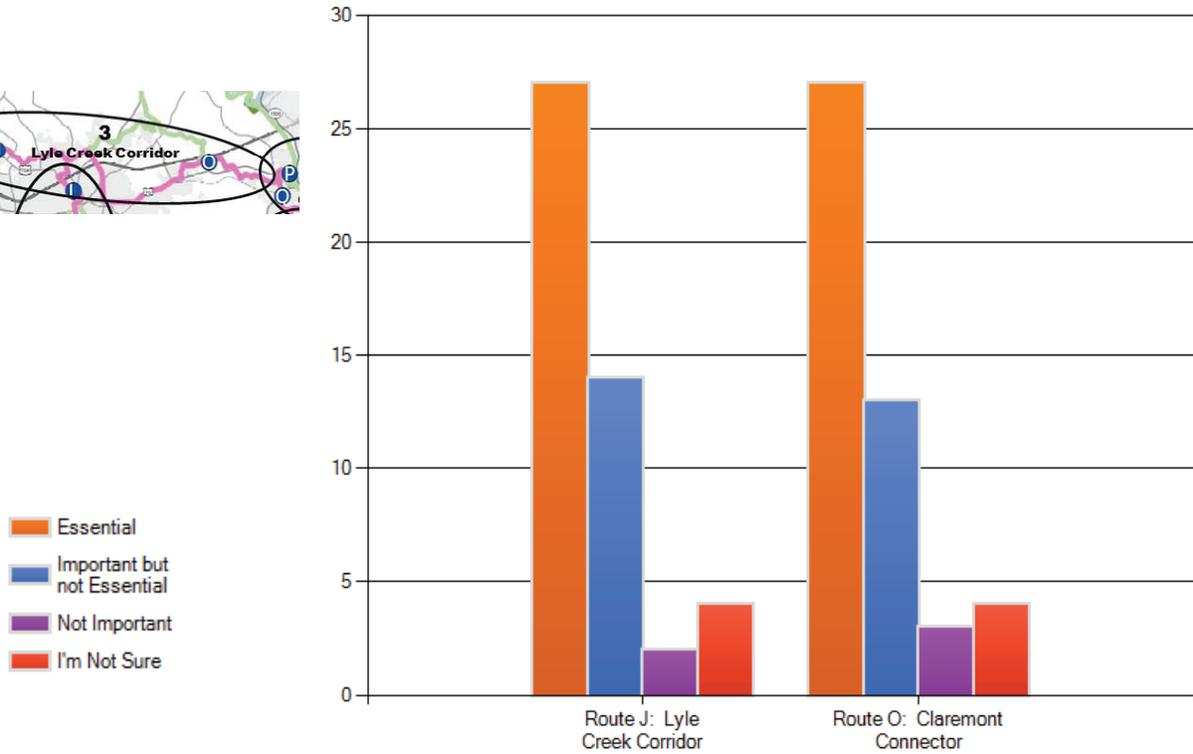




Corridor 3 – Lyle Creek Corridor



How important is this route segment in the overall Catawba County / Carolina Thread Trail network?

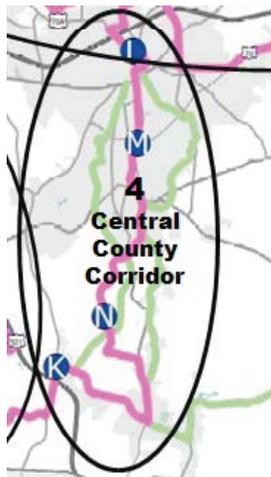




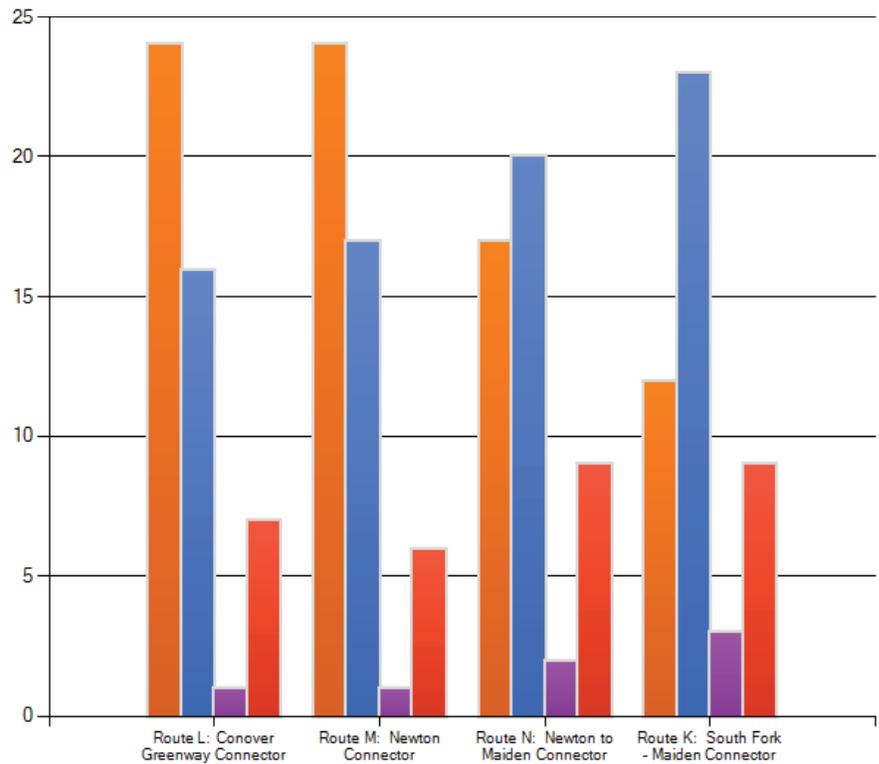
Corridor 4 – Central County Corridor



How important is this route segment in the overall Catawba County / Carolina Thread Trail network?



- Essential
- Important but not Essential
- Not Important
- I'm Not Sure

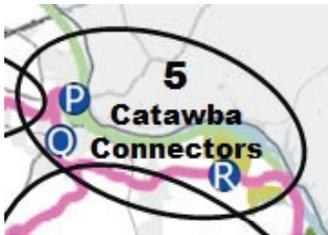




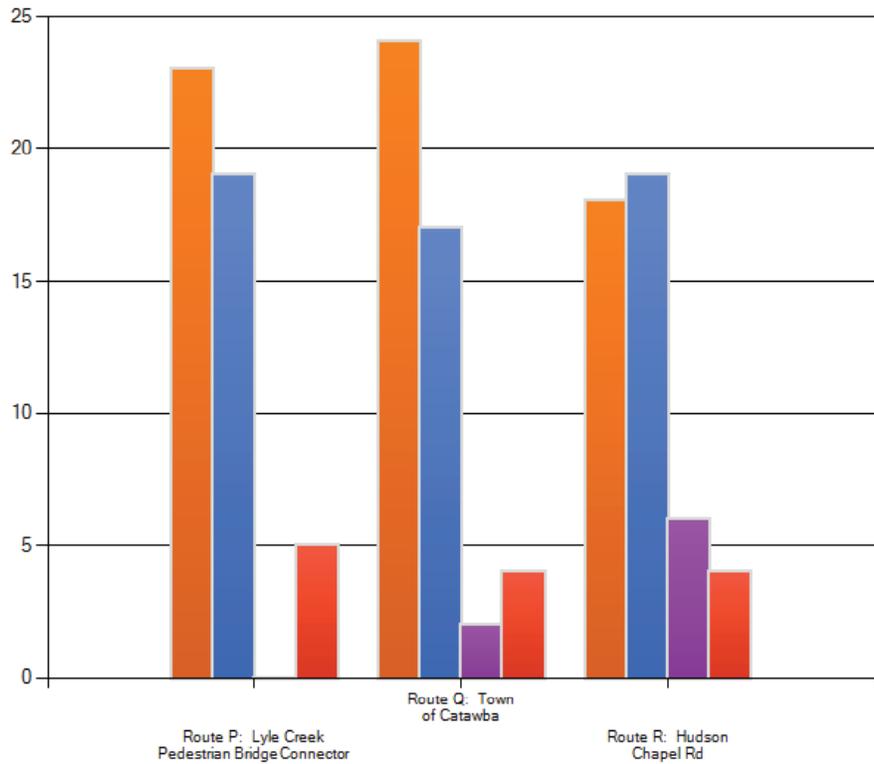
Corridor 5 – Catawba Connectors



How important is this route segment in the overall Catawba County / Carolina Thread Trail network?



- Essential
- Important but not Essential
- Not Important
- I'm Not Sure



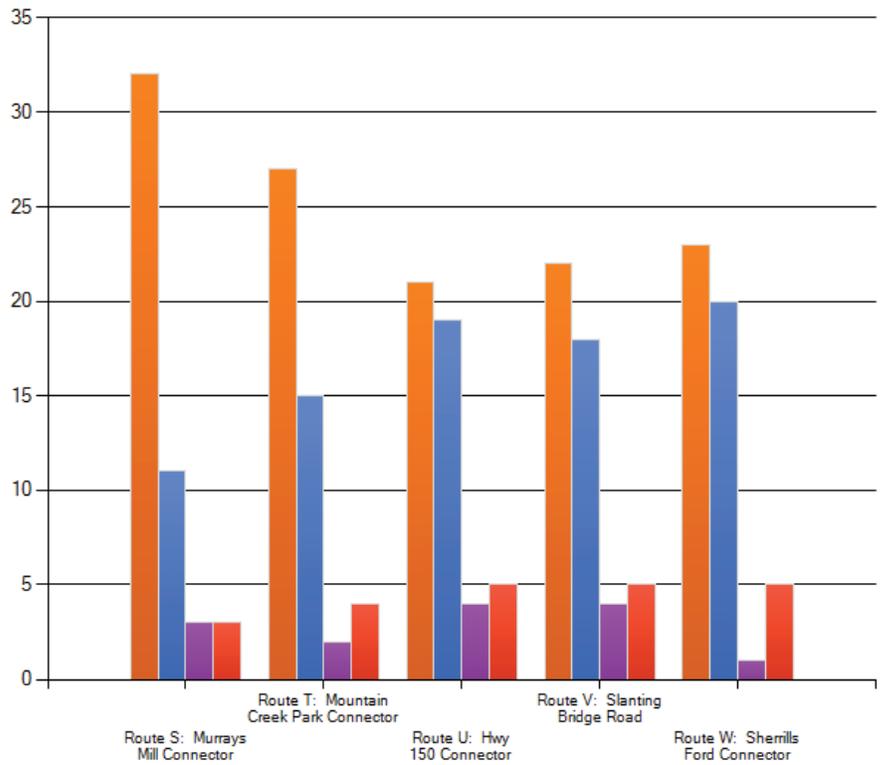


Corridor 6 – Murrays Mill / Sherrills Ford Corridor



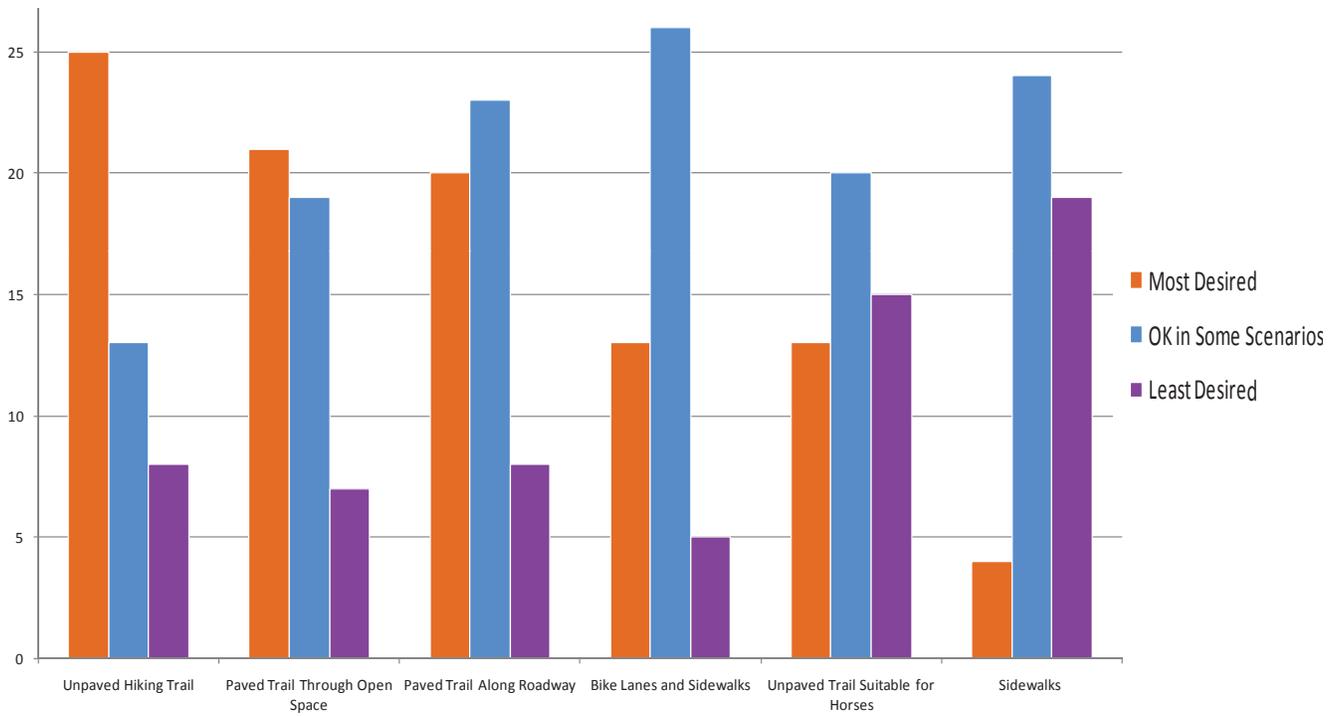
- Essential
- Important but not Essential
- Not Important
- I'm Not Sure

How important is this route segment in the overall Catawba County / Carolina Thread Trail network?





Trail Surface Preference





Appendix IV: Stakeholder Walks

A Review of Potential Corridors and Key Locations Thursday March 25th

Walk 1 Jacob Fork

First Stop-

Jacob Fork River at Hwy 127. Commonly used canoe put-in using private gravel drive as pull-off point. Vertical clearance below the overpass will allow greenway to cross Hwy. 127 along the river below the overpass. The embankment is heavily armored with rip-rap.

Recommendation: leave route as-is.

Second Stop-

Jacob Fork River at Sand Pit Road. Several properties on the north bank of the river have been acquired and are held by a developer. Opportunity may exist to work with the developer to establish a trail through the property. As noted, the river has a wide meander. At each outside curve of the river, significant topography and rock were noted. Each inside curve of the River was relatively flat with sandy shoals. This flip-flop of steep topography along both north and south banks presents challenges. The consultant recommends continuing the proposed alignment on the north bank and planning conservation easements in conjunction with the developer to avoid topographic constraints.

Recommendation: leave route as-is.

Walk 2 Catawba

First Stop-

Hunsucker Park. The Group walked the grounds and reviewed the adjacent property in which the Town of Catawba will obtain an easement. Hunsucker Park is currently along an alternate route.

Recommendation: leave route as-is.

Second Stop-

Boat launch at Duke Energy land holdings. Area not part of Thread network; however, this property would provide creekside linkage from the Thread to Hunsucker Park.

Recommendation: leave route as-is.

Third Stop-

Main Street Bridge Crossing. Location on proposed route for potential pedestrian bridge; could potentially cross Lyle Creek and connect to abandoned right-of-way.

Recommendation: leave route as-is.



Fourth Stop-

With permission of land owners, the trail could run between the tree farm and the creek. Design elements such as fences or plantings could help reinforce the trail limit and discourage trespassing onto Tree Farm property. Lyle Creek tributary requires another bridge crossing. Steep topography on the south side of the creek west of the Tree Farm.

Recommendation: Consider shifting route to north side of creek, but review connection back to southern bank of creek at Bunker Hill Bridge.

Walk 3 Claremont

First Stop-

Claremont City Park located immediately off Hwy 70/Main Street has asphalt trails and other park amenities on site. It is bounded by a small drainage conveyance to the north. Ultimately it was decided to not route the trail through this park and instead utilize Lookout Street to connect Main Street and Centennial Boulevard.

Recommendation: leave route as-is.

Second Stop-

I-40 Rest Area could be considered as a trailhead location; however, this would take careful coordination with NCDOT. The trail will skirt along the southern property of the I-40 rest area east toward Lyle Creek. During the drive, difficulty providing an I-40 crossing through a box culvert along Lyle Creek was noted.

Recommendation: Revise the route to provide I-40 crossing utilizing Thornburg Drive.

Third Stop-

Neighborhood along Peachtree Street was reviewed for potential sewer easement connection from Centennial to Highway 70/Main Street.

Recommendation: Consideration of this easement at this time was not recommended due to potential costly construction. Additionally there is no clear connection from the sewer easement to Hwy 70.

Fourth Stop-

Thornburg Drive is a well developed, boulevard style, roadway crossing I-40. Good sidewalks and planted medians could allow this crossing to be part of a priority route.

Recommendation: Consider alternatives other than Lyle Creek for crossing I-40. Thornburg Drive could make a good north-south connection across the interstate. Highway 70 / Main Street appears to be the most accessible route to connect Claremont and Conover.



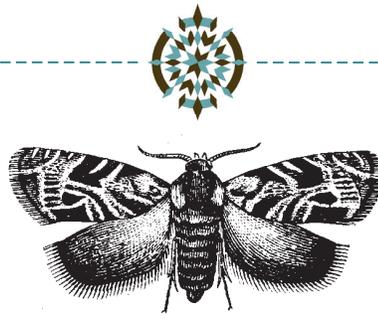
Walk 4 Sherrills Ford

The group convened at the library and proceeded to take a car tour of potential routes in the area. Raccoon Track Drive, as part of development approval, will provide sidewalk connections within its right of way. This road also ties in well with Duke Energy's high power transmission line, allowing a strong connection from the Sherrills Ford area to Hudson Chapel Road. Both Raccoon Track Drive and the power transmission easement occur within significant topography; major grading would be necessary to control erosion and ease longitudinal slopes as much as possible.

Recommendation: leave route as-is.

Walk 5 Southside Park, the Town of Maiden

Sam, Alex, Mary George, and Cliff Brooks gathered for a final walk on Friday March 26th. The group traveled to Southside park to review the potential for connecting to Newton's Heritage Trail and discuss the potential for the trail to follow the creek. Alex informed the group of potential land owner issues adjacent to the park. A sewer easement is located south of the park. The remainder of the tour was conducted by car reviewing business 321, Blackburn Bridge and the Town of Maiden proper. It was noted without use of the Newton to Maiden Rail a strong north south connection will be difficult and require further review beyond master planning.



Appendix V: Funding and Financing

FEDERAL GRANTS AND FUNDING

The Safe, Accountable, Flexible, Efficient,
Transportation Equity Act: A Legacy of Users of 2005
(SAFETEA-LU)

U.S. Department of Transportation- Federal Highway
Administration

<http://www.fhwa.dot.gov/safetealu/summary.htm>

- Finances bicycle, pedestrian, and greenway projects at local and state levels.
- Provides up to 80% for development and construction costs
- Used for facilities such as sidewalks, rail-trails, bike-lanes and greenways.
- Primarily used by municipalities (since its focus is on bicycle and pedestrian corridors, environmental mitigation, historic preservation, and scenic byways.
- A thorough engineering assessment should be performed to determine construction costs prior to applying.

Recreation Trails Program

U.S. Department of Transportation- Federal Highway
Administration

<http://www.fhwa.dot.gov/environment/rectrails/>

- Assistance program of the Department of Transportation's Federal Highway Administration.
- Funds are distributed equally between states, and then in proportion to their non-highway recreational fuel (snowmobiles, off-road motorcycles, etc.) usage.
- Funds are used to develop and maintain recreation trails and trail-related facilities for both non-motorized and motorized recreation trail users.

Federal Aid Construction Funds

U.S. Department of Transportation- Federal Highway

Administration

<http://www.fhwa.dot.gov/specialfunding/stp/>

- Provided for the construction of pedestrian/bicycle transportation facilities.
- Are included in the National Highway System (NHS) Surface Transportation Program (STP), and Congestion Mitigation and Air Quality (CMAW).
- The primary source of funding is STP Enhancement Funding.

Safe Routes to School Program (SRTS)

U.S. Department of Transportation

<http://safety.fhwa.dot.gov/saferoutes/>

- Federal-Aid program of the U.S. Department of Transportation's Federal Highway Administration (FHWA).
- Funded at \$612 million over five Federal fiscal years (FY 2005-2009).
- Provides funds to the states to improve the ability of primary and middle school students to walk and bicycle to school safely.

Watershed Protection and Flood Protection

United States Department of Agriculture

<http://www.nrcs.usda.gov/programs/watershed/>

- Grant falls under the USDA Natural Resource Conservation Service.
- Assists state and local governments in their operation/maintenance of watersheds less than 250,000 sq. acres.
- Provides financial and technical assistance
- Projects should involve improvement of watershed protection, flood prevention, sedimentation control, public water-based fish and wildlife enhancements, and recreation planning.



- NRCS requires a 50% local match for public recreation and fish/wildlife projects.

STATE GRANTS AND FUNDING

North Carolina Parks and Recreation Trust Fund (PARTF)

The North Carolina State Parks System

http://www.ncparks.gov/About/grants/partf_main.php

- Established for local governments and the North Carolina Division of Parks and Recreation.
- It is a funding source for the development and/or improvement of parks and recreation facilities (including land acquisition)
- It is state funded and matches money spent by municipalities (on parks and recreation)
- The fund request is a maximum of \$1,000,000.

Land and Water Conservation Fund (LWCF)

The North Carolina State Parks System

http://www.ncparks.gov/About/grants/lwcf_grant.php

- Federally-funded, LWCF was established for local and state governments to fund outdoor recreational development and land acquisition.
- It is funded from the sale or lease of nonrenewable resources (offshore oil/gas leases and surplus federal land sales)
- Money may be used on a large variety of outdoor public projects and may include minimalistic facility (roads, water supply, etc.) design.
- No more than 50% of the project cost may be federally funded by LWCF (other assistance programs may be used.)

Adopt-A-Trail Grant Program (AAT)

http://www.ncparks.gov/About/Grants/trails_main.php

- Funding provided by the state of North Carolina
- A total of \$108,000 available per year. Maximum grant amount per applicant is \$5,000.
- Program provides funds to governmental agencies and non-profit organizations to be applied to related promotional information, new trail construction, trail renovation, adjacent facilities, and land acquisition through willing sellers.

North Carolina Ecosystem Enhancement Program

North Carolina Department of Transportation, North Carolina Department of Environmental and Natural Resources

<http://www.nceep.net/>

- Combines a wetlands-restoration initiative by the N.C. Dept. of Environment and Natural Resources with environmental efforts by the Dept. of Transportation to restore, enhance, and protect its wetlands and waterways.
- Provides watershed planning and project implementation efforts within NC's threatened/degraded watersheds.
- Provides compensation for unavoidable environmental impacts associated with transportation, infrastructure, and economic development.

North Carolina Natural Heritage Trust Fund (NHTF)

<http://www.ncnhtf.org/>

- Provides supplemental funding to select state agencies for the acquisition and protection of important natural areas.
- The eligible agencies are: Dept. of Environment and



Natural Resources, the Wildlife Resources Commission, the Dept. of Cultural Resources, and the Dept. of Agriculture and Consumer Services.

- Catawba County is not eligible although other grants are awarded for the preservation and/or educational purposes.

Clean Water Management Trust Fund (CWMTF)

<http://www.cwmtf.net/a/index.html#home.html>

- Grants money to local governments, state agencies, and non-profit conservation groups
- Funds projects that specifically address water pollution issues.
- Eligible plans include projects contributing toward a network of riparian buffers and greenways.
- No match is required by local municipalities; however, the "suggestion" of a match is highly recommended.

The North Carolina Conservation Tax Credit

North Carolina Department of Environmental and Natural Resources

<http://www.onencnaturally.org/pages/ConservationTaxCredit.html>

- Provides an incentive (in the form of an income tax credit) for landowners that donate interests in real property for conservation purposes.
- The goal is to manage stormwater, protect water supply watersheds, preserve working farms and forests, and set-aside greenways for ecological communities, public trails, and wildlife corridors.

Farmland Protection Trust Fund

North Carolina Department of Agriculture and Consumer Services

<http://www.ncadfp.org/>

- Funded through an allocation by the NC General Assembly to the NC Department of Agriculture and Consumer Services.
- Funding (over recent years) has ranged from a couple hundred thousand dollars to millions of dollars.
- It is a voluntary program designed to protect farmland from development by either acquiring property outright or acquiring conservation easements on the property.

State Construction Funds

- These funds (not including the Highway Trust Fund for Urban Loops and Interchanges) may be used for the construction of sidewalks and bicycle accommodations that are a part of roadway improvement projects.

LOCAL FUNDING OPPORTUNITIES, LAND ACQUISITION AND DEVELOPMENT

Life Estate

- A gift in which a donor retains the land during his/her lifetime, and then relinquishes title of the property after his/her death.
- The owner (or family) is then relieved of property tax for the given land.

Local Gifts

- Local gifts refer to the donations of land, money, labor, and/or construction.
- Should utilize an organized and very specific strategic method to procure.
- Involves contacting potential donors—such as individuals, institutions, foundations, service clubs, etc.



Easements

- Most common type of “less-than-fee” interest in land.
- Seeks to compensate property owners for the right to use his/her land in some way, or to compensate for the loss of his/her privileges to use the land
- Usually, the land owner may still use the land,
- Continues to generate property tax revenue for the county.

Fee Simple Purchase

- Most common method used to acquire municipal property for park facilities.
- Very limited monetary resources makes it difficult to pursue.
- Has an advantage of simplifying justification to the public

Fee Simple with Lease-Back or Resale

- Allows local governments to acquire land through fee simple purchase, but also allows them to either sell or lease the property to prospective users.
- Has restrictions that enable local governments to preserve land from future development.
- Results from situations in which land owners, who have lost monetary amounts in property value, determine it is more economical to sell land to the County.

Long Term Option

- Allow counties to purchase property over long periods of time.
- Enables the County to consider pieces of land that may have future value, though not currently desired/ affordable at the time.
- County can protect the future of the land without

purchasing it upfront

- Purchase price will not increase
- All privileges relinquished by the land owner require compensation in the form of securing the option.



Appendix VI: Summary of Rail and Utility Discussions

Rail Corridors

Although the use of inactive railway lines in the County remains an attractive option for Carolina Thread Trail routing, significant hurdles exist. In particular, it was noted in the Public Forums that there is desire to utilize the inactive rail corridor between Newton and Maiden to serve a strong north-south connection through the County.

However, this portion of rail segment is held through NCDOT lease agreement and federal funding. The land on which the easement exists is not held in fee simple. The terms of the lease dictate that if NCDOT were to release the easement and remove the tracks, then the land would revert to original property owners within 7 years. However, as part of the recent stimulus from the federal government, federal dollars are used to maintain the easement for potential future commerce. NCDOT no longer has the authority to release the easement, as this must be granted at the federal level. As understood through conversations with NCDOT, there is little desire or incentive for the federal government or NCDOT to release the land at this time.

The Town of Maiden has had conversations with NCDOT prior to the involvement of the federal government. The legal finding from those conversations, which took place in 2002 is included within this appendix. -Summary of Conversations with Steve Head NCDOT



Inactive rail corridor between Newton and Maiden



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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

September 17, 2002

Mr. Kevin Sanders, Interim Town Manager
Town of Maiden
P.O. Box 125
Maiden, NC 28650-0125

Dear Mr. Sanders:

The purpose of this letter is to respond to a concept that was described in an article published in the August 21 edition of the Maiden Observer News Enterprise.

The article theorized a series of steps wherein the former Norfolk Southern line known as the Maiden Branch (comprising 6.3 miles between South Newton and the Lincoln County line, mile-posts HG 70.07-77.0) could be converted from its present inactive status into a rail trail.

This conceptual plan is in error. The rail corridor in question was acquired by NCDOT pursuant to North Carolina's rail corridor acquisition and preservation statutes. The rail corridor preservation statutes do not give the NCDOT the authority to abandon or relinquish its interest in acquired rail property. Absent a situation involving a restoration of rail service, abandonment or relinquishing of our property rights is contrary to the General Assembly's express mandate concerning corridor preservation.

Please call on me if I can respond to any questions that you may have.

Sincerely,

Patrick B. Simmons
Rail Division Director

PBSsb

cc: Dan Arrasmith, NC Rails-Trails

MAILING ADDRESS:
NC DOT RAIL DIVISION
1553 MML SERVICE CENTER
RALEIGH NC 27689-1553

TELEPHONE: 919-733-4713
FAX: 919-715-6580
WEBSITE: WWW.BYTRAIN.ORG

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC



Powerline Utility Corridors

Within the County there are several high power transmission lines operated and maintained by Duke Energy. Steadman Sugg of Duke Energy informed the Steering Committee of the utility company's policy with regard to trail use within its easement. However each of the power line easements, while maintained by Duke Energy, is owned by the underlying property owners who must give consent to a greenway trail prior to approaching Duke Energy.

During the public forums the County's citizens expressed a desire to utilize this type of easement by creating maps delineating trail locations, in particular a north-south connector between Sherrills Ford and Hudson Chapel Road. This corridor provides a desirable connection without relying upon additional road right of way; however only after exhausting other options should this right of way be planned. Additionally, the Committee agreed upon routing trail between Sherrills Ford Road and Mountain Creek Park via another transmission line easement. See Appendix VII for design guidelines within transmission rights of way.



High power transmission line connecting Sherrills Ford Road and Mountain Creek Park



Appendix VII: Design Guidelines



Context Sensitive Design Solutions:

Protection of ecologically sensitive and diverse areas:

Occasionally trail routes may come in conflict with ecologically sensitive areas. This disturbance should be limited and efforts made during the design development process to avoid these areas. Where determined necessary boardwalks and trail barriers may mitigate a trail's impact.

Restricted Access Trails:

Occasionally trail routes may pass through sensitive ecological areas and environmental assessment will allow trail at grade but require the protection of surrounding plant communities. Restricted access trails limits all disturbance to the confines of the trail. Appropriate barriers may include black chain link fence, wood posts and cable, wood fence, or steel rail.





Boardwalks:

A design may require a trail to pass through ecologically sensitive areas. Elevated boardwalks offer a minimal impact design solution. Boardwalks designed with a pinned footing detail allow trails to extend through sensitive areas without the heavy impact associated with concrete footings, which require damaging excavations and the use of large construction equipment. Also pinned footings allow boardwalks to 'float' above sensitive plant and animal communities; their construction does not require the heavy equipment associated with concrete footing installation.



Trail Adjacent Farmlands:

Locations in which planned trail routes lie adjacent to farmlands careful consideration should be given to include mitigation strategies to protect the interest of both land owners and trail users.

Potential strategies may include:

- Early engagement with land owners to discuss trail implementation and facilitate collaboration.
- Designed buffers including physical barriers such as appropriately designed fencing and/or plant screening.
- Establish minimum offset from edge of pavement to property boundary.
- Discuss each land owner's operation and maintenance procedures, specifically pest mitigation strategies, to review potential conflicts with trail users.



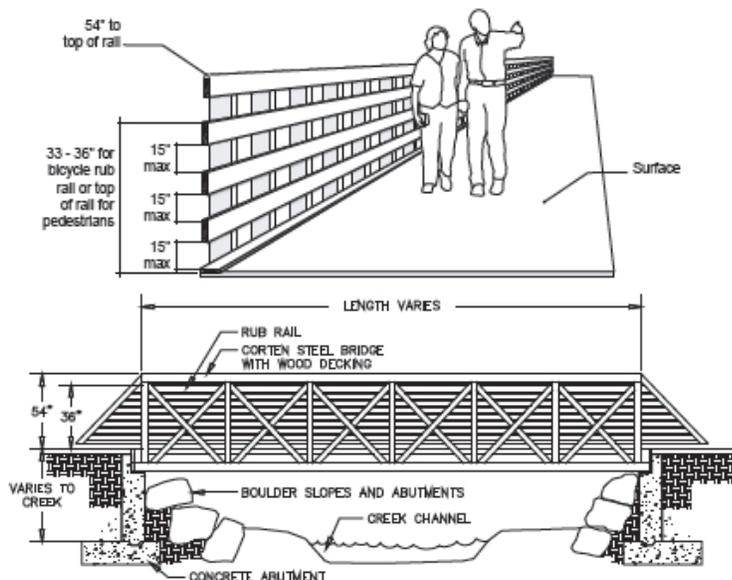
Bicycle/Pedestrian Bridge:

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)

- The function of a bridge in an off-road, multi-use trail situation is to provide access to the user over certain natural (i.e. streams) or man-made (i.e. roadways) features.
- If a corridor already contains a bridge such as an abandoned rail bridge, an engineer should be consulted to assess the structural integrity before removal or reuse
- A trail bridge should support 6.25 tons
- Information about the load bearing capacity of bridges can be found in the American Association of State Highway Transportation Officials (AASHTO) Standard Specifications for Highway Bridges.
- There are many options in terms of high quality, prefabricated pedestrian bridges available.
- 54 inches to top of rail Surface; 33-36 inches for bicycle rub rail or top of rail for pedestrians 15 inches

Railings

- Railings are important safety features on bridges, boardwalks or in any areas where there may be a hazardous drop-off.
- At a minimum, railings should consist of a horizontal top, bottom, and middle rail. Picket style fencing should be avoided as it may present a safety hazard for bicyclists.
- A pedestrian railing should be 42" above the surface.
- The middle railing functions as a "rub rail for bicyclists and should be located between 33 and 36" above the surface.
- Local, state, and/or federal regulations and building codes should be consulted to determine when it is appropriate to install a railing.

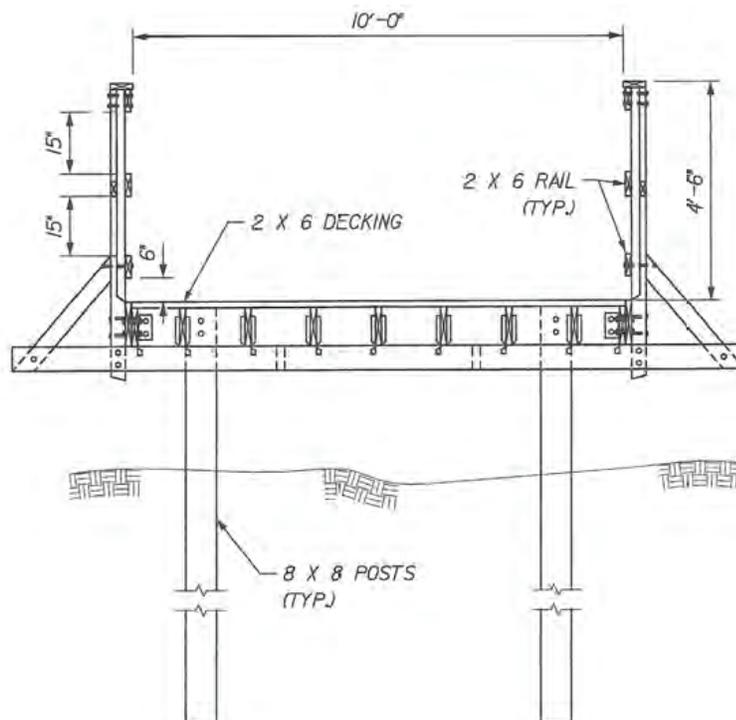




Boardwalk and Bridges:

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)

- Boardwalks are used in environmentally sensitive areas where they function as “mini-bridges”
- When the height of a boardwalk exceeds 30 inches, railings are required
- The thickness of the decking should be a minimum of 2 inches
- Decking should be either non-toxic treated wood or recycled plastic.
- The foundation normally consists of wooden posts or auger piers (screw anchors). Screw anchors provide greater support and last much longer.
- Opportunities exist to build seating and signage into boardwalks.
- In general, building in wetlands should be avoided.





Erosion Mitigation Strategies:

During trail construction, erosion control is required to prevent sedimentation deposit outside the limit of work. Hay bales, waddles, coir logs, and siltation fences are examples of devices used to limit migration of sediment from the construction zone. Preferable options include seed embedded filter socks and interpretive stormwater features such as the ecological sculptures by Daniel McCormick. The artist uses local riparian materials in the form of subtle sculpture and mounding to assist in the reestablishment of damaged watershed zones.

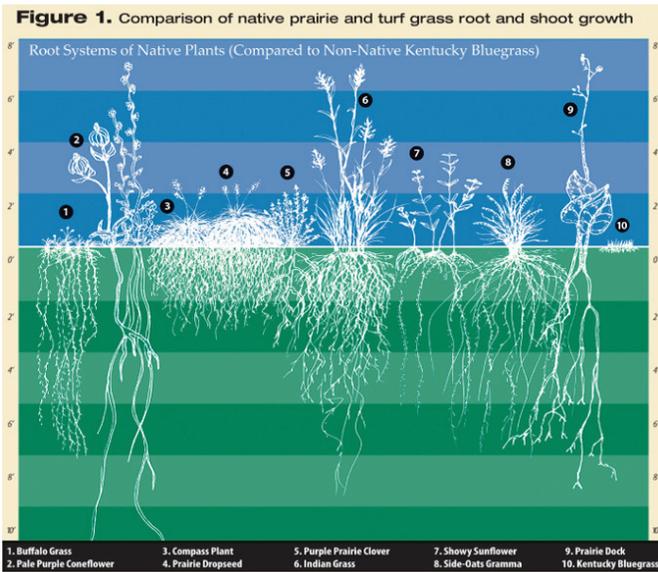
Temporary seeding is usually part of any erosion control strategy. Seeding of native grasses and forbs is recommended for temporary and permanent erosion control. Native grasses produce root zones up to 6 feet in depth providing greater protection against erosion than other conventional warm season grasses such as fescues and Bermuda.



Established Meadow



Reclamation art by Daniel McCormick



Native grass root zone depth chart



Native plug installation



Interpretive Signage:

Signage may be used for wayfinding or as an interpretive element in the landscape. Interpretive signage highlights site context and deepens the observer's understanding of a site's historical, cultural, and ecological context.

- Signage may be incorporated into natural features
- Signage may be stand-alone kiosks or boards with an educational element
- Constructed elements should acknowledge the site specific context
- Constructed elements should complement other site furnishing elements





Creekside Trail (urban areas only)

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)

- Located only in urban areas where right-of-way constraints and channelized streams restrict trail development
- Typically positioned directly adjacent to the stream channel and are, therefore, subject to frequent flooding.
- Parking areas near urban creeks can also be retrofitted to accommodate this type of trail.
- When box culverts are built along creeks on planned trail routes, they should be designed to meet this trail type, and should have sufficient space for trail users.
- Require hard paved surfaces of concrete to withstand high-velocity stream flows.
- Retaining walls or other structural elements may also be required for stable construction and to protect the trail from erosion and flood damage.
- The installation of railings, benches, signage, and trash receptacles, which could obstruct flow during storm events, should be carefully considered.
- The use of retaining walls as seat walls is one way in which non-obtrusive amenities can be included.
- Special consideration should be given to the mitigation of impacts from trail construction on the natural environment.
- Minimum 10 feet width for multi-use trails.

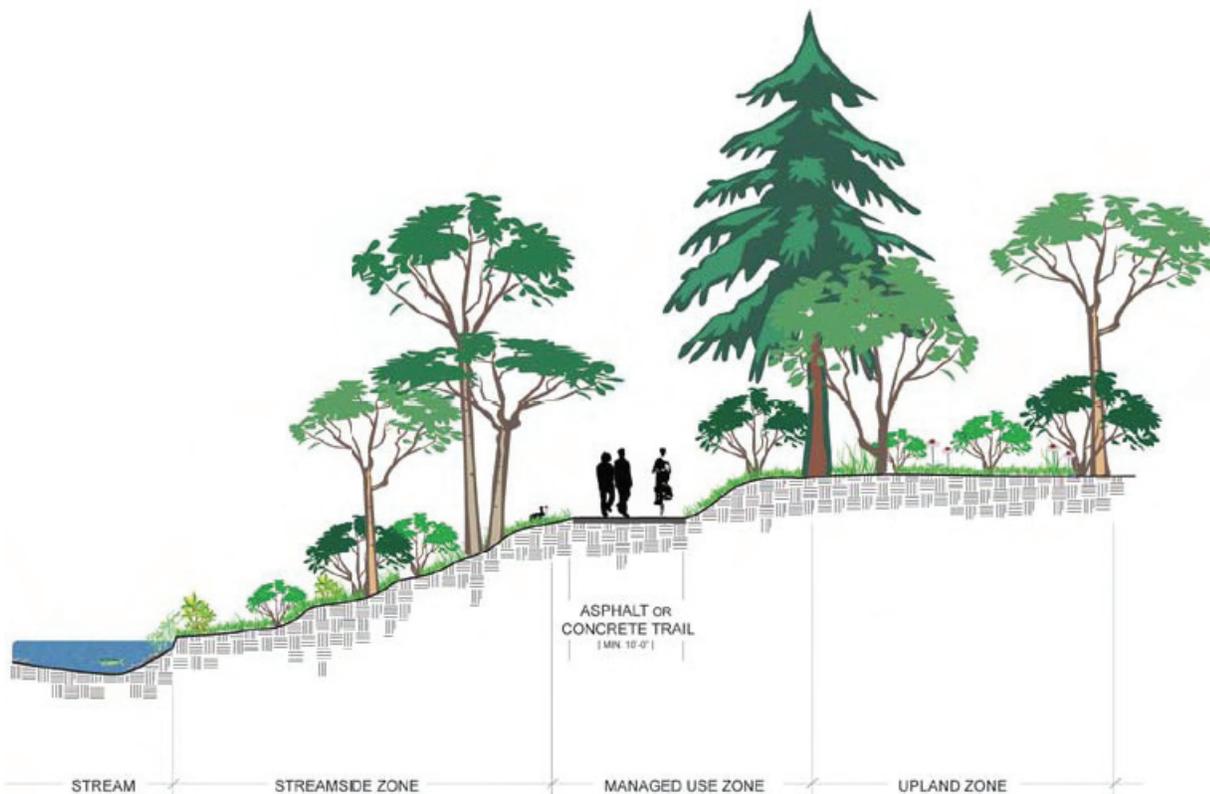




Floodway Trail (limited areas):

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)

- Typically positioned within the floodway, but not directly adjacent to streams; some vegetative buffer between the stream and trail should be left intact.
- Subject to infrequent, periodic flooding.
- Require paved surfaces of either asphalt or concrete depending on frequency of flooding and expected velocity of flow.
- Proper trail foundation will increase the longevity of the trail.
- No soft shoulder should be constructed due to flood considerations.
- All elements of the trail, including the trail tread, railings, benches, and trash receptacles, will be periodically flooded; materials should be carefully selected and sited accordingly.
- Special consideration should be paid to the mitigation of impacts from trail construction on the natural environment.
- Minimum 10 foot width for multi-use trails.

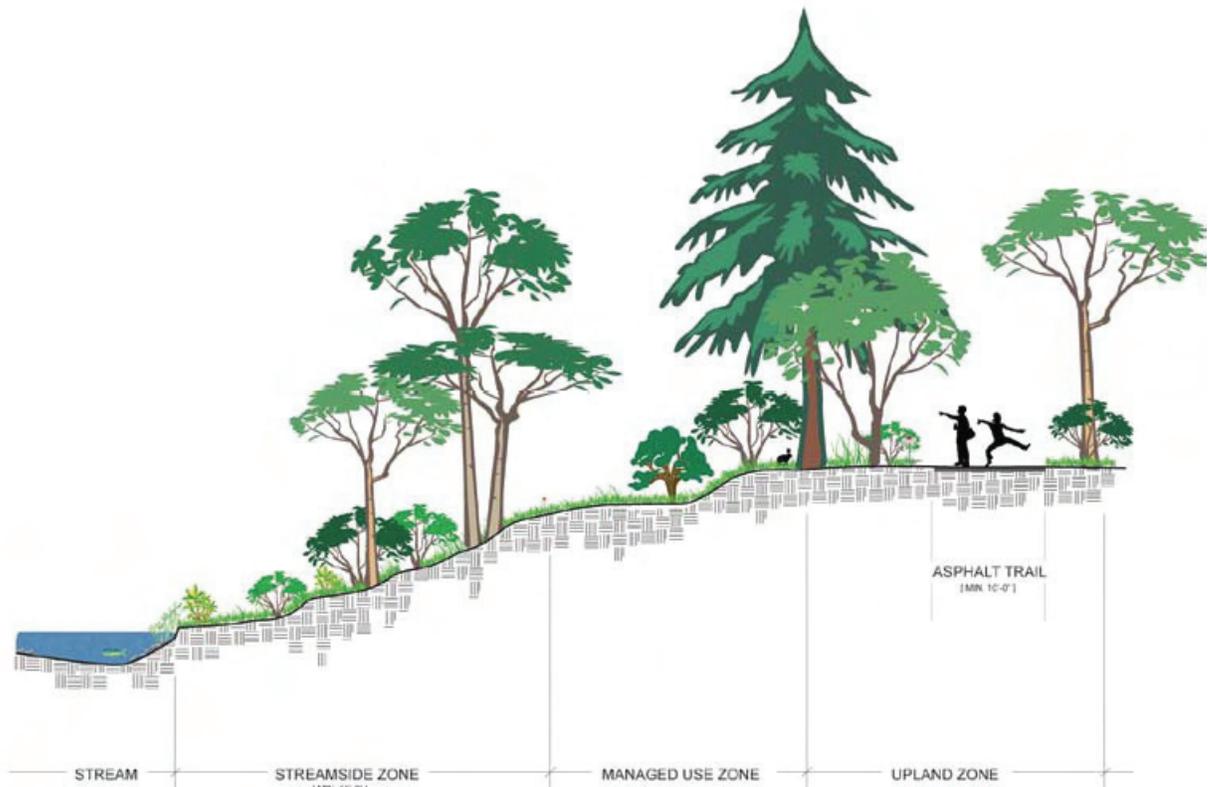




Floodplain Trail:

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)

- Typically positioned outside the floodway, within the floodplain; significant vegetative buffer between the stream and trail should be left intact.
- Subject to occasional flooding, during large storm events.
- Paved asphalt recommended, though an aggregate stone surface may be adequate in some locations.
- Proper trail foundation will increase the longevity of the trail.
- Minimum 2 foot graded shoulder recommended.
- Minimum 10 foot width for multi-use trails.





Water Trail and Water Trail Access Sites:

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)

- Also known as water-based trails, paddle trails, blueways or blue trails.
- Typically defined as sections of rivers, creeks, wetlands, and other water bodies that are designated as routes for canoeing, kayaking, and tubing.
- Clearly marked access points and/or trailheads should be provided.
- Educational signs, directional signs, and regulatory signs should inform users of their surroundings and safe navigation of the watercourse safely.
- Improved rapids are increasingly popular along water trails; they should only be used in areas where high usage is expected and a demand for such a facility has been established.
- The provision of designated picnic areas and camp sites along water trails can reduce the problem of trespassing private property along the watercourse.
- If a pathway from parking area to water access exceeds 1500 feet, a permanently affixed canoe or kayak stand should be positioned every 1000 feet.
- Informational signs containing emergency contact numbers, as well as contact numbers for the managing partner, must be displayed at the parking area and/or within 150 feet of the access site.
- Access to waterway must be firm, compacted, and permanently delineated.

Minimum construction for facilities:

- Lights in parking and picnic areas are recommended
- Maps should be provided to guide users along the watercourse and to access sites for drop-in and take-out.
- Natural, but well maintained pathway from parking to water access:
 - Pathway at least 6 feet wide
 - Grass not higher than 8 inches
 - Tree overhang not lower than 14 feet
 - Grade must not exceed 20 percent





Natural Surface Trail:

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)

- Also known as footpaths or hiking trails
- Designed to accommodate pedestrians on foot; not intended for cyclists or other wheeled users.
- Trail surface typically made of dirt, rock, soil, forest litter, snow, ice, pine mulch, leaf mulch, or other native materials.
- Preparation varies from machine-worked surfaces to those worn only by usage.
- May be more appropriate for ecologically sensitive areas.
- Provide positive drainage for trail tread without extensive removal of existing vegetation.
- Varies in width from 18 inches to 5 feet.
- Vertical clearance should be maintained at 9 feet.

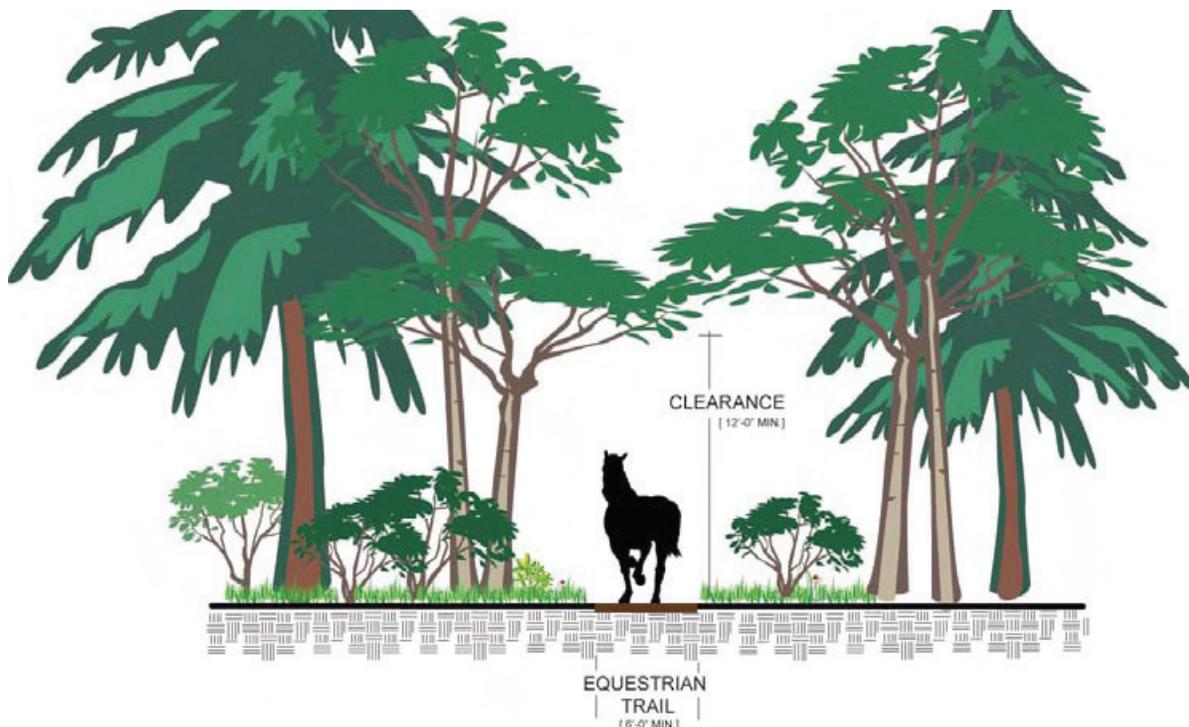




Equestrian Trail:

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)

- Vertical clearance for equestrians is at least 10 feet, with 12 feet preferred.
- A horizontal clearance should be at least 5 feet.
- Dirt or stabilized dirt is a preferred surface. Crushed granite screenings are also acceptable. Hard surfaces like asphalt and concrete are undesirable for equestrians because they can injure horses' hooves. Granular stone may also present problems because loose aggregate can get stuck in hooves.
- Within the tread, large rocks, stumps, and other debris should be cleared.
- Sight distances for equestrians, who usually travel between 4 and 6 miles per hour, should be at least 100 feet.
- Hitching posts should be installed at rest stops, picnic areas, and rest rooms.
- For horseback riders, a water crossing is preferred over a high and narrow bridge. If erosion is a concern, or if water crossing is for some reason undesirable, then provide mounting blocks at the bridge so riders can dismount and lead their horses.
- Equestrians should be expected to remove their horse's manure from trail surfaces. Many riders are not comfortable dismounting and taking care of this as it occurs. Therefore, equestrians should be strongly encouraged (or possibly required in exchange for use of the trail) to join fellow riders on manure clean-up days.





Multi-Use Equestrian Trail:

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)

- Standards from 'Equestrian Trail' on preceding page also apply here.
- Although equestrians prefer a separate tread, a cleared shoulder could suffice if necessary.
- If a single tread is used to accommodate numerous users, including equestrians, extra effort should be used to ensure the sub-base and sub-grade of the trail are firm and properly prepared.
- Signs indicating that equestrians have the right-of-way on a multi-use trail should be included in the design plan and posted on the trail. Signs that can quickly and clearly indicate trail protocol can help educate trail users about equestrians.
- Maps should be provided to guide users along the watercourse and to access sites for drop-in and take-out.
- Natural, but well maintained pathway from parking to water access:
 - Pathway at least 6 feet wide
 - Grass not higher than 5 inches
 - Tree overhang not lower than 14 feet
 - Grade must not exceed 20 percent

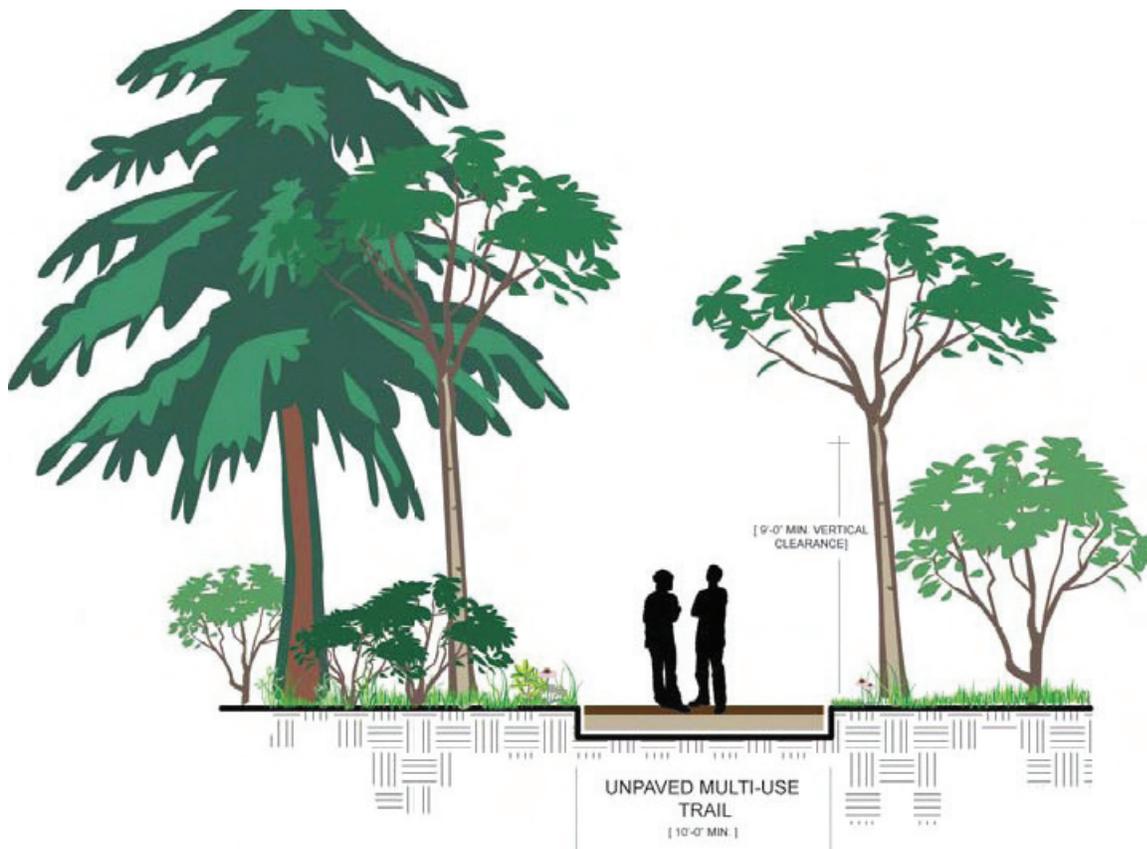




Unpaved Multi-Use Trail (10' wide typical):

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)

- Potential materials used to surface an unpaved, multi-use trail include natural materials, soil cement, graded aggregate stone, and shredded wood fiber.
- The soft surface materials are less expensive to install and compatible with the natural environment; however, they do not accommodate certain users, such as roller-bladers and the physically disabled. Soft surface trails are preferred by some runners and mountain bicyclists.
- While soil cement will accommodate most users, bicyclist should have only restricted use to prevent premature degradation of the surface.
- Graded aggregate may need to be kept in place with wood or metal edging, and is limited to flatter slopes.
- If properly compacted and constructed, granular stone surface trails can support bicycles and wheel-chairs.
- Shredded wood fiber blends with the natural environment, but decays rapidly and must be installed on flat subgrades.





Paved Multi-Use Trail (10' wide typical):

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)

- Typically composed of asphalt or concrete, paved multi-use trails should be designed to withstand the loading requirements of occasional maintenance and emergency vehicles.
- In areas prone to frequent flooding, it is recommended that concrete be used for its excellent durability.
- As a flexible pavement, asphalt should be considered when installing a paved multi-use trail on slopes.
- A concern for the use of asphalt is the deterioration of trail edges. Installation of geotextile fabric beneath a layer of aggregate base course can help to maintain the edge of the trail. It is also important to provide a 2 foot wide graded shoulder to prevent edges from crumbling.
- Most often, concrete is used for intensive urban applications. It is the strongest surface type and has the lowest maintenance requirement if it is installed properly.
- Centerline stripes should be considered for trails that generate substantial amounts of traffic. Centerline stripes are particularly useful along curving sections of trail.



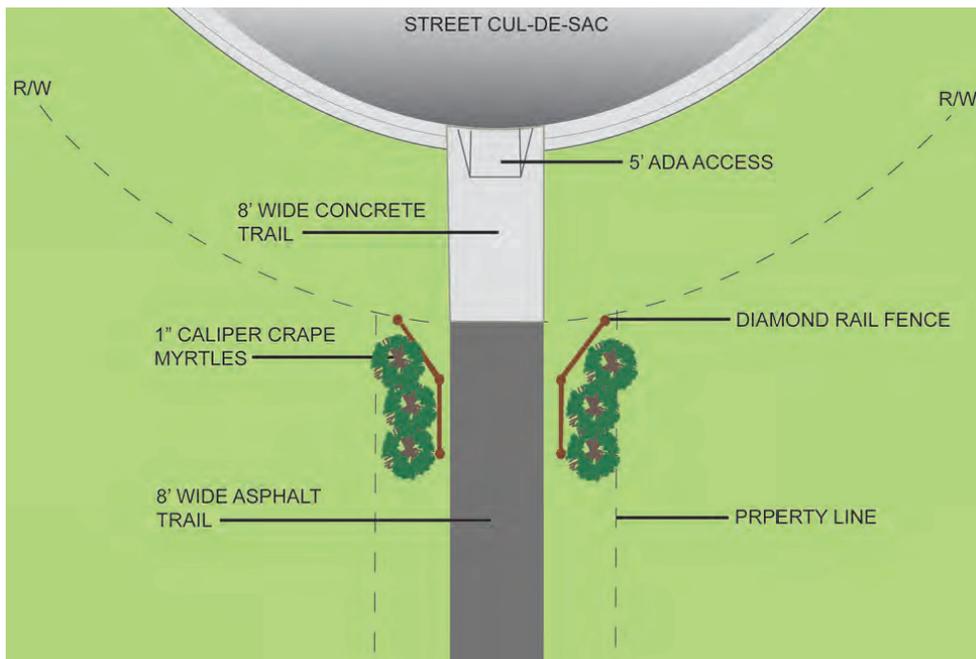


Neighborhood Entrance Trail:

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)

Where an access trail is developed in a residential area to link to a greenway, the following standards are recommended:

- Trail pavement shall be 8 feet 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 feet wide only when necessary to protect large mature native trees over 18 inches in caliper, wetlands or other ecologically sensitive areas.
- Trail pavement shall not encroach within the sideyard setback to a distance equal to the sideyard setback of the adjacent property.
- No access trail shall be less than 5 feet wide.
- Access trails should meander whenever possible.
- All landscape materials shall be installed during the appropriate planting season for the particular species.
- Other ornamental landscape shall be included at the street frontage of the access trail based upon input from the residents of the area.
- Annuals may be provided when there is a commitment from at least 3 neighbors or a Home Owners Association to install and maintain these plants.
- Two sections of diamond rail fencing can be included on each side of the trail near the street frontage. Diamond rail will not be included if the respective neighborhood deeds and covenants do not permit it.

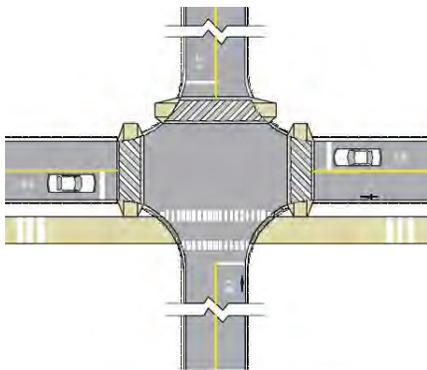




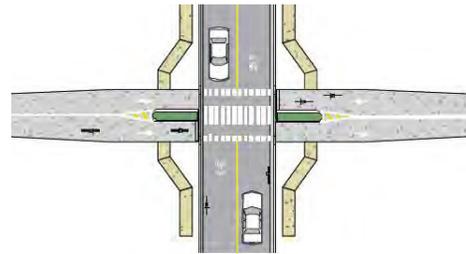
Trail Intersections:

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)

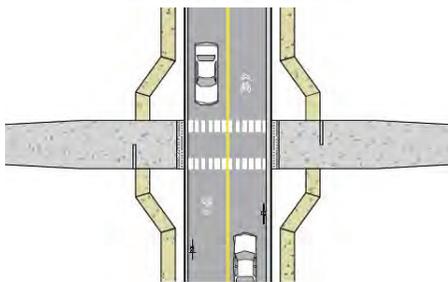
- Site the crossing area at a logical and visible location.
- Warn motorists of the upcoming trail crossing and trail users of the upcoming intersections.
- Maintain visibility between trail users and motorists.
- Intersection approaches should be made at relatively flat grades so that cyclists are not riding down hill into intersections.
- If the intersection is more than 75 feet from curb to curb, it is preferable to provide a center median refuge area.



4-WAY INTERSECTION CROSSING
Shared Use Path

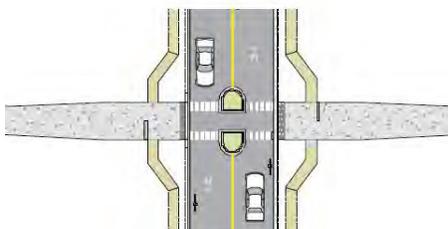


MIDBLOCK CROSSING
Shared Use Path with Sidewalks and Medians



MID-BLOCK INTERSECTION
Shared Use Path with Sidewalks

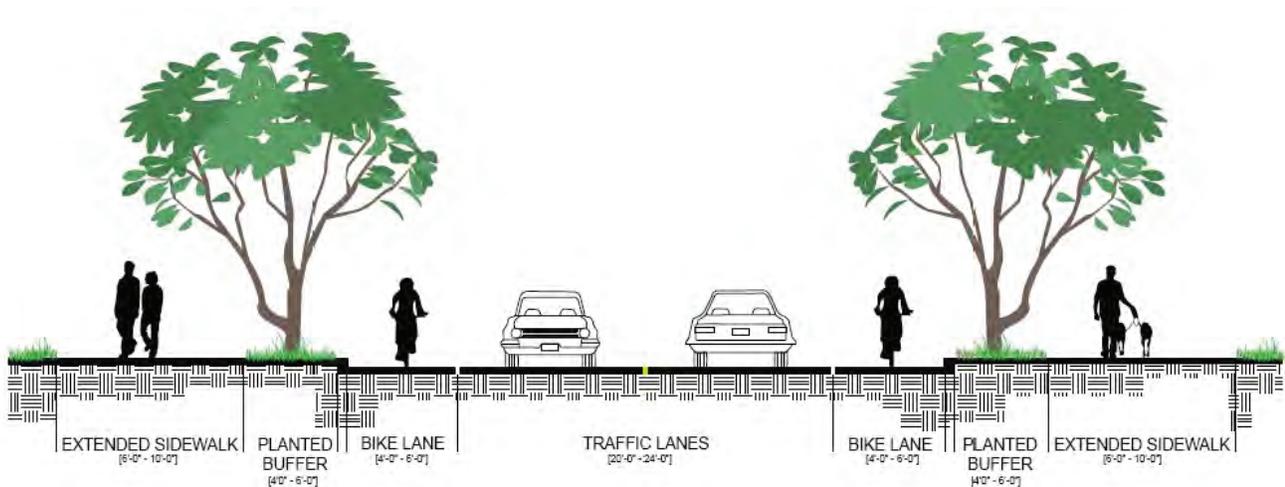
MEDIAN REFUGE
Shared Use Path with Sidewalks





Street Based Trail: Sidewalks and Bikeways

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)
On the following pages several different types of bicycle facilities are described for street based trails, including signed/
shared roadways, wide outside lanes, bicycle lanes, and side paths. In addition to bicycle facilities, all street based trails
should have a wide sidewalk (6-10 feet wide), except where pedestrians are accommodated on sidepath.

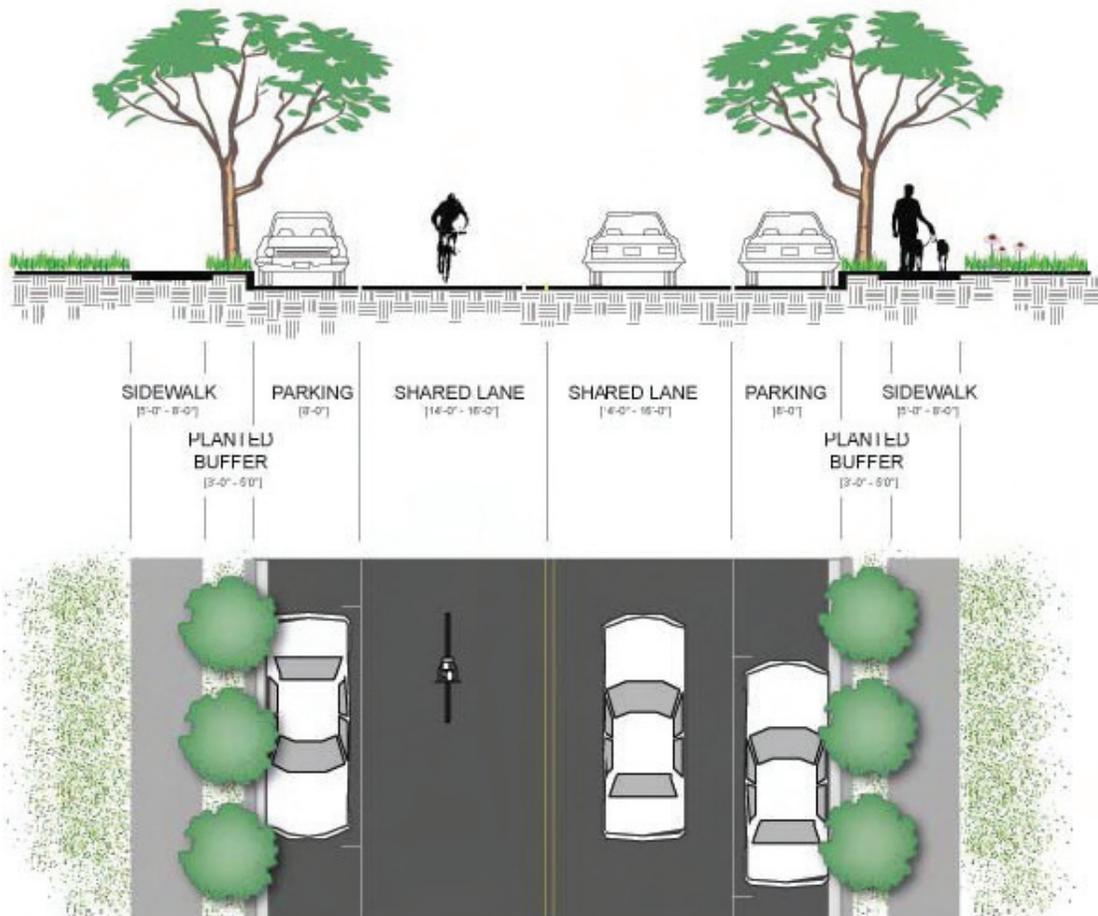




Street Based Trail: Signed/Shared Roadway

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)

- May either be a low volume (less than 3000 cars per day) roadway with traffic calming and signage to create a safe shared use environment, OR a higher volume roadway with wide (14 foot) outside lanes.

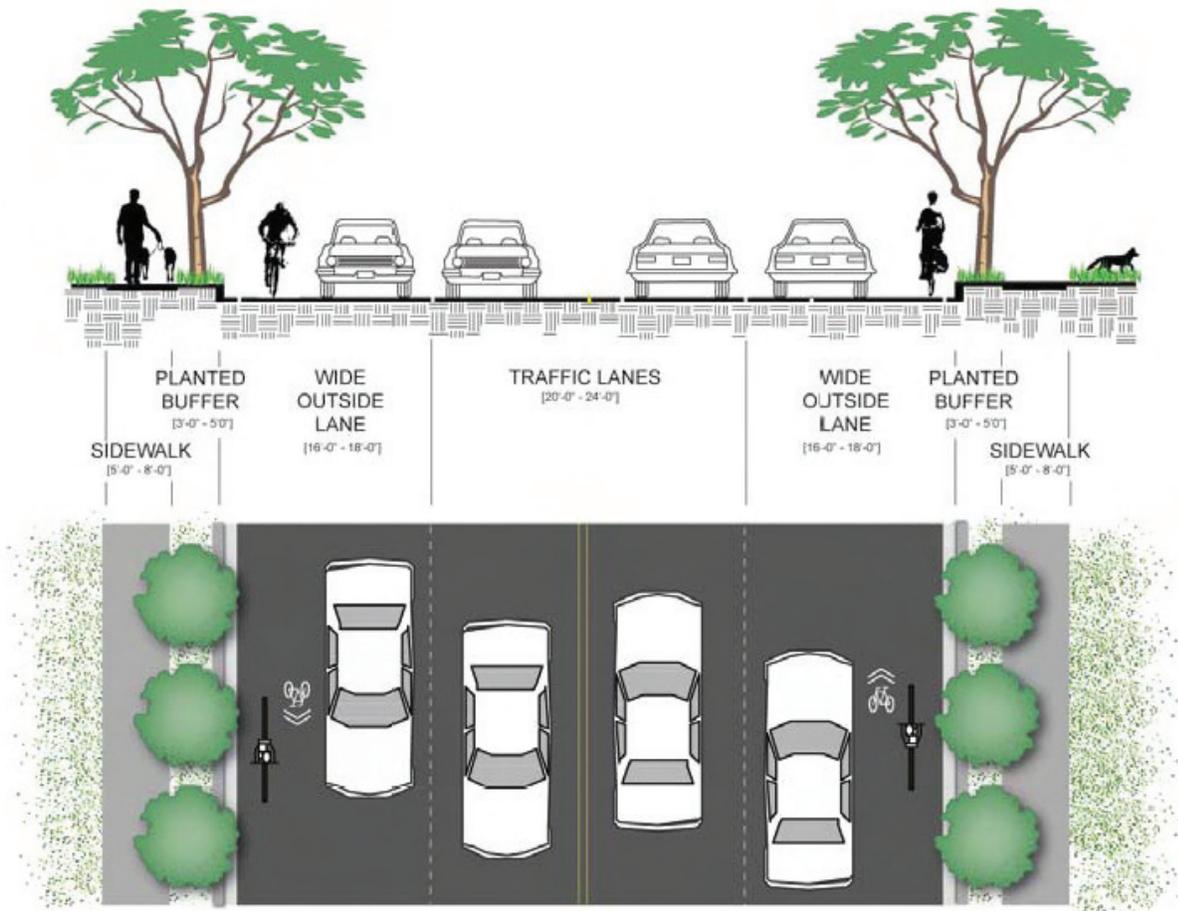




Street Based Trail: Wide Outside Lane

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)

- For skilled bicyclists who are capable of sharing the road with motor vehicles.
- Provide smooth pavement, free of debris.
- Provide compatible storm grates (so that grate openings do not run parallel to the roadway)



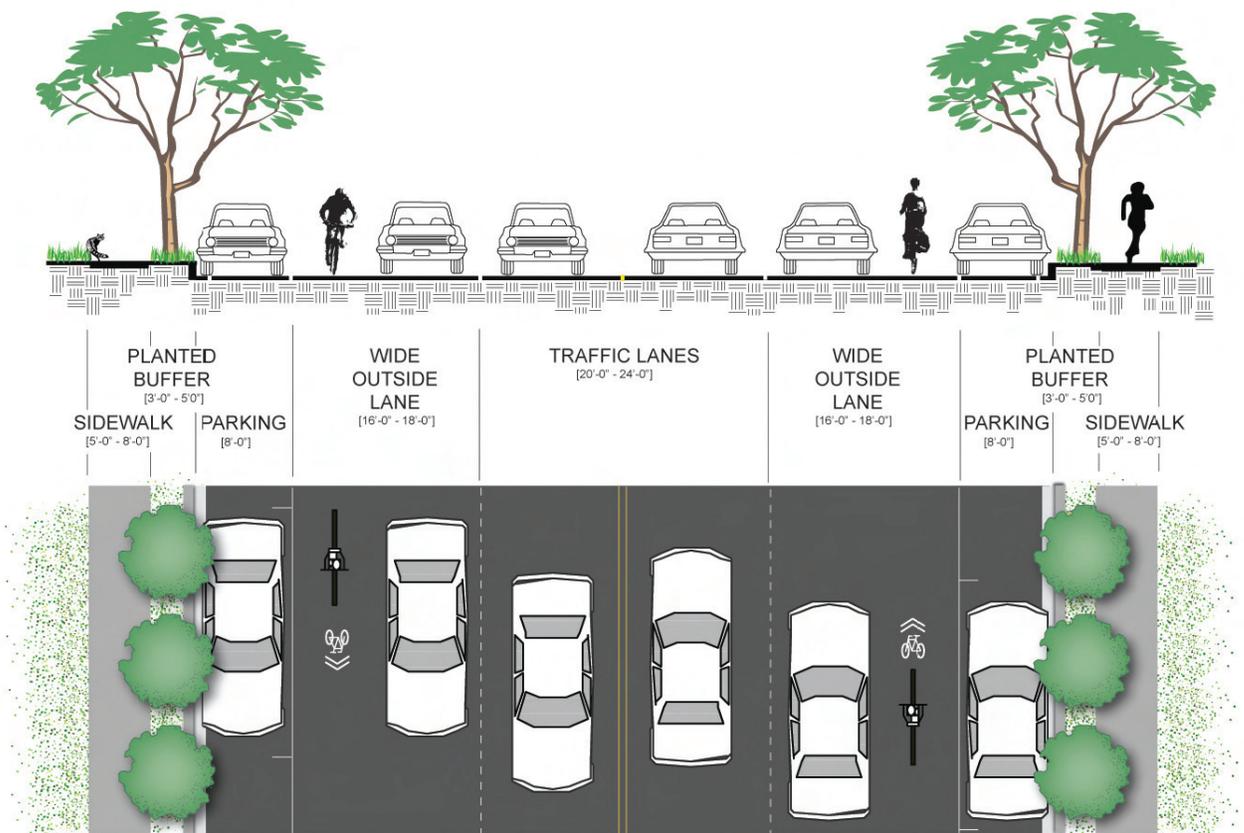


Street Based Trail:

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)

Wide Outside Lane with Parking

Refer to 'Wide Outside Lane' standards on preceding page.

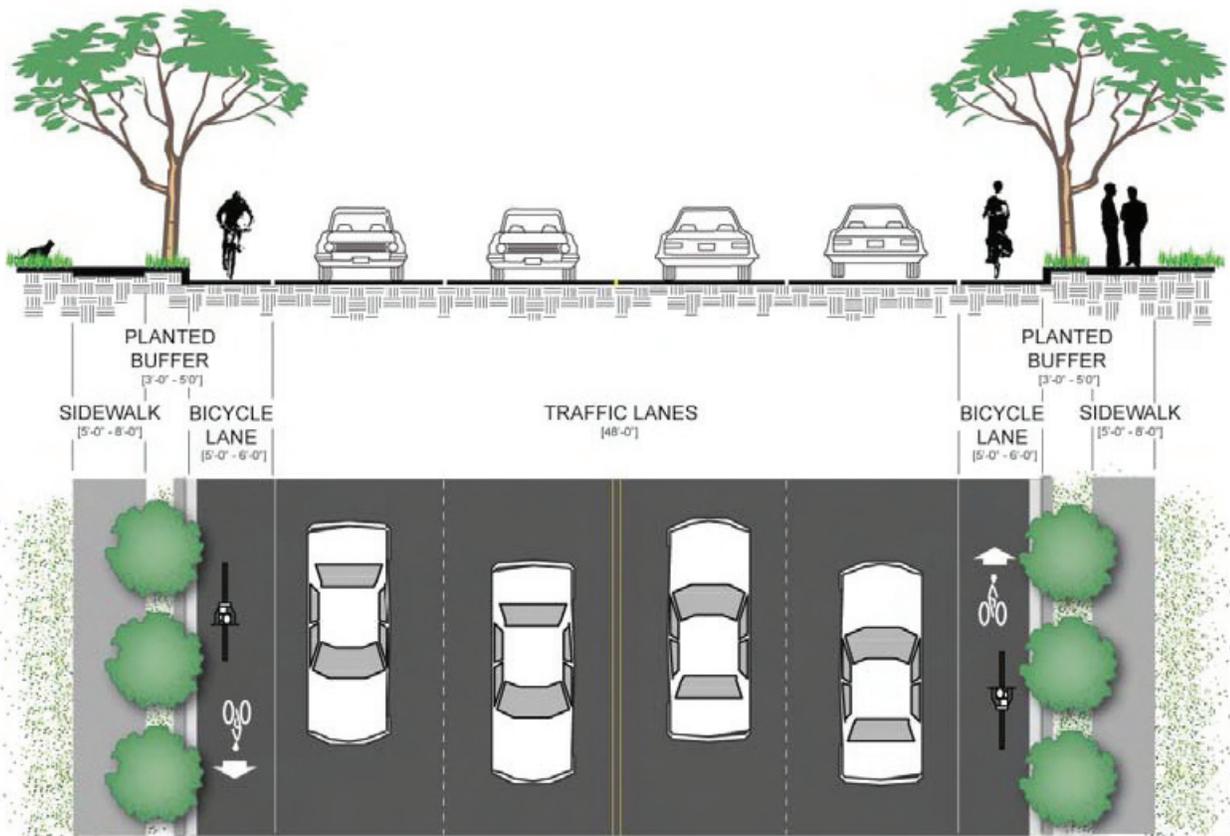




Street Based Trail: Bicycle Lane

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)

- Should be used on roadways with 3,000 or more average daily traffic (ADT).
- Recommended width of 5 feet-6 feet with a minimum width of 4 feet (ASHTO national standard is 5 feet).

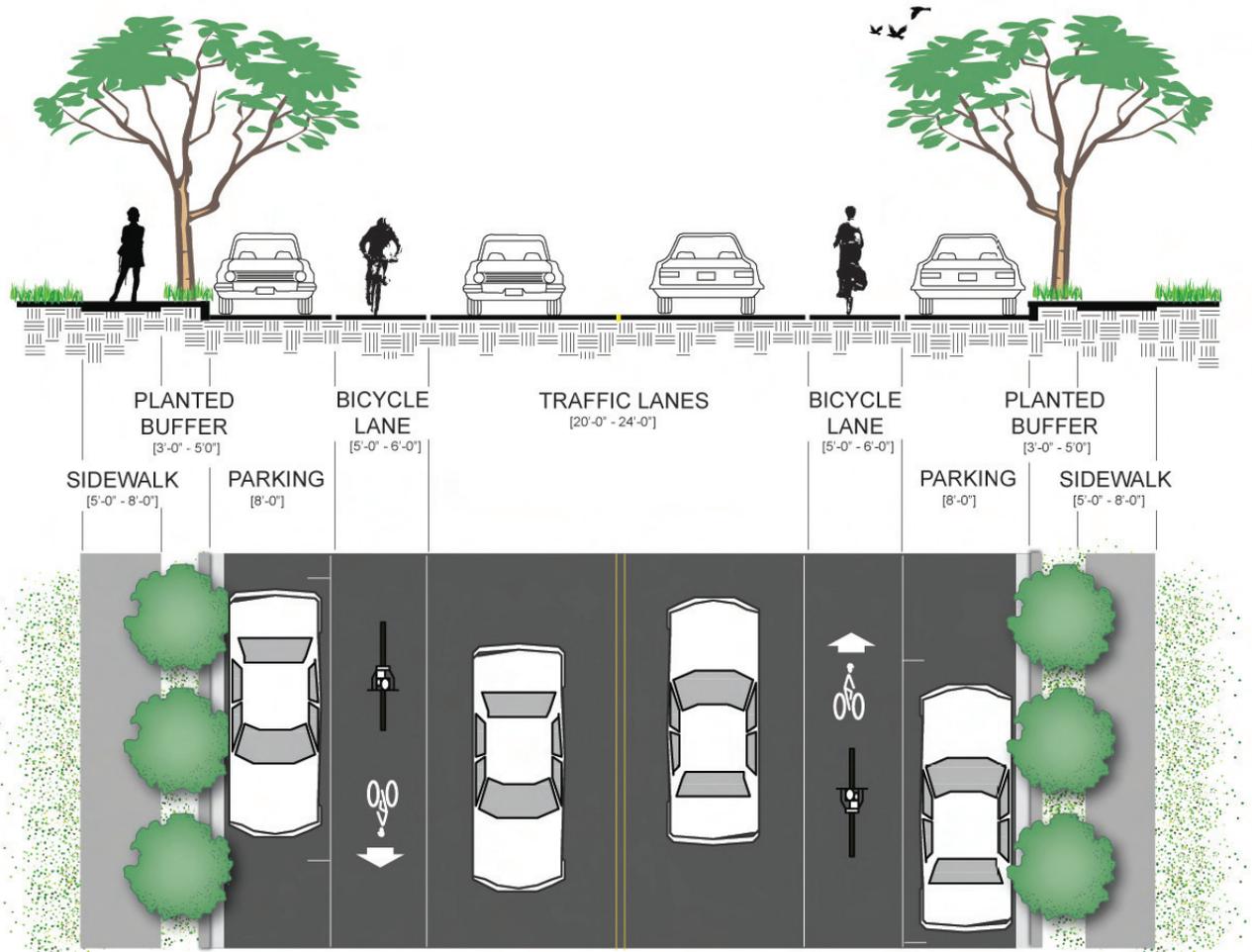




Street Based Trail: Bicycle Lane with Parking

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)

- On moderate volume roadways, such as minor collectors, where on-street parking is permitted and a bike lane is provided, the bike lane must be between parking and the travel lane.
- Appropriate space must be allocated to allow passing cyclists room to avoid open car doors.





Street Based Trail: Side Path

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)

- This type of trail works best in corridors where there are limited driveway/intersection crossings and more desirable destinations along one side of the roadway, or where no roadway space is available to provide bike lanes.
- The trail should be at least 10 feet wide (preferable 12 feet) with a 3 foot to 5 foot, preferably 6 foot, vegetated buffer where possible.
- Side paths are the preferred facility when the primary trail is a street-based.





Trail Underpass:

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)

- Typically utilize existing overhead roadway bridges adjacent to streams or culverts under the roadway that are large enough to accommodate trail users.
- Vertical clearance of the underpass must be at least 8 feet, preferably 10 feet.
- Width of the underpass must be at least 12 feet.
- Proper drainage must be established to avoid pooling of stormwater.
- Lighting is recommended for safety.





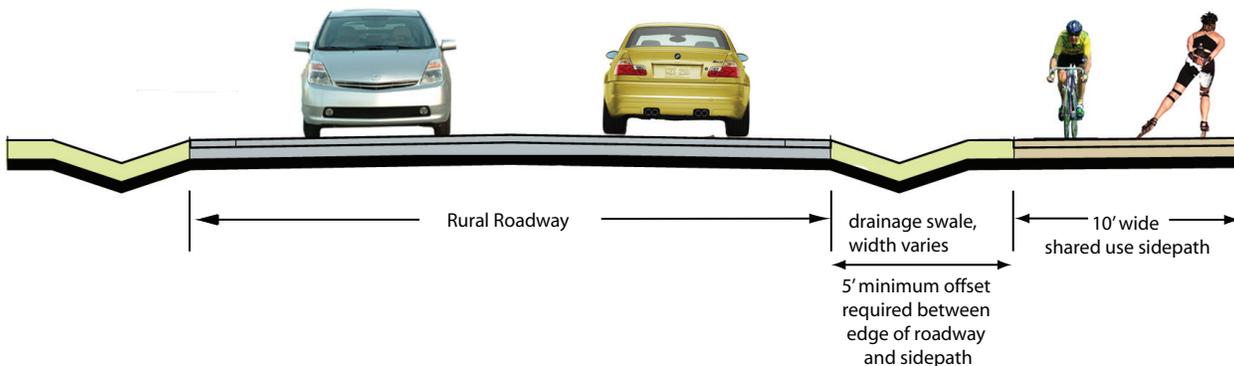
Rural Roadways:

Many of Catawba County roadways stretch into the rural landscape. We heard from folks at open houses express a desire for better and safer bike facilities on the County's rural roadways. Where feasible a Shared Use Pathway offers a solution to accommodate off-road facilities. Design considerations for these areas as recommended from (ASHTO Guide to Development of Bicycle Facilities) include:

- Provide minimum 5 feet horizontal clearance from edge of pavement to nearest edge of trail.
- In any condition where less than 5 feet clearance is provided a vertical barrier with a minimum height of 42 inches is required.
- 10' minimum trail width is recommended. Wider trails may be considered for high-use areas.

Additional considerations include:

- Consult affected landowners to discuss potential right of way development to include trail.
- Coordinate trail development with all utilities.
- Review all local, state and federal statutes for necessary permitting prior to pursuing design development within the right of way.

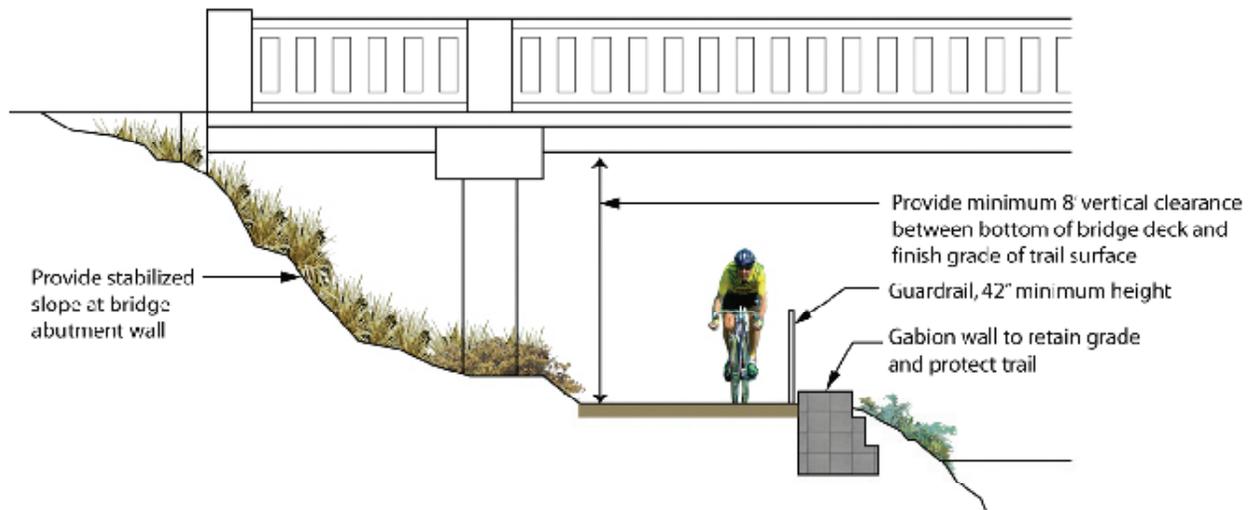




Under Bridge Crossings:

Catawba County has a wealth of riparian corridors. In many instances, The Thread Trail is routed adjacent to a stream corridor. At locations in which proposed trails cross a street or highway condition, this may occur as an at-grade crossing, or in some instances, the trail may need to be routed underneath a bridge overpass. Design considerations for these areas include:

- Provide minimum 8 feet vertical clearance from top of trail surface to lowest point of bridge deck structure, 10 feet vertical clearance is recommended
- Gabion walls may be necessary to protect the trail, retain grade, and create a flat 'shelf' upon which to construct the trail.
- Concrete trail with crushed stone base is recommended for durability and longevity, minimizing maintenance.
- Review all local, state and federal statutes for necessary permitting prior to pursuing design development within the floodzone.



Trail along stream corridor at vehicular overpass



Trail Overpass:

(Images and text from Carolina Thread Trail Master Plan for Lincoln Counties; produced by Greenways Inc.)

- Safety should be the primary consideration in bridge/overpass design.
- Specific design and construction specifications will vary for each bridge and can be determined only after all site-specific criteria are known.
- Always consult a structural engineer before completing bridge design plans, before making alterations or additions to an existing bridge, and prior to installing a new bridge.
- A signature bridge should be considered in areas of high visibility, such as over major roadways. While often more expensive, a more artistic overpass will draw more attention to the trail system in general, and could serve as a regional landmark.



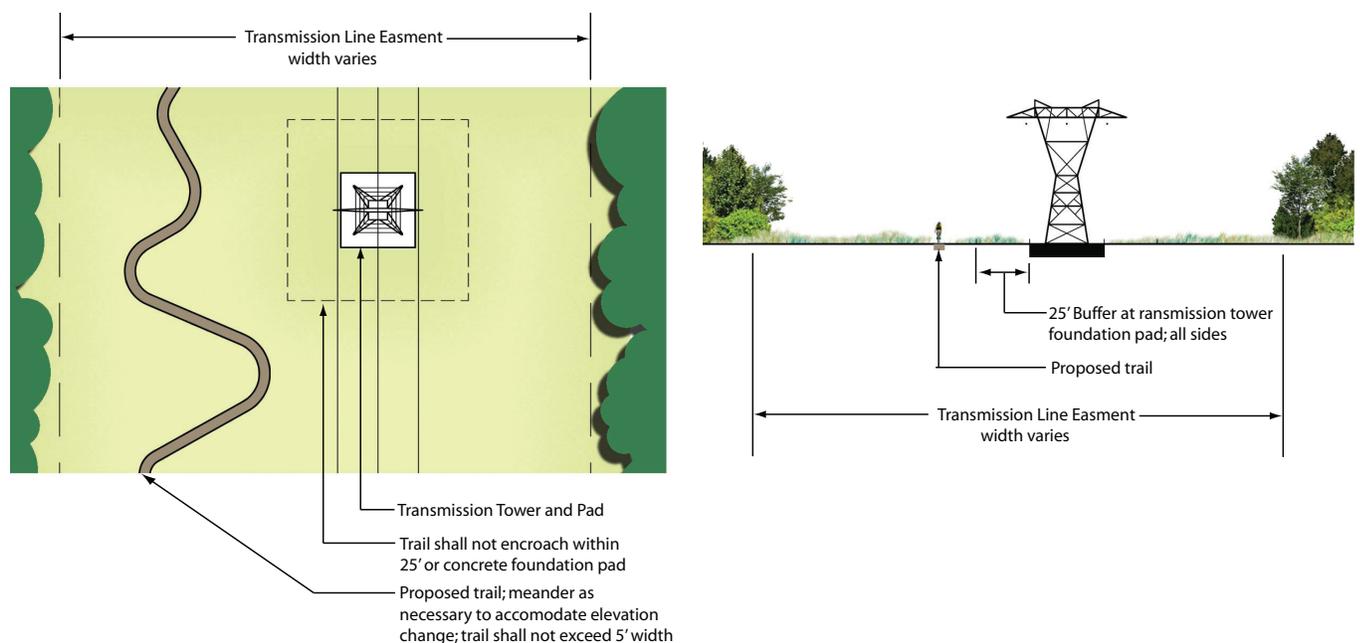


Trail within Duke Energy Transmission Easement

Any trail segment utilizing Duke Energy’s easements is required to adhere to the established public criteria regarding trails and greenways, as well as the following stipulations:

- The trail must not exceed 5 feet in width.
- The easement shall only include the width of the 5’ trail. A maintained shoulder will not be included.
- The trail must not encroach within 25 feet of a utility tower foundation pad.
- The trail will be allowed to meander as much as necessary to control erosion and/or ease longitudinal slopes along the trail.
- The trail must not cross under power transmission lines. Its layout is required to be ‘justified’ to the open side of the easement.
- Most of Duke Energy’s Rights of Way are located on private property. In no way will Duke Energy seek to obtain the rights of ingress and egress onto private property nor will Duke work on behalf of the applicant to secure these rights.
- Duke Energy is not responsible for the destruction of any property in an attempt to ingress or egress from the Right of Way.
- Duke Energy reserves the rights to approve or deny any application, for any reason, that meets these criteria.
- Duke Energy’s Electric Transmission Rights-of-Way Guidelines / Restrictions apply. For reference, these guidelines are provided on the following page

During the design development process, Duke Energy should be involved in the coordination and review of greenway design. All trails within the easement shall be approved in writing by Duke Energy prior to construction.





DUKE ENERGY'S ELECTRIC TRANSMISSION RIGHTS-OF-WAY GUIDELINES/RESTRICTIONS VALID FOR NORTH CAROLINA AND SOUTH CAROLINA

This list of rights-of-way restrictions has been developed to answer the most frequently asked questions about property owner use of Duke Energy's electric transmission rights of way. This list does not cover all restrictions or all possible situations. You should contact the Asset Protection Right-of-Way Specialist if you have additional concerns about the rights of way. This list of restrictions is subject to change at any time and without notice. Duke Energy reserves all rights conveyed to it by the right-of-way agreement applicable to the subject property. All activity within the rights of way shall be reviewed by an Asset Protection Right-of-Way Specialist. It is strongly suggested that you contact Duke Energy and submit plans for approval prior to construction of any improvements within the rights of way.

1. Structures, buildings, manufactured homes, mobile homes and trailers, satellite signal receiver systems, swimming pools (and any associated equipment and decking), graves, billboards, dumpsters, signs, wells, septic systems or storage tanks and systems (whether above or below ground), refuse of any type, flammable material, building material, wrecked or disabled vehicles and all other objects (whether above or below ground) which may, in Duke Energy's opinion, interfere with the electric transmission right of way, in any way, are not allowed within the rights-of-way limits. Transformers, telephone/cable pedestals (and associated equipment), and fire hydrants are not allowed. Manholes, water valves, water meters and backflow preventors are not permitted.
2. Fences shall not be attached to poles or towers. Fences shall not exceed 10 feet in height and shall be installed greater than 25 feet from poles, towers and guy anchors. Fences shall not parallel the centerline within the rights of way but may cross from one side to the other at any angle not less than 30 degrees with the centerline. If a fence crosses the rights of way, a gate (16 foot wide gate at each crossing) shall be installed by the property owner, per Duke Energy's specifications, to allow free access required by Duke Energy equipment.
3. Contact Duke Energy and obtain written approval before grading or filling on the rights of way. Grading (cuts or fill) shall be no closer than 25 feet from a pole or tower leg, and the slope shall not exceed 4:1 on the rights of way. Grading or filling within the rights of way or near a structure, which will prevent free equipment/vehicle access, or creates ground to conductor clearance violations, will not be permitted. Sedimentation control, including re-vegetation, is required per state regulations.
4. Streets, roads, driveways, sewer lines, water lines, and other utility lines, or any underground facilities shall not parallel the centerline within the rights of way, but may cross, from one side to the other, at any angle not less than 30 degrees with the centerline. No portion of such facility shall be located within 25 feet of Duke Energy's supporting structures.



Intersections of roads, driveways, or alleyways are not permitted within the rights of way.

5. Any drainage feature that allows water to pond, causes erosion, directs storm water toward the rights of way, or limits access to or around a structure is prohibited.
6. Contact Duke Energy prior to the construction of lakes, ponds or retention facilities, etc. within the rights-of-way limits.
7. Duke Energy does not object to parking within the rights of way, provided that:
 - a. A barrier, sufficient to withstand a 15 mph vehicular impact, shall be erected by the party constructing the parking area to protect the pole, tower or guy anchor. The barrier shall be located in such a manner as to restrict parking to at least 5 feet from the structure.
 - b. Any access areas, entrances, or exits shall cross (from one side to the other) the rights of way at or near right angles to the centerline, and shall not pass within 25 feet of any structure. Parking lot entrances/exits cannot create an intersection within the right of way.
 - c. Lighting structures within the rights-of-way limits must be approved by Duke Energy before installing. Total height may not exceed 15 feet.
 - d. Signs and other attachments to Duke Energy structures are prohibited.
8. Duke Energy Carolinas will not object to certain vegetation plantings as long as:
 - a. It does not interfere with the access of existing structures or the safe and reliable operation and maintenance of the line.
 - b. With prior written approval, Duke Energy Carolinas does not object to plants, shrubs and trees that are of a species that will not exceed, at maturity, fifteen (15) feet in height.
 - c. Duke Energy Carolinas reserves the right to object to the planting of all plants, shrubs and trees within the right of way easement that may interfere with the proper operation and maintenance of the line.
 - d. Duke Energy Carolinas may exercise the right to cut "danger trees" outside the rights of way limits as authorized by the right of way agreement applicable to the subject property and as required to properly maintain and operate the transmission line.



footnotes

- 1 The First National Biking and Walking Study
- 2 Centers for Disease Control and Prevention, Promoting Physical Activity Through Trails
(<http://www.cdc.gov/nccdphp/dnpa/physical/trails.htm>)
- 3 <http://www.surgeongeneral.gov/index.html>
- 4 Burke, Edmund R., Ph.D. Benefits of Bicycling and Walking to Health (for FHWA), Washington, DC, 1992, p. 13.)
- 5 Unifour Air Quality Plan page 7
- 6 Ibid page 15
- 7 Ibid page 28
- 8 Ibid pages 50-52
- 9 Ibid pages 50-52
- 10 U.S Department of Agriculture, Forest Service Pamphlet #R1-92-100, cited in "Benefits of Trees in Urban Areas," Colorado Tree Coalition, www.coloradotrees.org/.
- 11 www.railstotrails.org/resources/documents/resource_docs/tgc_economic.pdf
- 12 Robert Chambers, Speaker West Virginia House of Delegates, From "Green Jobs" Speech to the West Virginia House of Delegates, Feb. 21, 1995.
- 13 Barthlow, Kelly, Moore, Roger, The Economic Impacts and Uses of Long-Distance Trails, The National Park Service, 1998, p 49.
- 14 A Regional Economic Impact Study of the Carolina Thread Trail, March 2007
- 15 www.railstotrails.org/resources/documents/resource_docs/tgc_economic.pdf Walking the Walk: How Walkability Raises Home Values in U.S. Cities By Joe Cortright, Impresa, Inc., for CEOs for Cities
16. www.AmericanHiking.org
- 17 Catawba County Website, catawbacountync.gov
- 18 US census data
- 19 Conover Parks Master Plan, produced by the City of Conover Planning Department; City of Conover, NC 28613
- 20 2008 Conover Pedestrian Transportation Plan, produced by the City of Conover Planning Department; City of Conover, NC 28613
- 21 The Park and Recreation Master Plan for Hickory, North Carolina; produced by Gardner Gidley and Associates, Clemmons NC 27012; February, 1997
- 22 Sidewalk, Bikeway, Greenway, and Trail Master Plan, Hickory NC produced in 2000 and updated in 2005
- 23 The Parks and Recreation Needs Assessment, produced by Site Solutions for the City of Hickory, NC; May 4, 2010.
- 24 Duke Energy Comprehensive Relicensing Agreement Recreation Amenities for Catawba County
- 25 Lake Norman Regional Bicycle Plan -<http://www.lakenormanrpo.org>



26 The Greater Hickory Recreation/Tourism Plan was prepared in 2006 by Woolpert Incorporated

27 The Mountain Creek Park Plan, prepared by Catawba County Planning Department, 2008 January 16

28 Foresight , Final Report July 2004, produced by the FORESIGHT Committee in association with the Western Piedmont Council of Governments

29 Catawba County's Parks Master Plan, McGill Associates Hickory, NC 28601 adopted 2007 December 17, prepared for Catawba County Board of Commissioners.

30 County's Small Area Plans

31 The Unifour Strategic Air Quality Plan (DRAFT Revision) August 13, 2010;

http://www.surgeongeneral.gov/topics/obesity/calltoaction/fact_vision.html

