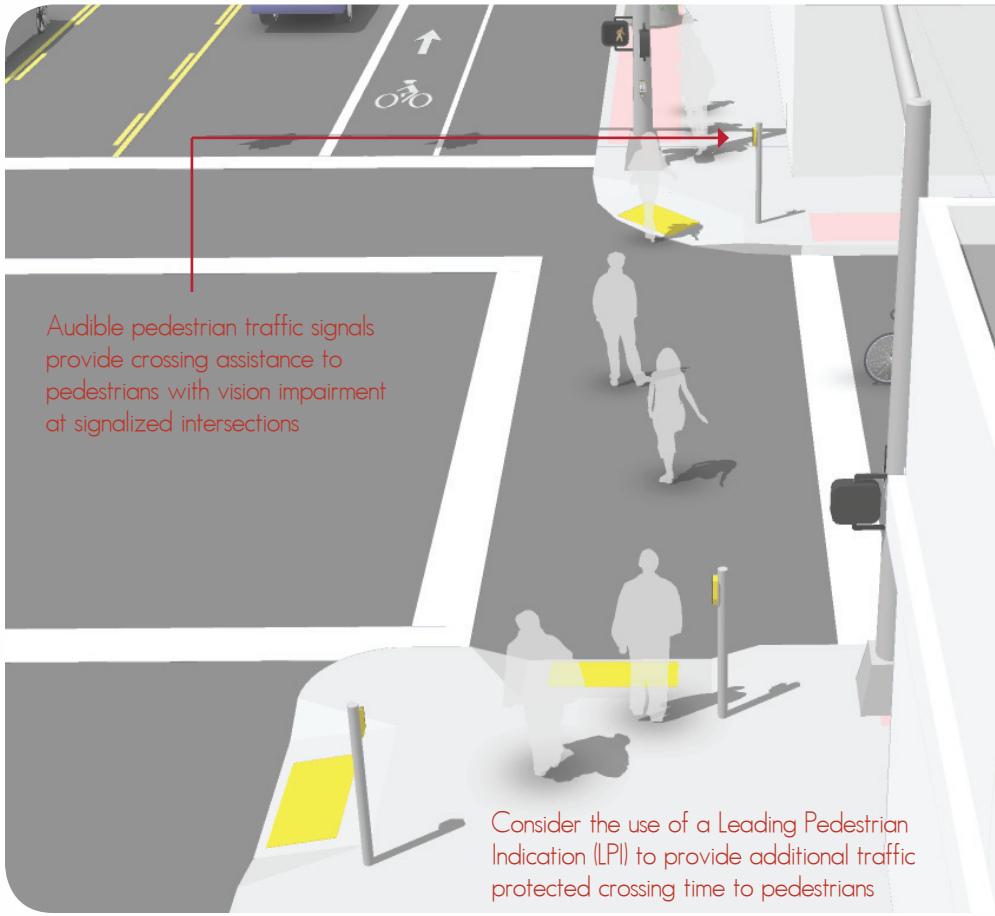
Countdown pedestrian signals are particularly valuable for pedestrians, as they indicate whether a pedestrian has time to cross the street before the signal phase ends. Countdown signals should be used at all signalized intersections.

Signal Timing

Providing adequate pedestrian crossing time is a critical element of the walking environment at signalized intersections. The MUTCD recommends traffic signal timing to assume a pedestrian walking speed of 4' per second, meaning that the length of a signal phase with parallel pedestrian movements should provide sufficient time for a pedestrian to safely cross the adjacent street.

At crossings where older pedestrians or pedestrians with disabilities are expected, crossing speeds as low as 3' per second may be assumed. Special pedestrian phases can be used to provide greater visibility or more crossing time for pedestrians at certain intersections.

In busy pedestrian areas such as downtowns, the pedestrian signal indication should be built into each signal phase, eliminating the requirement for a pedestrian to actuate the signal by pushing a button.



Discussion

When push buttons are used, they should be located so that someone in a wheelchair can reach the button from a level area of the sidewalk without deviating significantly from the natural line of travel into the crosswalk, and marked (for example, with arrows) so that it is clear which signal is affected.

In areas with very heavy pedestrian traffic, consider an all-pedestrian signal phase to give pedestrians free passage in the intersection when all motor vehicle traffic movements are stopped.

Materials and Maintenance

It is important to repair or replace traffic control equipment before it fails. Consider semi-annual inspections of controller and signal equipment, intersection hardware, and loop detectors.

Additional References and Guidelines

United States Access Board. (2007). Public Rights-of-Way Accessibility Guidelines (PROWAG).

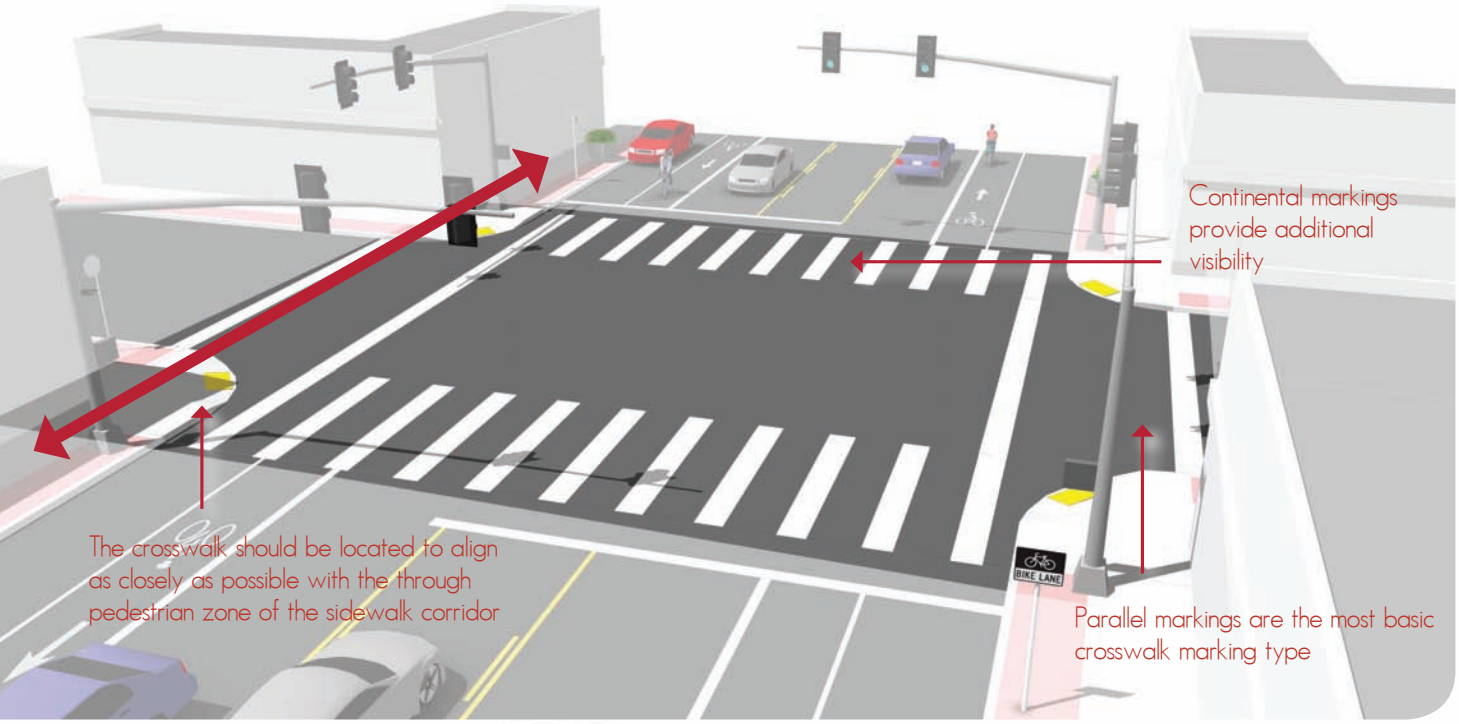
AASHTO. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.

TDOT. (2005) PLAN Go: Bicycle and Pedestrian Element.

Marked Crosswalks

Description

A marked crosswalk signals to motorists that they must stop for pedestrians and encourages pedestrians to cross at designated locations. Installing crosswalks alone will not necessarily make crossings safer especially on multi-lane roadways. At mid-block locations, crosswalks can be marked where there is a demand for crossing and there are no nearby marked crosswalks.



Guidance

At signalized intersections, all crosswalks should be marked. At un-signalized intersections, crosswalks may be marked under the following conditions:

- At a complex intersection, to orient pedestrians in finding their way across.
- At an offset intersection, to show pedestrians the shortest route across traffic with the least exposure to vehicular traffic and traffic conflicts.
- At an intersection with visibility constraints, to position pedestrians where they can best be seen by oncoming traffic.
- At an intersection within a school zone on a walking route.

Discussion

Continental crosswalk markings should be used at crossings with high pedestrian use or where vulnerable pedestrians are expected, including: school crossings, across arterial streets for pedestrian-only signals, at mid-block crosswalks, and at intersections where there is expected high pedestrian use and the crossing is not controlled by signals or stop signs. See Accommodating Pedestrians at Signalized Crossings for a discussion of enhancing pedestrian crossings.

Materials and Maintenance

Because the effectiveness of marked crossings depends entirely on their visibility, maintaining marked crossings should be a high priority. Thermoplastic markings offer increased durability than conventional paint.

Additional References and Guidelines

FHWA. (2009). Manual on Uniform Traffic Control Devices. (3B.18)
AASHTO. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.
FHWA. (2005). Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations.
FHWA. (2010). Crosswalk Marking Field Visibility Study.
TDOT. (2005) PLAN Go: Bicycle and Pedestrian Element.

Hybrid Beacon for Mid-Block Crossing

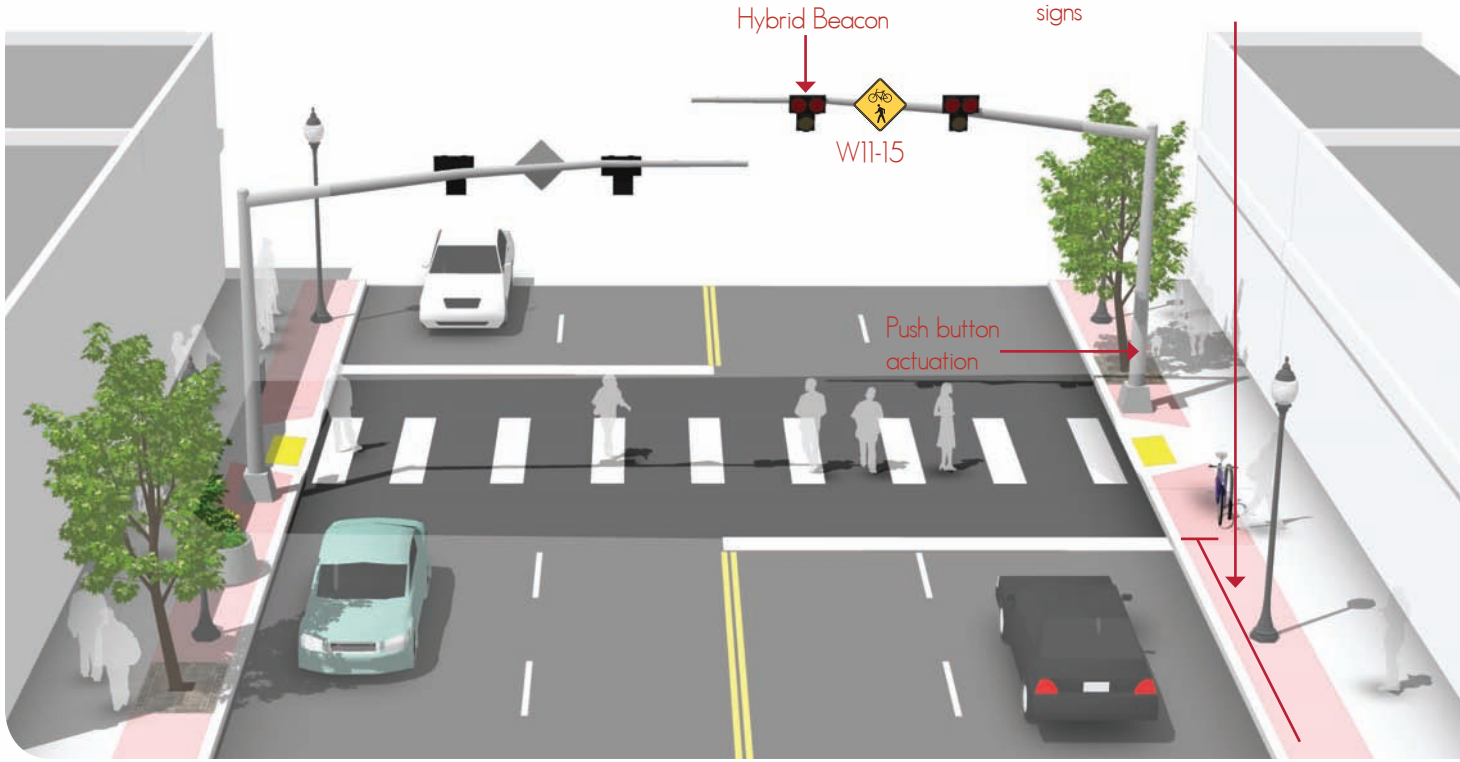
Description

Hybrid beacons are used to improve non-motorized crossings of major streets. A hybrid beacon consists of a signal-head with two red lenses over a single yellow lens on the major street, and a pedestrian signal head for the crosswalk.

Guidance

Hybrid beacons may be installed without meeting traffic signal control warrants if roadway speed and volumes are excessive for comfortable pedestrian crossings.

- If installed within a signal system, signal engineers should evaluate the need for the hybrid signal to be coordinated with other signals.
- Parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the marked crosswalk to provide adequate sight distance.



Discussion

Hybrid beacon signals are normally activated by push buttons, but may also be triggered by infrared, microwave or video detectors. The maximum delay for activation of the signal should be two minutes, with minimum crossing times determined by the width of the street.

Each crossing, regardless of traffic speed or volume, requires additional review by a registered engineer to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity, and safety.

Materials and Maintenance

Hybrid beacons are subject to the same maintenance needs and requirements as standard traffic signals. Signing and striping need to be maintained to help users understand any unfamiliar traffic control.

Additional References and Guidelines

FHWA. (2009). Manual on Uniform Traffic Control Devices.

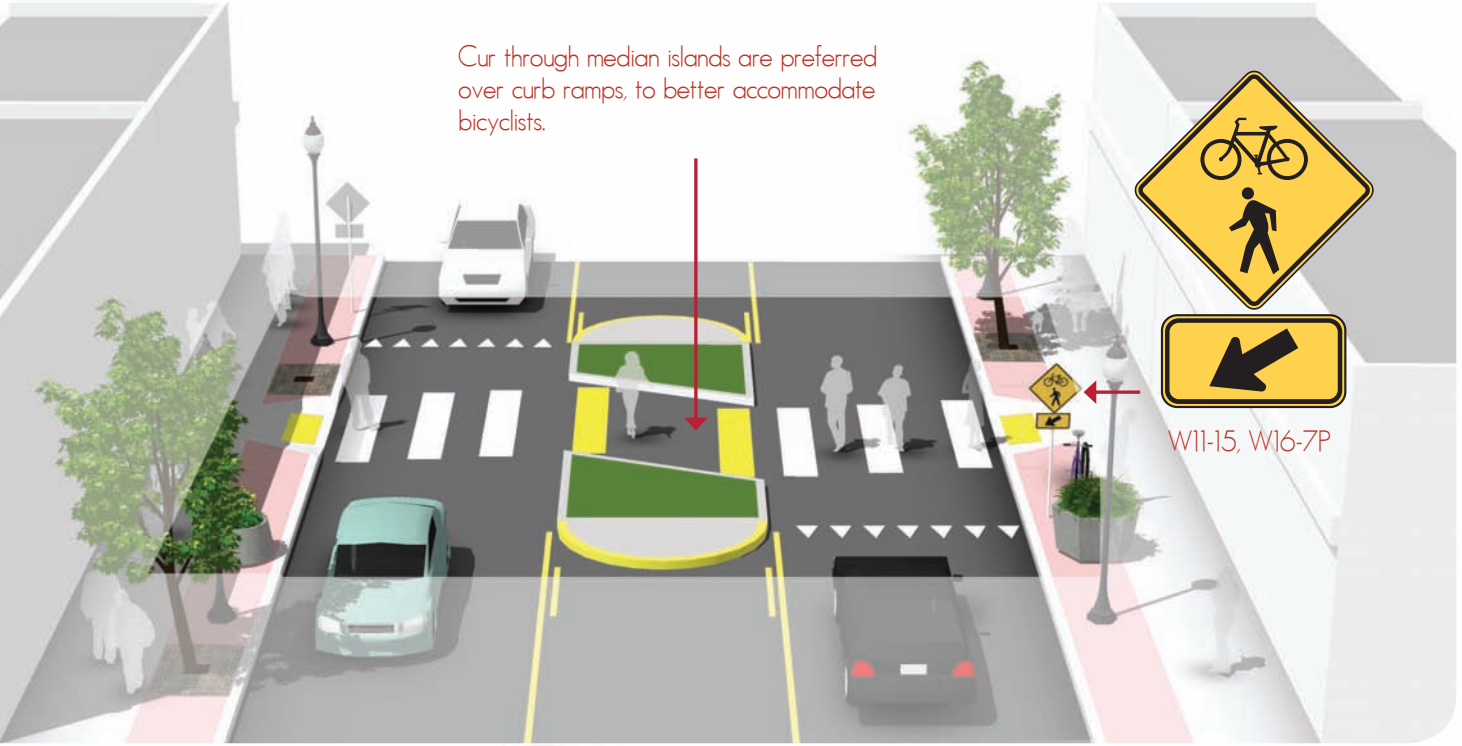
NACTO. (2012). Urban Bikeway Design Guide.

TDOT. (2005) PLAN Go: Bicycle and Pedestrian Element.

Median Refuge Islands

Description

Median refuge islands are located at the mid-point of a marked crossing and help improve pedestrian safety by allowing pedestrians to cross one direction of traffic at a time. Refuge islands minimize pedestrian exposure by shortening crossing distance and increasing the number of available gaps for crossing.



Guidance

- Can be applied on any roadway with a left turn center lane or median that is at least 6' wide.
- Appropriate at signalized or unsignalized crosswalks
- The refuge island must be accessible, preferably with an at-grade passage through the island rather than ramps and landings.
- The island should be at least 6' wide between travel lanes (to accommodate bikes with trailers and wheelchair users) and at least 20' long.
- On streets with speeds higher than 25 mph there should also be double centerline marking, reflectors, and "KEEP RIGHT" signage.

Discussion

If a refuge island is landscaped, the landscaping should not compromise the visibility of pedestrians crossing in the crosswalk. Shrubs and ground plantings should be no higher than 1 ft 6 in. On multi-lane roadways, consider configuration with Active Warning Beacons for improved yielding compliance.

Materials and Maintenance

Refuge islands may collect road debris and may require somewhat frequent maintenance. Refuge islands should be visible to snow plow crews and should be kept free of snow berms that block access.

Additional References and Guidelines

AASHTO. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.

FHWA. (2009). Manual on Uniform Traffic Control Devices.

NACTO. (2012). Urban Bikeway Design Guide.

TDOT. (2005) PLAN Go: Bicycle and Pedestrian Element.

ADA Compliant Curb Ramps

Description

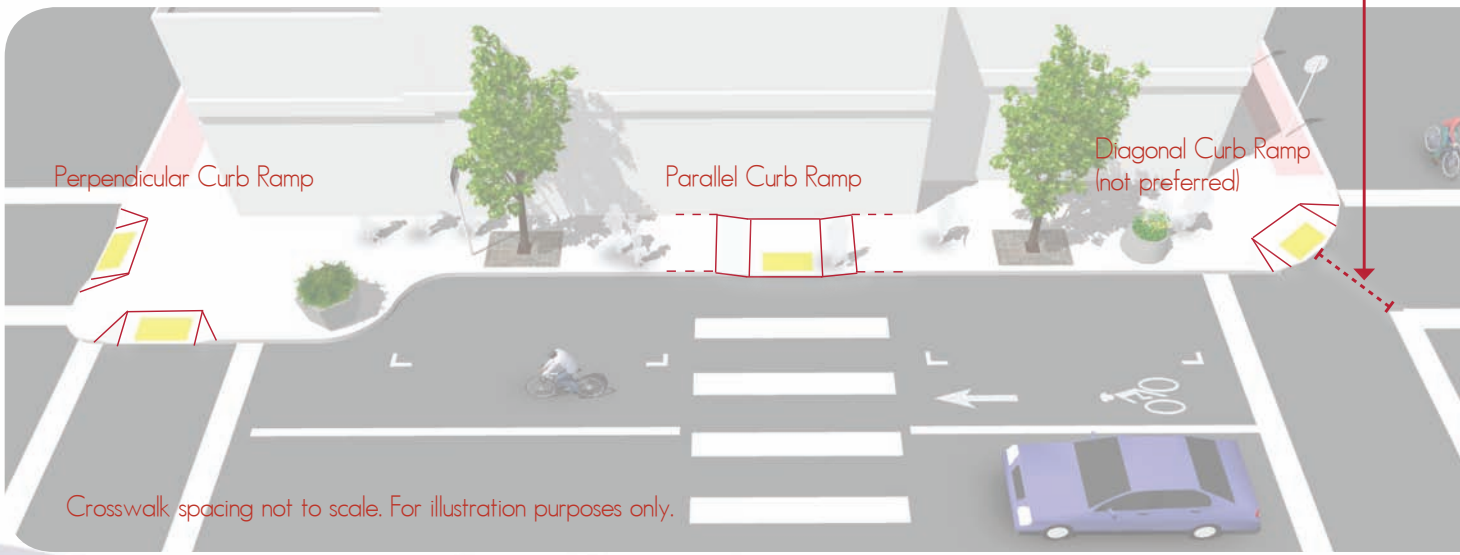
Curb ramps are the design elements that allow all users to make the transition from the street to the sidewalk. There are a number of factors to be considered in the design and placement of curb ramps at corners. Properly designed curb ramps ensure that the sidewalk is accessible from the roadway. A sidewalk without a curb ramp can be useless to someone in a wheelchair, forcing them back to a driveway and out into the street for access.

Although diagonal curb ramps might save money, they create potential safety and mobility problems for pedestrians,including reduced maneuverability and increased interaction with turning vehicles, particularly in areas with high traffic volumes. Diagonal curb ramp configurations are the least preferred of all options.

Guidance

- The landing at the top of a ramp shall be at least 4 feet long and at least the same width as the ramp itself.
- The ramp shall slope no more than 1:50 (2.0%) in any direction.
- If the ramp runs directly into a crosswalk, the landing at the bottom will be in the roadway.
- If the ramp lands on a dropped landing within the sidewalk or corner area where someone in a wheelchair may have to change direction, the landing must be a minimum of 5'-0" long and at least as wide as the ramp, although a width of 5'-0" is preferred.

Curb ramps shall be located so that they do not project into vehicular traffic lanes, parking spaces, or parking access aisles. Three configurations are illustrated below.



Discussion

The edge of an ADA compliant curb ramp will be marked with a tactile warning device (also known as truncated domes) to alert people with visual impairments to changes in the pedestrian environment. Contrast between the raised tactile device and the surrounding infrastructure is important so that the change is readily evident. These devices are most effective when adjacent to smooth pavement so the difference is easily detected. The devices must provide color contrast so partially sighted people can see them.

Materials and Maintenance

It is critical that the interface between a curb ramp and the street be maintained adequately. Asphalt street sections can develop potholes at the foot of the ramp, which can catch the front wheels of a wheelchair.

Additional References and Guidelines

United States Access Board. (2002). Accessibility Guidelines for Buildings and Facilities.

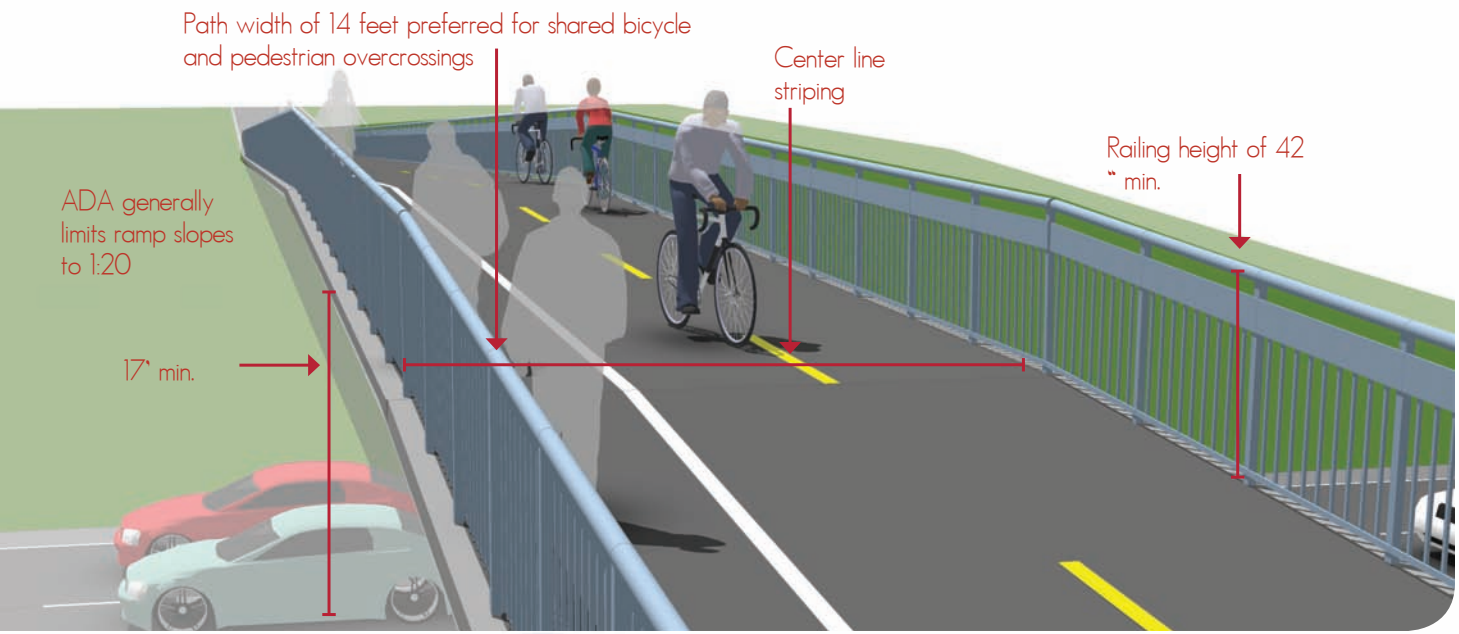
United States Access Board. (2007). Public Rights-of-Way Accessibility Guidelines (PROWAG).

USDOT. (2010). ADA Standards for Accessible Design.

Overcrossings

Description

Bicycle/pedestrian overcrossings provide critical non-motorized system links by joining areas separated by barriers such as deep canyons, waterways or major transportation corridors. In most cases, these structures are built in response to user demand for safe crossings where they previously did not exist. Grade-separated crossings may be needed where existing bicycle/pedestrian crossings do not exist, where ADT exceeds 25,000 vehicles, and where 85th percentile speeds exceed 45 miles per hour. Overcrossings require a minimum of 17 feet of vertical clearance to the roadway below versus a minimum elevation differential of around 12 feet for an undercrossing. This results in potentially greater elevation differences and much longer ramps for bicycles and pedestrians to negotiate.



Guidance

8 foot minimum width, 14 feet preferred. If overcrossing has any scenic vistas additional width should be provided to allow for stopping. A separate 5 foot pedestrian area may be provided for facilities with high bicycle and pedestrian use.

10 foot headroom on overcrossing; clearance below will vary depending on feature being crossed.

Roadway:	17 feet
Freeway:	18.5 feet
Heavy Rail Line:	23 feet

The overcrossing should have a centerline stripe even if the rest of the path does not have one.

Discussion

Overcrossings for bicycles and pedestrians typically fall under the Americans with Disabilities Act (ADA), which strictly limits ramp slopes to 5% (1:20) with landings at 400 foot intervals, or 8.33% (1:12) with landings every 30 feet.

Overcrossings pose potential concerns about visual impact and functional appeal, as well as space requirements necessary to meet ADA guidelines for slope.

Materials and Maintenance

Potential issues with vandalism.

Overcrossings can be more difficult to clear of snow than undercrossings.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

AASHTO. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.

AASHTO. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.

Trail Support Facilities

This section provides guidance on the design of facilities intended to improve trail access. When connected to the trail system, bicycle boulevards improve bicycle access to trails by providing a low-stress option to arrive at access points or trailheads. Wayfinding signs along existing and future bicycle and pedestrian routes guide users to the trail, improving the experience. Finally, bicycle racks support bicycle use. When located at trailheads or along the trail, they enable bicyclists to park and experience the trail as pedestrians.

Bicycle Boulevard

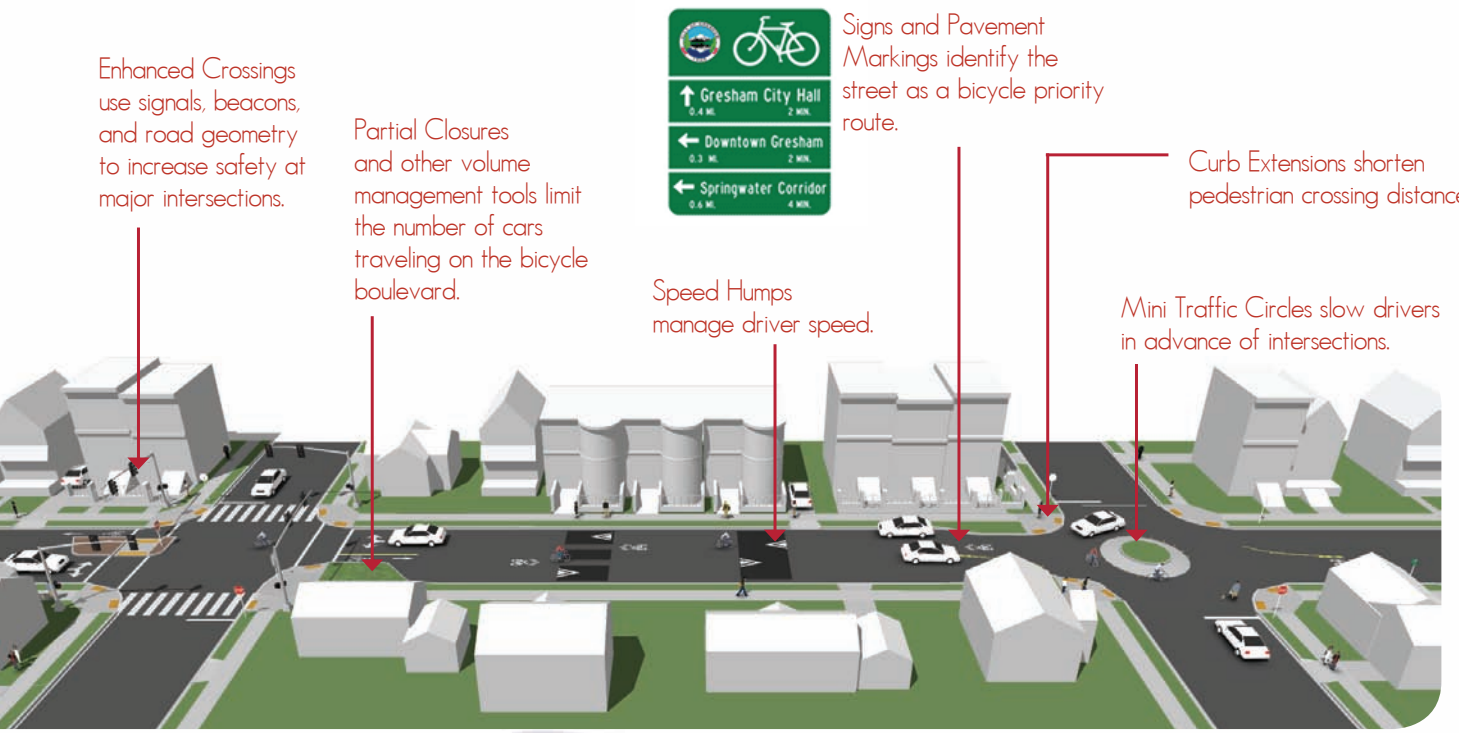
Wayfinding Systems

Bicycle Racks

Bicycle Boulevard

Description

Bicycle boulevards are low-volume, low-speed streets modified to enhance bicyclist comfort by using treatments such as signage, pavement markings, traffic calming and/or traffic reduction, and intersection modifications. These treatments allow through movements of bicyclists while discouraging similar through-trips by non-local motorized traffic.



Guidance

Signs and pavement markings are the minimum treatments necessary to designate a street as a bicycle boulevard.

Bicycle boulevards should have a maximum posted speed of 25 mph. Use traffic calming to maintain an 85th percentile speed below 22 mph.

Implement volume control treatments based on the context of the bicycle boulevard, using engineering judgment. Target motor vehicle volumes range from 1,000 to 3,000 vehicles per day.

Intersection crossings should be designed to enhance safety and minimize delay for bicyclists.

Discussion

Bicycle boulevard retrofits to local streets are typically located on streets without existing signalized accommodation at crossings of collector and arterial roadways. Without treatments for bicyclists, these intersections can become major barriers along the bicycle boulevard and compromise safety.

Traffic calming can deter motorists from driving on a street. Anticipate and monitor vehicle volumes on adjacent streets to determine whether traffic calming results in inappropriate volumes. Traffic calming can be implemented on a trial basis.

Materials and Maintenance

Vegetation should be regularly trimmed to maintain visibility and attractiveness.

Additional References and Guidelines

Alta Planning + Design and IBPI. (2009). Bicycle Boulevard Planning and Design Handbook.

Ewing, Reid and Brown, Steven. (2009). U.S. Traffic Calming Manual.

TDOT. (2005) PLAN Go: Bicycle and Pedestrian Element.

Wayfinding Systems

Description

Wayfinding signs provide information about destinations along the trail corridor and alert trail users to connecting routes.

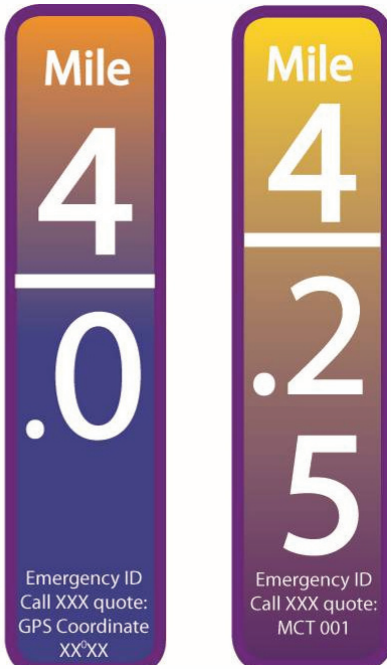
Guidance

A comprehensive wayfinding system should be incorporated into the trail network.

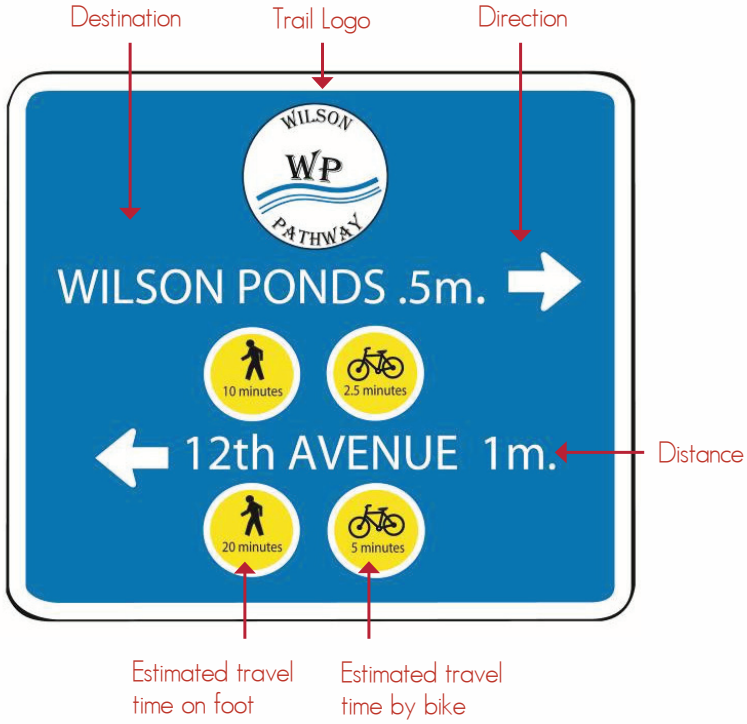
Wayfinding signage at major decision points include the walking and bicycling times.

Pedestrian-scaled mile markers should be posted at one-quarter mile intervals along the trail. The mile markers should include either a GPS coordinate or an address identification number as mutually agreed upon by the City of Johnson City, Washington County, Carter County and the City of Elizabethton to assist emergency responders in locating trail users in need of assistance.

Pedestrian-scaled mile markers



Example Decision Sign



Discussion

It can be useful to classify a list of destinations for inclusion on the signs based on their relative importance to users throughout the area. A particular destination's ranking in the hierarchy can be used to determine the physical distance from which the locations are signed. For example, primary destinations (such as the downtown area) may be included on signage up to five miles away. Secondary destinations (such as a transit station) may be included on signage up to two miles away. Tertiary destinations (such as a park) may be included on signage up to one mile away.

Materials and Maintenance

Maintenance needs for bicycle wayfinding signs are similar to other signs and will need periodic replacement due to wear.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

FHWA. (2009). Manual on Uniform Traffic Control Devices.

NACTO. (2012). Urban Bikeway Design Guide.

TDOT. (2005) PLAN Go: Bicycle and Pedestrian Element.

Bicycle Racks

Description

Short-term bicycle parking is meant to accommodate visitors, customers, and others expected to depart within two hours. It should have an approved standard rack, appropriate location and placement, and weather protection. The Association for Pedestrian and Bicycle Professionals (APBP) recommends selecting a bicycle rack that:

- Supports the bicycle in at least two places, preventing it from falling over.
- Allows locking of the frame and one or both wheels with a U-lock.
- Is securely anchored to ground.
- Resists cutting, rusting and bending or deformation.

Guidance

- 2' minimum from the curb face to avoid 'dooring.'
- Close to destinations; 50' maximum distance from main building entrance.
- Minimum clear distance of 6' should be provided between the bicycle rack and the property line.
- Should be highly visible from adjacent bicycle routes and pedestrian traffic.
- Locate racks in areas that cyclists are most likely to travel.

Discussion

Where the placement of racks on sidewalks is not possible (due to narrow sidewalk width, sidewalk obstructions, street trees, etc.), bicycle parking can be provided in the street where on-street vehicle parking is allowed in the form of on-street bicycle corrals.

Some types of bicycle racks may meet design criteria, but are discouraged except in limited situations. This includes undulating "wave" racks, schoolyard "wheel bender" racks, and spiral racks.

Materials and Maintenance

Use of proper anchors will prevent vandalism and theft. Racks and anchors should be regularly inspected for damage. Educate snow removal crews to avoid burying racks during winter months.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

APBP. (2010). Bicycle Parking Guide 2nd Edition.

TDOT. (2005) PLAN Go: Bicycle and Pedestrian Element.

ADDITIONAL REFERENCES

In addition to the previously described national standards, the basic bicycle and pedestrian design principals outlined in this chapter are derived from the documents listed below. Many of these documents are available online and provide a wealth of public information and resources.

Additional US Federal Guidelines

- American Association of State Highway and Transportation Officials. (2001). AASHTO Policy on Geometric Design of Streets and Highways. Washington, DC. www.transportation.org
- United States Access Board. (2007). Public Rights-of-Way Accessibility Guidelines (PROWAG). Washington, D.C. http://www.access-board.gov/PROWAC/alterations/guide.htm
- United States Department of Justice. (2010). 2010 ADA Standards for Accessible Design. http://www.ada.gov/2010ADAstandards_index.htm

Best Practice Documents

- Alta Planning + Design and the Initiative for Bicycle & Pedestrian Innovation (IBPI). (2009). Fundamentals of Bicycle Boulevard Planning & Design. http://www.ibpi.usp.pdx.edu/media/BicycleBoulevardGuidebook.pdf
- Alta Planning + Design. (2009). Cycle Tracks: Lessons Learned. http://www.altaplanning.com/App_Content/files/pres_stud_docs/Cycle%20Track%20lessons%20learned.pdf
- Association of Pedestrian and Bicycle Professionals (APBP). (2010). Bicycle Parking Design Guidelines, 2nd Edition.
- City of Portland Bureau of Transportation. (2010). Portland Bicycle Master Plan for 2030. http://www.portlandonline.com/transportation/index.cfm?c=44597
- Federal Highway Administration. (2005). BIKESAFE: Bicycle Countermeasure Selection System. http://www.bicyclinginfo.org/bikesafe/index.cfm
- Federal Highway Administration. (2005). PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System. http://www.walkinginfo.org/pedsafe/
- Federal Highway Administration. (2005). Report HRT-04-100, Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations. http://www.fhwa.dot.gov/publications/research/safety/04100/
- Federal Highway Administration. (2001). Designing Sidewalks and Trails for Access. http://www.fhwa.dot.gov/environment/sidewalk2/contents.htm
- King, Michael, for the Pedestrian and Bicycle Information Center. (2002). Bicycle Facility Selection: A Comparison of Approaches. Highway Safety Research Center, University of North Carolina – Chapel Hill. http://www.hsrc.unc.edu/pdf/2002/BicycleFacilitySelectionMKingetal2002.pdf
- Oregon Department of Transportation. (2012). Oregon Bicycle and Pedestrian Design Guide. http://www.oregon.gov/ODOT/HWY/BIKEPED/planproc.shtml
- Rosales, Jennifer. (2006). Road Diet Handbook: Setting Trends for Livable Streets.

GLOSSARY

The following list is comprised of common terms, acronyms and concepts used in bicycle transportation planning, design and operation.

AASHTO – American Association of State Highway and Transportation Officials

Accessible route – A continuous route on private property that is accessible to persons with disabilities. There must be at least one accessible route linking the public sidewalk to each accessible building.

Actuated signal – A signal where the length of the phases for different traffic movements is adjusted for demand by a signal controller using information from detectors.

ADA – Americans with Disabilities Act of 1990; broad legislation mandating provision of access to employment, services, and the built environment to those with disabilities.

At-grade crossing – A junction where bicycle path or sidewalk users cross a roadway over the same surface as motor vehicle traffic, as opposed to a grade-separated crossing where users cross over or under the roadway using a bridge or tunnel.

Audible pedestrian signals – Pedestrian signal indicators that provide an audible signal to assist visually impaired pedestrians in crossing the street.

Bicycle boulevard - Streets designed to give bicyclists priority by reducing motor vehicle volumes and speeds using barriers or other design elements, in order to enhance bicycle safety and enjoyment.

Bicycle facilities - A general term used to describe all types of bicycle-related infrastructure including linear bikeways and other provisions to accommodate or encourage bicycling, including bike racks and lockers, bikeways, and showers at employment destinations.

Bike lane - A striped lane for one-way bike travel on a street or highway.

Bicycle level of service (BLOS) – Indication of bicyclist comfort level for specific roadway geometries and traffic conditions. Roadways with a better (lower) score are more attractive (and usually safer) for bicyclists.

Bike path – A paved pathway separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent alignment. Bike paths may be used by pedestrians, bicyclists, skaters, wheelchair users, runners, and other non-motorized users.

Bike route - A shared roadway specifically identified for use by bicyclists, providing a superior route based on traffic volumes and speeds, street width, directness, and/or cross-street priority; designated by signs only.

Bikeway – A generic term for any road, street, path or way that in some manner is specifically designed for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

Bollard – Post used to restrict motor vehicle use of space dedicated to bicyclists and/or pedestrians.

Clearance interval – The length of time that the DON'T WALK indication is flashing on a pedestrian signal indication.

Clearance, lateral – Width required for safe passage of people riding bicycles as measured on a horizontal plane.

Clearance, vertical – Height required for safe passage of people riding bicycles as measured on a vertical plane.

Crosswalk – Any portion of a roadway at an intersection or elsewhere that is distinctly indicated for pedestrian crossing. Where there are no pavement markings, there is a crosswalk at each leg of every intersection, defined by law as the prolongation or connection of the lateral lines of the sidewalks.

Curb extension – An area where the sidewalk and curb are extended into the parking lane, usually in order to shorten pedestrian crossing distance. Also called "bulb-out" or "curb bulb."

Curb ramp – A combined ramp and landing to accomplish a change of level at a curb in order to provide access to pedestrians using wheelchairs.

Directional signs – Signs typically placed at road and bikeway junctions (decision points) to guide people riding bicycles toward a destination or experience.

Geometry - The vertical and horizontal characteristics of a transportation facility, typically defined in terms of gradient, radius, and superelevation.

Grade separation - Vertical separation of travelways through use of a bridge or tunnel so that traffic conflicts are minimized.

Grade-separated crossing – A bridge or tunnel allowing pedestrians and bicyclists to cross a major roadway without conflict.

HCM - Highway Capacity Manual

HDM – Highway Design Manual

Level of service (LOS) - Term for the measurement of how well traffic "flows" on a

roadway system or how well an intersection functions.

Loop detector - A device placed under the pavement at intersections to detect a vehicle or bicycle and subsequently trigger a signal to turn green.

Medians – Area in the center of the roadway that separates directional traffic; may provide a striped crossing and halfway point for pedestrians (also can be effective traffic calming design). Medians may be level with the surrounding roadway or "raised" using curb and/or gutter. Medians may include landscaping, concrete, paint/striping or any combination thereof.

MUTCD – Manual on Uniform Traffic Control Devices

Paved shoulder – The edge of the roadway beyond the outer stripe edge that provides a place for people riding bicycles. It only functions well for bicyclists if it is wide enough (4-5 feet), free of debris, and does not contain rumble strips or other obstructions.

Pavement marking – An assortment of markings on the surface of the pavement that provide directions to motorists and other road users as to the proper use of the road (theMUTCD determines these standard markings).

Pedestrian – a person afoot; a person operating a pushcart; a person riding on, or pulling a coaster wagon, sled, scooter, tricycle, bicycle with wheels less than 14 inches in diameter, or a similar conveyance; a person on roller skates, skateboard, wheelchair or a baby in a carriage.

Pedestrian signal indication – the lighted WALK/DON'T WALK (or walking man/hand) signal that indicates the pedestrian phase.

Refuge islands – Corner raised triangles or medians, used by pedestrians and bicyclists at intersections or mid-block crossings for assistance with crossing wide streets, especially where motor vehicle right turn lanes exist.

Right-of-way (ROW) - The right of one vehicle, bicycle or pedestrian to proceed in a lawful manner in preference to another vehicle, bicycle, or pedestrian. Also the strip of property in which a transportation facility or other facility is built.

Shared Lane Marking (SLM) or Sharrow – A pavement marking that designates roadway space to be shared between drivers and people riding bicycles.

Shared roadway - A roadway where bicyclists and motor vehicles share the same space with no striped bike lane. Any roadway where bicycles are not prohibited by law (i.e. interstate highways or freeways) is a shared roadway.

Shared use path – A paved right-of-way that permits more than one type of user, such as a trail designated for use by both pedestrians and bicyclists.

Sidewalk – An improved facility intended to provide for pedestrian movement; usually, but not always, located in the public right-of-way adjacent to a roadway. Typically constructed of concrete.

Sight distance - The distance a person can see along an unobstructed line of sight.

Traffic calming - Changes in street alignment, installation of barrier, and other physical measures to reduce traffic speeds and/or cut-through traffic volume in the interest of street safety, livability, and other public purposes.

Traffic control devices - Signs, signals or other fixtures, whether permanent or temporary, placed on or adjacent to a travelway by authority of a public body having jurisdiction to regulate, warn, or guide traffic.

Traffic volume - The number of vehicles that pass a specific point in a specific amount of time (hour, day, year).

Wide curb lane – A 14 foot (or greater) wide outside lane adjacent to the curb of a roadway that provides space for bicyclists to ride to the right of motor vehicles. Also referred to as a "wide outside lane". If adjacent to parking, 22 foot wide pavement

Funding Strategies C

Overview

Due to the cost of most construction and trail development activities, it may be necessary to consider several sources of funding, that when combined, would support these costs. This appendix outlines sources of funding at the federal, state, and local government levels and from the private sector. These sources cover a variety of costs related to trail and community development in Johnson City and surrounding areas. The following descriptions are intended to provide an overview of available options and do not represent a comprehensive list. Funding sources can be used for a variety of activities, including: planning, design, implementation and maintenance. It should be noted that this section reflects the funding available at the time of writing. The funding amounts, fund cycles, and even the programs themselves are susceptible to change without notice.

Federal Funding Sources

Federal funding is typically directed through State agencies to local governments either in the form of grants or direct appropriations, independent from State budgets, where shortfalls may make it difficult to accurately forecast available funding for future project development. Federal funding typically requires a local match of approximately 20%, but there are sometimes exceptions, such as the recent American Recovery and Reinvestment Act stimulus funds, which did not require a match. Since these funding categories are difficult to forecast, it is recommended that the local jurisdiction work with its MPO on getting pedestrian projects listed in the State Transportation Improvement Program (STIP), as discussed below.

The following is a list of possible Federal funding sources that could be used to support construction of many trail improvements. Most of these are competitive, and involve the completion of extensive applications with clear documentation of the project needs, costs, and benefits.

Moving Ahead for Progress in the Twenty-First Century (MAP-21)

The largest source of federal funding for bicycle and pedestrian is the US DOT's Federal-Aid Highway Program, which Congress has reauthorized roughly every six years since the passage of the Federal-Aid Road Act of 1916. The latest act, Moving Ahead for Progress in the Twenty-First Century (MAP-21) was enacted in July 2012 as Public Law 112-141. The Act replaces the Safe, Accountable, Flexible, Efficient Transportation Equity Act – a Legacy for Users (SAFETEA-LU), which was valid from August 2005 - June 2012.

MAP-21 authorizes funding for federal surface transportation programs including highways and transit for the 27 month period between July 2012 and September 2014. It is not possible to guarantee the continued availability of any listed MAP-21 programs, or to predict their future funding levels or policy guidance. Nevertheless, many of these programs have been included in some form since the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991, and thus may continue to provide capital for active transportation projects and programs.

In Tennessee, federal monies are administered through the Tennessee Department of Transportation (TDOT) and Metropolitan Planning Organizations

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(MPOs). Most, but not all, of these programs are oriented toward transportation versus recreation, with an emphasis on reducing auto trips and providing inter-modal connections. Federal funding is intended for capital improvements and safety and education programs, and projects must relate to the surface transportation system.

There are a number of programs identified within MAP-21 that are applicable to bicycle and pedestrian projects. These programs are discussed below.

More information: http://www.fhwa.dot.gov/map21/summaryinfo.cfm

Transportation Alternatives

Transportation Alternatives (TA) is a new funding source under MAP-21 that consolidates three formerly sepa-rate programs under SAFETEA-LU: Transportation Enhancements (TE), Safe Routes to School (SR2S), and the Recreational Trails Program (RTP). These funds may be used for a variety of pedestrian, bicycle, and streetscape projects including sidewalks, bikeways, multi-use paths, and rail-trails. TA funds may also be used for selected education and encouragement programming such as Safe Routes to School, despite the fact that TA does not provide a guaranteed set-aside for this activity as SAFETEA-LU did. Unless the Governor of a given state chooses to opt out of Recreational Trails Program funds, dedicated funds for recreational trails continue to be provided as a subset of TA. MAP-21 provides $85 million nationally for the RTP.

Complete eligibilities for TA include:

Transportation Alternatives as defined by Section 1103 (a)(29). This category includes the construction, planning, and design of a range of bicycle and pedestrian infrastructure including "on-road and off-road trail facilities for pedestrians, bicyclists, and other non-motorized forms of transportation, including sidewalks, bicycle infrastructure, pedestrian and bicycle signals, traffic calming techniques, lighting and other safety-related infrastructure, and transportation projects to achieve compliance with the Americans with Disabilities Act of 1990." Infrastructure projects and systems that provide "Safe Routes for Non-Drivers" is a new eligible activity. More information:

http://www.fhwa.dot.gov/environment/transportation_enhancements/legislation/map21.cfm

Recreational Trails.

TA funds may be used to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses. Examples of trail uses include hiking, bicycling, in-line skating, equestrian use, and other non-motorized and motorized uses. These funds are available for both paved and unpaved trails, but may not be used to improve roads for general passenger vehicle use or to provide shoulders or sidewalks along roads.

Recreational Trails Program funds may be used for:

- Maintenance and restoration of existing trails
- Purchase and lease of trail construction and maintenance equipment
- Construction of new trails, including unpaved trails
- Acquisition or easements of property for trails
- State administrative costs related to this program (limited to seven percent of a state's funds)
- Operation of educational programs to promote safety and environmental protection related to trails (limited to five percent of a state's funds)

Tennessee's dedicated 2012 RTP funds total $1,531,600 (http://www.fhwa.dot.gov/MAP21/funding.cfm). Under MAP-21, governors may choose to opt out of a portion or all of this "dedicated" RTP funding. As of this writing, the governor of Tennessee has not opted out of the RTP funding. If the governor does opt out, these funds still must remain in Transportation Alternatives.

Safe Routes to School

The purpose of the Safe Routes to Schools eligibility is to promote safe, healthy alternatives to riding the bus or being driven to school. All projects must be within two miles of primary or middle schools (K-8).

Eligible projects may include:

- Engineering improvements. These physical improvements are designed to reduce potential bicycle and pedestrian conflicts with motor vehicles. Physical improvements may also reduce motor vehicle traffic volumes around schools, establish safer and more accessible crossings, or construct walkways, trails or bikeways. Eligible improvements include sidewalk improvements, traffic calming/speed reduction, pedestrian and bicycle crossing improvements, on-street bicycle facilities, off-street bicycle and pedestrian facilities, and secure bicycle parking facilities.
- Education and Encouragement Efforts. These programs are designed to teach children safe bicycling and walking skills while educating them about the health benefits, and environmental impacts. Projects and programs may include creation, distribution and implementation of educational materials; safety based field trips; interactive bicycle/pedestrian safety video games; and promotional events and activities (e.g., assemblies, bicycle rodeos, walking school buses).
- Enforcement Efforts. These programs aim to ensure that traffic laws near schools are obeyed. Law enforcement activities apply to cyclists, pedestrians and motor vehicles alike. Projects may include development of a crossing guard program, enforcement equipment, photo enforce-ment, and pedestrian sting operations.

Planning, designing, or constructing roadways within the right-of-way of former Interstate routes or divided highways.

At the time of writing, detailed guidance from the Federal Highway Administration on this new eligible activity was not available.

Average annual funds available through TA over the life of MAP-21 equal $814 million nationally, which is based on a 2% set-aside of total MAP-21 allocations. Projected obligations for Tennessee total $2,461,194,414 for year(s) 2012, 2013, and 2014 (http://www.fhwa.dot.gov/MAP21/funding.cfm). TDOT may elect to transfer up to 50% of TA funds to other highway programs, therefore the amount listed above represents the maximum potential funding.

Johnson City is eligible to compete for TA funds through two separate competitive grant programs administered by TDOT; however, if TDOT opts out of TA funds to the maximum extent possible, only the first competitive grant program described below will apply. MAP-21 requires TDOT to allocate a set amount of TA funding to rural communities in Tennessee. These funds are distributed through a competitive grant program that is not open to government agencies located in urban areas containing more than 200,000 or more residents.

Remaining TA funds (those monies not re-directed to other highway programs) are disbursed through a separate competitive grant program administered by TDOT. Local governments, school districts, tribal governments, and public lands agencies are permitted to compete for these funds.

Highway Safety Improvement Program

MAP-21 doubles the amount of funding available through the Highway Safety Improvement Program (HSIP) relative to SAFETEA-LU. HSIP provides $2.4 billion nationally for projects and programs that help communities achieve significant reductions in traffic fatalities and serious injuries on all public roads, bikeways, and walkways. MAP-21 preserves the Railway-Highway Crossings Program within HSIP but discontinues the High-Risk Rural roads set-aside unless safety statistics demonstrate that fatalities are increasing on these roads. Bicycle and pedestrian safety improvements, enforcement activities, traffic calming projects, and crossing treatments for non-motorized users in school zones are eligible for these funds.

Surface Transportation Program

The Surface Transportation Program (STP) provides states with flexible funds which may be used for a variety of projects on any Federal-aid Highway including the National Highway System, bridges on any public road, and transit facilities. Bicycle and pedestrian improvements are eligible activities under the STP. This covers a wide variety of projects such as on-street facilities, off-road trails, sidewalks, crosswalks, bicycle and pedestrian signals, parking, and other ancillary facilities. SAFETEA-LU also specifically clarifies that the modification of sidewalks to comply with the requirements of the Americans with Disabilities Act (ADA) is an eligible activity.

Funds under Title 23 generally may be used only for projects that are on the Federal-aid highway system -- which typically does not include local or minor collector roads. However, bicycle and pedestrian projects not located on the Federal-aid highway system may be funded under the STP (and therefore also under the Transportation Enhancement Activities, Congestion Mitigation and Air Quality Improvement Program) and under the Bridge Program. Highway Safety Improvement Program funds may be spent on any public highway or trail. In addition, non-construction projects, such as maps, coordinator positions, and encouragement programs, are eligible for STP funds.

More information: http://www.fhwa.dot.gov/safetealu/factsheets/stp.htm

TDOT Transportation Alternatives Funding

The federal Transportation Alternatives (TA) program is administered by the state Project Development Branch and is traditionally funded by a set-aside of Surface Transportation Program (STP) funds. Ten percent of STP funds are designated for Transportation Alternatives (TA) activities, which include the "provision of facilities for pedestrians and bicycles, provision of safety and educational activities for pedestrians and bicyclists," and the "preservation of abandoned railway corridors (including the conversion and use thereof for pedestrian and bicycle trails)" 23 USC Section 190 (a)(35). TA grants can be used to build a variety of pedestrian, bicycle, streetscape, and other improvements that strengthen the cultural, aesthetic, and environmental aspects of the State's intermodal transportation system.

The State typically will make a Call for Projects, and each project must benefit the traveling public and help communities increase transportation choices and access, enhance the built and natural environment and create a sense of place. The TA program funds project design, engineering, and construction. To improve chances of selection, applicants should demonstrate strong community support. Chances are also improved if the local match is higher than the required 20%.

A limited amount of statewide enhancement funds are available each year for landscaping, stormwater runoff management, and pedestrian and bicyclist safety as a part of larger transportation projects. These funds are not allocated through the TA Call for Projects, and must be evaluated through the TIP prioritization process. In 2011, individual TA awards ranged from roughly $300,000 to $800,000.

More information: http://www.tdot.state.tn.us/local/grants.htm.

High Risk Rural Roads Program

The purpose of the High Risk Rural Roads Program (HR3) is to reduce the frequency and severity of collisions on rural roads by correcting or improving hazardous roadway locations or features. For a project to be eligible for HR3 funds, the project must be located on a roadway functionally classified as a rural major or

minor collector, or a rural local road. There are 21 categories of projects eligible for funding under this program, including a category for projects that improve pedestrian or bicyclist safety.

More information: http://safety.fhwa.dot.gov/safetealu/memos/memo051906.cfm

Transportation, Community, and System Preservation Program

The Transportation, Community, and System Preservation (TCSP) Program provides federal funding for transit-oriented development, traffic calming, and other projects that improve the efficiency of the transportation system, reduce the impact on the environment, and provide efficient access to jobs, services, and trade centers. The program is intended to provide communities with the resources to explore the integration of their transportation system with community preservation and environmental activities. The TCSP Program funds require a 20 percent match. Pedestrian and bicycle projects meet several TCSP goals, are generally eligible for the TCSP program and are included in many TCSP projects. The program, administered by TDOT locally, provides funding for a comprehensive initiative including planning grants, implementation grants, and research to investigate and address the relationships among transportation, community, and system preservation plans and practices and identify private sector-based initiatives to improve those relationships. The program was authorized at $61 million nationally in federal fiscal year 2011 and provided nearly $1 million for the Tennessee River Walk in Chattanooga.

Congress has identified projects to be selected for funding through the TCSP program. Assuming that this method is used to allocate TCSP funds in the future, local jurisdictions will need to work closely with their RPO/MPO, TDOT, and members of Congress to gain access to this funding.

More information: http://www.fhwa.dot.gov/tcsp/

Congestion Mitigation and Air Quality Improvement program

The Congestion Mitigation and Air Quality (CMAQ) Improvement program currently allocates approximately $20 million annually to Tennessee to fund programs in "air quality non-attainment and maintenance areas" (areas that do not meet federal air quality standards) and projects designed to improve air quality and reduce congestion, without adding single occupant vehicle capacity to the transportation system. These federal dollars can be used to build bicycle and pedestrian facilities that reduce travel by automobile. Purely recreational facilities generally are not eligible.

CMAQ funding is processed by TDOT through Tennessee's Metropolitan Planning Organizations (MPOs). Individual project proposals must meet a minimum cost threshold of $100,000, and must meet a required local share of 20%. SAFETEA-LU authorized an extension of CMAQ Program funds through FY 2012.

More information: http://www.tdot.state.tn.us/cmaq/default.htm

FHWA Recreational Trails Program (RTP)

The Recreational Trails Program (RTP) provides funds to the States to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses. The RTP is an assistance program of the Department of Transportation's Federal Highway Administration (FHWA). Federal transportation funds benefit recreation including hiking, bicycling, in-line skating, equestrian use, cross-country skiing, snowmobiling, off-road motorcycling, all-terrain vehicle riding, four-wheel driving, or using other off-road motorized vehicles.

The RTP funds come from the Federal Highway Trust Fund, and represent a portion of the motor fuel excise tax collected from non-highway recreational fuel use: fuel used for off-highway recreation by snowmobiles, all-terrain vehicles, off-highway motorcycles, and off-highway light trucks.

The RTP funds are distributed to the States by legislative formula: half of the funds are distributed equally among all States, and half are distributed in proportion to the estimated amount of nonhighway recreational fuel use in each State. See the Funding Levels by State.

Recreational Trails Program funds are apportioned to the States by legislative formula (23 U.S.C. 104(h)). FHWA receives $840,000 per year for program administration, trail related research and technical assistance, and training. The remainder of the funds are distributed to the States. Half of the funds are distributed equally among all States, and half are distributed in proportion to the estimated amount of non-highway recreational fuel use in each State: fuel used for off-road recreation by snowmobiles, all-terrain vehicles, off-road motorcycles, and off-road light trucks. In 2012, Tennessee received an apportionment of approximately $1,148,700.

More information: http://www.fhwa.dot.gov/environment/recreational_trails/index.cfm

National Recreation Trails

Though not a source of funding, NRT designation from the Secretary of the Interior recognizes exemplary existing trails of local or regional significance. NRT designation provides benefits, including access to technical assistance from NRT partners and listing in a database of National Recreation Trails. In addition, some potential support sources will take NRT designation into account when making funding decisions. The NRT program is open to applications.

More information: http://www.americantrails.org/nationalrecreationtrails/

Rivers, Trails, and Conservation Assistance Program

Also not a source of funding, RTCA is a technical assistance arm of the National Park Service dedicated to helping local groups and communities preserve and develop open space, trails and greenways. RTCA

is an important resource center for many trail builders in urban, rural and suburban areas. "Instead of money," their Web site notes, "[RTCA] supplies a staff person with extensive experience in community-based conservation to work with a local group on a project."

More Information: http://www.nps.gov/ncrc/programs/rtca/index.htm

Federal Transit Administration Programs

Federal Transit Administration (FTA) funding is available for projects designed to improve access to transit. Individual grant programs vary on the specific goals, but eligible improvements include crossing improvements, pedestrian signals, sidewalks and trails. Programs of the FTA are described in the following section.

New Freedom Program

The New Freedom formula grant program provides capital and operating costs to provide transportation services and facility improvements that exceed those required by the Americans with Disabilities Act. Examples of pedestrian/accessibility projects funded in other communities through the New Freedom Initiative include installing Accessible Pedestrian Signals (APS), enhancing transit stops to improve accessibility, and establishing a mobility coordinator position. Likely eligible improvements include mid-block and high-visibility crossing improvements.

Applications for FTA funds are administered by the FTA, and pass through TDOT for rural areas and MPO/RPOs for urbanized areas.

More information: http://www.hhs.gov/newfreedom/ and http://www.fta.dot.gov/funding/grants/grants_financing_3549.html

FTA Job Access and Reverse Commute Program

The Job Access and Reverse Commute (JARC) program was established to address the unique transportation challenges faced by welfare recipients and low-income persons seeking to obtain and maintain employment. Capital, planning and operating expenses for projects that transport low income individuals to and from jobs and activities related to employment, are eligible for this program.

More information: http://www.fta.dot.gov/funding/grants/grants_financing_3550.html

Paul S. Sarbanes Transit in Parks Program

This program addresses the challenge of increasing vehicle congestion in and around our national parks and other federal lands. Eligible recipients include state, tribal, or local governmental authorities with jurisdiction over land in the vicinity of an eligible area acting with the consent of the Federal Lands Management Area. The funds may support capital and planning expenses for new or existing alternative transportation systems in the vicinity of an eligible area. It includes non-motorized transportation systems such as pedestrian and bicycle trails.

More information: http://www.fta.dot.gov/funding/grants/grants_financing_6106.html

FTA Urbanized Area Formula Program

FTA capital/operating grant for urbanized areas with populations over 50,000. This grant can be used for pedestrian or bicyclist access to transit.

More information: http://www.fta.dot.gov/funding/grants/grants_financing_3561.html

Formula Grants for Other than Urbanized Areas

This program is formula-based and provides funding to states for supporting public transportation in rural areas with populations of less than 50,000. This grant funds routes to transit, bike racks, shelters, and equipment for public transportation vehicles.

More information: http://www.fta.dot.gov/funding/grants/grants_financing_3555.html

Transportation for Elderly Persons and Persons with Disabilities

This program can be used for capital expenses that support transportation to meet the special needs of older adults and persons with disabilities, including providing access to an eligible public transportation facility.

More information: http://www.fta.dot.gov/funding/grants/grants_financing_3556.html

Bus and Bus Related Facilities

This is capital assistance for new and replacement buses, related equipment and facilities. It has traditionally been designated to specific projects at a federal level. This grant can be used for pedestrian or bicycle access to transit and bus racks.

More information: http://www.fta.dot.gov/funding/grants/grants_financing_3557.html

Metropolitan and Statewide Planning

This program provides funding for statewide and metropolitan coordinated transportation planning. Federal planning funds are first apportioned to State DOTs. State DOTs then allocate planning funding to MPOs. Eligible activities include pedestrian or bicycle planning to increase safety for non-motorized users, and to enhance the interaction and connectivity of the transportation system across and between modes.

http://www.fta.dot.gov/funding/grants/grants_financing_3563.html

Partnership for Sustainable Communities

Founded in 2009, the Partnership for Sustainable Communities is a joint project of the Environmental Protection Agency (EPA), the U.S. Department of Housing and Urban Development (HUD), and the U.S. Department of Transportation (USDOT). The partnership aims to "improve access to affordable housing, more transportation options, and lower transportation costs while protecting the environment in communities nationwide." The Partnership

is based on five Livability Principles, one of which explicitly addresses the need for bicycle and pedestrian infrastructure ("Provide more transportation choices:, develop safe, reliable, and economical transportation choices to decrease household transportation costs, reduce our nation's dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health").

The Partnership is not a formal agency with a regular annual grant program. Nevertheless, it is an important effort that has already led to some new grant opportunities (including both TIGER I and TIGER II grants). Tennessee jurisdictions should track partnership communications and be prepared to respond proactively to announcements of new grant programs. Initiatives that speak to multiple livability goals are more likely to score well than initiatives that are narrowly limited in scope to pedestrian improvement efforts.

More information: http://www.epa.gov/smartgrowth/partnership/

Federal Community Development Block Grant Funds

State level Community Development Block Grant Recovery (CDBG-R) funds are allocated through the States to local municipal or county governments for projects that enhance the viability of communities by providing decent housing and suitable living environments and by expanding economic opportunities, principally for persons of low and moderate income.

The program provides communities with resources to address a wide range of unique community development needs. Beginning in 1974, the CDBG program is one of the longest continuously run programs at HUD. The CDBG program provides annual grants on a formula basis to 1209 general units of local government and States.

Federal CDBG grantees may use Community Development Block Grants funds for activities that include (but are not limited to): acquiring real property; reconstructing or rehabilitating housing and other property; building public facilities and improvements, such as streets, sidewalks, community and senior citizen centers and recreational facilities; paying for planning and administrative expenses, such as costs related to developing a consolidated plan and managing Community Development Block Grants funds; provide public services for youths, seniors, or the disabled; and initiatives such as neighborhood watch programs.

More information: http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs

Department of Energy

The Department of Energy's Energy Efficiency and Conservation Block Grants (EECBG) grants may be used to reduce energy consumption and fossil fuel emissions and for improvements in energy efficiency. Section 7 of the funding announcement states that these grants provide opportunities for the development and implementation of transportation programs to conserve energy used in transportation including development of infrastructure such as bike lanes and pathways and pedestrian walkways. Although the current grant period has passed, more opportunities may arise in the future.

More information: http://www.eecbg.energy.gov

Rivers, Trails, and Conservation Assistance Program

The Rivers, Trails, and Conservation Assistance Program (RTCA) is a National Parks Service (NPS) program providing technical assistance via direct NPS staff involvement to establish and restore greenways, rivers, trails, watersheds and open space. The RTCA program provides only for planning assistance—there are no implementation funds available. Projects are prioritized for assistance based on criteria including conserving significant community resources, fostering cooperation between agencies, serving a large number of users, encouraging public involvement in planning and implementation, and focusing on lasting accomplishments. This program may benefit trail development in Tennessee locales indirectly through technical assistance, particularly for community organizations, but is not a capital funding source.

More information: http://www.nps.gov/ncrc/programs/rtca/ or contact the Southeast Region RTCA Program Manager Deirdre "Dee" Hewitt at (404) 507-5691.

National Scenic Byways

Discretionary Grant Program

The National Scenic Byways Discretionary Grants program provides merit-based funding for byway-related projects each year, utilizing one or more of eight specific activities for roads designated as National Scenic Byways, All-American Roads, State scenic byways, or Indian tribe scenic byways. The activities are described in 23 USC 162(c). This is a discretionary program; all projects are selected by the US Secretary of Transportation.

Eligible projects include construction along a scenic byway of a facility for pedestrians and bicyclists and improvements to a scenic byway that will enhance access to an area for the purpose of recreation. Construction includes the development of the environmental documents, design, engineering, purchase of right-of-way, land, or property, as well as supervising, inspecting, and actual construction.

More information: http://www.bywaysonline.org/grants/

National Fish and Wildlife Foundation

The National Fish and Wildlife Foundation (NFWF) is a private, nonprofit, tax-exempt organization chartered by Congress in 1984. The National Fish and Wildlife Foundation sustains, restores, and enhances the Nation's fish, wildlife, plants and habitats. Through leadership conservation investments with public and private partners, the Foundation is dedicated to achieving maximum conservation impact by developing and applying best practices and innovative methods for measurable

outcomes.

The Foundation awards matching grants under its Keystone Initiatives to achieve measurable outcomes in the conservation of fish, wildlife, plants and the habitats on which they depend. Awards are made on a competitive basis to eligible grant recipients, including federal, tribal, state, and local governments, educational institutions, and non-profit conservation organizations. Project proposals are received on a year-round, revolving basis with two decision cycles per year. Grants generally range from $50,000-$300,000 and typically require a minimum 2:1 non-federal match.

Funding priorities include bird, fish, marine/coastal, and wildlife and habitat conservation. Other projects that are considered include controlling invasive species, enhancing delivery of ecosystem services in agricultural systems, minimizing the impact on wildlife of emerging energy sources, and developing future conservation leaders and professionals.

Website: http://www.nfwf.org/AM/Template.cfm?Section=Grants

Federal Lands Highway Program

The Federal Lands Highway Program (FLHP) is a coordinated program of public roads and transit facilities serving Federal and Indian lands. Funding for pedestrian improvements is available through the Public Lands Highway – Discretionary, and Forest Highways Programs.

More information: http://flh.fhwa.dot.gov/

Public Lands Highway - Discretionary

The Public Lands Highway - Discretionary (PLH-D) Program is intended for the planning, design, construction, reconstruction of improvement of roads and bridges that are within or adjacent to, or provide access to public lands and Indian reservations. PLH-D funding has been used for bike trails, walkways, and transportation planning activities.

More information: http://flh.fhwa.dot.gov/programs/plh/discretionary/

Forest Highways

The Forest Highways (FH) Program provides funding to resurface, restore, rehabilitate, or reconstruct designated public roads that provide access to or are within a National Forest or Grassland. Eligible activities include provision for pedestrians and bicycles.

More information: http://flh.fhwa.dot.gov/programs/plh/fh/

State Funding Sources

State Transportation Improvement Program

TDOT's Bicycle Pedestrian Policy is designed to routinely integrate bicycling and walking options into the transportation system as a means to improve mobility and safety of non-motorized traffic. With Federal SAFETEA-LU funding, the following programs related to bicycle and pedestrian activities are administered through the Statewide Transportation Improvement Plan (some of which are detailed above): Congestion Mitigation and Air Quality - focuses on multi-modal transportation alternatives; Transportation Enhancement Set Aside - this is the primary source of bicycle and pedestrian funding in Tennessee; High Priority Projects - earmarks often designated for greenway projects; Recreational Trails Program; and the Safe Routes to School Program.

To access the STIP: http://www.tdot.state.tn.us/programdev/docs/STIP2011-14.pdf. For more about the STIP process: http://www.bikewalktn.org/TIP-STIP.html

Spot Safety Program

The Spot Safety Program is a state funded public safety investment and improvement program that provides effective low cost safety improvements for intersections, and Tennessee's state maintained roads. It is used to develop smaller improvement projects to address safety and operational issues. Auxiliary components of intersections interfacing with the Johnson City Rail Trail could be eligible under this program. Administered by the State, qualifying projects are 100% Federally funded.

More information: http://www.tdot.state.tn.us/local/cities.htm

Governor's Highway Safety Office

The Governor's Highway Safety Office (GHSO) is Tennessee's advocate for highway safety. This office works with law enforcement, judicial personnel and community advocates to coordinate activities and initiatives relating to the human behavioral aspects of highway safety.

The GHSO's mission is to develop, execute and evaluate programs to reduce the number of fatalities, injuries and related economic losses resulting from traffic crashes on Tennessee's roadways. The office works in tandem with the National Highway Safety Administration to implement programs focusing on occupant protection, impaired driving, speed enforcement, truck and school bus safety, pedestrian and bicycle safety and crash data collection and analysis. Programs administered by the Governor's Highway Safety Office are 100% federally funded.

More information: http://www.tdot.state.tn.us/ghso/grants.htm

Clean Water State Revolving Fund - Green Projects Set-Aside

The FY 2012 CWSRF Capitalization Grant requires a portion of funds to be set-aside towards Green Projects (GP). The State will set-aside a portion of the grant dollars to fund eligible Green Projects. GP shall be utilized for projects to address green infrastructure, water or energy efficiency improvements, or other environmentally innovative activities. Projects meeting GP criteria will follow the same process as all other SRF projects. EPA's GPR eligibility guidance for the CWSRF Loan Program will be used to evaluate the GP projects. Additionally, GP projects will be selected separately from the total cost until the GP requirement has been met. A State will be considered to have met the GP requirement when the required percentage of its capitalization grant for FY 2012 is

in executed assistance agreements for qualifying GP projects. If a GP project is underbid and the State has not met the required percentage for GP, the difference between the amount in the executed assistance agreement and the winning bid must be used for another GP project(s).

More information: http://www.tn.gov/environment/srf/docs/cwsrf_2012iup_draft.pdf

TN Department of Environment and Conservation Recreational Education Services (TDEC-RES) Division

Recreation Educational Services is responsible for administering federal and state grant programs to local and state governments. The Division manages the Land and Water Conservation Fund (LWCF), the Local Parks and Recreation Fund (LPRF) Grant Program, the Natural Resources Trust Fund (NRTF) and the Recreation Trails Program (RTP). These grant programs are further detailed below or in the 'Local Government Funding Sources' section of this Appendix.

More Info: http://www.tn.gov/environment/recreation/grants.shtml

Land And Water Conservation Fund

The Land, Water & Conservation Fund (LWCF) program is a federally funded, state administered grant program and provides matching grants to local governments and state agencies that provide recreation and parks, for the acquisition and development of public outdoor recreation areas and facilities. All grant projects must be on publicly owned land.

More information: http://www.tn.gov/environment/recreation/grants.shtml

Recreational Trails Program

The Recreational Trails Program (RTP) is a federally funded, state administered grant program. The RTP provides grant funding for land acquisition for trails, trail maintenance, trail construction, trail rehabilitation and for trail head support facilities. These funds are distributed in the form of an 80% grant with a 20% match. Local, state and federal land managing agencies are eligible to apply as well as state chartered, non-profit organizations with IRS 501 (c) (3) status that have a written agreement for trail management with an agency. All grant projects must be on publicly owned land.

More information: http://www.tn.gov/environment/recreation/grants.shtml

State Administered Community Development Block Grants

The primary statutory objective of the CDBG program is to develop viable communities by providing decent housing and a suitable living environment and by expanding economic opportunities, principally for persons of low- and moderate-income. The State must ensure that at least 70 percent of its CDBG grant funds are used for activities that benefit low and moderate income persons over a one-, two-, or three-year time period selected by the State. This general objective is achieved by granting "maximum feasible priority" to activities which benefit low and moderate income families or aid in the prevention or elimination of slums or blight. This type of program can be an excellent option to support community development initiatives connecting diverse populations near the Rail Trail corridor in Washington County and Carter County with the Johnson City Rail Trail as well as auxiliary projects.

Communities receiving CDBG funds from the State may use the funds for many kinds of community development activities including, but not limited to: acquisition of property for public purposes; construction or reconstruction of streets, water and sewer facilities, neighborhood centers, recreation facilities, and other public works; demolition; rehabilitation of public and private buildings; public services; planning activities; assistance to non-profit entities for community development activities; and assistance to private, for-profit entities to carry out economic development activities (including assistance to micro-enterprises).

The State may use $100,000 plus up to 50% the costs it incurs for program administration, up to a maximum of 3 percent of its CDBG allocation. The State may expend up to 3% of its CDBG allocation on technical assistance activities. However, the total the State spends on both administrative and technical assistance expenses may not exceed 3% of the State's allocation.

Funds are allocated as part of two primary programs: Community Development and Economic Development CDBGs.

More information: http://tn.gov/ecd/CDBG/index.shtml#3

Additional information: http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs/stateadmin

State Land Acquisition Fund

The State Lands Acquisition Fund (SLAF) has been instrumental in the efforts to acquire lands for preservation and conservation across the entire state of Tennessee. Since the inception of the real estate transfer tax, the SLAF serves as the facilitating entity when structuring collaborative land purchases involving multiple funding sources, non-profit agencies, and state agencies.

More Information: http://www.tennessee.gov/environment/recreation/lands/

Urban and Community Forestry Grant

Urban forests of Tennessee are experiencing new demands and pressures as interest grows in greenways, heat islands, and storm water control. The Urban & Community Forestry Program goal is to improve urban environments through planting and management of trees. It promotes the establishment of urban forestry programs in cities and towns, assists them in developing self-sustaining urban and community forestry programs, and provides technical assistance. Much of this work is done through administration of Urban Forestry Grants, awarded to local governments, community non-profit groups, and educational institutions.

The recommended maximum amount

an individual grantee may apply for is $20,000, but exceptional projects may be considered for additional funding.

The urban and community forestry grants require a match equal to the grant (50-50 match). This means the cost of the project are paid 50% by the grant from the Federal Government (through the State) and 50% by the grantee. A grantee's share of such support may be in the form of cash, services, or in-kind contributions. Grantees shall not use other federal funds to match an urban forestry grant, nor use local funds or in-kind contributions to match more than one federal grant. This program can be an excellent way to support a healthy ecosystem integral to the Johnson City Rail Trail.

More information: http://www.tn.gov/agriculture/forestry/urbanforests.shtml

And: http://www.tn.gov/agriculture/forms/infopak.pdf

Local Government Funding Sources

Municipalities often plan for the funding of pedestrian and bicycle facilities/improvements through development of Capital Improvement Programs (CIP). In Knoxville, for example, the greenways system was allocated $200,000 as part of their Capital Improvement Projects for the 2011/2012 fiscal year through the Parks and Recreation Department. CIPs should include all types of capital improvements (water, sewer, buildings, streets, etc.) versus programs for single purposes. This allows municipal decision-makers to balance all capital needs. A variety of possible funding options available to Tennessee jurisdictions for implementing bicycle and pedestrian projects are described below. However, many will require specific local action as a means of establishing a program, if not already in place.

TN Recreation Initiative Program (TRIP)

The Tennessee Recreation Initiative Program (TRIP) apportions grant money to cities and counties who lack a professional parks and recreational director and do not provide a comprehensive recreation delivery system in their community. These grants are a three-year commitment, $50,000 grant matched by the communities. Next anticipated grant cycle:Summer 2013.

More information: http://www.tn.gov/environment/recreation/grants.shtml

Local Parks and Recreation Fund Grants

These grants are specifically designed to help local communities improve their green spaces and may also be used for trail development and capital projects in parks, natural areas and greenways. LPRF grants require a 50 percent match, with a maximum possible award of $250,000. By statute, at least 60 percent of the funds allocated for these grants will be awarded to municipal governments.

More inforamtion: http://bikewalktn.blogspot.com/2012/01/local-parks-and-rec-fund-grants.html

Utilities

Tennessee Valley Authority is practically the exclusive provider of electricity in Tennessee, but is tax-exempt because it is a federal corporate agency. Instead, TVA distributes annual gross receipts to city and county governments as payments in lieu of taxes. Local governments have come to depend on this reliable revenue source in their budgets and for capital improvement projects .

More information: http://www.tva.com/abouttva/keyfacts.htm#tvataxes

Tennessee Municipal Bond Fund

The Tennessee Municipal Bond Fund (TMBF) creates and administers various types of loan programs for the benefit of cities and counties. As an entity of the Tennessee Municipal League, TMBF works closely with city officials to structure cost-effective and flexible borrowing options. Any governmental purpose project qualifies for financing through the TMBF programs. The loan size and/or repayment term typically determines which program a borrower utilizes. Types of projects include but are not limited to schools, roads, utilities, public buildings, jails, equipment, and any other project considered to be of benefit to the public. Project funds are available for any size government.

More information: http://www.tml1.org/bond-fund.php

Capital Outlay Notes

The governing body of a local government in Tennessee is authorized to issue and sell interest-bearing capital outlay notes for public works projects.

More information: http://law.justia.com/codes/tennessee/2010/title-9/chapter-21/part-6/9-21-601/

Capital Reserve Fund

Other states have created statutory authority for municipalities to create capital reserve funds for any capital purpose, including bicycle and pedestrian facilities. The reserve fund must be created through ordinance or resolution that states the purpose of the fund, the duration of the fund, the approximate amount of the fund, and the source of revenue for the fund. Sources of revenue can include general fund allocations, fund balance allocations, grants and donations for the specified use.

More informatino: http://www.osc.state.ny.us/localgov/pubs/lgmg/reservefunds.pdf

Local Improvement Districts (LIDs)

Local Improvement Districts (LIDs) are most often used by cities to construct localized projects such as streets, sidewalks or bikeways. Through the LID process, the costs of local improvements are generally spread out among a group of property owners within a specified area. The cost can be allocated based on property frontage or other methods such as traffic trip generation.

More information: http://www.portlandoregon.gov/transportation/35715

Municipal Service District

Other states have created statutory authority to establish municipal service districts, to levy a property tax in the district

additional to the citywide property tax, and to use the proceeds to provide services in the district. Downtown revitalization projects are one of the eligible uses of service districts, and can include projects such as street, sidewalk, or bikeway improvements within the downtown taxing district.

More information: http://canons.sog.unc.edu/?p=4591

Tax Increment Financing

Project Development Financing bonds, also known as Tax Increment Financing (TIF) allows localities to use future gains in taxes to finance the current improvements that will create those gains. When a public project (e.g., sidewalk improvements) is constructed, surrounding property values generally increase and encourage surrounding development or redevelopment. The increased tax revenues are then dedicated to finance the debt created by the original public improvement project. Streets, streetscapes, and sidewalk improvements can be specifically authorized. Tax Increment Financing typically occurs within designated development financing districts that meet certain economic criteria that are approved by a local governing body. TIF funds are generally spent inside the boundaries of the TIF district, but they can also be spent outside the district if necessary to encourage development within it.

More information: http://www.lincolninst.edu/pubs/1078_Tax-Increment-Financing

Installment Purchase Financing

As an alternative to debt financing of capital improvements, communities can execute installment or lease purchase contracts for improvements. This type of financing is typically used for relatively small projects that the seller or a financial institution is willing to finance or when up-front funds are unavailable. In a lease purchase contract the community leases the property or improvement from the seller or financial institution. The lease is paid in installments that include principal, interest, and associated costs. Upon completion of the lease period, the community owns the property or improvement. While lease purchase contracts are similar to a bond, this arrangement allows the community to acquire the property or improvement without issuing debt. These instruments, however, are more costly than issuing debt.

More information: http://www.development.ohio.gov/Business/tif/

Taxes

Many communities have raised money for general transportation programs or specific project needs through self-imposed increases in taxes and bonds. For example, Pinellas County residents in Florida voted to adopt a one cent sales tax increase, which provided an additional $5 million for the development of the overwhelmingly popular Pinellas Trail. Sales taxes have also been used in Allegheny County, Pennsylvania, and in Boulder, Colorado to fund open space projects. A gas tax is another method used by some municipalities to fund public improvements. A number of taxes provide direct or indirect funding for the operations of local governments and public improvement projects that can be used for bicycle and pedestrian facilities. Some of them are:

Sales Tax

In Tennessee, sales tax is imposed on all retail sales, leases and rentals of most goods, as well as taxable services (occupancy taxes fall under this category as well). Tennessee cities and counties have the option of imposing an additional local option sales tax.

Use Tax - The use tax is the counterpart to the sales tax. It is applied when merchandise (tangible personal property) is purchased from outside the state of Tennessee and imported into the state for use or consumption. The 45 states that impose a sales tax also levy a use tax.

More information: http://www.tn.gov/revenue/taxguides/salesanduse.pdf

Property Tax

Property taxes generally support a significant portion of a municipality's activities. However, the revenues from property taxes can also be used to pay debt service on general obligation bonds issued to finance greenway system acquisitions. Because of limits imposed on tax rates, use of property taxes to fund greenways could limit the municipality's ability to raise funds for other activities. Property taxes can provide a steady stream of financing while broadly distributing the tax burden. In other parts of the country, this mechanism has been popular with voters as long as the increase is restricted to parks and open space. Note, other public agencies compete vigorously for these funds, and taxpayers are generally concerned about high property tax rates.

More information: http://www.assessment.state.tn.us/

Excise Taxes

Excise taxes are taxes on specific goods and services. These taxes require special legislation and funds generated through the tax are limited to specific uses. Examples include lodging, food, and beverage taxes that generate funds for promotion of tourism, and the gas tax that generates revenues for transportation related activities.

More information: http://www.tn.gov/revenue/tntaxes/fae.shtml

Fees

A variety of fee options have been used by local jurisdictions to assist in funding pedestrian and bicycle improvements. Enabling actions may be required for a locality to take advantage of these tools.

Stormwater Utility Fees

Greenway trail property may be purchased with stormwater fees, if the property in question is used to mitigate floodwater or filter pollutants.

Stormwater charges are typically based on an estimate of the amount of impervious surface on a user's property. Impervious surfaces (such as rooftops and paved areas) increase both the amount and rate of stormwater runoff compared to natural conditions. Such surfaces cause runoff that directly or indirectly discharge into public

storm drainage facilities and create a need for stormwater management services. Thus, users with more impervious surface are charged more for stormwater service than users with less impervious surface. The rates, fees, and charges collected for stormwater management services may not exceed the costs incurred to provide these services.

More information: http://www.tnenvironment.com/Pres09/Best.pdf

Johnson City specific: http://www.johnsoncitytn.org/uploads/files/stormwater/Stormwater%20Utility%20Information/Stormwater%20Utility%20FAQ.pdf

Streetscape Utility Fees

Streetscape Utility Fees could help support streetscape maintenance of the area between the curb and the property line through a flat monthly fee per residential dwelling unit. Discounts would be available for senior and disabled citizens. Non-residential customers would be charged a per-foot fee based on the length of frontage streetscape improvements. This amount could be capped for non-residential customers with extremely large amounts of street frontage. The revenues raised from Streetscape Utility Fees would be limited by ordinance to maintenance (or construction and maintenance) activities in support of the streetscape.

Impact Fees

Developers can be required to pay impact fees through local enabling legislation. Impact fees, which are also known as capital contributions, facilities fees, or system development charges, are typically collected from developers or property owners at the time of building permit issuance to pay for capital improvements that provide capacity to serve new growth. The intent of these fees is to avoid burdening existing customers with the costs of providing capacity to serve new growth so that "growth pays its own way."

Communities that institute impact fees must develop a sound financial model that enables policy makers to justify fee levels for different user groups, and to ensure that revenues generated meet (but do not exceed) the needs of development. Factors used to determine an appropriate impact fee amount can include: lot size, number of occupants, and types of subdivision improvements. A developer may reduce the impacts (and the resulting impact fee) by paying for on- or offsite pedestrian improvements that will encourage residents/tenants to walk or use transit rather than drive. Establishing a clear nexus or connection between the impact fee and the project's impacts is critical in avoiding a potential lawsuit.

More information: http://www.impactfees.com/state-local/state.php

Exactions

Exactions are similar to impact fees in that they both provide facilities to growing communities. The difference is that through exactions it can be established that it is the responsibility of the developer to build the greenway or pedestrian facility that crosses through the property, or adjacent to the property being developed.

In-Lieu-Of Fees

As an alternative to requiring developers to dedicate on-site greenway or pedestrian facility that would serve their development, some communities provide a choice of paying a front-end charge for off-site protection of pieces of the larger system. Payment is generally a condition of development approval and recovers the cost of the off- site land acquisition or the development's proportionate share of the cost of a regional facility serving a larger area. Some communities prefer in-lieu-of fees. This alternative allows community staff to purchase land worthy of protection rather than accept marginal land that meets the quantitative requirements of a developer dedication but falls short of qualitative interests.

Bonds and Loans

Bonds have been a very popular way for communities across the country to finance their pedestrian and greenway projects. A number of bond options are listed below. Contracting with a private consultant to assist with this program may be advisable. Since bonds rely on the support of the voting population, an education and awareness program should be implemented prior to any vote. Billings, Montana used the issuance of a bond in the amount of $599,000 to provide the matching funds for several of their TEA-21 enhancement dollars. Austin, Texas has also used bond issues to fund a portion of its bicycle and trail system.

Revenue Bonds

Revenue bonds are bonds that are secured by a pledge of the revenues from a specific local government activity. The entity issuing bonds pledges to generate sufficient revenue annually to cover the program's operating costs, plus meet the annual debt service requirements (principal and interest payment). Revenue bonds are not constrained by the debt ceilings of general obligation bonds, but they are generally more expensive than general obligation bonds.

General Obligation Bonds

Cities, counties, and service districts generally are able to issue general obligation (G.O.) bonds that are secured by the full faith and credit of the entity. A general obligation pledge is stronger than a revenue pledge, and thus may carry a lower interest rate than a revenue bond. The local government issuing the bonds pledges to raise its property taxes, or use any other sources of revenue, to generate sufficient revenues to make the debt service payments on the bonds. Frequently, when local governments issue G.O. bonds for public enterprise improvements, the public enterprise will make the debt service payments on the G.O. bonds with revenues generated through the public entity's rates and charges. However, if those rate revenues are insufficient to make the debt payment, the local government is obligated to raise taxes or use other sources of revenue to make the payments. Bond measures are typically limited by time, based on the debt load of the local government or the project under focus. Funding from bond measures can be used for right-of-way acquisition, engineering,

design, and construction of pedestrian and bicycle facilities. Voter approval is required.

Special Assessment Bonds

Special assessment bonds are secured by a lien on the property that benefits from the improvements funded with the special assessment bond proceeds. Debt service payments on these bonds are funded through annual assessments to the property owners in the assessment area.

State Revolving Fund Loans

Initially funded with federal and state money, and continued by funds generated by repayment of earlier loans, State Revolving Funds (SRFs) provide low interest loans for local governments to fund water pollution control and water supply related projects including many watershed management activities. These loans typically require a revenue pledge, like a revenue bond, but carry a below market interest rate and limited term for debt repayment (20 years).

Funds from Private Foundations & Organizations

Many communities have solicited greenway and pedestrian infrastructure funding assistance from private foundations and other conservation-minded benefactors. Below are several examples of private funding opportunities available in Tennessee and the U.S.

East Tennessee Foundation

East Tennessee Foundation's (ETF) field-of-interest and affiliate funds support a competitive grantmaking process in broad charitable areas including arts and culture, community development, youth-at-risk or a particular East Tennessee county (Affiliate Funds) within the Foundation's 25-county service area. Since 1986, East Tennessee Foundation has awarded over $187 million in grants through its competitive grantmaking process.

More information: http://www.easttennesseefoundation.org/grants/competitive.html#overview

Elizabethton/Carter County Community Foundation

Elizabethton/Carter County Community Foundation was created through a gift from a local anonymous donor who cares deeply about Elizabethton and Carter County. The donor's love for the community, the preservation of its history, its culture and landscape, is reflected through the establishment of this permanent fund to create opportunities for others to give and join in supporting the well-being of Carter County and its citizens.

Elizabethton/Carter County Community Foundation is a philanthropic organization governed by a local board of directors. The Foundation supports programs and projects that build community goodwill, seek to solve community challenges and produce results for the benefit of communities located in Carter County.

Successful applicants for one-year grants will propose innovative projects, programs or activities that will: make a significant contribution to the health and welfare of Carter County and utilize its unique assets; directly benefit Carter County residents; provide educational and cultural opportunities; support community or economic development, historic preservation, and/or environmental enhancement; and build the capacity of the applicant organization and its leadership to more effectively carry out its mission.

Elizabethton/Carter County Community Foundation grants are only available to organizations that reside within or serve the residents of Carter County. Grants are generally for one year and between $500-$2,000.

More informatino: http://www.easttennesseefoundation.org/grants/competitive/elizabethton/carter.html

Mountain States Health Alliance - Mountain States Foundation

Mountain States Foundation advances quality health care in the northeast Tennessee region by linking friends with Mountain States Health Alliance and creating a difference through giving.

The Mountain States Foundation provides support to numerous causes that are of great importance to the people of Northeast Tennessee, Southwest Virginia, Western North Carolina and Eastern Kentucky. The generosity of individuals, businesses and other organizations across the region enables the Mountain States Foundation to fulfill its mission. They also hold special events to raise support for the growing healthcare needs of the region.

More information: http://www.mountainstatesfoundation.org/what_we_do/programs_services.aspx

BlueCross BlueShield Tennessee Foundation

Established in December of 2003, the BlueCross BlueShield of Tennessee Health Foundation promotes the philanthropic mission of BlueCross BlueShield of Tennessee. They award grants focused on high-impact initiatives and that work with civic and economic partners to promote healthy lifestyle choices across the state. This, in turn, helps control health care costs for all Tennessee residents.

The Tennessee Health Foundation is dedicated to enhancing quality of life by awarding grants that improve health, public education and economic development for Tennesseans. They support effective multicultural approaches for developing healthy lifestyles; enhance collaborative community partnerships for broader access to health resources; explore innovative solutions aimed at breaking cycles of health neglect; and establish healthy initiatives aimed at prevention, intervention and education.

For 2012, their funding will focus on

expanding access to care with an emphasis on health disparities and at-risk populations; addressing the problems of infant mortality and childhood obesity; and improving patient safety and quality for our fellow Tennesseans.

They give priority to projects that reflect their mission and emphasize healthy living, health care access and quality of life, such as the following:

- Projects that are solution-oriented and measurable to show proven results.
- Projects that help the most amount of people across income, race and gender lines.
- Projects that obtain high participation and can be easily replicated.
- Projects that are collaborative and attract diverse community partnerships.

More information: http://www.bcbst.com/about/community/TN-health-foundation/

The Robert Wood Johnson Foundation

The Robert Wood Johnson Foundation was established in 1972 and today it is the largest U.S. foundation devoted to improving the health and health care of all Americans. Grant making is concentrated in four areas:

To assure that all Americans have access to basic health care at a reasonable cost

To improve care and support for people with chronic health conditions

To promote healthy communities and lifestyles

To reduce the personal, social and economic harm caused by substance abuse: tobacco, alcohol, and illicit drugs

More information: http://www.rwjf.org/grants/

REI Grants

REI is dedicated to inspiring people to love the outdoors and take care of the places they love. REI focuses philanthropic efforts on supporting and promoting participation in active volunteerism to care for public lands, natural areas, trails and waterways. This focus engages a full spectrum of REI resources to mobilize communities around outdoor stewardship.

The store teams cultivate strong partnerships with local non-profit organizations that engage individuals, families and entire communities in outdoor volunteer stewardship. REI stores use their public visibility, staff support and online communication tools to connect people to the stewardship opportunities hosted by their partners. These store resources thereby drive customers' attention, awareness and involvement in support of partner programs and needs.

REI also supports local partners financially with grant funding. The grants program begins with nominations from store teams who select the local non-profits with whom they've developed enduring and meaningful partnerships. Nominated partners are then invited to submit applications for grant funding. REI grants provide partner organizations with the resources and capacity to organize stewardship activities and get volunteers involved.

More inforamtion: http://www.rei.com/about-rei/grants02.html

Walmart State Giving Program

The Walmart Foundation financially supports projects that create opportunities for better living. Grants are awarded for projects that support and promote education, workforce development/economic opportunity, health and wellness, and environmental sustainability. Both programmatic and infrastructural projects are eligible for funding. State Giving Program grants start at $25,000, and there is no maximum award amount. The program accepts grant applications on an annual, state by state basis January 2nd through March 2nd.

More information: http://walmartstores.com/CommunityGiving/8168.aspx?p=8979

The Rite Aid Foundation Grants

The Rite Aid Foundation is a foundation that supports projects that promote health and wellness in the communities that Rite Aid serves. Award amounts vary and grants are awarded on a one year basis. A wide array of activities are eigible for funding, including infrastructural and programmatic projects.

More information: http://www.riteaid.com/company/community/foundation.jsf

Bank of America Charitable Foundation, Inc.

The Bank of America Charitable Foundation is one of the largest in the nation. The primary grants program is called Neighborhood Excellence, which seeks to identify critical issues in local communities. Another program that applies to greenways is the Community Development Programs, and specifically the Program Related Investments. This program targets low and moderate income communities and serves to encourage entrepreneurial business development.

More information: http://www.bankofamerica.com/foundation.

American Greenways Eastman Kodak Awards

The Conservation Fund's American Greenways Program has teamed with the Eastman Kodak Corporation and the National Geographic Society to award small grants ($250 to $2,000) to stimulate the planning, design and development of greenways. These grants can be used for activities such as mapping, conducting ecological assessments, surveying, holding conferences, developing brochures, producing interpretive displays, incorporating land trusts, and building trails. Grants cannot be used for academic research, institutional support, lobbying or political activities. Currently, the grant program is on hold until further notice.

More information: http://www.conservationfund.org/kodak_awards.

The Trust for Public Land

Land conservation is central to the mission of the Trust for Public Land (TPL). Founded in 1972, the Trust for Public Land is the only national nonprofit working exclusively to protect land for human enjoyment and well being. TPL helps conserve land for recreation and spiritual nourishment and to improve the health and quality of life of American communities.

More information: http://www.tpl.org

National Trails Fund

American Hiking society created the National Trails Fund in 1998 as the only privately supported national grants program providing funding to grassroots organizations working toward establishing, protecting, and maintaining foot trails in America. The society provides funds to help address the $200 million backlog of trail maintenance. National Trails Fund grants help give local organizations the resources they need to secure access, volunteers, tools and materials to protect America's cherished public trails. To date, American Hiking has granted more than $240,000 to 56 different trail projects across the U.S. for land acquisition, constituency building campaigns, and traditional trail work projects. Awards range from $500 to $10,000 per project. Projects the American Hiking Society will consider include:

Securing trail lands, including acquisition of trails and trail corridors, and the costs associated with acquiring conservation easements.

Building and maintaining trails that will result in visible and substantial ease of access, improved hiker safety, and/or avoidance of environmental damage.

Constituency building surrounding specific trail projects, including volunteer recruitment and support.

More information: http://www.americanhiking.org/.

The Conservation Alliance

The Conservation Alliance is a non-profit organization of outdoor businesses whose collective annual mem-bership dues support grassroots citizen-action groups and their efforts to protect wild and natural areas. One hundred percent of its member companies' dues go directly to diverse, local community groups across the nation

For groups who seek to protect the last great wild lands and waterways from resource extraction and commercial development, the Alliance's grants are substantial in size (about $35,000 each), and have often made the difference between success and defeat. Since its inception in 1989, The Conservation Alliance has contributed $4,775,059 to grassroots environmental groups across the nation, and its member companies are proud of the results: To date the groups funded have saved over 34 million acres of wild lands and 14 dams have been either prevented or removed-all through grassroots community efforts.

The Conservation Alliance is a unique funding source for grassroots environmental groups. It is the only environmental grant maker whose funds come from a potent yet largely untapped constituency for protection of ecosystems - the non-motorized outdoor recreation industry and its customers. This industry has great incentive to protect the places in which people use the clothing, hiking boots, tents and backpacks it sells. The industry is also uniquely positioned to educate outdoor enthusiasts about threats to wild places, and engage them to take action. Finally, when it comes to decision-makers - especially those in the Forest Service, Nation-al Park Service, and Bureau of Land Management, this industry has clout - an important tool that small advocacy groups can wield.

The Conservation Alliance Funding Criteria:

- The Project should be focused primarily on direct citizen action to protect and enhance our natural resources for recreation.
- The Alliance does not look for mainstream education or scientific research projects, but rather for active campaigns.
- All projects should be quantifiable, with specific goals, objectives and action plans and should include a measure for evaluating success.
- The project should have a good chance for closure or significant measurable results over a fairly short term (one to two years).
- Funding emphasis may not be on general operating expenses or staff payroll.

More information: http://www.conservationalliance.com/grants.

Bike Belong Grants

The Bikes Belong Grant program funds important and influential projects that leverage federal funding and build momentum for bicycling in communities across the U.S. These projects include greenways and rail trails accessible by pedestrians and bicyclists. Applicants can request a maximum amount of $10,000 for their project, and priorities are given to areas that have not received Bikes Belong funding in the past three years.

A new Bikes Belong opportunity is Community Partnership Grants. These grants are designed to foster and support partnerships between city or county governments, non-profit organizations, and local businesses to improve the environment for bicycling in the community. Grants will primarily fund the construction or expansion of facilities such as bike lanes, trails, and paths. The lead organization must be a non-profit organization with IRS 501(c)3 designation or a city or county government office.

More information: http://www.bikesbelong.org/grants/

The Cinergy Foundation

The Cinergy Foundation places special emphasis on projects that help communities help themselves. The Foundation supports local community, civic and leadership development projects. The Cinergy Foundation also views community foundations as positive vehicles for sustaining the long-term health of a

community and promoting philanthropic causes. Infrastructure needs by a community will not be considered.

The Cinergy Foundation supports health and social service programs which promote healthy life styles and preventative medical care. United Way campaigns are included in Health and Social Services funding.

More information: http://www.cinergy.com/foundation/categories.asp

Local Trail Sponsors

A sponsorship program for trail amenities allows smaller donations to be received from both individuals and businesses. Cash donations could be placed into a trust fund to be accessed for certain construction or acquisition projects associated with the greenways and open space system. Some recognition of the donors is appropriate and can be accomplished through the placement of a plaque, the naming of a trail segment, and/or special recognition at an opening ceremony. Valuable in-kind gifts include donations of services, equipment, labor, or reduced costs for supplies.

Corporate Donations

Corporate donations are often received in the form of liquid investments (i.e. cash, stock, bonds) and in the form of land. Municipalities typically create funds to facilitate and simplify a transaction from a corporation's donation to the given municipality. Donations are mainly received when a widely supported capital improvement program is implemented. Such donations can improve capital budgets and/or projects.

Private Individual Donations

Private individual donations can come in the form of liquid investments (i.e. cash, stock, bonds) or land. Municipalities typically create funds to facilitate and simplify a transaction from an individual's donation to the given municipality. Donations are mainly received when a widely supported capital improvement program is implemented. Such donations can improve capital budgets and/or projects.

Fundraising / Campaign Drives

Organizations and individuals can participate in a fundraiser or a campaign drive. It is essential to market the purpose of a fundraiser to rally support and financial backing. Often times fundraising satisfies the need for public awareness, public education, and financial support.

Land Trust Acquisition and Donation

Land trusts are held by a third party other than the primary holder and the beneficiaries. This land is oftentimes held in a corporation for facilitating the transfer between two parties. For conservation purposes, land is often held in a land trust and received through a land trust. A land trust typically has a specific purpose such as conservation and is used so land will be preserved as the primary holder had originally intended.

Volunteer Work

Residents and other community members are excellent resources for garnering support and enthusiasm for a greenway corridor or pedestrian facility. Furthermore volunteers can substantially reduce implementation and maintenance costs. Individual volunteers from the community can be brought together with groups of volunteers from church groups, civic groups, scout troops and environmental groups to work on greenway development on special community workdays. Volunteers can also be used for fund-raising, maintenance, and programming needs.

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Operations and Maintenance D

Guiding Principles for Effective Operations and Maintenance

The Johnson City Rail Trail should be regarded and maintained as a public resource. The condition of the trail reflects the relationship between the trail, trail managers and the surrounding community. A well-maintained trail will serve the Johnson City/Elizabethton communities for generations to come. The following guiding principles will help assure the preservation of a first class trail:

- Good maintenance begins with sound planning and design.
- Foremost, protect life, property, and the environment.
- Promote and maintain a quality outdoor recreation and transportation experience.
- Develop a management plan that is reviewed and updated annually with tasks, operational policies, standards, and routine and remedial maintenance goals.
- Develop a maintenance plan that is reviewed and updated annually and includes regular inspection schedules
- Maintain construction and design quality control, and conduct regular inspections.
- Include field crews, police, and fire/rescue personnel in both the design review and on-going management process.
- Maintain an effective, responsive public feedback system, and promote public participation.
- Be a good neighbor to adjacent properties.
- Operate a cost-effective program with sustainable funding sources.

Maintenance

Maintenance tasks should be conducted more frequently for trail facilities where use is the most concentrated. Methods such as trail use counts, sketch plan analysis methods for estimating demand, public survey results, and public meeting comments can be used to determine which areas are the most heavily used and may require the most maintenance attention. The frequency of required maintenance tasks should be established as new phases are implemented and should be reviewed and updated annually to reflect any changes in usage, safety issues, etc.

Appendix Contents

Routine Maintenance Defined

Routine maintenance refers to the day-to-day regimen of litter pick-up, trash and debris removal, graffiti removal, weed and dust control, trail sweeping, sign replacement, tree and shrub trimming, and other regularly scheduled activities. Routine maintenance also includes minor repairs and replacements, such as fixing cracks and potholes or repairing a broken hand railing.

Suggested Maintenance Schedule

An important note about graffiti. Rapid removal of graffiti is a key component to a maintaining a safe trail. Rapid removal signals to the "taggers" and the community that the trail is cared for and being regularly observed. Data shows that graffiti removal within 24 to 48 hours results in a nearly zero rate of recurrence. At minimum, a graffiti reporting phone number should be prominently displayed on regulatory signage along the trail. Website and/or a QR code listed on signage, along with a phone number, would provide alternative reporting opportunities that appeal to a broader audience.

Facilities that are well-maintained extend their longevity.

LONGEVITY OF FACILITIES	
Mulch	2-3 years
Granular stone	7-10 years
Asphalt	7-15 years
Concrete	20+ years
Boardwalk	7-10 years
Bridge/Underpass/ Tunnel	100+ years

Table E.1 Suggested Maintenance Schedule

Maintenance Task	Suggested Frequency
Inspections	Seasonally (4 times/year)
Sign repair/replacement	1-3 years
Site furnishings; replace damaged components	As needed
Fencing repair	Inspect monthly for holes and damage, repair immediately
Pavement markings replacement	1-3 years
Pavement sweeping/blowing	As needed; before high use season
Pavement sealing; pothole repair	5-15 years
Lighting repair	Annually
Introduced tree and shrub plantings, trimming	1-3 years
Shrub/tree irrigation for introduced planting areas	Weekly during summer months until plants are established
Shoulder plant trimming (weeds, trees, branches)	Bi-annual (e.g. Fall and Spring)
Major damage response (fallen trees, washouts, flooding)	Immediately following an event; as needed
Culvert inspection	Before rainy season; after major storms
Maintaining culvert inlets	Inspect before onset of rainy season; after major storms
Trash disposal	Weekly during high use; twice monthly during low use
Litter pick-up	Weekly during high use; twice monthly during low use
Graffiti removal	Weekly; as needed

Remedial Maintenance Defined

Remedial maintenance refers to correcting significant defects in the network, as well as repairing, replacing, or restoring major components that have been destroyed, damaged, or significantly deteriorated from normal usage and old age. Some items ("minor repairs") may occur on a five to ten year cycle, such as repainting, seal coating asphalt pavement, or replacing signage. Major reconstruction items will occur over a longer period or after an event such as a flood. Examples of major reconstruction include stabilization of a severely eroded hillside, repaving a trail surface or a street used for biking, or replacing a footbridge. Remedial maintenance should be part of a long-term capital improvement plan.

Maintenance Safety Checklist

A maintenance safety checklist should be generated to assist trail maintenance crews and trail patrol volunteers in identifying potential problems. The safety checklist should include, but not be limited to, the following: Are shrubs and other vegetation, including the vegetation on the top and sides of the embankments, trimmed down to 24" in height (with the exception of vegetated screening in specified locations to provide privacy to residential lots)?

- Is the vegetative screening no more than four feet in height?
- Are tree branches, including the trees on the top and sides of the embankments, trimmed up to provide 8' (min.) vertical clearance from the ground?
- Are tree canopies blocking lighting fixtures?
- Is there any graffiti present?
- Are all pedestrian mile marker signs present?
- Are there off-trail worn pathways in undesired locations?
- Is the trail in good condition (no crumbling edges, washed out areas, excessive debris, pavement marking visible, etc.)

Operations & Maintenance Costs for Rail Trail Systems

In 2005, the Rails-to-Trails Conservancy's (RTC) Northeast Regional Office researched over 100 organizations managing the operations and maintenance of a rail trail system in the northeastern United States . 39 of these organizations were able to provide a lump-sum amount either budgeted or spent. Key figures from this include:

- $1,500 – average operations and maintenances costs per year per mile (costs for asphalt and non-asphalt trails were roughly equivalent)
- 17 years – average frequency in which complete re-surfacing occurred for asphalt trails
- 137,000 – average annual users

Operations and maintenance costs for rail trails are variable across organizations and places. Most organizations had difficulty providing a breakdown of their annual expenditures. Often times, operations and maintenance costs for a rail trail do not have a specific budget, but are part of a park system's overall general operations and maintenance budget. Also, many maintenance needs are unpredictable and completed "as needed". These costs are context dependent and can include things such as snow removal, fallen tree removal, pothole repair among other maintenance needs that may be less regular. However, some activities are routine and can be regularly planned. These include the following (but not limited to):

Routine Maintenance

Vegetation management

- Mowing
- Litter clean-up
- Pruning, trimming, weeding
- Invasive species management
- Tree removal as needed
- Planting

Drainage Cleaning and Maintenance (ditches, gullies, culverts, sloped trails)

- Flushing
- Raking
- Other mechanical means

Trailhead, amenity, and signage maintenance

- Parking
- Toilet facilities
- Informational kiosks
- Picnic tables/benches
- Maps
- Trail rules and regulations
- Traffic control for trail users
- Mile markers
- Directional signs
- Fencing

*Note: 2/3 of trails report vandalism

Operations and maintenance costs for rail trails vary across organizations.

Trail Inspection/patrolling

- o Walking
- o Driving
- o Surface Investigation

Research performed by Flink et al summarizes these activities and their frequency. It should be noted their research involved stream/river based multi-use trails, which typically require more care than rail trail systems. Stream/river based multi-use trails in urban areas will see higher levels of usage, additional interfaces with street crossings and other city structures, and will face additional logistical challenges in being part of a riparian corridor. In fact, their research found that operations and maintenance costs for these types of trail systems average approximately $6,500 per mile annually. Rail trail costs will likely be substantially lower than this figure, and the frequency estimates of operations and maintenance activities listed below by Flink et al will likely be on the lower end as well:

- Drainage/channel maintenance: 3 - 5 times per year
- Sweeping/blowing debris: 16 - 24 times per year
- Trash removal: 16 - 24 times per year
- Vegetation management: 8 - 12 times per year
- Mowing of shoulders: 8 - 24 times per year

Again, variability is displayed in this example and each rail trail system will develop its own routine operations and maintenance schedule as needed.

Non-Routine (Remedial) Maintenance

Non-routine operations and maintenance activities and costs that may not be included in an annual budget and may not be regular, but need to be planned for, can include trail resurfacing/repaving, bridge repairs, grading, and other larger repairs. These costs sometimes come out of capital improvement budgets, and sometimes they are thrust upon the rail trail organization's annual budget. Such improvements and their subsequent costs can also cause fluctuation in an organizations budget.

Variation in Operations and Maintenance Costs

Some of the factors that can affect per mile operations and maintenance costs for a rail trail can include the following (but not limited to):

- Intensity of use
- Rural vs. urban sections of the trail – in addition to a higher intensity of use, urban sections will likely include additional interfaces with other town infrastructure (roads, bridges, etc.), and will require maintenance attention
- What is specifically included in the operations and maintenance budget? Are larger projects like sealing, resurfacing (or smaller resurfacing projects) going to be included? Are other funds or funding sources going to be created or planned for to handle those costs? The answer to these questions can be affected by other town/park capital improvement projects competing for funds
- Use of volunteers – public agency management vs non-profit/volunteer management
  - o Some rail trails are owned and managed by non-profit organizations; operations and maintenance costs for these trails will likely be lower due to the extent of volunteer use (however, liability risks are more easily dealt with when rail trails are owned and managed by a public agency)
- Cost of living in the area
- Other contextual characteristics - i.e.: snow removal in northern states, sweeping during "mulberry season" (see Constitution Trail below), etc.

Rail Trail Operations and Maintenance Examples

The following organizations were contacted to provide further insight to specific maintenance activities and budget allowances (if known). These examples show many similarities in responsibilities, but inherent in each are contextual differences as well. Similar to Johnson City's planned rail trail, these four examples are also paved trails and under 20 miles in length. They are briefly outlined below:

Hoodlebug Trail – 10.5 miles paved, Indian County, Pennsylvania: Managed by Indiana County, operations and maintenance costs are generally $1,600 per mile per year. The funding for these activities comes out of the overall park operations and maintenance budget. Some of their key activities include:

- Mowing
- Trimming
- Tree removal
- Access area maintenance
- Storm clean-up
- Some drainage and ditch cleaning is performed, but is minimal
- Some resurfacing has been performed (in-grown tree roots, freeze-thaw cycle), but those costs come from the county's general fund
- Volunteer help is used for special projects such as adopt-a-trail litter clean ups

Constitution Trail – 14 miles paved, Normal-Bloomington, Illinois: Managed by the Town of Normal Parks and Recreation. All rail trail operations and maintenance costs come out of the town's general park maintenance budget, and estimations specifically for the rail trail's operations and maintenance costs are unavailable.

However, here is some insight to key operations and maintenance activities and other details:

- Mowing routine: weekly (non-winter months)
- Vegetation trimming: 3-4 times per year
- They have had difficulty with tree roots growing under the trail that buckle/break up asphalt - have had to resurface small sections due to this
- They have not had to deal with drainage issues very often (the drainage system installed in the 1800s as part of the old railroad still functions well)
- Repairs from vandalism
- Daily - one staff member takes a utility vehicle on trail – picks up trash, dumps trash cans, sweeps and reports anything else as needed
- Mulberry Season - trail is swept frequently using a bobcat skid-steer and broom
- The town of Normal now requires them to remove snow
- Volunteer groups donate money, trees, benches, pick-up trash, etc.
- The trail was constructed in the 1980s – they are beginning to resurface 1,500-foot sections each year
- Sometimes larger improvements come out of the towns capital improvements budget, but other times they come out of the town's general park operations and maintenance budget – depends on availability of funds and other projects on the agenda

Moraine State Park Bicycle Trail – 7.5 miles paved, Moraine State Park, Pennsylvania: Annual maintenance of the trail comes out of the park's general operations and maintenance budget. Estimates are that costs run approximately $17,000 - $20,000 per year; or $2,226 - $2,667 per mile per year. Key activities and other details include:

- Bi-weekly clearing of the trail with pull behind blower
- Tree removal after storms
- Sign replacement
- Pavement repair needs will likely raise costs another $5,000 for the 2012-2013 budget cycle
- Maintain bicycle rental concession, restrooms, parking lots, vending machines, storm shelters and picnic tables at the trailhead and various places along the trail
- Culverts cleared by hand as needed and based on staffing
- Trimming/pruning typically done twice per year
- Mowing
- Probation work crew provides help with brush removal several times per year
- Some use of volunteers as well

Creekside Trail – 17 miles paved, Greene County, Ohio: Greene County, Ohio manages this trail as a part of its 62-mile trail network (most of which are rail trails). It is estimated that the county spends approximately $250,000 per year on this 62-mile trail network or ~$4,000 per mile per year on operations and maintenance. Key activities include:

- Mowing routine: 7-10 day intervals
- Vegetation Trimming: approximately 3 times per year
- Some use of volunteer support
- Ditch clean-out
- Have spent additional time with invasive species management (honeysuckle)
- Some resurfacing as well

Asphalt trail resurfacing should be considered every 17 years.

Operational Policies

Public Access and Use

Residents and visitors shall have access to and use of the Johnson City Rail Trail during normal hours of operation as defined herein. All access and use is governed by a Trail Ordinance (described herein). The use of the Trail is limited to non-motorized users, including hiking, bicycling, in-line skating, running, jogging, equestrian use (where provided), and wheelchair use. The only motorized vehicles permitted to use the pathway are those owned or licensed for maintenance purposes by the City of Johnson City and City of Elizabethton.

Hours of Operation

The Johnson City Rail Trail will be operated

as a non-lighted linear park and recreation facility, and shall be open for public use from dawn to dusk, 365 days a year, except as specifically designated by the City of Johnson City and City of Elizabethton. Lighting may be located in strategic locations adjacent to existing lighted areas to increase security and safety. Residents and tourists that are found using these facilities after dusk or before dawn shall be deemed in violation of these hours of operation and subject to fines and/or prosecution.

Care and Management of the Trail

The City of Johnson City and City of Elizabethton shall be responsible for the care and upkeep of the trails and all lands, drainage features, signage, fences, bridges, trail heads, landscape plantings and trail amenities.

Fencing and Vegetative Screening Policy

The City of Johnson City and City of Elizabethton will work with adjacent landowners on an individual basis to determine fencing and vegetative screening requirements of the Johnson City Rail Trail. The care of fences and screening outside of the trail right-of-way or not on City of Johnson City property (the rail-trail corridor) is the responsibility of the adjacent landowner.

Resource Stewardship and Enhancement

A well-managed trail is critical to the long-term success of this plan. This involves stewardship, the oversight of resources, and operations and maintenance. Stewardship might range from cleaning up litter to assuring that a project does not visually scar the surrounding landscape.

The stewardship process must consider both the private sector (such as land subdivision and development) and public sector activities, such as the construction of roads and utilities. In pursuit of this, coordination among agencies at the local, regional, state, and federal level is vital to assure that these activities are supportive of the plan and complementary to each other. Long-term stewardship also calls for the enduring commitment of agency staff, elected officials, and concerned citizens all working together. This suggests the need for a shared community vision and value system centered on the protection of trail, bicycle, pedestrian, and outdoor recreational resources. This plan and similar plans can help coordinate and guide that action.

Funding the Operations & Maintenance Program

Identifying funding sources, creating funding sources and sustaining reliable funding over the long term is critical to the overall success of operations and maintenance and, ultimately, the success and growth of the regional greenway and trail network. Several types of funding sources can be identified and a combination of these might offer the best solutions. The following are potential sources for operations and maintenance. Appendix E identifies funding sources for project design and implementation.

Budget Allocations

These are funds coming directly from existing agency and department programs as part of annual budget contributions. Typically this is the base revenue source for operations and management. Note that on most projects around the nation, private donors or other potential partners will want to see a strong long-term public side commitment to management as a condition of awarding grants for capital trail improvements and management programs.

Multi-Objective Partnerships

Most trails serve multiple public and private benefits including access for floodway and ditch upkeep, utility access, street maintenance, and enhancement of adjacent private properties. This may pose a number of opportunities for task sharing and cost sharing among the various beneficiaries, particularly with respect to storm drainage management along river, creek, and wetland corridors.

In-Kind Services

In-kind services involve people, such as volunteers, youth and student labor, and seniors to provide routine maintenance practices to network facilities. In-kind services may also include donations of material and equipment. Another consideration is the adopt-a-trail program, which works with service clubs, scouts, school groups, businesses and others. Adopt-a-trail programs should include credit signage and written agreements with the adopting group. Note, however, that volunteer and in-kind participation will likely meet only a fraction of the operations and maintenance needs and funding of these programs may be sporadic. The management program will still need a base of trained professionals and proper equipment. Use of in-kind services requires staff time for coordination.

Creating an Endowment

An endowment is a set-side account held strictly to generate revenue from investment earnings. The endowment could be held by a non-profit and could be established for the region, rather than for a single municipality's trail. Funding of the endowment could come from a percent of capital grants and from an endowment campaign. The endowment could also be funded by bequests and deferred giving such as donations of present or future interests in stocks or real estate. To have an effective impact, the endowment should have several million dollars in its "corpus" (asset holding). This endowment could be built up gradually in tandem with

project development. Contributions to the fund would be solicited from greenway advocates, businesses, civic groups, and other foundations. Special events could be held whose sole purpose is to raise capital money for the endowment. The resulting fund would support long-term operations and maintenance of the trail and can also be used in the acquisition of high-priority properties that may be lost if not acquired by private sector initiative.

EARNED INCOME AND USER FEES

Local jurisdictions should work with their local 'Friends of the Greenway' group to capture and direct fees and revenues that are derived from greenway events and activities into an account that can be dedicated to operating and managing the trail. Revenues could be used to support the endowment. User fees for amenities of the trail or user permits for trail and open space facilities can add to the revenue stream. Leasing trail rights-of-way for fiber-optic and other utility corridors can also generate earned income. For example, Grand Forks, North Dakota has demonstrated that a properly operated greenway can generate upwards of $250,000 in direct revenues annually for use in offsetting the cost of operations and maintenance costs.

Additional Information

Studies of Trail Liability

A study by the Rails to Trails Conservancy (RTC) provides a primer on trail-related liability issues and risk management techniques. The report was co-authored by RTC in cooperation with the National Park Service: Rivers, Trails, and Conservation Assistance Program.

Concerns and Solutions

There are two primary categories of people who might be concerned about liability issues presented by a trail: the trail managing and owning entity (typically a public entity) and private landowners. Private landowners can be divided into two categories, those who have provided an easement for a trail over their land and those who own land adjacent to a trail corridor.

Similarly, there may be a pre-existing corridor traversing or lying adjacent to their property such as a former rail corridor that has been converted to a trail. In either situation, private landowners may have some concerns about the liability should a trail user stray onto their land and become injured. In the first instance, where an easement is granted, the concern may be over injuries on both the granted right-of-way as well as injuries that may occur on land under their control that is adjacent to the trail. Under the latter condition, where the landowner has no ownership interest in the trail, the landowner will only be concerned with injury to trail users wandering onto their property and getting hurt or perhaps a tree from their property falling onto the trail.

In general, people owning land adjacent to a trail -- whether the trail is an easement granted by them or is held by separate title -- foresee that people using the trail may be endangered by a condition on their land. Potential hazards such as a pond, a ditch, or a dead tree may cause the landowner to worry about liability for a resulting injury. The landowners may reduce their liability by taking the following actions.

- Work with trail designers to have the trail located away from hazards that cannot be corrected,
- Make it clear that trail users are not invited onto the adjoining land. This can be aided by having the trail designer develop signs, vegetative screening, or fencing,
- If a hazardous condition does exist near the trail, signs should be developed to warn trail users of the hazard if it cannot be mitigated.

Of particular concern to adjacent landowners are attractions to children that may be dangerous, such as a pond. Many states recognize that children may trespass to explore an attractive nuisance. These states require a legal responsibility to children, even as trespassers, that is greater than the duty of care owed to adults.

If a landowner provides an easement for a public-use-trail, the easement contract should specify that the managing agency will carry liability insurance, will design the trail to recognized standards and will develop and carry out a maintenance plan. The landowner may also request that an indemnification agreement be created in their favor.

Abutting property owners frequently express concerns about their liability to trail users. In general, their liability, if any, is limited and is defined by their own actions in relation to the trail. If an abutting property owner possesses no interest in the trail, then he or she does not have any right or obligation to warn trail users about defects in the trail unless the landowner creates a dangerous condition on the trail by his own act or omission. In that event, the abutting landowner would be responsible for his own acts or omissions that caused the injury to a third party using the trail, just as the operator of one car is responsible to the operator of another for an accident he caused on a city street.

Forms of Protection

There are three legal precepts, either alone or in combination, that define and in many cases limit liability for injury resulting from trail use. The first is the concept of duty of care, which speaks to the responsibility that a landowner (private or public) has to anyone on his or her land. Second is the Recreational Use Statute (RUS), which is available in all 50 states and provides protection to private landowners and some

public landowners who allow public free access to land for recreational purposes. For those public entities not covered by a RUS, states tend to have a tort claims act, which defines and limits governmental liability. Third, for all private and public parties, liability insurance provides the final line of defense. Trail owners can also find much protection through risk management.

Duty of Care

Tort law, with regard to finding fault for an incident that occurs in a particular location is concerned with the "class" of person who incurs the injury, and the legal duty of care that a landowner owes a member of the general public varies from state to state but is generally divided into four categories. In most states, a landowner's responsibility for injuries depends on the status of the injured person. A landowner owes increasingly greater duties of care (i.e.; is more at risk) if the injured person is a "trespasser", a "licensee", an "invitee", or a "child".

Trespasser -- a person on land without the landowner's permission, whether intentionally or by mistaken belief that they are on public land. Trespassers are due the least duty of care and therefore pose the lowest level of liability risk. The landowner is generally not responsible for unsafe conditions. The landowner can only be held liable for deliberate or reckless misconduct, such as putting up a trip wire. Adjacent landowners are unlikely to be held liable for injuries sustained by trespassers on their property.

Licensee -- a person on land with the owner's permission but only for the visitor's benefit. This situation creates a slightly higher liability for the landowner. For example, a person who is permitted to hunt on a farm without paying a fee, if there were no RUS, would be classified as a licensee. If the landowner charged a fee, the hunter would probably be classified as an invitee. Again, the landowner is not responsible for discovering unsafe conditions; however, the landowner must provide warning of the known unsafe conditions.

Invitee -- a person on the owner's land with the owner's permission, expressly or implied, for the owner's benefit, such as a paying customer. This is the highest level of responsibility and therefore carries the highest level of liability. The owner is responsible for unknown dangers that should have been discovered. Put in a different way, the landowner has a duty to:

1) Inspect the property and facilities to discover hidden dangers;

2) Remove the hidden dangers or warn the user of their presence;

3) Keep the property and facilities in reasonably safe repair: and

4) Anticipate foreseeable activities by users and take precautions to protect users from foreseeable dangers.

The landowner does not insure the invitee's safety, but must exercise reasonable care to prevent injury. Generally, the landowner is not liable for injuries caused by known, open, or obvious dangers where there has been an appropriate warning. For example, customers using an ice rink open to the public for a fee would be invitees.

Children -- even if trespassing, some states accord children a higher level of protection. The concept of "attractive nuisance" is particularly relevant to children. Landforms such as ponds can be attractive to children who, unaware of potential danger, may be injured if they explore such items.

Prior to the widespread adoption of RUS' by the states, this classification system defined the liability of adjacent landowners. Even now, trail managers or private landowners who charge a fee are at greater risk of liability because they owe the payee a greater responsibility to provide a safe experience.

Thus, where no RUS exists or is unavailable, trail users would be of the licensee class, provided the trail manager does not charge an access fee. If a trail manager charges a fee, the facility provider tends to owe a greater duty of care to the user and thus has a greater risk of liability if a trail user is injured due to a condition of the trail.

Recreational Use Statutes (RUS)

The Council of State Governments produced a model recreational use statute (RUS) in 1965 in an effort to encourage private landowners to open their land for public recreational use by limiting the landowner's liability for recreational injuries when access was provided without charge.

Recreational use statutes are now on the books in all 50 states. These state laws provide protection to landowners who allow the public to use their land for recreational purposes. The theory behind these statutes is that if landowners are protected from liability they would be more likely to open up their land for public recreational use and that, in turn, would reduce state expenditures to provide such areas. To recover damages, an injured person must prove "willful and wanton misconduct" on the part of the landowner, essentially the same duty of care owned to a trespasser. However, if the landowner is charging a fee for access to the property, the protection offered by the recreational use statue is lost in most states.

The preamble of the model RUS is clear that it was designed for private landowners

but the actual language of the model legislation does not differentiate between private and public landowners. The result is that while some states have followed the intent of the model statute and limited the immunity to private landowners, other states have extended the immunity either to cover public landowners legislatively or judicially.

Under the Federal Tort Claims Act, the federal government is liable for negligence like a private landowner under the law of the state. As a result, RUS's intended for private individuals have been held applicable to the federal government where it has opened land up for public recreation.

Under lease arrangements between a public agency and a private landowner, land can be provided for public recreation while the public agency agrees to defend and protect the private landowner. The private landowner may still be sued but the public agency holds the landowner harmless, taking responsibilities for the cost of defending a lawsuit and any resulting judgments.

While state RUS's and the court interpretations of these laws vary somewhat, a few common themes can be found. The statues were created to encourage landowners to make their land available for public recreation purposes by limiting their liability provided they do not charge a fee. The RUS limits the duty of care a landowner would otherwise owe to a recreational licensee to keep his or her premises safe for use. It also limits a landowner's duty to warn of dangerous conditions provided such failure to warn is not considered grossly negligent, willful, wanton, or reckless. The result of many of these statues is to limit landowner liability for injuries experienced by people partaking in recreational activities on their land. The existence of a RUS may also have the effect of reducing insurance premiums for landowners whose lands are used for recreation.

These laws do not prevent somebody from suing a trail manager/owner or a private property owner who has made his or her land available to the public for recreational use, it only means the suit will not advance in court if certain conditions hold true. Thus, the trail manager/owner may incur costs to defend himself of herself. Such costs are the principal reason for purchasing liability insurance.

Risk Management

All of the above-mentioned forms of protection aside, perhaps the best defense a trail manager has are sound policy and practice for trail maintenance and usage. Developing a comprehensive technique is the best defense against an injury-related lawsuit.

Trails that are properly designed and maintained go a long way to ward off any potential liability. There are some general design guidelines (AASHTO and MUTCD) that, if adhered to, can provide protection by showing that conventional standards were used in designing and building the trail. Trails that are designed in accordance with recognized standards or "best practices" may be able to take advantage of any design immunities under state law. Within the spectrum of public facilities, trails are quite safe, often less risky than roads, swimming pools and playgrounds.

The managing agency should also develop a comprehensive maintenance plan that provides for regular maintenance and inspection. These procedures should be spelled out in detail in a trail management handbook and a record should be kept of each inspection including what was discovered and any corrective action taken. The trail manager should attempt to ward off or eliminate any hazardous situations before an injury occurs. Private landowners that provide public easements for a trail should ensure that such management plans are in place and used to reduce their own liability. Key points include:

During trail design and development:

- Develop an inventory of potential hazards along the corridor;
- Create a list of users that will be permitted on the trail and the risks associated with each;
- Identify all applicable laws;
- Design and locate the trail such that obvious dangers are avoided. Warnings of potential hazards should be provided, and mitigated to the extent possible;
- Trail design and construction should be completed by persons who are knowledgeable about design guidelines, such as those listed in AASHTO and MUTCD documents;
- Trail regulations should be posted and enforced.

Once the trail is open for use:

- Regular inspections of the trail by a qualified person who has the expertise to identify hazardous conditions and maintenance problems.
- Maintenance problems should be corrected quickly and documented. Where a problem cannot be promptly corrected, warnings to trail users should be erected.
- Procedures for handling medical emergencies should be developed. The procedures should be documented as well as any occurrence of medical emergencies.
- Records should be maintained of all inspections, what was found, and what was done about it. Photographs of found hazardous conditions can be useful.

These risk management techniques will not only help to ensure that hazardous conditions are identified and corrected in a timely manner, thereby averting injury to trail users, but will also serve to protect the trail owner and managing agency from liability. Showing that the agency had been acting in a responsible manner can serve as an excellent defense in the event that a lawsuit develops

Use of Volunteers for Trail Work

Trail mangers often use volunteers for routine trail maintenance or even for trail construction. What happens if the volunteer is injured while performing trail-related work? What happens if an action taken by a volunteer leads to an injury of a trail user? First, make sure your insurance covers volunteer workers. Second, the trail manager should be protected from any user injury created by an act of a volunteer provided the act is not one of willful or reckless misconduct. The Federal Volunteer Protection Act of 1997 protects the volunteer worker. This act protects volunteers of nonprofit organizations or governmental entities. The Act states that such volunteers are not liable for harm caused by their acts of commission or omission provided the acts are in good faith.

Opinion of Probable Costs

Budgetary cost estimates for both design and construction of the proposed Johnson City Rail Trail are provided on the following pages.

A total cost summary for structural improvements is presented first, followed by a similar summary for each segment.

All cost estimates should be considered with the following notes and limitations in mind:

- This "Opinion of Probable Cost" (OPC) should not be considered a guaranteed maximum cost, but instead is a professional opinion of probable construction costs at the time of this study. Costs should be revisited every two years and updated accordingly. It should be anticipated that bids and actual costs will vary from this OPC.
- The "Cost Factor", as utilized, is a percentage of calculated costs, which is added to the subtotal. The Cost Factor helps compensate for unknown elements or conditions, variations in quantities used, and other unforeseen circumstances.
- A separate "Contingency Fund" should be developed above and beyond the total figure in the OPC. This fund will provide for modifications to the design, higher than anticipated costs, and other program alterations after construction initiation.

PRELIMINARY PROBABLE COST OF CONSTRUCTION

Aug-12

PROJECT NAME - Johnson City Rail Trail
SECTION 1
Project Summary

NO.	ITEM	QTY.	UNIT	COST	EXTENSION
A.	**EARTHWORK, DEMOLITION, CLEARING + EROSION CONTROL**				
1	Clearing + Grubbing (includes litter and vandalism removal)	3,485	LF	$3.00	$10,455.00
2	Silt Fence (Each Side)	6,970	LF	$3.00	$20,910.00
3	Fine Grading (0-5 cu ft/lf)	3,485	LF	$4.28	$14,915.80
4	Construction Entrance	1	EA	$3,000.00	$3,000.00
5	Bank Stabilization	750	LF	$4.28	$3,210.00
6	Hydroseeding	3,485	LF	$0.32	$1,115.20
	Total Earthwork, Demolition, Clearing + Erosion Control				***$53,606.00***
B	**GENERAL CONSTRUCTION**				
7	6" Base Course (Where Required)	800	LF	$13.33	$10,664.00
8	4-'0" high Black 3-board Fence	0	LF	$25.00	$0.00
11	6'-0" high opaque fencing	214	LF	$20.00	$4,280.00
12	4'-0" high evergreen vegetative screening	0	LF	$50.00	$0.00
13	Retaining Walls	0	SFF	$45.00	$0.00
14	Curb and Gutter	0	LF	$12.00	$0.00
	Total General Construction				***$14,944.00***
C.	**STRUCTURES AND SPECIAL FEATURES**				
15	Lighting and Wiring of Overpasses and Underpasses	4	LS	$22,000.00	$88,000.00
16	Rehabilitation of Existing Structures (see separate costing information for structures)	1	LS	$473,350.00	$473,350.00
18	Gateways	1	EA	$1,180.00	$1,180.00
19	Overlook on Bridge	1	EA	$21,000.00	$21,000.00
20	Interpretive Signage	3	EA	$1,800.00	$5,400.00
21	Kiosks	1	EA	$2,500.00	$2,500.00
22	Mile Markers	6	EA	$325.00	$1,950.00
23	Tree Planting	0	EA	$500.00	$0.00
24	Raised Planters/Bollards	0	EA	$25.00	$0.00
	Trash/Recycle Receptacles	1	EA	$350.00	$350.00
	Benches	1	EA	$450.00	$450.00
	Total Structures and Special Features				***$594,180.00***
D.	**SAFETY TREATMENTS**				
26	Detectable Warning Mat	4	EA	$175.00	$700.00
27	Signage (Traffic Control, Directional)	12	EA	$250.00	$3,000.00
28	Bank Stabilization	0	LF	$40.00	$0.00
29	Intersection Treatment (Unsignalized Crossing with curb ramp, curb improvements and crosswalk	4	EA	$5,525.00	$22,100.00
30	Intersection Treatment (Signalized Crossing - Countdown Signal Only)	0	EA	$10,020.00	$0.00
31	Raised Crosswalk	0	EA	$7,000.00	$0.00
32	Intersection Treatment (Signalized Crossing - HAWK)	1	EA	$52,500.00	$52,500.00
33	Black wrought iron fencing along steep slopes	0	LF	$90.00	$0.00
	Total Safety Treatments				***$78,300.00***

SUBTOTAL ALL AREAS		$741,030.00
COST FACTOR	20% Contingency	$148,206.00
GRAND TOTAL ALL AREAS		$889,236.00

SUMMARY OF PROBABLE COSTS

	CATEGORY	% OF TOTAL	TOTAL
A.	**Earthwork, Demolition, Clearing + Erosion Control**	**6%**	**$53,606.00**
B.	**General Construction**	**2%**	**$14,944.00**
C.	**Bridges and Special Features**	**67%**	**$594,180.00**
D.	**Safety Treatments**	**9%**	**$78,300.00**
E.	**Trailheads and Waysides**	**0%**	**$0.00**
	COST FACTOR	**17%**	**$148,206.00**
	GRAND TOTAL ALL AREAS	**100%**	**$889,236.00**

PRELIMINARY PROBABLE COST OF CONSTRUCTION

Aug-12

PROJECT NAME - Johnson City Rail Trail

SECTION 2
Project Summary

NO.	ITEM	QTY.	UNIT	COST	EXTENSION
A.	**EARTHWORK, DEMOLITION, CLEARING + EROSION CONTROL**				
1	Clearing + Grubbing (includes litter and vandalism removal)	3,855	LF	$3.00	$11,565.00
2	Silt Fence (Each Side)	7,710	LF	$3.00	$23,130.00
3	Fine Grading (0-5 cu ft/lf)	3,855	LF	$4.28	$16,499.40
4	Construction Entrance	0	EA	$3,000.00	$0.00
5	Bank Stabilization	0	LF	$4.28	$0.00
6	Hydroseeding	3,855	LF	$0.32	$1,233.60
	Total Earthwork, Demolition, Clearing + Erosion Control				***$52,428.00***
B	**GENERAL CONSTRUCTION**				
7	6" Base Course (Where Required)	1,200	LF	$13.33	$15,996.00
8	4-'0" high Black 3-board Fence	0	LF	$25.00	$0.00
11	6'-0" high opaque fencing	238	LF	$20.00	$4,760.00
12	4'-0" high evergreen vegetative screening	2,947	LF	$50.00	$147,350.00
13	Retaining Walls	0	SFF	$45.00	$0.00
14	Curb and Gutter	0	LF	$12.00	$0.00
	Total General Construction				***$168,106.00***
C.	**STRUCTURES AND SPECIAL FEATURES**				
15	Lighting and Wiring of Underpasses	0	LS	$11,000.00	$0.00
16	Rehabilitation of Existing Structures (see separate costing information for structures)	1	LS	$48,000.00	$48,000.00
18	Gateways	0	EA	$1,180.00	$0.00
19	Overlook on Bridge	0	EA	$21,000.00	$0.00
20	Interpretive Signage	0	EA	$1,800.00	$0.00
21	Kiosks	0	EA	$2,500.00	$0.00
22	Mile Markers	6	EA	$325.00	$1,950.00
23	Tree Planting	0	EA	$500.00	$0.00
24	Raised Planters/Bollards	0	EA	$25.00	$0.00
	Trash/Recycle Receptacles	0	EA	$350.00	$0.00
	Benches	0	EA	$450.00	$0.00
	Total Structures and Special Features				***$49,950.00***
D.	**SAFETY TREATMENTS**				
26	Detectable Warning Mat	4	EA	$175.00	$700.00
27	Signage (Traffic Control, Directional)	4	EA	$250.00	$1,000.00
28	Retaining Wall	0	LF	$40.00	$0.00
29	Intersection Treatment (Unsignalized Crossing with curb ramp, curb improvements and crosswalk)	1	EA	$5,525.00	$5,525.00
30	Intersection Treatment 2 (Signalized Crossing - Countdown Signal Only)	0	EA	$10,020.00	$0.00
31	Raised Crosswalk	0	EA	$7,000.00	$0.00
32	Intersection Treatment 2 (Signalized Crossing - HAWK)	0	EA	$52,500.00	$0.00
33	Black wrought iron fencing along steep slopes	0	LF	$90.00	$0.00
	Total Safety Treatments				***$7,225.00***

SUBTOTAL ALL AREAS		$277,709.00
COST FACTOR	20% Contingency	$55,541.80
GRAND TOTAL ALL AREAS		$333,250.80

SUMMARY OF PROBABLE COSTS

	CATEGORY	% OF TOTAL	TOTAL
A.	**Earthwork, Demolition, Clearing + Erosion Control**	**16%**	**$52,428.00**
B.	**General Construction**	**50%**	**$168,106.00**
C.	**Bridges and Special Features**	**15%**	**$49,950.00**
D.	**Safety Treatments**	**2%**	**$7,225.00**
E.	**Trailheads and Waysides**	**0%**	**$0.00**
	COST FACTOR	**17%**	**$55,541.80**
	GRAND TOTAL ALL AREAS	**100%**	**$333,250.80**

PRELIMINARY PROBABLE COST OF CONSTRUCTION

Aug-12

PROJECT NAME - Johnson City Rail Trail
SECTION 3
Project Summary

NO.	ITEM	QTY.	UNIT	COST	EXTENSION
A.	**EARTHWORK, DEMOLITION, CLEARING + EROSION CONTROL**				
1	Clearing + Grubbing (includes litter and vandalism removal)	3,855	LF	$3.00	$11,565.00
2	Silt Fence (Each Side)	7,710	LF	$3.00	$23,130.00
3	Fine Grading (0-5 cu ft/lf)	3,855	LF	$4.28	$16,499.40
4	Construction Entrance	0	EA	$3,000.00	$0.00
5	Bank Stabilization	949	LF	$4.28	$4,061.72
6	Hydroseeding	3,855	LF	$0.32	$1,233.60
	Total Earthwork, Demolition, Clearing + Erosion Control				***$56,489.72***
B	**GENERAL CONSTRUCTION**				
7	6" Base Course (Where Required)	1,200	LF	$13.33	$15,996.00
8	4-'0" high Black 3-board Fence	0	LF	$25.00	$0.00
11	6'-0" high opaque fencing	1,038	LF	$20.00	$20,760.00
12	4'-0" high evergreen vegetative screening	0	LF	$50.00	$0.00
13	Retaining Walls	0	SFF	$45.00	$0.00
14	Curb and Gutter	0	LF	$12.00	$0.00
	Total General Construction				***$36,756.00***
C.	**STRUCTURES AND SPECIAL FEATURES**				
15	Lighting and Wiring of Underpasses	0	LS	$11,000.00	$0.00
16	Rehabilitation of Existing Structures (see separate costing information for structures)	1	LS	$750,000.00	$750,000.00
18	Gateways	2	EA	$1,180.00	$2,360.00
19	Overlook on Bridge	0	EA	$21,000.00	$0.00
20	Interpretive Signage	0	EA	$1,800.00	$0.00
21	Kiosks	0	EA	$2,500.00	$0.00
22	Mile Markers	6	EA	$325.00	$1,950.00
23	Tree Planting	0	EA	$500.00	$0.00
24	Raised Planters/Bollards	0	EA	$25.00	$0.00
	Trash/Recycle Receptacles	0	EA	$350.00	$0.00
	Benches	0	EA	$450.00	$0.00
	Total Structures and Special Features				***$754,310.00***
D.	**SAFETY TREATMENTS**				
26	Detectable Warning Mat	8	EA	$175.00	$1,400.00
27	Signage (Traffic Control, Directional)	10	EA	$250.00	$2,500.00
28	Bank Stabilization	0	LF	$40.00	$0.00
29	Intersection Treatment (Unsignalized Crossing with curb ramp, curb improvements and crosswalk)	3	EA	$5,525.00	$16,575.00
30	Intersection Treatment 2 (Signalized Crossing - Countdown Signal Only)	0	EA	$10,020.00	$0.00
31	Raised Crosswalk	0	EA	$7,000.00	$0.00
32	Intersection Treatment 2 (Signalized Crossing - HAWK)	0	EA	$52,500.00	$0.00
33	Black wrought iron fencing along steep slopes	0	LF	$90.00	$0.00
	Total Safety Treatments				***$20,475.00***

SUBTOTAL ALL AREAS		$868,030.72
COST FACTOR	20% Contingency	$173,606.14
GRAND TOTAL ALL AREAS		$1,041,636.86

SUMMARY OF PROBABLE COSTS

	CATEGORY	% OF TOTAL	TOTAL
A.	**Earthwork, Demolition, Clearing + Erosion Control**	**5%**	**$56,489.72**
B.	**General Construction**	**4%**	**$36,756.00**
C.	**Bridges and Special Features**	**72%**	**$754,310.00**
D.	**Safety Treatments**	**2%**	**$20,475.00**
E.	**Trailheads and Waysides**	**0%**	**$0.00**
	COST FACTOR	**17%**	**$173,606.14**
	GRAND TOTAL ALL AREAS	**100%**	**$1,041,636.86**

PRELIMINARY PROBABLE COST OF CONSTRUCTION

Aug-12

PROJECT NAME - Johnson City Rail Trail
SECTION 4
Project Summary

NO.	ITEM	QTY.	UNIT	COST	EXTENSION
A.	**EARTHWORK, DEMOLITION, CLEARING + EROSION CONTROL**				
1	Clearing + Grubbing (includes litter and vandalism removal)	4,225	LF	$3.00	$12,675.00
2	Silt Fence (Each Side)	8,000	LF	$3.00	$24,000.00
3	Fine Grading (0-5 cu ft/lf)	4,225	LF	$4.28	$18,083.00
4	Construction Entrance	0	EA	$3,000.00	$0.00
5	Bank Stabilization	0	LF	$4.28	$0.00
6	Hydroseeding	4,225	LF	$0.32	$1,352.00
	Total Earthwork, Demolition, Clearing + Erosion Control				***$56,110.00***
B	**GENERAL CONSTRUCTION**				
7	6" Base Course (Where Required)	2,300	LF	$13.33	$30,659.00
8	4-'0" high Black 3-board Fence	1,056	LF	$25.00	$26,400.00
11	6'-0" high opaque fencing	0	LF	$20.00	$0.00
12	4'-0" high evergreen vegetative screening	0	LF	$50.00	$0.00
13	Retaining Walls	0	SFF	$45.00	$0.00
14	Curb and Gutter	0	LF	$12.00	$0.00
	Total General Construction				***$57,059.00***
C.	**STRUCTURES AND SPECIAL FEATURES**				
15	Lighting and Wiring of Underpasses	0	LS	$11,000.00	$0.00
16	Rehabilitation of Existing Structures (see separate costing information for structures)	1	LS	$1,350.00	$1,350.00
18	Gateways	1	EA	$1,180.00	$1,180.00
19	Overlook on Bridge	0	EA	$21,000.00	$0.00
20	Interpretive Signage	1	EA	$1,800.00	$1,800.00
21	Kiosks	0	EA	$2,500.00	$0.00
22	Mile Markers	6	EA	$325.00	$1,950.00
23	Tree Planting	0	EA	$500.00	$0.00
24	Raised Planters/Bollards	0	EA	$25.00	$0.00
	Trash/Recycle Receptacles	1	EA	$350.00	$350.00
	Benches	1	EA	$450.00	$450.00
	Total Structures and Special Features				***$7,080.00***
D.	**SAFETY TREATMENTS**				
26	Detectable Warning Mat	2	EA	$175.00	$350.00
27	Signage (Traffic Control, Directional)	2	EA	$250.00	$500.00
28	Retaining Wall	0	LF	$40.00	$0.00
29	Intersection Treatment (Unsignalized Crossing with curb ramp, curb improvements and crosswalk)	2	EA	$5,525.00	$11,050.00
30	Intersection Treatment 2 (Signalized Crossing - Countdown Signal Only)	0	EA	$10,020.00	$0.00
31	Raised Crosswalk	0	EA	$7,000.00	$0.00
32	Intersection Treatment 2 (Signalized Crossing - HAWK)	0	EA	$52,500.00	$0.00
33	Black wrought iron fencing along steep slopes	0	LF	$90.00	$0.00
	Total Safety Treatments				***$11,900.00***

SUBTOTAL ALL AREAS		$132,149.00
COST FACTOR	20% Contingency	$26,429.80
GRAND TOTAL ALL AREAS		$158,578.80

SUMMARY OF PROBABLE COSTS

	CATEGORY	% OF TOTAL	TOTAL
A.	**Earthwork, Demolition, Clearing + Erosion Control**	**35%**	**$56,110.00**
B.	**General Construction**	**36%**	**$57,059.00**
C.	**Bridges and Special Features**	**4%**	**$7,080.00**
D.	**Safety Treatments**	**8%**	**$11,900.00**
E.	**Trailheads and Waysides**	**0%**	**$0.00**
	COST FACTOR	**17%**	**$26,429.80**
	GRAND TOTAL ALL AREAS	**100%**	**$158,578.80**

PRELIMINARY PROBABLE COST OF CONSTRUCTION

Aug-12

PROJECT NAME - Johnson City Rail Trail
SECTION 5
Project Summary

NO.	ITEM	QTY.	UNIT	COST	EXTENSION
A.	**EARTHWORK, DEMOLITION, CLEARING + EROSION CONTROL**				
1	Clearing + Grubbing (includes litter and vandalism removal)	4,435	LF	$3.00	$13,305.00
2	Silt Fence (Each Side)	8,800	LF	$3.00	$26,400.00
3	Fine Grading (0-5 cu ft/lf)	4,435	LF	$4.28	$18,981.80
4	Construction Entrance	1	EA	$3,000.00	$3,000.00
5	Bank Stabilization	0	LF	$4.28	$0.00
6	Hydroseeding	4,435	LF	$0.32	$1,419.20
	Total Earthwork, Demolition, Clearing + Erosion Control				***$63,106.00***
B	**GENERAL CONSTRUCTION**				
7	6" Base Course (Where Required)	2,000	LF	$13.33	$26,660.00
8	4-'0" high Black 3-board Fence	0	LF	$25.00	$0.00
11	6'-0" high opaque fencing	0	LF	$20.00	$0.00
12	4'-0" high evergreen vegetative screening	0	LF	$50.00	$0.00
13	Retaining Walls	0	SFF	$45.00	$0.00
14	Curb and Gutter	0	LF	$12.00	$0.00
	Total General Construction				***$26,660.00***
C.	**STRUCTURES AND SPECIAL FEATURES**				
15	Lighting and Wiring of Underpasses	1	LS	$11,000.00	$11,000.00
16	Rehabilitation of Existing Structures (see separate costing information for structures)	1	LS	$96,000.00	$96,000.00
18	Gateways	0	EA	$1,180.00	$0.00
19	Overlook on Bridge	0	EA	$21,000.00	$0.00
20	Interpretive Signage	1	EA	$1,800.00	$1,800.00
21	Kiosks	1	EA	$2,500.00	$2,500.00
22	Mile Markers	6	EA	$325.00	$1,950.00
23	Tree Planting	0	EA	$500.00	$0.00
24	Raised Planters/Bollards	0	EA	$25.00	$0.00
	Trash/Recycle Receptacles	0	EA	$350.00	$0.00
	Benches	0	EA	$450.00	$0.00
	Total Structures and Special Features				***$113,250.00***
D.	**SAFETY TREATMENTS**				
26	Detectable Warning Mat	4	EA	$175.00	$700.00
27	Signage (Traffic Control, Directional)	6	EA	$250.00	$1,500.00
28	Retaining Wall	0	LF	$40.00	$0.00
29	Intersection Treatment (Unsignalized Crossing with curb ramp, curb improvements and crosswalk)	2	EA	$5,525.00	$11,050.00
30	Intersection Treatment 2 (Signalized Crossing - Countdown Signal Only)	0	EA	$10,020.00	$0.00
31	Raised Crosswalk	0	EA	$7,000.00	$0.00
32	Intersection Treatment 2 (Signalized Crossing - HAWK)	0	EA	$52,500.00	$0.00
33	Black wrought iron fencing along steep slopes	0	LF	$90.00	$0.00
	Total Safety Treatments				***$13,250.00***

SUBTOTAL ALL AREAS		$216,266.00
COST FACTOR	20% Contingency	$43,253.20
GRAND TOTAL ALL AREAS		$259,519.20

SUMMARY OF PROBABLE COSTS

	CATEGORY	% OF TOTAL	TOTAL
A.	**Earthwork, Demolition, Clearing + Erosion Control**	**24%**	**$63,106.00**
B.	**General Construction**	**10%**	**$26,660.00**
C.	**Bridges and Special Features**	**44%**	**$113,250.00**
D.	**Safety Treatments**	**5%**	**$13,250.00**
E.	**Trailheads and Waysides**	**0%**	**$0.00**
	COST FACTOR	**17%**	**$43,253.20**
	GRAND TOTAL ALL AREAS	**100%**	**$259,519.20**

PRELIMINARY PROBABLE COST OF CONSTRUCTION

Aug-12

PROJECT NAME - Johnson City Rail Trail
SECTION 6 - doesn't include spur to Smokehouse
Project Summary

NO.	ITEM	QTY.	UNIT	COST	EXTENSION
A.	**EARTHWORK, DEMOLITION, CLEARING + EROSION CONTROL**				
1	Clearing + Grubbing (includes litter and vandalism removal)	3,695	LF	$3.00	$11,085.00
2	Silt Fence (Each Side)	7,500	LF	$3.00	$22,500.00
3	Fine Grading (0-5 cu ft/lf)	3,695	LF	$4.28	$15,814.60
4	Construction Entrance	0	EA	$3,000.00	$0.00
5	Bank Stabilization	0	LF	$4.28	$0.00
6	Hydroseeding	3,695	LF	$0.32	$1,182.40
	Total Earthwork, Demolition, Clearing + Erosion Control				***$50,582.00***
B	**GENERAL CONSTRUCTION**				
7	6" Base Course (Where Required)	1,700	LF	$13.33	$22,661.00
8	4-'0" high Black 3-board Fence	0	LF	$25.00	$0.00
11	6'-0" high opaque fencing	0	LF	$20.00	$0.00
12	4'-0" high evergreen vegetative screening	0	LF	$50.00	$0.00
13	Retaining Walls	0	SFF	$45.00	$0.00
14	Curb and Gutter	0	LF	$12.00	$0.00
	Total General Construction				***$22,661.00***
C.	**STRUCTURES AND SPECIAL FEATURES**				
15	Lighting and Wiring of Underpasses	0	LS	$11,000.00	$0.00
16	Rehabilitation of Existing Structures (see separate costing information for structures)	2	LS	$11,550.00	$23,100.00
18	Gateways	1	EA	$1,180.00	$1,180.00
19	Overlook at Buffalo Creek	1	EA	$45,000.00	$45,000.00
20	Interpretive Signage	0	EA	$1,800.00	$0.00
21	Kiosks	0	EA	$2,500.00	$0.00
22	Mile Markers	6	EA	$325.00	$1,950.00
23	Tree Planting	0	EA	$500.00	$0.00
24	Raised Planters/Bollards	0	EA	$25.00	$0.00
	Trash/Recycle Receptacles	0	EA	$350.00	$0.00
	Benches	0	EA	$450.00	$0.00
	Total Structures and Special Features				***$71,230.00***
D.	**SAFETY TREATMENTS**				
26	Detectable Warning Mat	0	EA	$175.00	$0.00
27	Signage (Traffic Control, Directional)	2	EA	$250.00	$500.00
28	Retaining Wall	0	LF	$40.00	$0.00
29	Intersection Treatment (Unsignalized Crossing with curb ramp, curb improvements and crosswalk)	2	EA	$5,525.00	$11,050.00
30	Intersection Treatment 2 (Signalized Crossing - Countdown Signal Only)	0	EA	$10,020.00	$0.00
31	Raised Crosswalk	0	EA	$7,000.00	$0.00
32	Intersection Treatment 2 (Signalized Crossing - HAWK)	0	EA	$52,500.00	$0.00
33	Black wrought iron fencing along steep slopes	0	LF	$90.00	$0.00
	Total Safety Treatments				***$11,550.00***

SUBTOTAL ALL AREAS		$156,023.00
COST FACTOR	20% Contingency	$31,204.60
GRAND TOTAL ALL AREAS		$187,227.60

SUMMARY OF PROBABLE COSTS

	CATEGORY	% OF TOTAL	TOTAL
A.	**Earthwork, Demolition, Clearing + Erosion Control**	**27%**	**$50,582.00**
B.	**General Construction**	**12%**	**$22,661.00**
C.	**Bridges and Special Features**	**38%**	**$71,230.00**
D.	**Safety Treatments**	**6%**	**$11,550.00**
E.	**Trailheads and Waysides**	**0%**	**$0.00**
	COST FACTOR	**17%**	**$31,204.60**
	GRAND TOTAL ALL AREAS	**100%**	**$187,227.60**

PRELIMINARY PROBABLE COST OF CONSTRUCTION

Aug-12

PROJECT NAME - Johnson City Rail Trail
SECTION 7 - does not include spur to Lyon's Field
Project Summary

NO.	ITEM	QTY.	UNIT	COST	EXTENSION
A.	**EARTHWORK, DEMOLITION, CLEARING + EROSION CONTROL**				
1	Clearing + Grubbing (includes litter and vandalism removal)	3,590	LF	$3.00	$10,770.00
2	Silt Fence (Each Side)	7,000	LF	$3.00	$21,000.00
3	Fine Grading (0-5 cu ft/lf)	3,590	LF	$4.28	$15,365.20
4	Construction Entrance	1	EA	$3,000.00	$3,000.00
5	Bank Stabilization	0	LF	$4.28	$0.00
6	Hydroseeding	3,590	LF	$0.32	$1,148.80
	Total Earthwork, Demolition, Clearing + Erosion Control				***$51,284.00***
B	**GENERAL CONSTRUCTION**				
7	6" Base Course (Where Required)	1,800	LF	$13.33	$23,994.00
8	4-'0" high Black 3-board Fence	0	LF	$25.00	$0.00
11	6'-0" high opaque fencing	0	LF	$20.00	$0.00
12	4'-0" high evergreen vegetative screening	1,507	LF	$50.00	$75,350.00
13	Retaining Walls	0	SFF	$45.00	$0.00
14	Curb and Gutter	0	LF	$12.00	$0.00
	Total General Construction				***$99,344.00***
C.	**STRUCTURES AND SPECIAL FEATURES**				
15	Lighting and Wiring of Underpasses	1	LS	$11,000.00	$11,000.00
16	Rehabilitation of Existing Structures (see separate costing information for structures)	1	LS	$128,000.00	$128,000.00
18	Gateways	1	EA	$1,180.00	$1,180.00
19	Overlook	0	EA	$45,000.00	$0.00
20	Interpretive Signage	0	EA	$1,800.00	$0.00
21	Kiosks	0	EA	$2,500.00	$0.00
22	Mile Markers	6	EA	$325.00	$1,950.00
23	Tree Planting	0	EA	$500.00	$0.00
24	Raised Planters/Bollards	0	EA	$25.00	$0.00
	Trash/Recycle Receptacles	1	EA	$350.00	$350.00
	Benches	1	EA	$450.00	$450.00
	Total Structures and Special Features				***$142,930.00***
D.	**SAFETY TREATMENTS**				
26	Detectable Warning Mat	4	EA	$175.00	$700.00
27	Signage (Traffic Control, Directional)	8	EA	$250.00	$2,000.00
28	Retaining Wall	0	LF	$40.00	$0.00
29	Intersection Treatment (Unsignalized Crossing with curb ramp, curb improvements and crosswalk)	2	EA	$5,525.00	$11,050.00
30	Intersection Treatment 2 (Signalized Crossing - Countdown Signal Only)	0	EA	$10,020.00	$0.00
31	Raised Crosswalk	0	EA	$7,000.00	$0.00
32	Intersection Treatment 2 (Signalized Crossing - HAWK)	0	EA	$52,500.00	$0.00
33	Black wrought iron fencing along steep slopes	0	LF	$90.00	$0.00
	Total Safety Treatments				***$13,750.00***

SUBTOTAL ALL AREAS		$307,308.00
COST FACTOR	20% Contingency	$61,461.60
GRAND TOTAL ALL AREAS		$368,769.60

SUMMARY OF PROBABLE COSTS

	CATEGORY	% OF TOTAL	TOTAL
A.	**Earthwork, Demolition, Clearing + Erosion Control**	**14%**	**$51,284.00**
B.	**General Construction**	**27%**	**$99,344.00**
C.	**Bridges and Special Features**	**39%**	**$142,930.00**
D.	**Safety Treatments**	**4%**	**$13,750.00**
E.	**Trailheads and Waysides**	**0%**	**$0.00**
	COST FACTOR	**17%**	**$61,461.60**
	GRAND TOTAL ALL AREAS	**100%**	**$368,769.60**

PRELIMINARY PROBABLE COST OF CONSTRUCTION

Aug-12

PROJECT NAME - Johnson City Rail Trail
SECTION 8 (does not include spurs)
Project Summary

NO.	ITEM	QTY.	UNIT	COST	EXTENSION
A.	**EARTHWORK, DEMOLITION, CLEARING + EROSION CONTROL**				
1	Clearing + Grubbing (includes litter and vandalism removal)	3,380	LF	$3.00	$10,140.00
2	Silt Fence (Each Side)	6,600	LF	$3.00	$19,800.00
3	Fine Grading (0-5 cu ft/lf)	3,380	LF	$4.28	$14,466.40
4	Construction Entrance	1	EA	$3,000.00	$3,000.00
5	Bank Stabilization	0	LF	$4.28	$0.00
6	Hydroseeding	3,380	LF	$0.32	$1,081.60
	Total Earthwork, Demolition, Clearing + Erosion Control				***$48,488.00***
B	**GENERAL CONSTRUCTION**				
7	6" Base Course (Where Required)	1,500	LF	$13.33	$19,995.00
8	4-'0" high Black 3-board Fence	0	LF	$25.00	$0.00
11	6'-0" high opaque fencing	0	LF	$20.00	$0.00
12	4'-0" high evergreen vegetative screening	1,345	LF	$50.00	$67,250.00
13	Retaining Walls	0	SFF	$45.00	$0.00
14	Curb and Gutter	0	LF	$12.00	$0.00
	Total General Construction				***$87,245.00***
C.	**STRUCTURES AND SPECIAL FEATURES**				
15	Lighting and Wiring of Underpasses	0	LS	$11,000.00	$0.00
16	Rehabilitation of Existing Structures (see separate costing information for structures)	0	LF	$1,350.00	$0.00
18	Gateways	0	EA	$1,180.00	$0.00
19	Overlook	0	EA	$45,000.00	$0.00
20	Interpretive Signage	0	EA	$1,800.00	$0.00
21	Kiosks	0	EA	$2,500.00	$0.00
22	Mile Markers	4	EA	$325.00	$1,300.00
23	Tree Planting	0	EA	$500.00	$0.00
24	Enhanced Shrub Layer	1,340	LF	$50.00	$67,000.00
	Trash/Recycle Receptacles	0	EA	$350.00	$0.00
	Benches	0	EA	$450.00	$0.00
	Total Structures and Special Features				***$68,300.00***
D.	**SAFETY TREATMENTS**				
26	Detectable Warning Mat	4	EA	$175.00	$700.00
27	Signage (Traffic Control, Directional)	6	EA	$250.00	$1,500.00
28	Retaining Wall	0	LF	$40.00	$0.00
29	Intersection Treatment (Unsignalized Crossing with curb ramp, curb improvements and crosswalk)	2	EA	$5,525.00	$11,050.00
30	Intersection Treatment 2 (Signalized Crossing - Countdown Signal Only)	0	EA	$10,020.00	$0.00
31	Raised Crosswalk	0	EA	$7,000.00	$0.00
32	Intersection Treatment 2 (Signalized Crossing - HAWK)	0	EA	$52,500.00	$0.00
33	Black wrought iron fencing along steep slopes	0	LF	$90.00	$0.00
	Total Safety Treatments				***$13,250.00***

SUBTOTAL ALL AREAS		$217,283.00
COST FACTOR	20% Contingency	$43,456.60
GRAND TOTAL ALL AREAS		$260,739.60

SUMMARY OF PROBABLE COSTS

	CATEGORY	% OF TOTAL	TOTAL
A.	**Earthwork, Demolition, Clearing + Erosion Control**	**19%**	**$48,488.00**
B.	**General Construction**	**33%**	**$87,245.00**
C.	**Bridges and Special Features**	**26%**	**$68,300.00**
D.	**Safety Treatments**	**5%**	**$13,250.00**
E.	**Trailheads and Waysides**	**0%**	**$0.00**
	COST FACTOR	**17%**	**$43,456.60**
	GRAND TOTAL ALL AREAS	**100%**	**$260,739.60**

PRELIMINARY PROBABLE COST OF CONSTRUCTION

Aug-12

PROJECT NAME - Johnson City Rail Trail
SECTION 8 (does not include spurs)
Project Summary

NO.	ITEM	QTY.	UNIT	COST	EXTENSION
A.	**EARTHWORK, DEMOLITION, CLEARING + EROSION CONTROL**				
1	Clearing + Grubbing (includes litter and vandalism removal)	3,380	LF	$3.00	$10,140.00
2	Silt Fence (Each Side)	6,600	LF	$3.00	$19,800.00
3	Fine Grading (0-5 cu ft/lf)	3,380	LF	$4.28	$14,466.40
4	Construction Entrance	1	EA	$3,000.00	$3,000.00
5	Bank Stabilization	0	LF	$4.28	$0.00
6	Hydroseeding	3,380	LF	$0.32	$1,081.60
	Total Earthwork, Demolition, Clearing + Erosion Control				***$48,488.00***
B	**GENERAL CONSTRUCTION**				
7	6" Base Course (Where Required)	1,500	LF	$13.33	$19,995.00
8	4-'0" high Black 3-board Fence	0	LF	$25.00	$0.00
11	6'-0" high opaque fencing	0	LF	$20.00	$0.00
12	4'-0" high evergreen vegetative screening	1,345	LF	$50.00	$67,250.00
13	Retaining Walls	0	SFF	$45.00	$0.00
14	Curb and Gutter	0	LF	$12.00	$0.00
	Total General Construction				***$87,245.00***
C.	**STRUCTURES AND SPECIAL FEATURES**				
15	Lighting and Wiring of Underpasses	0	LS	$11,000.00	$0.00
16	Rehabilitation of Existing Structures (see separate costing information for structures)	0	LF	$1,350.00	$0.00
18	Gateways	0	EA	$1,180.00	$0.00
19	Overlook	0	EA	$45,000.00	$0.00
20	Interpretive Signage	0	EA	$1,800.00	$0.00
21	Kiosks	0	EA	$2,500.00	$0.00
22	Mile Markers	4	EA	$325.00	$1,300.00
23	Tree Planting	0	EA	$500.00	$0.00
24	Enhanced Shrub Layer	1,340	LF	$50.00	$67,000.00
	Trash/Recycle Receptacles	0	EA	$350.00	$0.00
	Benches	0	EA	$450.00	$0.00
	Total Structures and Special Features				***$68,300.00***
D.	**SAFETY TREATMENTS**				
26	Detectable Warning Mat	4	EA	$175.00	$700.00
27	Signage (Traffic Control, Directional)	6	EA	$250.00	$1,500.00
28	Retaining Wall	0	LF	$40.00	$0.00
29	Intersection Treatment (Unsignalized Crossing with curb ramp, curb improvements and crosswalk)	2	EA	$5,525.00	$11,050.00
30	Intersection Treatment 2 (Signalized Crossing - Countdown Signal Only)	0	EA	$10,020.00	$0.00
31	Raised Crosswalk	0	EA	$7,000.00	$0.00
32	Intersection Treatment 2 (Signalized Crossing - HAWK)	0	EA	$52,500.00	$0.00
33	Black wrought iron fencing along steep slopes	0	LF	$90.00	$0.00
	Total Safety Treatments				***$13,250.00***

SUBTOTAL ALL AREAS		$217,283.00
COST FACTOR	20% Contingency	$43,456.60
GRAND TOTAL ALL AREAS		$260,739.60

SUMMARY OF PROBABLE COSTS

	CATEGORY	% OF TOTAL	TOTAL
A.	**Earthwork, Demolition, Clearing + Erosion Control**	**19%**	**$48,488.00**
B.	**General Construction**	**33%**	**$87,245.00**
C.	**Bridges and Special Features**	**26%**	**$68,300.00**
D.	**Safety Treatments**	**5%**	**$13,250.00**
E.	**Trailheads and Waysides**	**0%**	**$0.00**
	COST FACTOR	**17%**	**$43,456.60**
	GRAND TOTAL ALL AREAS	**100%**	**$260,739.60**

PRELIMINARY PROBABLE COST OF CONSTRUCTION

Aug-12

PROJECT NAME - Johnson City Rail Trail
SECTION 9 (does not include spur to Syc Shoals or Dixon St TH)
Project Summary

NO.	ITEM	QTY.	UNIT	COST	EXTENSION
A.	**EARTHWORK, DEMOLITION, CLEARING + EROSION CONTROL**				
1	Clearing + Grubbing (includes litter and vandalism removal)	4,383	LF	$3.00	$13,149.00
2	Silt Fence (Each Side)	8,200	LF	$3.00	$24,600.00
3	Fine Grading (0-5 cu ft/lf)	4,383	LF	$4.28	$18,759.24
4	Construction Entrance	0	EA	$3,000.00	$0.00
5	Bank Stabilization	0	LF	$4.28	$0.00
6	Hydroseeding	4,383	LF	$0.32	$1,402.56
	Total Earthwork, Demolition, Clearing + Erosion Control				***$57,910.80***
B	**GENERAL CONSTRUCTION**				
7	6" Base Course (Where Required)	2,000	LF	$13.33	$26,660.00
8	4-'0" high Black 3-board Fence	0	LF	$25.00	$0.00
11	6'-0" high opaque fencing	0	LF	$20.00	$0.00
12	4'-0" high evergreen vegetative screening	0	LF	$50.00	$0.00
13	Retaining Walls	0	SFF	$45.00	$0.00
14	Curb and Gutter	0	LF	$12.00	$0.00
	Total General Construction				***$26,660.00***
C.	**STRUCTURES AND SPECIAL FEATURES**				
15	Lighting and Wiring of Underpasses	0	LS	$11,000.00	$0.00
16	Rehabilitation of Existing Structures (see separate costing information for structures)	0	LF	$1,350.00	$0.00
18	Gateways	0	EA	$1,180.00	$0.00
19	Overlook	0	EA	$45,000.00	$0.00
20	Interpretive Signage	0	EA	$1,800.00	$0.00
21	Kiosks	0	EA	$2,500.00	$0.00
22	Mile Markers	6	EA	$325.00	$1,950.00
23	Tree Planting	120	EA	$500.00	$60,000.00
24	Enhanced Shrub Layer	1,200	LF	$50.00	$60,000.00
	Trash/Recycle Receptacles	0	EA	$350.00	$0.00
	Benches	0	EA	$450.00	$0.00
	Total Structures and Special Features				***$121,950.00***
D.	**SAFETY TREATMENTS**				
26	Detectable Warning Mat	8	EA	$175.00	$1,400.00
27	Signage (Traffic Control, Directional)	4	EA	$250.00	$1,000.00
28	Retaining Wall	0	LF	$40.00	$0.00
29	Intersection Treatment (Unsignalized Crossing with curb ramp, curb improvements and crosswalk)	4	EA	$5,525.00	$22,100.00
30	Intersection Treatment 2 (Signalized Crossing - Countdown Signal Only)	0	EA	$10,020.00	$0.00
31	Raised Crosswalk	0	EA	$7,000.00	$0.00
32	Intersection Treatment 2 (Signalized Crossing - HAWK)	0	EA	$52,500.00	$0.00
33	Black wrought iron fencing along steep slopes	0	LF	$90.00	$0.00
	Total Safety Treatments				***$24,500.00***

SUBTOTAL ALL AREAS		$231,020.80
COST FACTOR	20% Contingency	$46,204.16
GRAND TOTAL ALL AREAS		$277,224.96

SUMMARY OF PROBABLE COSTS

	CATEGORY	% OF TOTAL	TOTAL
A.	**Earthwork, Demolition, Clearing + Erosion Control**	**21%**	**$57,910.80**
B.	**General Construction**	**10%**	**$26,660.00**
C.	**Bridges and Special Features**	**44%**	**$121,950.00**
D.	**Safety Treatments**	**9%**	**$24,500.00**
E.	**Trailheads and Waysides**	**0%**	**$0.00**
	COST FACTOR	**17%**	**$46,204.16**
	GRAND TOTAL ALL AREAS	**100%**	**$277,224.96**

PRELIMINARY PROBABLE COST OF CONSTRUCTION

Aug-12

PROJECT NAME - Johnson City Rail Trail
SECTION 10
Project Summary

NO.	ITEM	QTY.	UNIT	COST	EXTENSION
A.	**EARTHWORK, DEMOLITION, CLEARING + EROSION CONTROL**				
1	Clearing + Grubbing (includes litter and vandalism removal)	4,066	LF	$3.00	$12,198.00
2	Silt Fence (Each Side)	8,000	LF	$3.00	$24,000.00
3	Fine Grading (0-5 cu ft/lf)	4,066	LF	$4.28	$17,402.48
4	Construction Entrance	0	EA	$3,000.00	$0.00
5	Bank Stabilization	0	LF	$4.28	$0.00
6	Hydroseeding	4,066	LF	$0.32	$1,301.12
	Total Earthwork, Demolition, Clearing + Erosion Control				***$54,901.60***
B	**GENERAL CONSTRUCTION**				
7	6" Base Course (Where Required)	2,000	LF	$13.33	$26,660.00
8	4-'0" high Black 3-board Fence	0	LF	$25.00	$0.00
11	6'-0" high opaque fencing	0	LF	$20.00	$0.00
12	4'-0" high evergreen vegetative screening	0	LF	$50.00	$0.00
13	Retaining Walls	0	SFF	$45.00	$0.00
14	Curb and Gutter	0	LF	$12.00	$0.00
	Total General Construction				***$26,660.00***
C.	**STRUCTURES AND SPECIAL FEATURES**				
15	Lighting and Wiring of Underpasses	0	LS	$11,000.00	$0.00
16	Rehabilitation of Existing Bridge Structure	0	LF	$1,350.00	$0.00
18	Gateways	0	EA	$1,180.00	$0.00
19	Overlook	0	EA	$45,000.00	$0.00
20	Interpretive Signage	0	EA	$1,800.00	$0.00
21	Kiosks	0	EA	$2,500.00	$0.00
22	Mile Markers	6	EA	$325.00	$1,950.00
23	Tree Planting	128	EA	$500.00	$64,000.00
24	Enhanced Shrub Layer	0	LF	$50.00	$0.00
	Trash/Recycle Receptacles	0	EA	$350.00	$0.00
	Benches	0	EA	$450.00	$0.00
	Total Structures and Special Features				***$65,950.00***
D.	**SAFETY TREATMENTS**				
26	Detectable Warning Mat	6	EA	$175.00	$1,050.00
27	Signage (Traffic Control, Directional)	8	EA	$250.00	$2,000.00
28	Retaining Wall	0	LF	$40.00	$0.00
29	Intersection Treatment (Unsignalized Crossing with curb ramp, curb improvements and crosswalk)	3	EA	$5,525.00	$16,575.00
30	Intersection Treatment 2 (Signalized Crossing - Countdown Signal Only)	0	EA	$10,020.00	$0.00
31	Raised Crosswalk	0	EA	$7,000.00	$0.00
32	Intersection Treatment 2 (Signalized Crossing - HAWK)	0	EA	$52,500.00	$0.00
33	Black wrought iron fencing along steep slopes	0	LF	$90.00	$0.00
	Total Safety Treatments				***$19,625.00***

SUBTOTAL ALL AREAS		$167,136.60
COST FACTOR	20% Contingency	$33,427.32
GRAND TOTAL ALL AREAS		$200,563.92

SUMMARY OF PROBABLE COSTS

	CATEGORY	% OF TOTAL	TOTAL
A.	**Earthwork, Demolition, Clearing + Erosion Control**	**27%**	**$54,901.60**
B.	**General Construction**	**13%**	**$26,660.00**
C.	**Bridges and Special Features**	**33%**	**$65,950.00**
D.	**Safety Treatments**	**10%**	**$19,625.00**
E.	**Trailheads and Waysides**	**0%**	**$0.00**
	COST FACTOR	**17%**	**$33,427.32**
	GRAND TOTAL ALL AREAS	**100%**	**$200,563.92**

PRELIMINARY PROBABLE COST OF CONSTRUCTION

Aug-12

PROJECT NAME - Johnson City Rail Trail
SECTION 11
Project Summary

NO.	ITEM	QTY.	UNIT	COST	EXTENSION
A.	**EARTHWORK, DEMOLITION, CLEARING + EROSION CONTROL**				
1	Clearing + Grubbing (includes litter and vandalism removal)	3,907	LF	$3.00	$11,721.00
2	Silt Fence (Each Side)	8,000	LF	$3.00	$24,000.00
3	Fine Grading (0-5 cu ft/lf)	3,907	LF	$4.28	$16,721.96
4	Construction Entrance	0	EA	$3,000.00	$0.00
5	Bank Stabilization	0	LF	$4.28	$0.00
6	Hydroseeding	3,907	LF	$0.32	$1,250.24
	Total Earthwork, Demolition, Clearing + Erosion Control				***$53,693.20***
B	**GENERAL CONSTRUCTION**				
7	6" Base Course (Where Required)	2,000	LF	$13.33	$26,660.00
8	4-'0" high Black 3-board Fence	0	LF	$25.00	$0.00
11	6'-0" high opaque fencing	0	LF	$20.00	$0.00
12	4'-0" high evergreen vegetative screening	1,185	LF	$50.00	$59,250.00
13	Resurface Access Road	775	LF	$22.00	$17,050.00
14	Curb and Gutter	775	LF	$12.00	$9,300.00
	Total General Construction				***$112,260.00***
C.	**STRUCTURES AND SPECIAL FEATURES**				
15	Lighting and Wiring of Underpasses	0	LS	$11,000.00	$0.00
16	Rehabilitation of Existing Structures (see separate costing information for structures)	0	LF	$1,350.00	$0.00
18	Gateways	1	EA	$1,180.00	$1,180.00
19	Overlook	0	EA	$45,000.00	$0.00
20	Gateway Signage	1	EA	$1,800.00	$1,800.00
21	Kiosks	0	EA	$2,500.00	$0.00
22	Mile Markers	6	EA	$325.00	$1,950.00
23	Tree Planting	0	EA	$500.00	$0.00
24	Curb along Trail	775	LF	$50.00	$38,750.00
	Trash/Recycle Receptacles	0	EA	$350.00	$0.00
	Benches	0	EA	$450.00	$0.00
	Total Structures and Special Features				***$43,680.00***
D.	**SAFETY TREATMENTS**				
26	Detectable Warning Mat	6	EA	$175.00	$1,050.00
27	Signage (Traffic Control, Directional)	6	EA	$250.00	$1,500.00
28	Retaining Wall	0	LF	$40.00	$0.00
29	Intersection Treatment (Unsignalized Crossing with curb ramp, curb improvements and crosswalk)	3	EA	$5,525.00	$16,575.00
30	Intersection Treatment 2 (Signalized Crossing - Countdown Signal Only)	0	EA	$10,020.00	$0.00
31	Raised Crosswalk	0	EA	$7,000.00	$0.00
32	Intersection Treatment 2 (Signalized Crossing - HAWK)	0	EA	$52,500.00	$0.00
33	Black wrought iron fencing along steep slopes	0	LF	$90.00	$0.00
	Total Safety Treatments				***$19,125.00***

SUBTOTAL ALL AREAS		$228,758.20
COST FACTOR	20% Contingency	$45,751.64
GRAND TOTAL ALL AREAS		$274,509.84

SUMMARY OF PROBABLE COSTS

	CATEGORY	% OF TOTAL	TOTAL
A.	**Earthwork, Demolition, Clearing + Erosion Control**	**20%**	**$53,693.20**
B.	**General Construction**	**41%**	**$112,260.00**
C.	**Bridges and Special Features**	**16%**	**$43,680.00**
D.	**Safety Treatments**	**7%**	**$19,125.00**
E.	**Trailheads and Waysides**	**0%**	**$0.00**
	COST FACTOR	**17%**	**$45,751.64**
	GRAND TOTAL ALL AREAS	**100%**	**$274,509.84**

PRELIMINARY PROBABLE COST OF CONSTRUCTION

Aug-12

PROJECT NAME - Johnson City Rail Trail
SECTION 12 - Does not include routing alternative around BJ's
Project Summary

NO.	ITEM	QTY.	UNIT	COST	EXTENSION
A.	**EARTHWORK, DEMOLITION, CLEARING + EROSION CONTROL**				
1	Clearing + Grubbing (includes litter and vandalism removal)	4,382	LF	$3.00	$13,146.00
2	Silt Fence (Each Side)	8,600	LF	$3.00	$25,800.00
3	Fine Grading (0-5 cu ft/lf)	4,382	LF	$4.28	$18,754.96
4	Construction Entrance	0	EA	$3,000.00	$0.00
5	Bank Stabilization	0	LF	$4.28	$0.00
6	Hydroseeding	4,382	LF	$0.32	$1,402.24
	Total Earthwork, Demolition, Clearing + Erosion Control				***$59,103.20***
B	**GENERAL CONSTRUCTION**				
7	6" Base Course (Where Required)	2,000	LF	$13.33	$26,660.00
8	4-'0" high Black 3-board Fence	2,600	LF	$25.00	$65,000.00
11	6'-0" high opaque fencing	0	LF	$20.00	$0.00
12	4'-0" high evergreen vegetative screening	275	LF	$50.00	$13,750.00
13	Retaining Walls	0	SFF	$45.00	$0.00
14	Curb and Gutter	0	LF	$12.00	$0.00
	Total General Construction				***$105,410.00***
C.	**STRUCTURES AND SPECIAL FEATURES**				
15	Lighting and Wiring of Underpasses	0	LS	$11,000.00	$0.00
16	Rehabilitation of Existing Structures (see separate costing information for structures)	0	LF	$1,350.00	$0.00
18	Gateways	0	EA	$1,180.00	$0.00
19	Overlook	0	EA	$45,000.00	$0.00
20	Interpretive Signage	2	EA	$1,800.00	$3,600.00
21	Kiosks	0	EA	$2,500.00	$0.00
22	Mile Markers	6	EA	$325.00	$1,950.00
23	Tree Planting	0	EA	$500.00	$0.00
24	Enhanced Shrub Layer	0	LF	$50.00	$0.00
	Trash/Recycle Receptacles	1	EA	$350.00	$350.00
	Benches	1	EA	$450.00	$450.00
	Total Structures and Special Features				***$6,350.00***
D.	**SAFETY TREATMENTS**				
26	Detectable Warning Mat	14	EA	$175.00	$2,450.00
27	Signage (Traffic Control, Directional)	15	EA	$250.00	$3,750.00
28	Retaining Wall	0	LF	$40.00	$0.00
29	Intersection Treatment (Unsignalized Crossing with curb ramp, curb improvements and crosswalk)	7	EA	$5,525.00	$38,675.00
30	Intersection Treatment 2 (Signalized Crossing - Countdown Signal Only)	0	EA	$10,020.00	$0.00
31	Raised Crosswalk	0	EA	$7,000.00	$0.00
32	Intersection Treatment 2 (Signalized Crossing - HAWK)	0	EA	$52,500.00	$0.00
33	Black wrought iron fencing along steep slopes	0	LF	$90.00	$0.00
	Total Safety Treatments				***$44,875.00***

SUBTOTAL ALL AREAS		$215,738.20
COST FACTOR	20% Contingency	$43,147.64
GRAND TOTAL ALL AREAS		$258,885.84

SUMMARY OF PROBABLE COSTS

	CATEGORY	% OF TOTAL	TOTAL
A.	**Earthwork, Demolition, Clearing + Erosion Control**	**23%**	**$59,103.20**
B.	**General Construction**	**41%**	**$105,410.00**
C.	**Bridges and Special Features**	**2%**	**$6,350.00**
D.	**Safety Treatments**	**17%**	**$44,875.00**
E.	**Trailheads and Waysides**	**0%**	**$0.00**
	COST FACTOR	**17%**	**$43,147.64**
	GRAND TOTAL ALL AREAS	**100%**	**$258,885.84**

PRELIMINARY PROBABLE COST OF CONSTRUCTION

Aug-12

PROJECT NAME - Johnson City Rail Trail
SECTION 13 does not include spur to apartment complex
Project Summary

NO.	ITEM	QTY.	UNIT	COST	EXTENSION
A.	**EARTHWORK, DEMOLITION, CLEARING + EROSION CONTROL**				
1	Clearing + Grubbing (includes litter and vandalism removal)	2,956	LF	$3.00	$8,868.00
2	Silt Fence (Each Side)	6,000	LF	$3.00	$18,000.00
3	Fine Grading (0-5 cu ft/lf)	2,956	LF	$4.28	$12,651.68
4	Construction Entrance	1	EA	$3,000.00	$3,000.00
5	Bank Stabilization	0	LF	$4.28	$0.00
6	Hydroseeding	2,956	LF	$0.32	$945.92
	Total Earthwork, Demolition, Clearing + Erosion Control				***$43,465.60***
B	**GENERAL CONSTRUCTION**				
7	6" Base Course (Where Required)	1,500	LF	$13.33	$19,995.00
8	4-'0" high Black 3-board Fence	1,850	LF	$25.00	$46,250.00
11	6'-0" high opaque fencing	0	LF	$20.00	$0.00
12	4'-0" high evergreen vegetative screening	275	LF	$50.00	$13,750.00
13	Retaining Walls	0	SFF	$45.00	$0.00
14	Curb and Gutter	0	LF	$12.00	$0.00
	Total General Construction				***$79,995.00***
C.	**STRUCTURES AND SPECIAL FEATURES**				
15	Lighting and Wiring of Underpasses	0	LS	$11,000.00	$0.00
16	Rehabilitation of Existing Structures (see separate costing information for structures)	1	LS	$2,000.00	$2,000.00
18	Gateways	0	EA	$1,180.00	$0.00
19	Overlook	0	EA	$45,000.00	$0.00
20	Interpretive Signage	0	EA	$1,800.00	$0.00
21	Kiosks	0	EA	$2,500.00	$0.00
22	Mile Markers	4	EA	$325.00	$1,300.00
23	Tree Planting	44	EA	$500.00	$22,000.00
24	Enhanced Shrub Layer	0	LF	$50.00	$0.00
	Trash/Recycle Receptacles	0	EA	$350.00	$0.00
	Benches	0	EA	$450.00	$0.00
	Total Structures and Special Features				***$25,300.00***
D.	**SAFETY TREATMENTS**				
26	Detectable Warning Mat	4	EA	$175.00	$700.00
27	Signage (Traffic Control, Directional)	6	EA	$250.00	$1,500.00
28	Retaining Wall	0	LF	$40.00	$0.00
29	Intersection Treatment (Unsignalized Crossing with curb ramp, curb improvements and crosswalk)	2	EA	$5,525.00	$11,050.00
30	Intersection Treatment 2 (Signalized Crossing - Countdown Signal Only)	0	EA	$10,020.00	$0.00
31	Raised Crosswalk	0	EA	$7,000.00	$0.00
32	Intersection Treatment 2 (Signalized Crossing - HAWK)	0	EA	$52,500.00	$0.00
33	Black wrought iron fencing along steep slopes	0	LF	$90.00	$0.00
	Total Safety Treatments				***$13,250.00***

SUBTOTAL ALL AREAS		$162,010.60
COST FACTOR	20% Contingency	$32,402.12
GRAND TOTAL ALL AREAS		$194,412.72

SUMMARY OF PROBABLE COSTS

	CATEGORY	% OF TOTAL	TOTAL
A.	**Earthwork, Demolition, Clearing + Erosion Control**	**22%**	**$43,465.60**
B.	**General Construction**	**41%**	**$79,995.00**
C.	**Bridges and Special Features**	**13%**	**$25,300.00**
D.	**Safety Treatments**	**7%**	**$13,250.00**
E.	**Trailheads and Waysides**	**0%**	**$0.00**
	COST FACTOR	**17%**	**$32,402.12**
	GRAND TOTAL ALL AREAS	**100%**	**$194,412.72**

PRELIMINARY PROBABLE COST OF CONSTRUCTION

Aug-12

PROJECT NAME - Johnson City Rail Trail
SECTION 14
Project Summary

NO.	ITEM	QTY.	UNIT	COST	EXTENSION
A.	**EARTHWORK, DEMOLITION, CLEARING + EROSION CONTROL**				
1	Clearing + Grubbing (includes litter and vandalism removal)	2,587	LF	$3.00	$7,761.00
2	Silt Fence (Each Side)	5,000	LF	$3.00	$15,000.00
3	Fine Grading (0-5 cu ft/lf)	2,587	LF	$4.28	$11,072.36
4	Construction Entrance	0	EA	$3,000.00	$0.00
5	Bank Stabilization	0	LF	$4.28	$0.00
6	Hydroseeding	2,587	LF	$0.32	$827.84
	Total Earthwork, Demolition, Clearing + Erosion Control				***$34,661.20***
B	**GENERAL CONSTRUCTION**				
7	6" Base Course (Where Required)	1,200	LF	$13.33	$15,996.00
8	4-'0" high Black 3-board Fence	2,250	LF	$25.00	$56,250.00
11	6'-0" high opaque fencing	0	LF	$20.00	$0.00
12	4'-0" high evergreen vegetative screening	0	LF	$50.00	$0.00
13	Retaining Walls	0	SFF	$45.00	$0.00
14	Curb and Gutter	0	LF	$12.00	$0.00
	Total General Construction				***$72,246.00***
C.	**STRUCTURES AND SPECIAL FEATURES**				
15	Lighting and Wiring of Underpasses	0	LS	$11,000.00	$0.00
16	Rehabilitation of Existing Structures (see separate costing information for structures)	0	LF	$1,350.00	$0.00
18	Gateways	0	EA	$1,180.00	$0.00
19	Overlook	0	EA	$45,000.00	$0.00
20	Interpretive Signage	0	EA	$1,800.00	$0.00
21	Kiosks	0	EA	$2,500.00	$0.00
22	Mile Markers	2	EA	$325.00	$650.00
23	Tree Planting	0	EA	$500.00	$0.00
24	Enhanced Shrub Layer	0	LF	$50.00	$0.00
	Trash/Recycle Receptacles	1	EA	$350.00	$350.00
	Benches	1	EA	$450.00	$450.00
	Total Structures and Special Features				***$1,450.00***
D.	**SAFETY TREATMENTS**				
26	Detectable Warning Mat	6	EA	$175.00	$1,050.00
27	Signage (Traffic Control, Directional)	6	EA	$250.00	$1,500.00
28	Retaining Wall	0	LF	$40.00	$0.00
29	Intersection Treatment (Unsignalized Crossing with curb ramp, curb improvements and crosswalk)	3	EA	$5,525.00	$16,575.00
30	Intersection Treatment 2 (Signalized Crossing - Countdown Signal Only)	0	EA	$10,020.00	$0.00
31	Raised Crosswalk	0	EA	$7,000.00	$0.00
32	Intersection Treatment 2 (Signalized Crossing - HAWK)	0	EA	$52,500.00	$0.00
33	Black wrought iron fencing along steep slopes	0	LF	$90.00	$0.00
	Total Safety Treatments				***$19,125.00***

SUBTOTAL ALL AREAS		$127,482.20
COST FACTOR	20% Contingency	$25,496.44
GRAND TOTAL ALL AREAS		$152,978.64

SUMMARY OF PROBABLE COSTS

	CATEGORY	% OF TOTAL	TOTAL
A.	**Earthwork, Demolition, Clearing + Erosion Control**	**23%**	**$34,661.20**
B.	**General Construction**	**47%**	**$72,246.00**
C.	**Bridges and Special Features**	**1%**	**$1,450.00**
D.	**Safety Treatments**	**13%**	**$19,125.00**
E.	**Trailheads and Waysides**	**0%**	**$0.00**
	COST FACTOR	**17%**	**$25,496.44**
	GRAND TOTAL ALL AREAS	**100%**	**$152,978.64**

PRELIMINARY PROBABLE COST OF CONSTRUCTION

Aug-12

PROJECT NAME - Johnson City Rail Trail
SECTION 15
Project Summary

NO.	ITEM	QTY.	UNIT	COST	EXTENSION
A.	**EARTHWORK, DEMOLITION, CLEARING + EROSION CONTROL**				
1	Clearing + Grubbing (includes litter and vandalism removal)	2,957	LF	$3.00	$8,871.00
2	Silt Fence (Each Side)	5,900	LF	$3.00	$17,700.00
3	Fine Grading (0-5 cu ft/lf)	2,957	LF	$4.28	$12,655.96
4	Construction Entrance	1	EA	$3,000.00	$3,000.00
5	Bank Stabilization	0	LF	$4.28	$0.00
6	Hydroseeding	2,957	LF	$0.32	$946.24
	Total Earthwork, Demolition, Clearing + Erosion Control				***$43,173.20***
B	**GENERAL CONSTRUCTION**				
7	6" Base Course (Where Required)	1,500	LF	$13.33	$19,995.00
8	4-'0" high Black 3-board Fence	2,957	LF	$25.00	$73,925.00
11	6'-0" high opaque fencing	210	LF	$20.00	$4,200.00
12	4'-0" high evergreen vegetative screening	0	LF	$50.00	$0.00
13	Retaining Walls	0	SFF	$45.00	$0.00
14	Curb and Gutter	0	LF	$12.00	$0.00
	Total General Construction				***$98,120.00***
C.	**STRUCTURES AND SPECIAL FEATURES**				
15	Lighting and Wiring of Underpasses	0	LS	$11,000.00	$0.00
16	Rehabilitation of Existing Structures (see separate costing information for structures)	1	LS	$2,000.00	$2,000.00
18	Gateways	1	EA	$1,180.00	$1,180.00
19	Overlook	0	EA	$45,000.00	$0.00
20	Gateway Signage	1	EA	$1,800.00	$1,800.00
21	Kiosks	1	EA	$2,500.00	$2,500.00
22	Mile Markers	4	EA	$325.00	$1,300.00
23	Tree Planting	0	EA	$500.00	$0.00
24	Enhanced Shrub Layer	0	LF	$50.00	$0.00
	Trash/Recycle Receptacles	0	EA	$350.00	$0.00
	Benches	0	EA	$450.00	$0.00
	Total Structures and Special Features				***$8,780.00***
D.	**SAFETY TREATMENTS**				
26	Detectable Warning Mat	8	EA	$175.00	$1,400.00
27	Signage (Traffic Control, Directional)	10	EA	$250.00	$2,500.00
28	Retaining Wall	0	LF	$40.00	$0.00
29	Intersection Treatment (Unsignalized Crossing with curb ramp, curb improvements and crosswalk)	4	EA	$5,525.00	$22,100.00
30	Intersection Treatment 2 (Signalized Crossing - Countdown Signal Only)	0	EA	$10,020.00	$0.00
31	Raised Crosswalk	0	EA	$7,000.00	$0.00
32	Intersection Treatment 2 (Signalized Crossing - HAWK)	0	EA	$52,500.00	$0.00
33	Black wrought iron fencing along steep slopes	210	LF	$90.00	$18,900.00
	Total Safety Treatments				***$44,900.00***

SUBTOTAL ALL AREAS		$194,973.20
COST FACTOR	20% Contingency	$38,994.64
GRAND TOTAL ALL AREAS		$233,967.84

SUMMARY OF PROBABLE COSTS

	CATEGORY	% OF TOTAL	TOTAL
A.	**Earthwork, Demolition, Clearing + Erosion Control**	**18%**	**$43,173.20**
B.	**General Construction**	**42%**	**$98,120.00**
C.	**Bridges and Special Features**	**4%**	**$8,780.00**
D.	**Safety Treatments**	**19%**	**$44,900.00**
E.	**Trailheads and Waysides**	**0%**	**$0.00**
	COST FACTOR	**17%**	**$38,994.64**
	GRAND TOTAL ALL AREAS	**100%**	**$233,967.84**