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12 | GREENWAYS

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INTRODUCTION

The Town of Apex is a fast-growing residential community located southwest of Raleigh in Wake County, North Carolina. As the Town continues to develop, the overall demand for recreational facilities and greenways increases. This plan aims to refine bicycle and pedestrian facility recommendations for the community, which already features an extensive network as the backbone of its park system. This plan also builds on recommendations featured in previous planning efforts, including the *2019 Bike Apex*, to improve access to parks, schools, and shopping areas while focusing on environmental protection, user safety, and overall connectivity. Regional connectivity is also an important aspect of the plan as it seeks to strengthen connections to neighboring communities including the Towns of Cary and Holly Springs, along with Chatham County. Proposed greenway recommendations may also support other communities throughout Wake County, which will be linked by the county-wide greenway system. The plan will also provide a framework for Town staff, residents, developers, and regional partners to create recommendations for greenway networks, policies, and programs that guide future development and enhance quality of life for residents.

WHAT IS A GREENWAY?

A greenway is a separated linear path that provides a low-stress recreational or transportation experience for bicyclists, pedestrians, skaters, wheelchair users, joggers, and others. Greenways are also considered open space corridors that may protect environmentally sensitive lands or stream corridors. Sometimes, greenways are referred to as a trail, shared-use path, and/or multi-use path. Separated paths that are adjacent to roadway corridors are called side paths or street-side greenways and contribute to a community's comprehensive bicycle and pedestrian system. Surface materials often vary for greenways. The two most common surface types are paved and unpaved. Concrete or asphalt are typically used for paved surfaces, with boardwalks and bridges typically constructed of lumber or composite materials, and chapel hill grit or compacted natural earth surfaces on unpaved greenways.

◀ Figure 12.1 - Image pictured to the left is the greenway at Apex Nature Park

The contents of this chapter rely on technical analysis and community engagement to provide specific and actionable answers to the questions below. The project team gathered responses from Town of Apex staff, civic leaders, residents, business owners, and visitors throughout the planning process.

Where do people want to go via greenways?

Identify key destinations that people want to bike and walk to via greenways.

How do we connect those places?

Identify the facilities, standards, and wayfinding signage to connect key locations.

How do we build the network?

Identify priority projects, costs, and funding opportunities.

How do people plan to use the greenway network?

Identify programs and policies to promote recreational opportunities and active transportation along greenways.

GUIDING PRINCIPLES OF A GREENWAY SYSTEM

There are four guiding principles of a greenway system consistently used across the industry that were considered when authoring the recommendations contained herein. Greenways should always aim to be accessible, equitable, experiential, and safe for its users. Each guiding principle is described below.

Accessibility

Accessibility generally refers to constructing greenways according to defined and approved design criteria, which ensures they can be used and enjoyed by people of all ages and ability levels. Often regulated by the Americans with Disabilities Act (ADA), such criteria tend to be technical in nature, controlling built aspects of greenways such as width, surface material, and longitudinal and horizontal slopes. More recently, the U.S. Access Board published the Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG). This document expands ADA standards to include those more specifically within the public-right-of-way.

The definition and role of accessibility has also been broadened and coined as “universal design” or “inclusive design”. Inclusive expands the idea of accessibility to include the experiences of users with disabilities including mobility difficulties, as well as cognitive, visual, auditory, or other disabilities.

Equity

Equity refers to the state of being equal, impartial, and fair. In the context of greenway planning, equity can refer to social, environmental, or health equity. In all cases, greenways should aim to support all residents equally, regardless of income, gender, race, ethnicity, location, or education to improve social connection and community bonds, improve health and well-being, and preserve healthy natural resources. Investments in greenway facilities is often located near high-density population centers where access to education, employment, public transportation, and healthy food and lifestyle choices are more prevalent. Investments in greenway infrastructure should occur in a way that considers equitable access, connectivity, and experiences for vulnerable populations. An emphasis on equity should be considered while planning for both urban and rural access to bicycle and pedestrian facilities.

Experience

Experience refers to feedback from the five senses when engaging in a task or activity. Together, these forms of sensory feedback contribute to an experience. Ultimately, greenway use should result in a positive and healthy experience gained from access to the sights and sounds of nature, pleasant views, and perceived safety on the facility. Greenways should positively contribute to the overall quality of life for a community. Once constructed, greenways will become a regular part of everyday life to support short trips to nearby destinations, exercise, and connecting with nature and loved ones.

Safety

Safe greenway systems provide routes that minimize the risk of injury, danger, and crime. Safe facilities should be comfortable for users of all ages and abilities and provide opportunities for multiple means of alternative transportation (i.e., walking, jogging, hiking, and bicycling). The application of relevant design standards ensures that grades, curves, and intersections with roadways and driveways are as safe as possible along the facility.

GREENWAY BENEFITS

When a greenway system is not entirely constructed then smaller segments are typically only used for recreational purposes. Planning and completing corridors in the system increase the benefit of greenways by allowing connectivity for transportation as well as linking to the regional system. Additional benefits from greenway systems and the potential impacts of greenway development or connected facilities such as side path and trails (like the American Tobacco Trail) include the following:

- › Improving bicycle and pedestrian transportation **mobility**
- › Improving **health and well-being** through active living
- › Protecting and enhancing the **environment**
- › Improving **equity** through a fair distribution of facilities
- › Creating value and generating a strong **economy**
- › Promoting unity and a sense of **community**



Figure 12.2 - Greenway Benefits

These benefits, among others, can help justify greenway investments. Each benefit is outlined below with case study examples throughout the country and within the state of North Carolina.

Mobility

Greenways can be used for both recreational and transportation-related purposes. For example, greenways serve as off-road linkages to neighborhoods, as well as centers for shopping, entertainment, education, and employment and provide users with a safe and enjoyable way to travel.

More than 45 percent of all driving trips in the United States are under 3 miles, and 60 percent of trips are less than 5 miles. These trips, which could be taken by bike or on foot in 20 to 30 minutes, represent opportunities for mode shifts to biking and walking. There is a great opportunity to increase mode shares of active transportation by investing in trails. Communities that are increasing their active transportation mode shares invest in well-connected, multi-modal networks that allow people of all ages and abilities to bike and walk to their desired destinations.

Providing direct bicycle and pedestrian connections between key destinations is an effective way to attract residents and visitors to bike and walk to locations that are closer to home. The Carolina Thread Trail is a regional example of a trail system that enhances mobility options within communities. This trail helps to connect neighborhoods and adjoining communities, connects children with nature, and promotes regional thinking among its communities. It also strategically designs its trails by incorporating public art, helping its users reconnect and recognize the local history of the land it traverses.

Health + Well Being

According to the USDOT, approximately one in four adults in the United States report that they do not engage in any physical activity outside of work. Increasing access to greenways within communities benefits positive health outcomes, especially in places where elements of urban life such as traffic and pollution contribute to stress and poor health. Greenways often serve as linear parks which offer a safe and comfortable environment for active recreation such as walking, biking, jogging, or running.

When local municipalities invest in active transportation facilities like greenways, they invest in the overall health of their communities. Providing walkable and/or bike-able access to key destinations such as schools, shopping areas, jobs, neighborhoods, and recreation facilities promotes an active lifestyle and reduces dependence on automobiles. When communities provide more opportunities for exercise and recreation, it increases positive physical and mental health outcomes and reduces the risks for developing health conditions such as diabetes, cardiovascular disease, stroke, cancer, and high blood pressure (CDC).

Environment

Greenways minimize the impact on bio-diverse lands and can play an important role to improve water quality and mitigate flooding. Greenways may be used to preserve open space that provides natural buffer zones to protect streams, rivers, and water bodies from pollution run-off. According to the Federal Emergency Management Agency (FEMA), flooding causes over \$1 billion in property damages every year. A benefits study written by the Rails to Trails Conservancy on trails and greenways states that these facilities can serve as natural floodplains by absorbing excess water; restoring developed floodplains to their natural state can mitigate flooding within communities. Additionally, many greenways and trails are located in forested or vegetated landscapes, and they can serve as protective buffers for wildlife habitat areas. These buffers are critical to supporting wildlife populations that require safe routes for migration.

Equity

The costs of owning, maintaining, fueling, insuring, and registering a vehicle can be a tremendous burden on many households. A bicycle, on the other hand, is a relatively inexpensive investment, and walking is free. For those who cannot afford a private vehicle, greenways offer a convenient and economical way to get around the Town and access shops, schools, and jobs. They can also help provide additional safe mobility options for those with disabilities, and connect communities underserved by pedestrian and bicycle infrastructure.

For some communities, access to outdoor recreation has not always been easy to obtain and must be reached by car. Access to outdoor recreation for parks and recreation opportunities are historically less abundant in low-income neighborhoods. Providing equitable access to all users within a community is fundamental to reducing instances of inequality. Historically, disadvantaged communities have been overlooked or ignored when it comes to planning and involving them in engagement efforts for future project connections. A study conducted by Headwater Economics found that these disparities in access to trails and parks have significant health, social, and economic implications, further exacerbating existing environmental justice concerns in these communities.

Economic Activity

Outdoor recreation opportunities such as greenways contribute to positive economic impacts to communities. For instance, property values of homes in many communities have been shown to increase. Additionally, in the real estate market, close greenway access can be an attractive amenity that increases interest in a property. Many developers also include greenways as recreational amenities in new developments. In Headwater Economics' review on the business impact of trails, the study noted that the economic impact from trails is highest when a trail is connected to local businesses that cater to trail user needs, including restaurants, grocery stores, camping, hotels, and gear stores. Since lodging typically accounts for the greatest expense during a trip, the study also found that a trail's economic impact is greatly increased when it attracts more overnight users.

At a larger scale, greenways can have impacts across an entire region. A recent study conducted by the East Coast Greenway Alliance, found that the East Coast Greenway, a trail linking cities along the eastern seaboard from Maine to Florida, generates over \$90 million in revenue and taxes each year and creates 800 temporary and permanent jobs within the Triangle region of North Carolina alone.



Figure 12.3 - Beaver Creek Greenway Construction

Community

Greenways help foster a sense of place and community by connecting people and key destinations. Greenways provide opportunities for residents to gather and connect within and around the Town creating an engaged and healthy community. These facilities can help bridge the gap between cultures, support alternative modes of travel, as well as serve as neutral gathering places and recreational areas for communities. The integration and promotion of greenways within communities helps regions associate greenways with specific places. With the continued support for and request for additional and more connected greenways by Apex residents, it is clear that greenways are an integral part of and recognizable symbol of community pride.

Providing interpretive signage or public art representative of a culture may help strengthen residents' cultural awareness. In addition to celebrating the history and culture of a community, greenways can also serve as the safest place within a community. A study on crime rates along the American Tobacco Trail in Durham, North Carolina, found that less than a half percent of area crimes occurred on the trail. With regular use, proper design (i.e., featuring lighting and clear sight lines), and continued maintenance, users can remain safe and secure while on greenways within their communities. Set hours, dedicated greenway staff, guest services, facility status updates, and more help promote a safe environment for visitors utilizing greenways. Additional benefits related to greenways are provided in the graphic below.

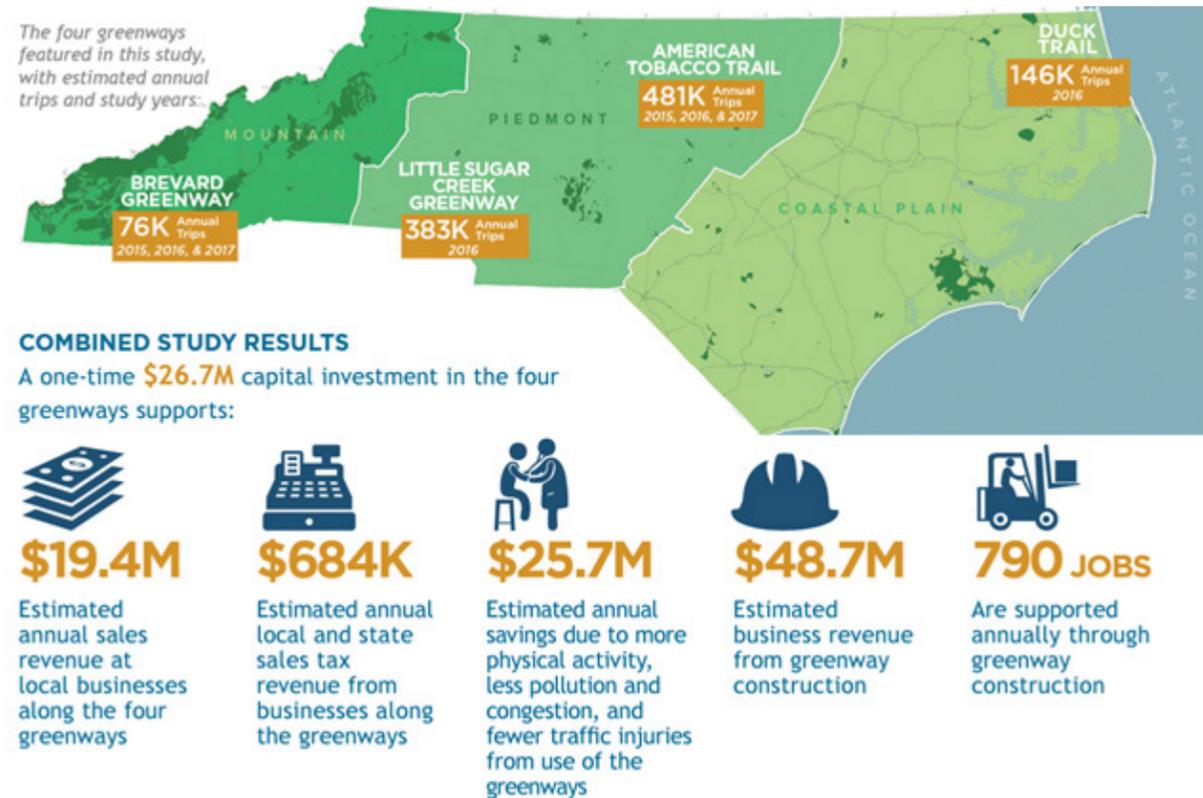


Figure 12.4 - Additional Greenway Benefits / Evaluating the Economic Impact of Shared Use Paths in North Carolina

RESOURCES

- Carolina Thread Trail – Trail Benefits: Connecting Communities: <https://www.carolinathreadtrail.org/trail-benefits/>
- Center for Disease Control and Prevention – Transportation Health Impact Assessment Toolkit (2011): https://www.cdc.gov/healthyplaces/transportation/promote_strategy.htm
- East Coast Greenway Alliance - The Impact of Greenways in the Triangle (2017). <https://www.greenway.org/uploads/attachments/cjgqs3ffg03yyp8qitykwkvz8-triangle-impact-report.pdf>
- Headwater Economics – Measuring Trail Benefits: Business Impacts (2016): <https://headwaterseconomics.org/wp-content/uploads/trails-library-business-impacts-overview.pdf>
- Headwater Economics – Measuring Trail Benefits: Equitable Access (2018): <https://headwaterseconomics.org/wp-content/uploads/trails-library-access-overview.pdf>
- Institute for Transportation Research and Education – Evaluating the Economic Contribution of Shared Use Paths in NC (2018): <https://itre.ncsu.edu/focus/bike-ped/sup-economic-impacts/>
- Outdoor Industry Association – The Outdoor Recreation Economy (2017): https://outdoorindustry.org/wp-content/uploads/2017/04/OIA_RecEconomy_FINAL_Single.pdf
- National Association of City Transportation Officials – Equitable Bike Share Means Building Better Places for People to Ride (2016): https://nacto.org/wp-content/uploads/2016/07/NACTO_Equitable_Bikeshare_Means_Bike_Lanes.pdf
- National Recreation and Parks Association – Trail Safety: The Perception and Reality: <https://www.nrpa.org/parks-recreation-magazine/2014/july/trail-safety-the-perception-and-reality/>
- Rails to Trails Conservancy – Benefits of Trails and Greenways: <https://www.railstotrails.org/resourcehandler.ashx?id=2988>

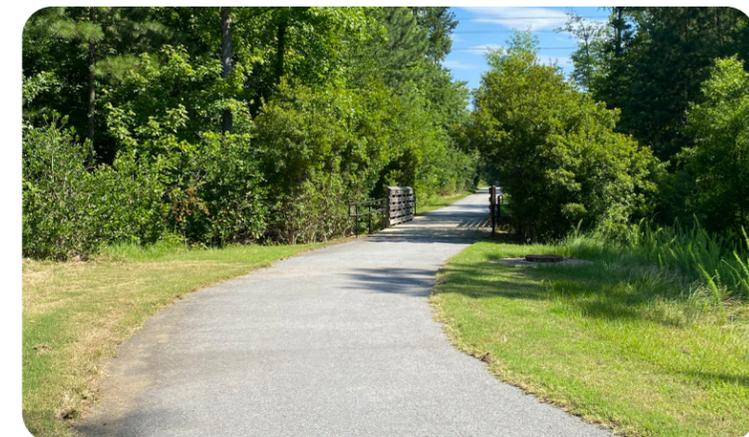


Figure 12.5 - Clark Branch Greenway

Community Context

Overview

The Research Triangle region is home to a well-developed greenway network across multiple adjacent municipalities, including Raleigh, Durham, Cary, Morrisville, Apex, and Holly Springs. The American Tobacco Trail is one major greenway located within the region. This trail forms part of a regional spine network that carries the East Coast Greenway through the area. As the southern terminus of the network, the Town of Apex’s strategic location provides connections to adjacent communities of western and southern Wake County. The Town currently maintains over 25 miles of public greenway facilities. In addition to greenways, the Apex Parks, Recreation & Cultural Resources Department manages many parks, recreation programs, and a skate plaza near downtown. The Town’s dedication to providing facilities for exercise and outdoor recreation makes it an attractive place for visitors to explore and for residents to enjoy daily.

Regional Context

The following map shows both existing and proposed greenway, trail, and side path facilities within the region. Three bicycle routes (not featured in the map) and two major greenways (American Tobacco Trail and East Coast Greenway) serve as regional facilities that connects Apex to Chatham, Durham, and Wake counties. Local corridors that include greenways, street-side greenways, side paths, bike lanes, trails, and sidewalks serve as critical links in local transportation networks by providing bicycle and pedestrian access to desired destinations.

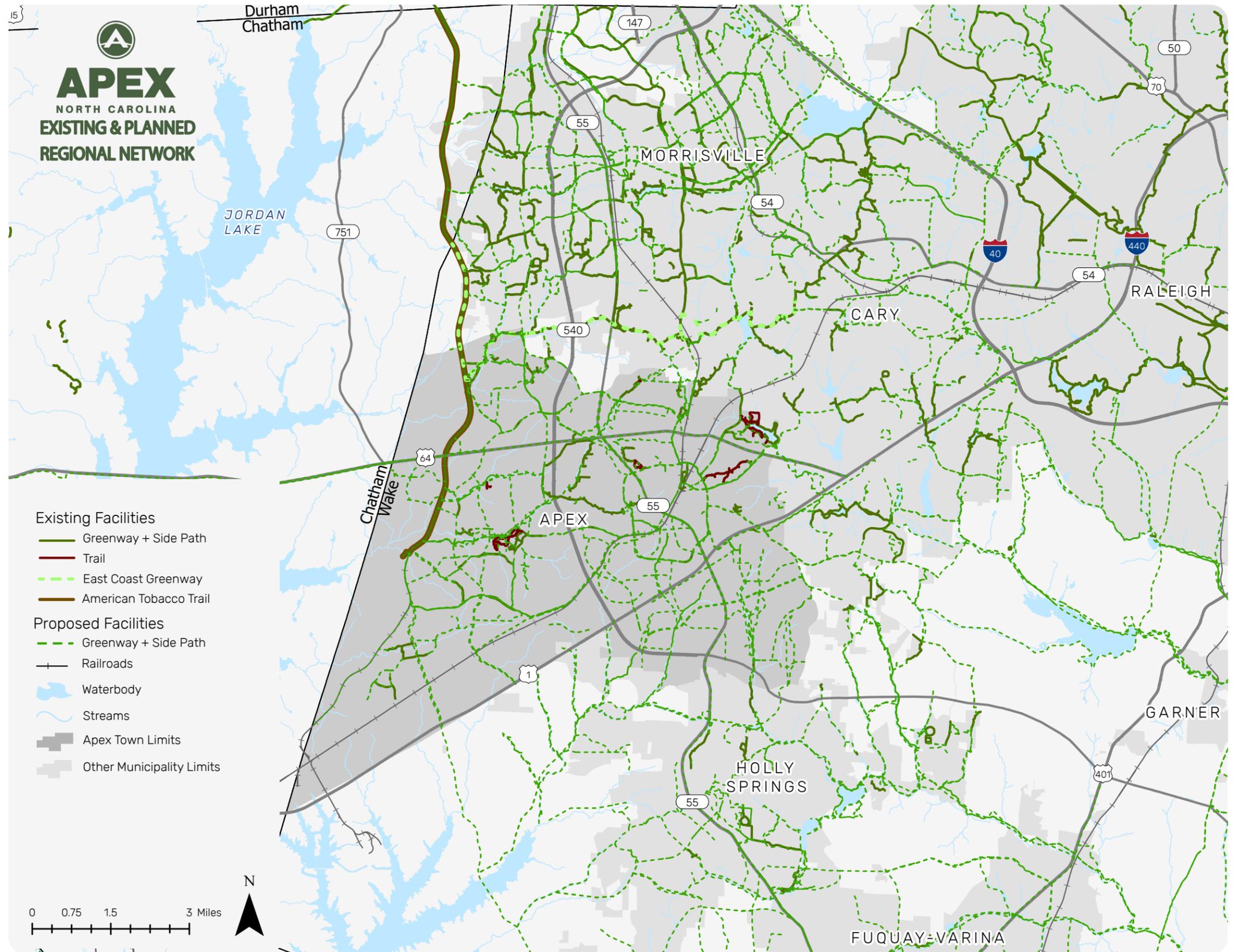


Figure 12.6- Existing + Planned Regional Network Map



EXISTING CONDITIONS

Previous Planning Efforts

The Town of Apex has prioritized multi-modal connectivity in planning efforts over the years. The following table provides a summary of key bicycle, pedestrian, and transit recommendations from previous plans and studies that are relevant to the development of the greenway and side path network recommendations in this plan.

Recommendations from Existing Plans

| EXISTING PLAN/STUDY | KEY RECOMMENDATIONS TO GUIDE TOWN OF APEX GREENWAYS |
|---------------------|--|
| Bike Apex, 2019 | <p>Bike Apex aims to improve multi-modal connectivity, accessibility, and safety by developing on-road bicycle facilities, side paths, and greenways throughout the Town. Key recommendations focus on keeping momentum on bicycle projects already in development, funding and building priority projects, building comprehensive planning projects incrementally over time, and implementing new programs that support and encourage bicycling. The plan also proposes policies that consider bicycle and greenway accommodations in new developments, guidelines for greenway and trail accessibility, developing a maintenance budget and operating plan for bicycle and greenway facilities, and programmatic recommendations to foster an active and engaged bicycle community.</p> <p>Priority greenway projects of the plan include completion of the Beaver Creek Greenway, Middle Creek Greenway, and Reedy Branch Greenway. Additionally, connectivity provided from side path along Apex Peakway, N Salem St/Davis Dr, and Laura Duncan Rd were identified as resident priorities. Other project recommendations include Little Beaver Creek Greenway, Lufkin Rd Greenway, Community Park Connector Greenway, NC 55/Williams St side path, Jenks Rd side path, Horton Ridge Rd side path, Salem/Old US 1 side path, Jessie Dr side path, Kelly Rd side path, Old Raleigh Rd side path, Davis Dr side path, Smith Rd side path, Reunion Creek Pkwy side path, Roberts Rd side path, Apex Barbecue Rd side path, Wimberly Rd side path, Ragan Rd side path, Mt Zion Church Rd & Hammocks Beach Trail side paths, Hughes St side path, and Morris Acres Rd.</p> |

| EXISTING PLAN/STUDY | KEY RECOMMENDATIONS TO GUIDE TOWN OF APEX GREENWAYS |
|--|---|
| Advance Apex: The 2045 Transportation Plan, 2019 | <p>Advance Apex is a community-driven effort that identifies transportation needs and an updated future land use map. The proposed transportation network combines thoroughfare, collector street, and intersection improvements with multi-modal facilities such as sidewalks, bike lanes, and side paths to ensure the roadway network is accessible to all ages and abilities. Key themes from the planning process include preserving the small-town feel, integrating transportation and land use decisions, prioritizing active transportation connections, addressing congestion on major roadways, enhancing transit accommodations, and focusing on safety needs for all modes, particularly around schools.</p> <p>Key policy recommendations guiding plan development are continuing to enforce Unified Development Ordinance (UDO) policies. Examples include requiring sidewalks on both sides of new collector streets and thoroughfares, providing pedestrian accommodations within a ½ mile of existing and planned schools, strengthening the UDO sidewalk policy to require sidewalks on both sides of residential streets in the Transit-Oriented Development (TOD) Context area and Planned Unit Developments (PUD), requiring all new developments to include sidewalk and greenway connections to existing facilities, allowing sidewalks to be replaced with greenways and side paths, and prioritizing funding for sidewalks in Town Center and the TOD Context areas.</p> <p>The transportation plan incorporates proposed facilities from the Apex Bicycle Plan, which include the Beaver Creek, Middle Creek, Reedy Branch, Little Beaver Creek, Lufkin Rd, and the Community Park Connector Greenways. It also includes the Apex Peakway, NC 55/Williams St, Jenks Rd, Horton Ridge Rd, Salem/Old US 1, Jessie Dr, Kelly Rd, Old Raleigh Rd, Davis Dr, Smith Rd, Reunion Creek Pkwy, Laura Duncan Rd, Roberts Rd, Apex Barbecue Rd, Wimberly Rd, Ragan Rd, Mt Zion Church Rd & Hammocks Beach Trail, Hughes St, and Morris Acres Rd side paths.</p> |

| EXISTING PLAN/STUDY | KEY RECOMMENDATIONS TO GUIDE TOWN OF APEX GREENWAYS |
|---|---|
| Apex Downtown Master Plan & Parking Study, 2019 | <p>The Apex Downtown Master Plan and Parking Study establishes a guiding vision for areas inside the Apex Peakway loop. It addresses commercial and residential markets, identifies projects for place-making and public spaces, and recommends parking strategies. The guiding principles of the plan are putting people first, celebrating Salem St, and embracing authentic Apex. Priority projects include transforming the Salem Street-scape, energizing alleys, re-purposing the Depot parking area into the premier public space downtown, attracting restaurants and local businesses to Salem St, re-envisioning the fire station site as a civic and mixed-use space, installing wayfinding signage Downtown, revitalizing Tunstall House grounds and the Strollway, making the NC 55/Salem St transit station a multi-modal and iconic gateway, and constructing 100 new housing units within a ½ mile of Downtown.</p> <p>Much of the connectivity desired in and around downtown is addressed through the Advance Apex Transportation Plan’s recommendations; however, this plan identifies streets which improve the overall walkability of the community. The streets that impact a 5- and 10-minute walk to Downtown will be most critical to improve connectivity in the Town’s core. Streets with the potential for transformation include Center Street, Chatham Street, Saunders Street, Mason Street, and N Salem Street.</p> |
| Wake County Southwest Area Study (SWAS), 2019 | <p>The Wake County Southwest Area Study (SWAS) was developed by the Capital Area Metropolitan Planning Organization (CAMPO). This study is an update to the 2012 SWAS Study and identifies a cohesive transportation strategy for the growing communities of Apex, Holly Springs, Fuquay-Varina, and Angier. The guiding principles of this study focus on livability, multi-modal mobility and accessibility, and sustainability. Key recommendations for Apex include the following:</p> <ul style="list-style-type: none"> › Connections to the American Tobacco Trail that extends Beaver Creek Greenway to Apex Nature Park › Connections to Holly Springs via the Middle Creek Greenway › Recreational trails between Apex Community Park and Regency Park in Cary › Greenways along Beaver Creek, Middle Creek, Swift Creek, and Williams Creek › Complete street roadway improvements that include side paths and bike lanes along Apex Peakway, Ten Ten Rd, Green Level West Rd, Jenks Rd, Laura Duncan Rd, Old Raleigh Rd, and Richardson Rd. |

| EXISTING PLAN/STUDY | KEY RECOMMENDATIONS TO GUIDE TOWN OF APEX GREENWAYS |
|---|---|
| Wake County Multi-Jurisdictional Hazard Mitigation Plan, 2015 | <p>This plan provides guidance on strategies to mitigate the impacts of natural disasters and hazards affecting communities in Wake County. Severe thunderstorms, flooding, high winds, lightning, tornadoes, hurricanes, and tropical storms are hazards of concern identified within Apex. Areas in the 100-year floodplain are especially susceptible to flooding. The following hazard mitigation recommendations were listed for the Town:</p> <ul style="list-style-type: none"> › Provide stream and creek buffers and floodplain and wetland projection through the UDO › Continue to provide protection for residential areas by not allowing residential lots in the floodplain › Develop an Open Space Ordinance to protect wildlife habitat › Maintain transportation corridors within the Town for evacuation routes |
| 2045 CAMPO-DCHC Metropolitan Transportation Plan (MTP), 2019 | <p>Key goals of the 2045 MTP focus on promoting and prioritizing multi-modal and affordable travel choices. Goals related to active transportation include increasing the safety of the transportation system for motorized and non-motorized users, enhancing the integration and connectivity of the transportation systems for all modes, increasing accessibility and mobility for people and freight, and improving the quality of life for the community. While the MTP defers to local and regional transportation plans for bicycle and pedestrian recommendations, multi-modal recommendations for Apex include the extension of the Beaver Creek Greenway from Kelly Rd to the American Tobacco Trail, greenways along Little Creek and Middle Creek from the Peakway extension towards Holly Springs, a side path along the Apex Peakway, and side path along Salem St from the Apex Peakway to Davis Dr. On-road bicycle facility recommendations include bike lanes along Old US 1 Hwy, Davis Dr, Olive Chapel Rd, Center St, and NC 55.</p> |
| Wake Transit Plan, 2016 | <p>The goal of the Wake County Transit Plan is to expand and enhance transit connections throughout Wake County. Key recommendations include the following:</p> <ul style="list-style-type: none"> › A 37-mile commuter rail connecting Garner, Raleigh, NCSU, Cary, Morrisville, and RTP › Bus Rapid Transit (BRT) throughout Downtown Raleigh, to Cary, to NC State, and Wake Med › 30-minute, 60-minute, and peak-only service to Wake County jurisdictions outside of Raleigh. › Transit recommendations for Apex include 60-minute, all day service between Apex and Downtown Raleigh and peak-only service between Apex and Cary, RTP, and Holly Springs. › Transit service from Apex to Cary and RTP also provides connections to Wake County BRT and Durham-Wake commuter rail corridors. |

| EXISTING PLAN/STUDY | KEY RECOMMENDATIONS TO GUIDE TOWN OF APEX GREENWAYS |
|--|--|
| Wake County Greenway System Plan, 2017 | The vision of the Wake County Greenway Plan is to create a connected and comprehensive county-wide greenway network that enhances the quality of life for Wake County residents. Recommendations for the overall system are organized into the following project categories: Bridge the Gaps, Connect to Parks and Lakes, Connect the Communities, and Complete the System. Priority recommendations in the Bridge the Gaps category for the Town of Apex include Middle Creek Greenway from Downtown Apex to Holly Springs, Apex West Greenway from the American Tobacco Trail to the Apex Nature Park and Beaver Creek Greenway, Lower Williams Creek Greenway (Swift Creek) from Apex Community Park to Symphony Lake Greenway, and Swift Creek Greenway (Upper Williams Creek Greenway) from Fred Bond Metro Park in Cary to Old Apex Rd. Completion of the Apex Loop Greenway is a priority project in the Connect Parks and Lakes category, and the Apex Cary Greenway is a key project in the Connect the Communities category. |
| Great Trails State Plan, 2021 | NCDOT's statewide trail plan proposes a comprehensive network of greenways and side paths to connect all 100 counties via non-motorized transportation. In Apex, the American Tobacco Trail and White Oak Creek Greenway are included in the statewide trail network as critical connections to Cary and Durham. The Plan proposes the Middle Creek Greenway to Swift Creek Connector as an opportunity to connect downtown Holly Springs to Apex and provides routes to public schools, employment centers in both Apex and Town of Cary and to the Regency Park/ Koko Booth Amphitheatre. The plan also proposes an extension along the American Tobacco Trail to connect to Fuquay Varina, and a side path along US 64 between Apex, Jordan Lake State Recreation Area, and Pittsboro. The Great Trails State network also include proposed trails along Williams Creek and Swift Creek from Apex Community Park to Clayton and the Neuse River Trail. |

Policy Review

In tandem with program and infrastructure recommendations, bicycle- and walk-friendly policies improve pedestrian and bicyclist safety and enhance multi-modal accommodations in town ordinances and codes. A summary of key state and local policies that may guide or impact the development of Apex's greenway network are provided below.

| EXISTING POLICIES | KEY POLICIES TO GUIDE/IMPACT TOWN OF APEX GREENWAYS |
|--|--|
| Town of Apex Unified Development Ordinance, 2000 / Codified 2021 | <p>Greenways Policies: Greenways may be credited against the requirements of Sec. 14.1 Park, Recreation, and Open Space Sites provided that such greenways are:</p> <ol style="list-style-type: none"> 1. A part of the Town's Parks, Recreation, Greenways, and Open Space Master Plan. 2. Dedicated to public use and located within a 20' public greenway easement located across HOA-owned/maintained land (easement cannot be located within individual residential lots). 3. Built to meet public greenway standards per the Town of Apex Standard Specifications and Standard Details. <p>B) Residential developments adjacent to planned/existing public greenways shall provide one (1) or more dedicated public greenway connection(s) from a public sidewalk/public multi-use path within the development to the planned/existing public greenway shown on the Town's Parks, Recreation, Greenways, and Open Space Master Plan; such greenway connections may be credited against the requirements of Sec. 14.1 provided that these greenway connections meet the standards in Sec. 14.2.1.A.2 and 3 above.</p> <p>Planned Unit Development (PUD-CZ) District: The development proposed in the PD Plan for PUD-CZ encourages cluster and compact development to the greatest extent possible that is interrelated and linked by pedestrian ways, bike-ways, and other transportation systems. At a minimum, the PD Plan must show sidewalk improvements as required by the Advance Apex: The 2045 Transportation Plan and the Town of Apex Standard Specifications and Standard Details, and greenway improvements as required by the Town of Apex Parks, Recreation, Greenways, and Open Space Plan and the Advance Apex: The 2045 Transportation Plan. In addition, sidewalks shall be provided on both sides of all streets for single-family detached homes.</p> |

Table 12.6 - Key Policies to Guide / impact Town of Apex Greenways

| EXISTING POLICIES | KEY POLICIES TO GUIDE/IMPACT TOWN OF APEX GREENWAYS |
|---|---|
| <p>Town of Apex Unified Development Ordinance, 2000 / Codified 2021 (continued)</p> | <p>Traditional Neighborhood District (TND-CZ): The development proposed in the PD Plan for TND-CZ encourages cluster and compact development to the greatest extent possible that is interrelated and linked by pedestrian ways, bike-ways, and other transportation systems. At a minimum, the PD Plan must show sidewalk improvements as required by the Advance Apex: The 2045 Transportation Plan and the Town of Apex Standard Specifications and Standard Details, and greenway improvements as required by the Town of Apex Parks, Recreation, Greenways, and Open Space Plan and the Advance Apex: The 2045 Transportation Plan.</p> <p>Site Plan Standards: The development proposed in the site plan shall comply with the applicable standards of Article 7: Subdivision and Article 14: Parks, Recreation, Greenways, and Open Space, including, but not limited to, street and utility improvements and park, recreation, and open space dedication or fee-in-lieu.</p> <p>Watershed Protection Overlay Districts: Greenway/hiking trails designed, constructed, and maintained to maximize nutrient removal and erosion protection, minimize adverse effects on aquatic life and habitat, and protect water quality to the maximum extent practical.</p> <p>General Provisions: All subdivisions shall comply with the principles, goals, and/or objectives of the 2045 Land Use Map and all other officially adopted plans and policies of the Town. Where a proposed subdivision includes any part of a transportation improvement which has been designated in Advance Apex: The 2045 Transportation Plan as provided for by NCGS 136-66.2 and 160D-501, such part of such transportation improvement shall be platted and dedicated by the subdivider in the location shown on the plan and at the width specified in the Town of Apex Standard Specifications and Standard Details. Similarly, where a proposed subdivision includes any part of a greenway as officially adopted by the Town, such part of such greenway shall be dedicated and platted by the subdivider in the location shown on the plan. Such dedication shall be in accordance with Article 14: Parks, Recreation, Greenways, and Open Space. Proposed subdivisions must comply with all requirements of this Ordinance.</p> |

| EXISTING POLICIES | KEY POLICIES TO GUIDE/IMPACT TOWN OF APEX GREENWAYS |
|---|---|
| <p>Town of Apex Unified Development Ordinance, 2000 / Codified 2021 (continued)</p> | <p>Design Standards: Internal Connectivity. All areas of a subdivision shall be internally connected by at least one (1) street located within the subdivision. Where severe topography or other physical features exist, the Director of Planning and Community Development, in conjunction with the Water Resources Director, may determine that a multi-use path or greenway be used to meet the internal connectivity requirement. If a subdivision is not connected internally, then it shall not be considered one (1) subdivision.</p> <p>Private Recreation and Open Space: A public sidewalk or public greenway shall be connected to the play lawn.</p> <p>Sidewalks: The subdivider shall construct sidewalks along both sides of all major and minor thoroughfares, all collectors, and on one side of all other streets within and bordering the subdivision property boundaries. Such sidewalks shall provide direct pedestrian connections to adjacent properties outside the subdivision.</p> <p>a) Consideration will be given to a greenway in lieu of some or all sidewalks within a development if an equal or better pedestrian system will be provided.</p> <p>b) Where street interconnectivity is not provided (such as but not limited to cul-de-sacs) within the development plan, pedestrian connections shall be constructed. The pedestrian connection requirement does not apply when a connection between two (2) cul-de-sacs would not improve connectivity with the subdivision or to surrounding areas as determined by the Director of Planning and Community Development. The pedestrian connection shall be constructed according to the following:</p> <p>(i) The developer shall construct the required pedestrian connections within open space or Resource Conservation Area owned by a homeowner’s association, using a minimum five-(5) ft width instead of the 10-ft-wide standard section for concrete greenways;</p> <p>(ii) The developer shall provide a 10-ft-wide public access and maintenance easement along these paths, with the paths in the center of the easements;</p> <p>(iii) The open space shall be provided between lots (not within lots) to maintain pedestrian connectivity and shall include destination and directional signs;</p> <p>(iv) Where necessary to cross a stream or creek, the developer shall construct a bridge with a minimum path width of six (6) ft across the bridge; and</p> <p>(v) In low-lying areas, the Director of Planning and Community Development may require that the developer construct a boardwalk.</p> |

| EXISTING POLICIES | KEY POLICIES TO GUIDE/IMPACT TOWN OF APEX GREENWAYS |
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| Town of Apex Unified Development Ordinance, 2000 / Codified 2021 (continued) | <p>Transportation Policies: This article ensures that adequate transportation facilities are constructed to serve new development and save unnecessary expenditures of funds by requiring the proper initial contraction of transportation networks, sidewalks, and drainage facilities and establish a procedure to assist in the funding of road improvements required by new growth in the Apex Planning Area.</p> |
| NCDOT Complete Streets Policy, 2019 | <p>The NCDOT Complete Streets Policy Update was adopted by the Board of Transportation in August 2019. This policy requires NCDOT to consider and incorporate multi-modal facilities in the design and improvement of all transportation projects in North Carolina. The adopted Comprehensive Transportation Plan (CTP) is considered the controlling plan for the identification of non-motorized facilities to be evaluated as part of a roadway project. The CTP may include and/or reference locally adopted plans for public transportation, bicycle and pedestrian facilities, and greenways. Bicycle, pedestrian, and public transportation facilities that appear in the CTP directly or by reference will be included as part of the proposed roadway project, and NCDOT is responsible for the full cost of the project. Bicycle, pedestrian, and transit facilities incidental to a roadway project where a need has been identified through the project scoping process but not identified in an adopted plan may be included in the project. Inclusion of these incidental facilities requires the local jurisdiction to share the incremental cost of constructing the improvements based on population thresholds. The policy also establishes maintenance responsibility for active transportation facilities. Bicycle, pedestrian, and transit improvements inside a municipal boundary are subject to local maintenance. Projects that have not completed environmental review prior to August 2019 are subject to the Complete Streets Policy.</p> |
| Wake County Land Development Ordinance, 2021 | <p>8-33 - Pedestrian, Bicycle, and Trail - The regulations of this section are intended to implement county planning objectives by promoting pedestrian and bicycle mobility, as well as recreational opportunities for county residents. Different requirements and standards apply in Short-Range Urban Services Areas, Long-Range Urban Services Areas, and Non-Urban Areas in recognition of the different physical and built environments that exist throughout Wake County.</p> |

| EXISTING POLICIES | KEY POLICIES TO GUIDE/IMPACT TOWN OF APEX GREENWAYS |
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| Wake County Land Development Ordinance, 2021 (continued) | <p>Short-Range Urban Service Areas: (A) Pedestrian Improvements: (1) When required - Within the Short-Range Urban Services Area, pedestrian improvements must be provided within the right-of-way of collector and thoroughfare roads whenever: (a) Such improvements are shown on or otherwise required by the Transportation Plan; (b) The subject subdivision is located within one and one-half miles of an existing or proposed school; (c) The subject subdivision is located within one mile of an activity center designated on the Land Use Plan; (d) The subject subdivision is located within one-half mile of an existing or proposed park, library or other public facility that can be reasonably expected to generate pedestrian traffic; or (e) The subject subdivision is adjacent to another subdivision or development with pedestrian routes that could be readily connected to similar improvements within the subject subdivision. (B) Off-Road Trail Improvements: (1) When required - Within the Short-Range Urban Services Area, off-road trail improvements must be provided whenever: (a) Such improvements are shown on or otherwise required by the Transportation Plan and/or the Consolidated Open Space Plan; (b) The subject subdivision has access to or is adjacent to existing or designated greenway corridors, in which case, access to such corridors must be incorporated into the overall subdivision design; or (c) The subject subdivision is adjacent to another subdivision or development that includes off-road trail improvements that could be readily connected to similar improvements within the subject subdivision.</p> <p>Long-Range Urban Service Areas: (A) Pedestrian Improvements: (1) When Improvements May Be Required - Within the Long-Range Urban Services Area, the Planning Director is authorized to require that developers provide pedestrian improvements within the right-of-way of collector and thoroughfare roads whenever:</p> |

| EXISTING POLICIES | KEY POLICIES TO GUIDE/IMPACT TOWN OF APEX GREENWAYS |
|---|---|
| <p>Wake County Land Development Ordinance, 2021 (continued)</p> | <p>(a) Such improvements are shown on or otherwise required by the Transportation Plan;</p> <p>(b) The subject subdivision is located within 1.5 miles of an existing or proposed school;</p> <p>(c) The subject subdivision is located within one mile of an activity center designated on the Land Use Plan;</p> <p>(d) The subject subdivision is located within one-half mile of an existing or proposed park, library or other public facility that can be reasonably expected to generate pedestrian traffic; or</p> <p>(e) The subject subdivision is adjacent to another subdivision or development with pedestrian routes that could be readily connected to similar improvements within the subject subdivision.</p> <p>(2) When Improvements May Not Be Required -</p> <p>(a) Within the Long-Range Urban Services Area, bicycle improvements within the right-of-way of collector or thoroughfare roads may not be required if the Planning Director determines that the provision of such improvements will not provide needed linkages or connections to existing or planned bicycle improvements.</p> <p>(b) The Planning Director may not require any combination of pedestrian, bicycle or off-road trail improvements that would constitute more than ten percent of the allowable impervious coverage of the subject subdivision, calculated on the basis of the impervious surface area allowed without provision of storm water management devices.</p> <p>(B) Off-Road Trail Improvements:</p> <p>(1) When Improvements May Be Required - Within the Long-Range Urban Services Area, the Planning Director is authorized to require that developers provide off-road trail improvements whenever:</p> <p>(a) Such improvements are shown on or otherwise required by the Transportation Plan and/or the Consolidated Open Space Plan;</p> <p>(b) The subject subdivision has access to or is adjacent to existing or designated greenway corridors, in which case, access to such corridors must be incorporated into the overall subdivision design; or</p> <p>(c) The subject subdivision is adjacent to another subdivision or development that includes off-road trail improvements that could be readily connected to similar improvements within the subject subdivision.</p> <p>(2) When Improvements May Not Be Required</p> <p>(a) Within the Long-Range Urban Services Area, off-road trail improvements may not be required if the Planning Director determines that the provision of such improvements will not provide needed linkages or connections to existing or planned trail improvements.</p> |

| EXISTING POLICIES | KEY POLICIES TO GUIDE/IMPACT TOWN OF APEX GREENWAYS |
|---|---|
| <p>Wake County Land Development Ordinance, 2021 (continued)</p> | <p>(b) The Planning Director may not require any combination of pedestrian, bicycle or off-road trail improvements that would constitute more than ten percent of the allowable impervious coverage for the subject subdivision, calculated on the basis of the impervious surface area allowed without provision of storm water management devices.</p> <p>(c) Off-road trail improvements may not be required in combination with pedestrian improvements within the right-of-way of collector and thoroughfare roads.</p> <p>Non-Urban Areas:</p> <p>1. Pedestrian Improvements Not Required - Pedestrian improvements within the right-of-way of collector and thoroughfare roads are not required within Non-Urban Areas.</p> <p>2. Off-Road Trail Improvements:</p> <p>(1) When Improvements May Be Required - Within the Non-Urban Area, the Planning Director is authorized to require that developers provide off-road trail improvements whenever:</p> <p>(a) Such improvements are shown on or otherwise required by the Transportation Plan and/or the Consolidated Open Space Plan;</p> <p>(b) The subject subdivision has access to or is adjacent to existing or designated greenway corridors, in which case, access to such corridors must be incorporated into the overall subdivision design; or</p> <p>(c) The subject subdivision is adjacent to another subdivision or development that includes off-road trail improvements that could be readily connected to similar improvements within the subject subdivision.</p> <p>(2) When Improvements May Not Be Required</p> <p>(a) Within the Non-Urban Area, off-road trail improvements may not be required if the Planning Director determines that the provision of such improvements will not provide needed linkages or connections to existing or planned trail improvements.</p> <p>(b) The Planning Director may not require any combination of pedestrian, bicycle or off-road trail improvements that would constitute more than ten percent of the allowable impervious coverage for the subject subdivision, calculated on the basis of the impervious surface area allowed without provision of storm water management devices.</p> |

| EXISTING POLICIES | KEY POLICIES TO GUIDE/IMPACT TOWN OF APEX GREENWAYS |
|--|--|
| Wake County Land Development Ordinance, 2021 (continued) | Maintenance - All streets, sidewalks, greenways, or other travel ways must be kept free from mud, dirt, dust, or other material that may create a hazard to public safety or cause the travel way to be unreasonably muddy, as determined by the County. |



Figure 12.7 - Pedestrians walking along the greenway, Apex, NC

EXISTING CONDITIONS ANALYSIS

Facility Types

The projects recommended in this chapter represent various facility types. Each facility is briefly described below. Additional information regarding the design of these facilities is presented in the Recommendations Section towards the end of this chapter (includes bridges and boardwalks).

Sidewalk

Sidewalks include the portion of a street or highway right-of-way, beyond the curb or edge of roadway pavement, which is intended for use by pedestrians. Sidewalks are generally narrower than paved trails and are usually constructed of concrete pavement or pavers.

Side Path

Side paths should be designed to meet Public Right-of-Way Accessibility Guidelines (PROWAG) standards. These bidirectional, shared-use paved surface parallel the roadway. These provide a high-quality experience for users who are not comfortable in using on-road facilities especially in heavy traffic environments. They are physically separated from the road but still located within the roadway right-of-way. Planting strips may be placed between the facility and the roadway to separate users from motorized traffic on the adjacent roadway. A planting strip width may be reduced in highly constrained areas where curb and gutter are present.

Greenway

A greenway is a bidirectional, shared-use paved surface that are typically found in parks, and along creeks and utility corridors where there are few conflicts with motorized vehicles. These separated linear paths provide a low-stress recreational or transportation experience for users. Greenways are also considered open space corridors that may protect environmentally sensitive lands or stream corridors. Sometimes, greenways are referred to as a trail, shared-use path, and/or multi-use path. Separated paths that are adjacent to roadway corridors located within wide streetscape buffers in the rural areas of Town are known as street-side greenways and contribute to a community's comprehensive bicycle and pedestrian system. Surface materials often vary for greenways.

Street-Side Greenway

A street-side greenway is a meandering bidirectional shared-use paved surface along a roadway that provides a travel area for cyclists and pedestrians within a widened streetscape buffer. Street-side greenways are typically located outside of the road right-of-way or setback at least five feet from the roadway.

Material and Design Considerations for All Facilities

Paved facilities, whether asphalt or concrete, generally require less long-term maintenance than unpaved facilities and are typically eligible for a wider variety of available funding sources. Paved facility surfaces also improve accessibility for users of all ages and abilities. Furthermore, boardwalk and bridge decks, can be constructed of concrete with a textured surface to both reduce the risk of slips and falls and minimize long-term maintenance costs when compared to wooden decking. Shoulders or shy zones should be kept clear of any obstacles to ensure the full facility width remains usable.

Existing Greenways

The existing greenway network within the Town of Apex consists of greenway segments that are spread out across the Town. Many segments are in stream corridors or alongside roadways. While several sections have been constructed in recent years by new developments on the edge of the municipal boundary, overall connectivity remains low due to gaps in the network. The American Tobacco Trail, a natural surface greenway located on a former rail bed, terminates at Apex's western edge, and serves as a popular connector to Cary and Durham. Together, the White Oak Creek Greenway and the American Tobacco Trail form part of the East Coast Greenway in the northwest section of Town. The following map shows the existing greenways, side paths, and sidewalks (that provide connectivity along a corridor only) within the Town of Apex. Privately-owned trails are also included in the map. Some of the projects contain multiple facility types that are noted on the left side of the map.

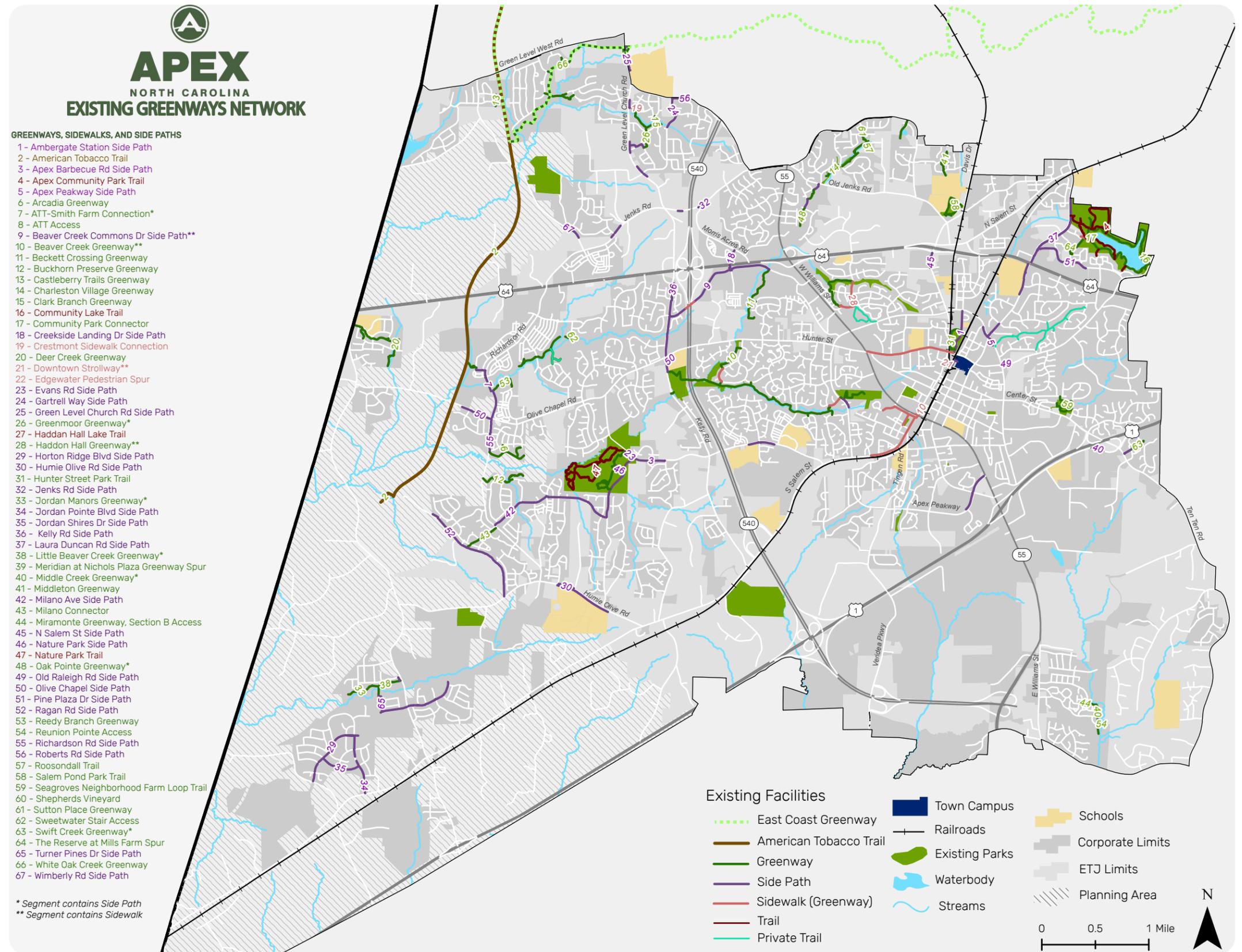


Figure 12.8 - Existing Greenways Network Map

Planned Greenways

The planned greenways displayed on the following map shape a comprehensive active transportation network within the Town of Apex. *Bike Apex, Advance Apex, the Wake County Greenway System Plan, and the Great Trails State Plan* informed many of the planned facilities highlighted on this map. Several side path and greenway facilities are strategically co-located within easements (highlighted in yellow or pink). It is important to note that some of the projects contain multiple facility types and these are noted on the left side of the map. The planned greenways help make north-south and east-west connections throughout the Town, as well as fill in network gaps between existing active transportation infrastructure. In addition, the planned facilities tie into schools, parks, Downtown Apex, and various neighborhoods to provide connectivity to a variety of key destination for visitors and residents to access via the greenway network. Several of the proposed greenway and side path segments cross the municipal boundary to make connections to adjacent communities.

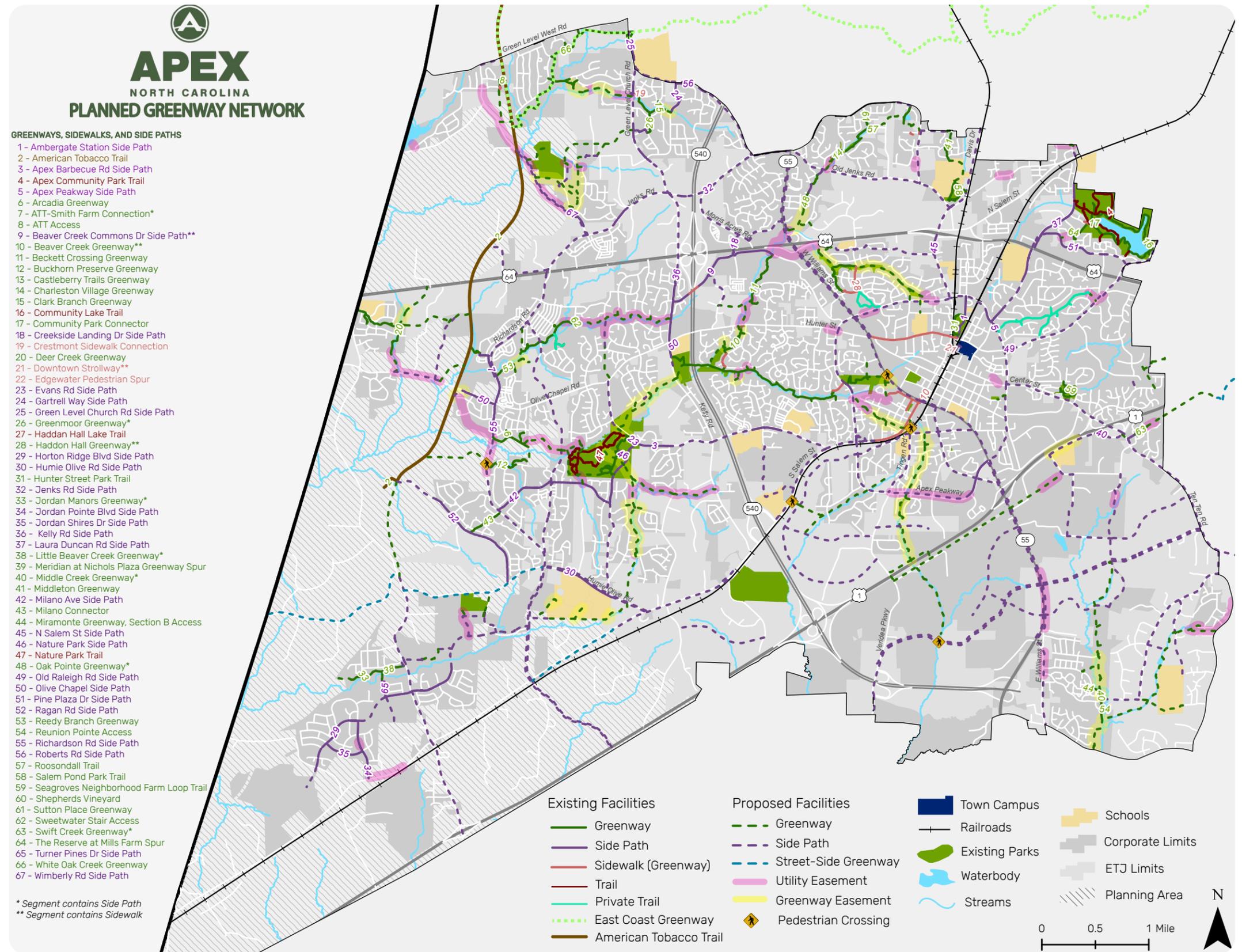


Figure 12.9 - Planned Greenway Network Map

Destinations

Greenways can be strategically placed to connect users to various key destinations within their communities. Key destinations within Apex that are highlighted on the following map include commercial areas, libraries, hospitals, subdivisions (over 100 lots), Town Campus, parks, and schools. In addition, the Town's employment density is mapped to show major employers that employ 100 to 750 or more employees.

Apex Community Park and Apex Nature Park are two large recreational areas in the Town that support facilities (e.g., trails, side paths, and greenways) for active transportation. Commercial centers on either side of Claude E. Pope Memorial Highway (US HWY 1) provide the highest concentration of existing employment opportunity in Town but do not have access to existing greenways in the immediate area. Town Campus and commercial centers along W Williams Street (HWY 55) also employ more than 500 people.

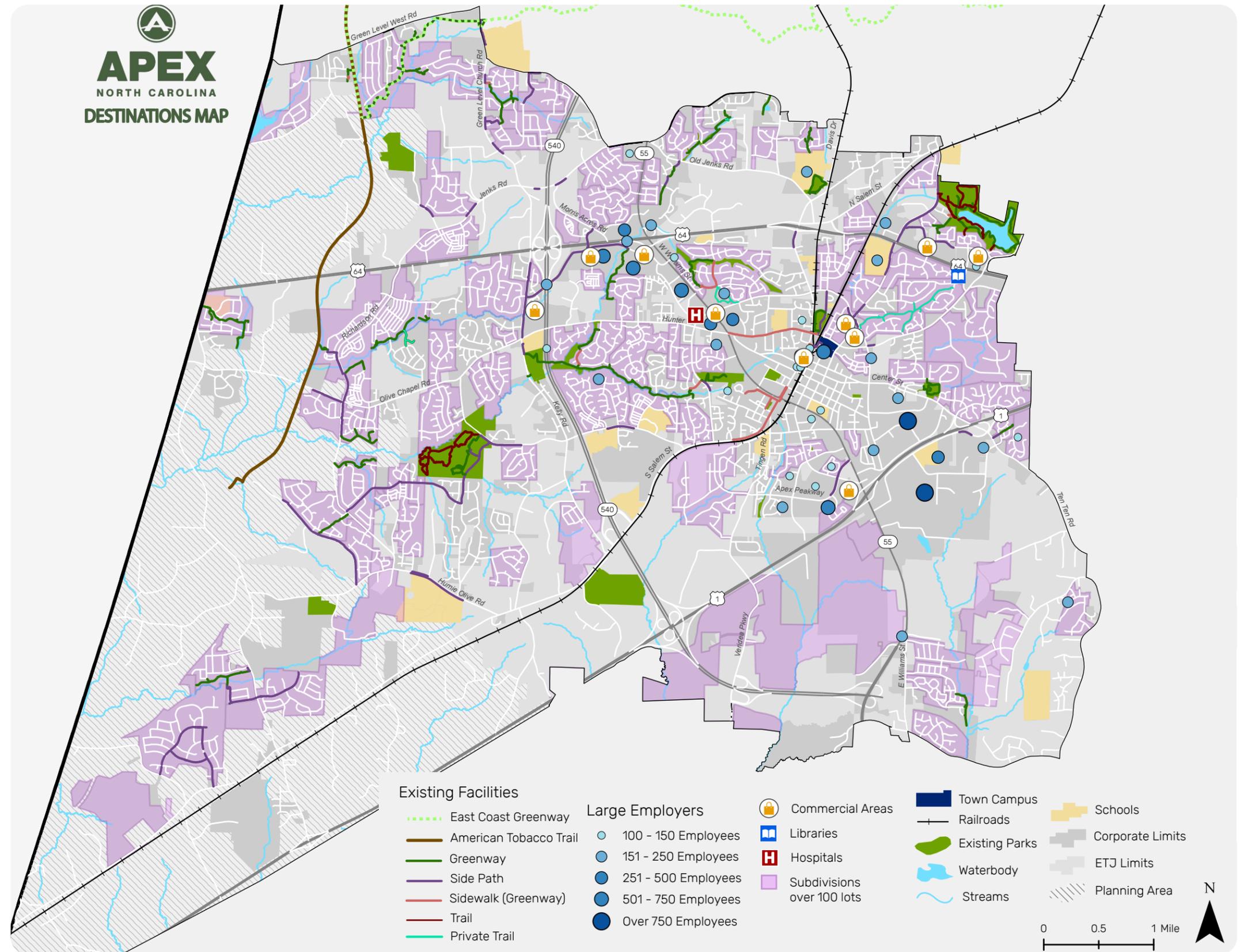


Figure 12.10 - Destinations Map

Existing Transit

Through the implementation of greenway projects recommended in this plan, the Town of Apex could support multi-modal travel options for its community. Multi-modal travel involves a combination of modes or services which could be supported through the use of active transportation facilities (e.g., greenway, side paths, and sidewalks) in tandem with transit.

If implemented, several side path and greenway projects recommended in this plan could help tie into the existing transit stop network within the Town. GoApex Route 1 recently launched its fixed route service in July 2022. The service is free to the public, and provides hourly trips from 6 AM to 10 PM, Monday through Saturday. The Town has partnered with GoCary to provide this service. Bicycle racks are provided on the GoApex Route 1 buses and at some bus stops. In addition to the fixed route service, the Town partnered with GoWake Access to provide complementary ADA paratransit service for individuals with disabilities, called GoApex Door to Door.

Outside of the local transit service there are also several regional transit routes that service Apex. These include GoCary Apex-Cary Express (ACX), GoTriangle Route 305 (Raleigh to Apex to Holly Springs), and GoTriangle Route 311 (Apex to RTP - currently not in service).

As displayed in the following map, there are two Park & Ride lots located within the Town (Lake Pine Plaza and S Hughes St at Williams St). Greenway and or side path connections to these lots could serve as safe, off-road facilities for riders to access the Park & Ride lots.

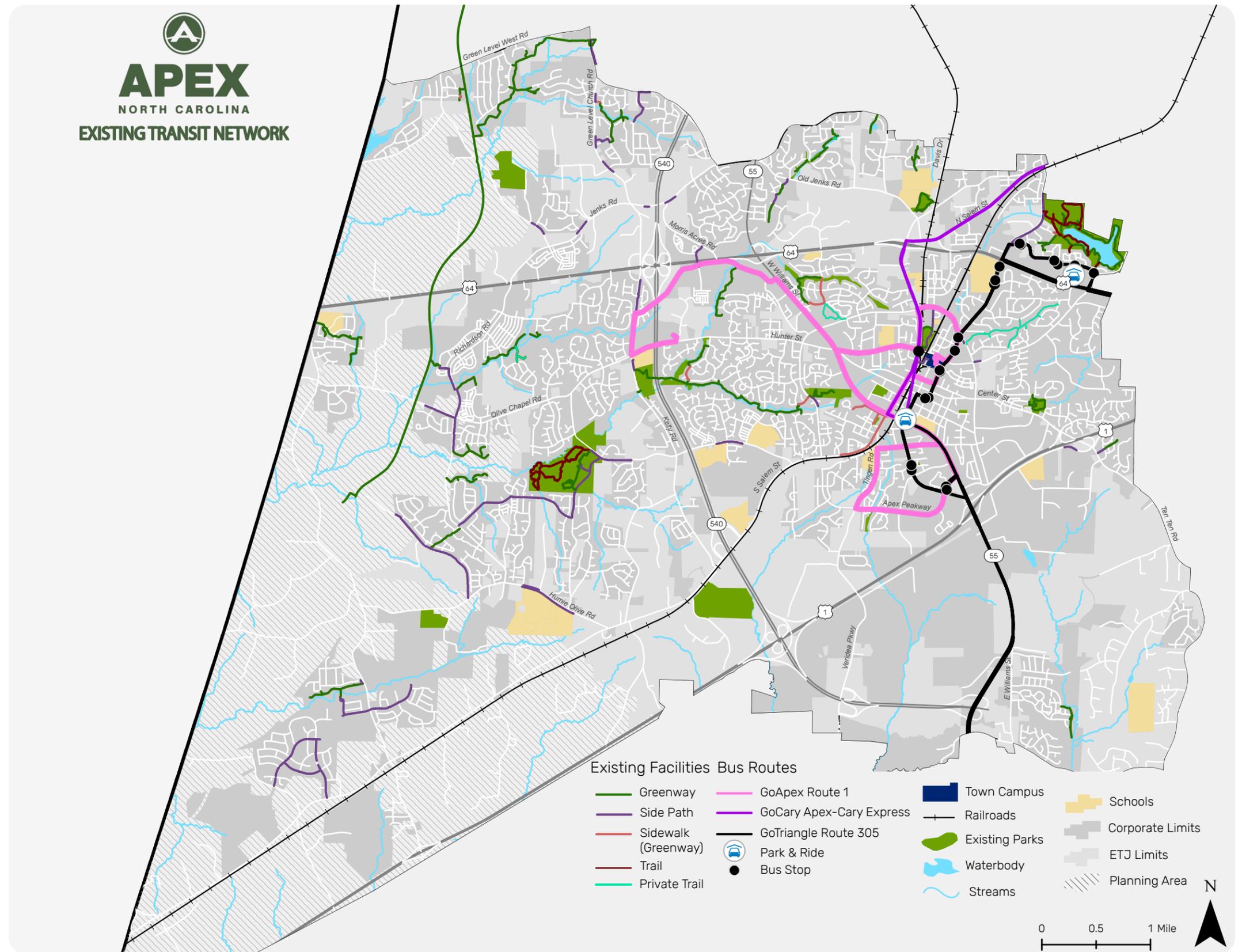


Figure 12.11 - Existing Transit Network Map

Bicycle + Pedestrian Crashes

Bicycle and pedestrian crash data can be used to identify locations of concern within the Town that may benefit from safety improvements. Crosswalks and rapid flashing beacons can serve as intersection improvements. The installation of new facilities like greenways and side paths can serve as off-road facilities that separate users from the roadway. The combination of these improvements provides users with safer and more comfortable experiences while utilizing these facilities.

The following map displays all pedestrian and bicycle crashes that occurred within the Town of Apex between 2007 and 2020. This data comes from police-reported bicycle-motor vehicle and pedestrian-motor vehicle collisions that occurred on the public roadway network and are documented by NCDOT. This data does not contain crashes occurring off the roadway, such as in parking lots, driveways, private roads, yards, alleys, and other open areas.

Crashes are symbolized on the map by injury type including fatal and non-fatal incidents. Four fatalities occurred within the Town; three pedestrians died, and one bicyclist died. Two crashes resulted in deaths along the railroad that runs parallel with S Salem Street. One pedestrian died at the intersection of US 1 and NC 540, while another passed away on NC 55 between Old Jenks Road and Morris Acres Rd. Improvements in infrastructure, as well as the implementation of policies and programs related to pedestrian and bicyclist safety may help reduce the crash rate within the Town.

The Town of Apex adopted a Vision Zero Action Plan in 2022. The purpose of this action plan is to achieve the goal of zero fatalities on Apex roadways by 2035.

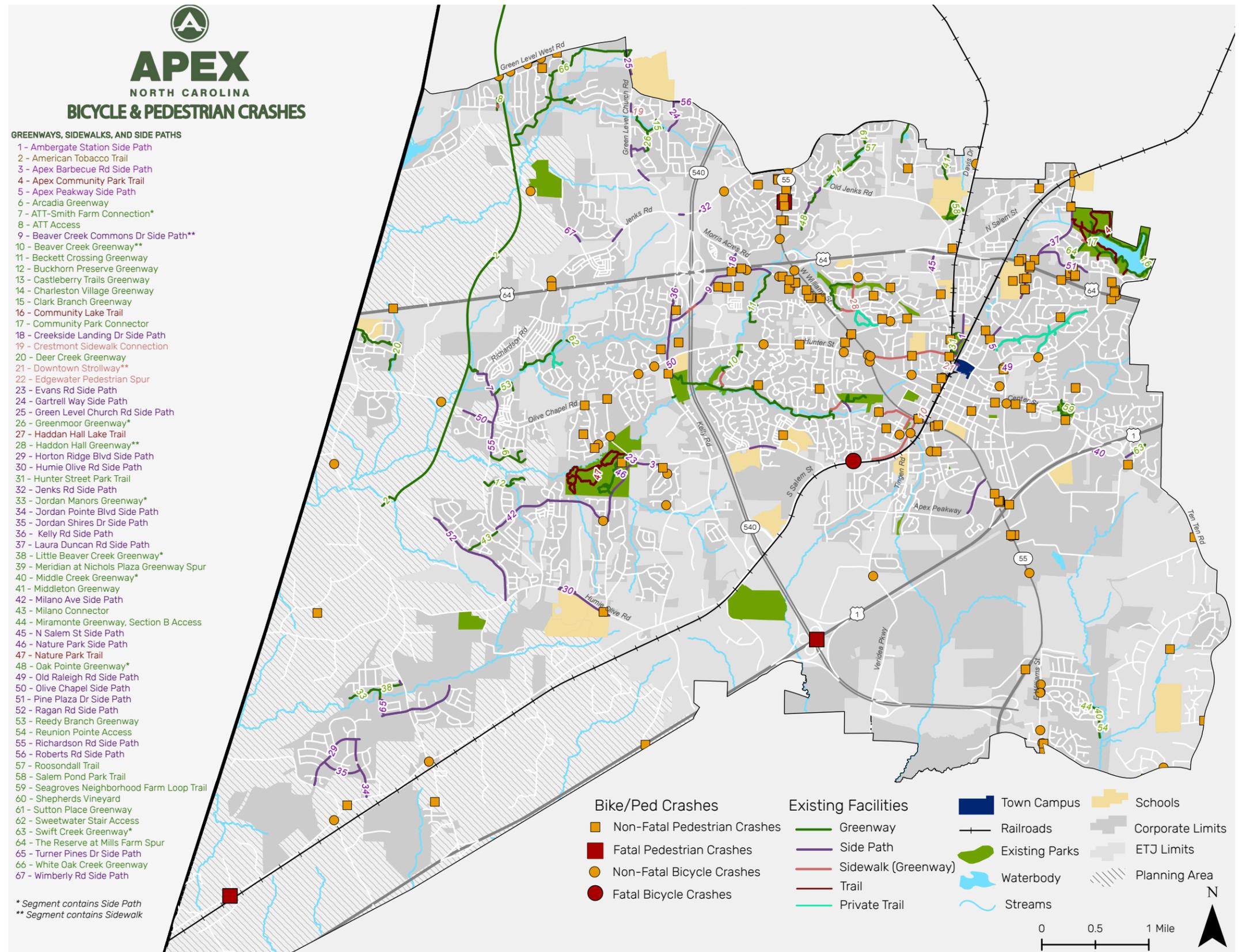


Figure 12.12 - Bicycle + Pedestrian Crash Map

Planned NCDOT STIP Projects

Under the Complete Streets Policy, NCDOT is committed to collaborating with cities, towns, and communities to ensure planned pedestrian, bicycle, and transit options are included in transportation projects. Planned roadway improvement projects through the NCDOT Strategic Transportation Improvement Program (STIP) may provide opportunities for complete streets. All STIP projects without a final environmental document are subject to the NCDOT Complete Streets Policy. Once this plan is adopted, greenway route recommendations must be considered as a part of STIP projects through the Complete Streets Policy.

NCDOT 2020-2029 STIP projects within and around the Town of Apex are displayed on the following map. Projects containing bicycle and pedestrian improvements are described in the list below.

- EB-6021 is the Beaver Creek Greenway extension project. It is located between Kelly Road Park and Apex Nature Park. The project proposes to realign an adjacent segment of the existing Beaver Creek Greenway.
- EB-6046 is on West Chatham Street from Hunter Street to Saunders Street in Apex. The project will construct sidewalk extensions and improve the safety of a pedestrian crossing.
- HL-0007 is located on Technology Drive and East Williams Street. The project will convert the intersection to an interchange.
- U-2901B is the NC 55 widening project that includes side path along both sides of the road.
- U-5301 on US 64 includes pedestrian crossing improvements (not featured in the map).
- U-5537 is located on Lake Pine Drive and includes a 10 ft multi-use path on the east side and a 5 ft sidewalk on the west side of the road. The roadway will be widened to three lanes north of Macgregor Pines Road to north of Versailles Drive.
- U-5825 is a widening project that includes a side path and bike lanes along Ten Ten Road.
- The Town also has a cost share agreement with NC Turnpike to have a grade-separated crossing of Middle Creek under NC 540 north of Sunset Lake Road.

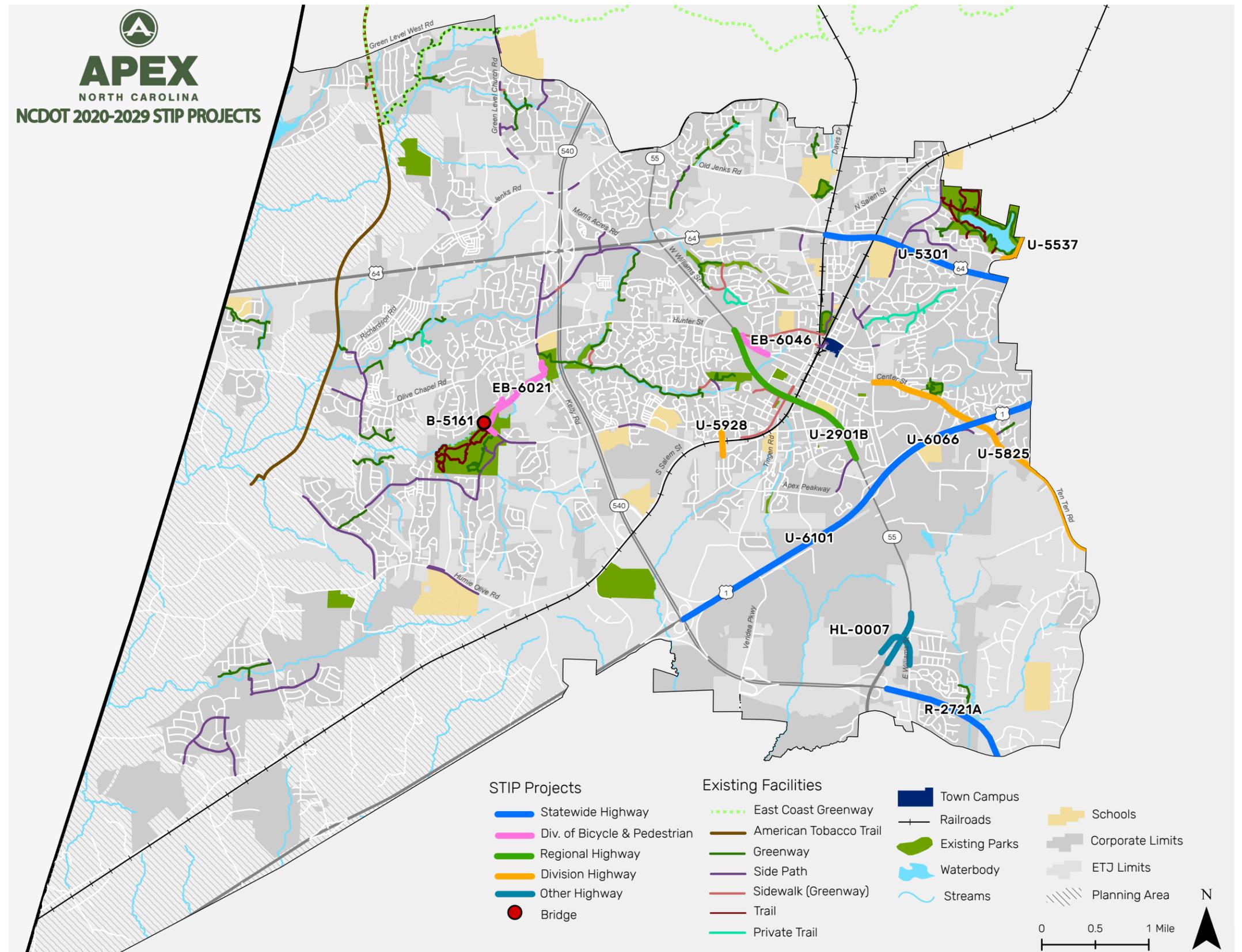


Figure 12.13 - NCDOT 2020-2029 STIP Projects

Topography

Apex has a varying topography that ranges from less than 250 ft above sea level near Jordan Lake and in stream beds to approximately 500 ft in the Town's historic core. This topographical feature is the origin of the name of the Town of Apex as it sits at the highest point along a 30-mile section of the Chatham Railroad. Steam engines would stop at the top of this climb to replenish their water supply on the way to Raleigh. Within the municipal limits, topography consists of terrain with some moderately steep slopes.

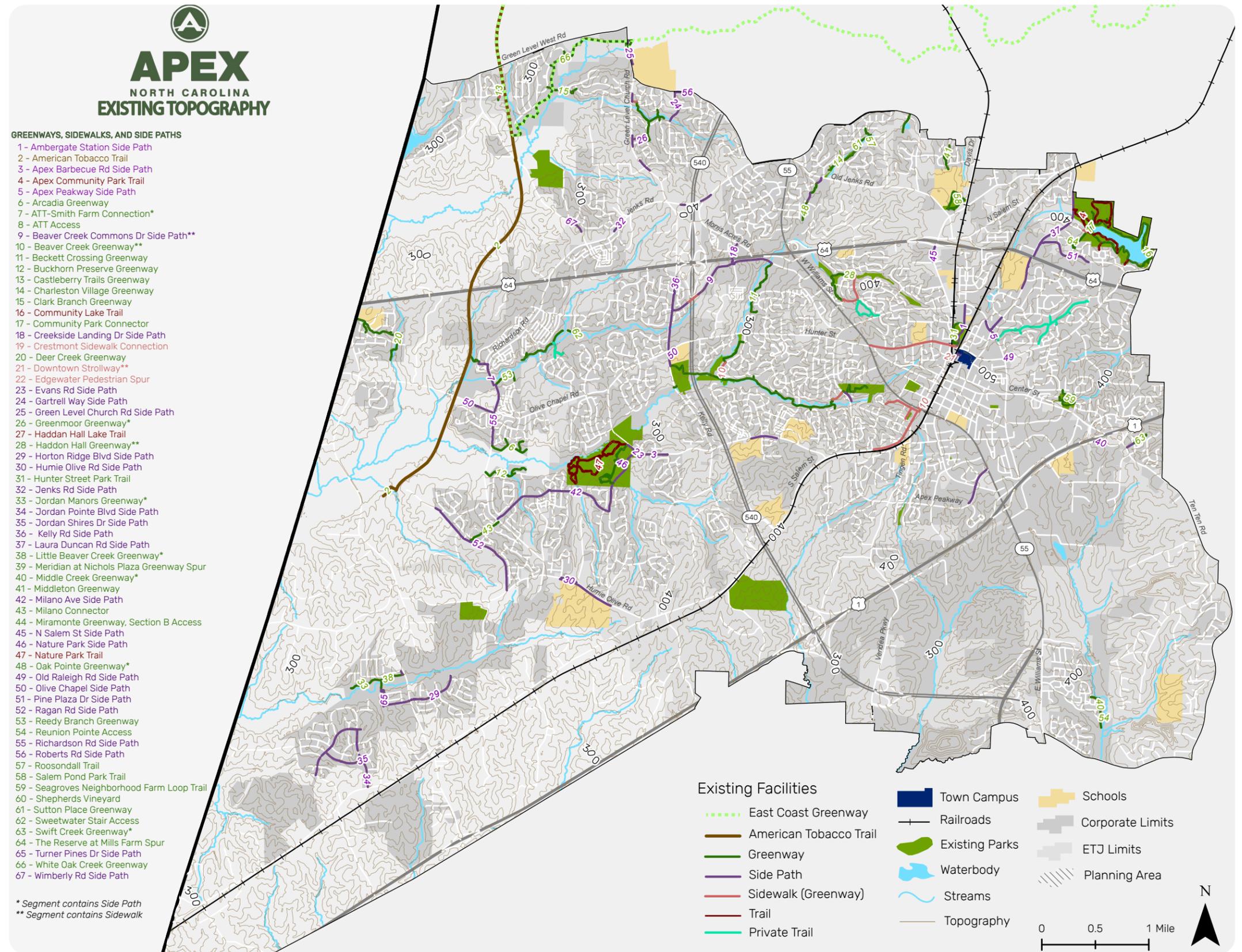


Figure 12.14 - Existing Topography Map

Floodplains + Wetlands

Floodplains and wetlands are unsuitable for development, so they are often considered prime corridors for greenways. While central Apex is located on a hill, the western region of the Town drains into Jordan Lake via Beaver Creek, Little Beaver Creek, and White Oak Creek. Floodplains and some wetlands cover most of these corridors, making it necessary for some greenways to be constructed using boardwalks. Big Branch drains to the Shearon Harris reservoir and Middle Creek drains to Sunset Lake.

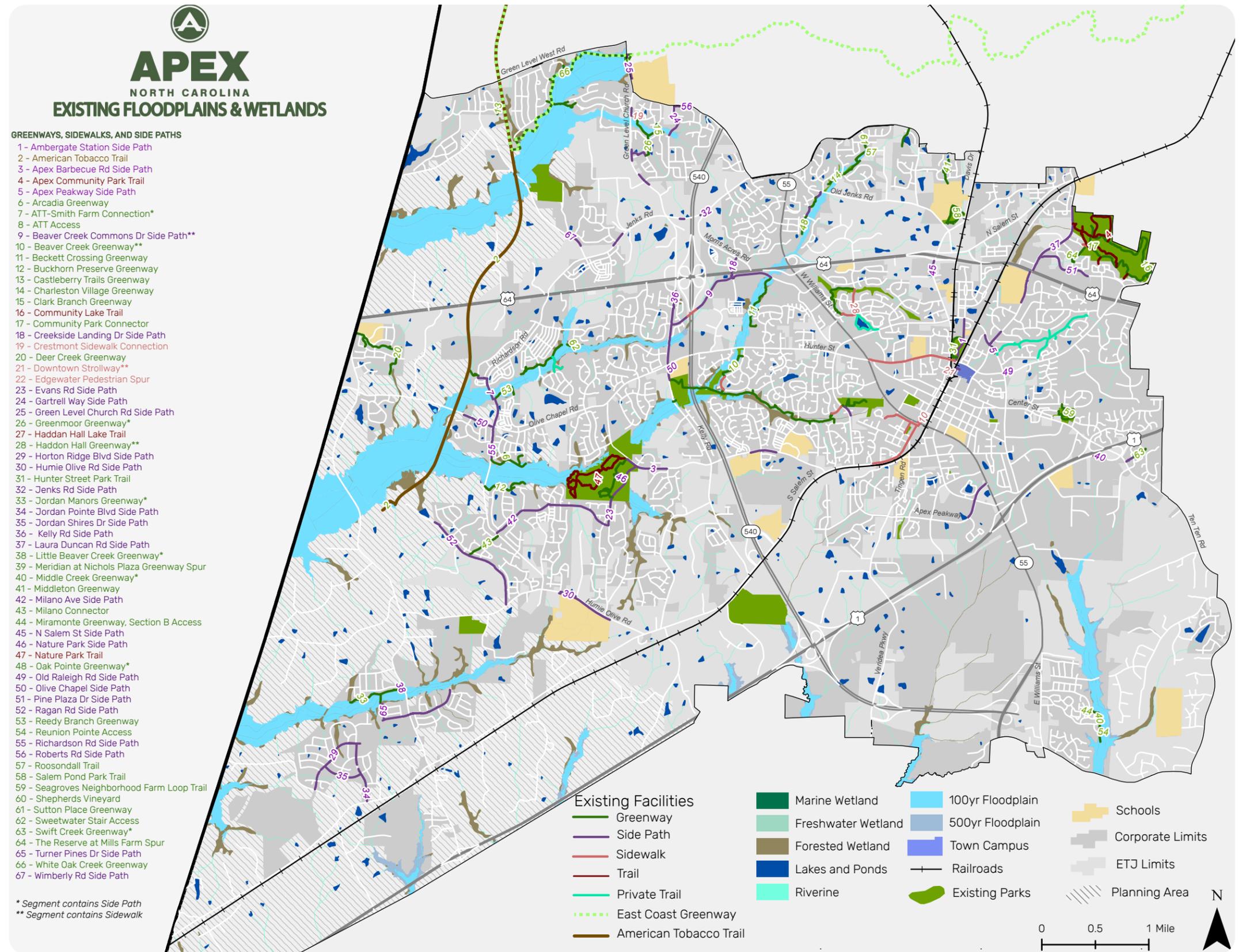


Figure 12.15 - Existing Floodplains + Wetlands Map

Utilities + Easements

Utility infrastructure such as power and sewer lines often require large easements to ensure access and security. These can also be used for greenway corridors in many cases. Apex has existing examples of greenways constructed parallel to sewer and power lines. Sewer lines are of particular interest to greenway planning as they often are routed through low-lying areas and floodplains. Environmental protection is also achieved when greenways are located on existing utility easement corridors. Placing greenways along corridor easements that have already been cleared for utilities means that fewer trees must be cleared for the greenway. The Town of Chapel Hill serves as a nearby example of a municipality that frequently relies on this strategy to expand its greenway network. The Town places the majority of its trails along its sewer easements where land is undeveloped. This strategy supports the Town's foundational goal of environmental conservation.

Both Duke Energy and sewer line easements are mapped below, and in some cases the two overlap. Two examples of greenways in Apex that are constructed adjacent to utility easements include the Beaver Creek Greenway and Reedy Branch Greenway.

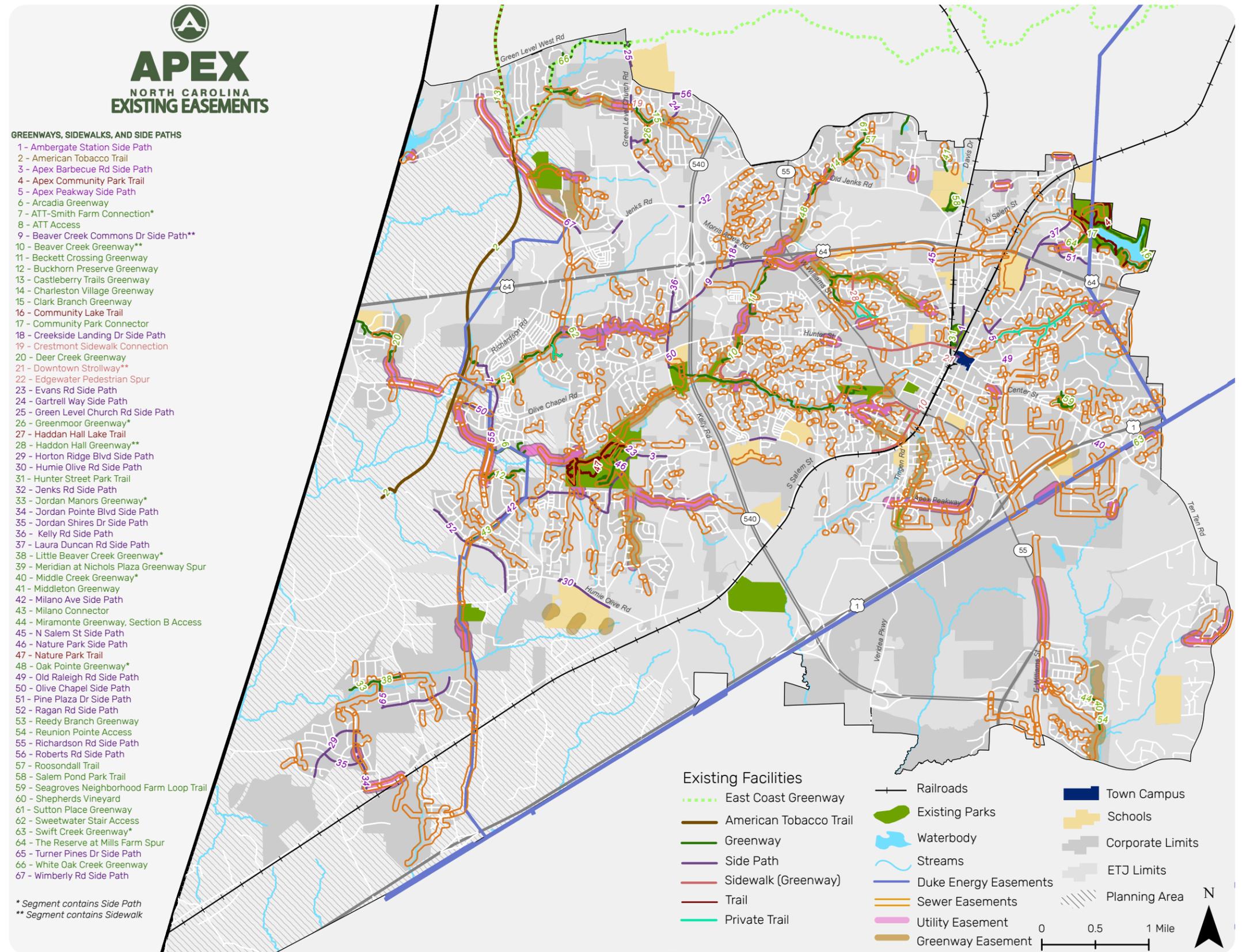


Figure 12.16 - Existing Easements Map

Opportunities + Constraints

An Opportunities and Constraints Analysis was performed to supplement site visits and fieldwork observations. It also helped the study team identify new areas for improvement that had not been addressed since the creation of the Town's existing Bicycle and Pedestrian System Plan Map. This analysis also helped the study team gain a better understanding of the community's needs and identify limitations within the Town as they relate to greenway planning.

The following table corresponds to the opportunities and constraints labeled on the following map. The table provides a summary of opportunities and constraints that may inform the development of project recommendations and planning strategies for Apex's greenway network.

The following opportunities and constraints were considered as part of this analysis:

- › Neighborhood connectivity
- › Multimodal connectivity
- › Connections to schools
- › Connections to parks
- › Connections to the regional trail network
- › Connections to neighboring jurisdictions
- › Downtown connectivity
- › Connections to shopping and commerce
- › Developer-built greenways
- › Facility connectivity along roadways
- › Maintenance of existing greenways
- › Utility easements

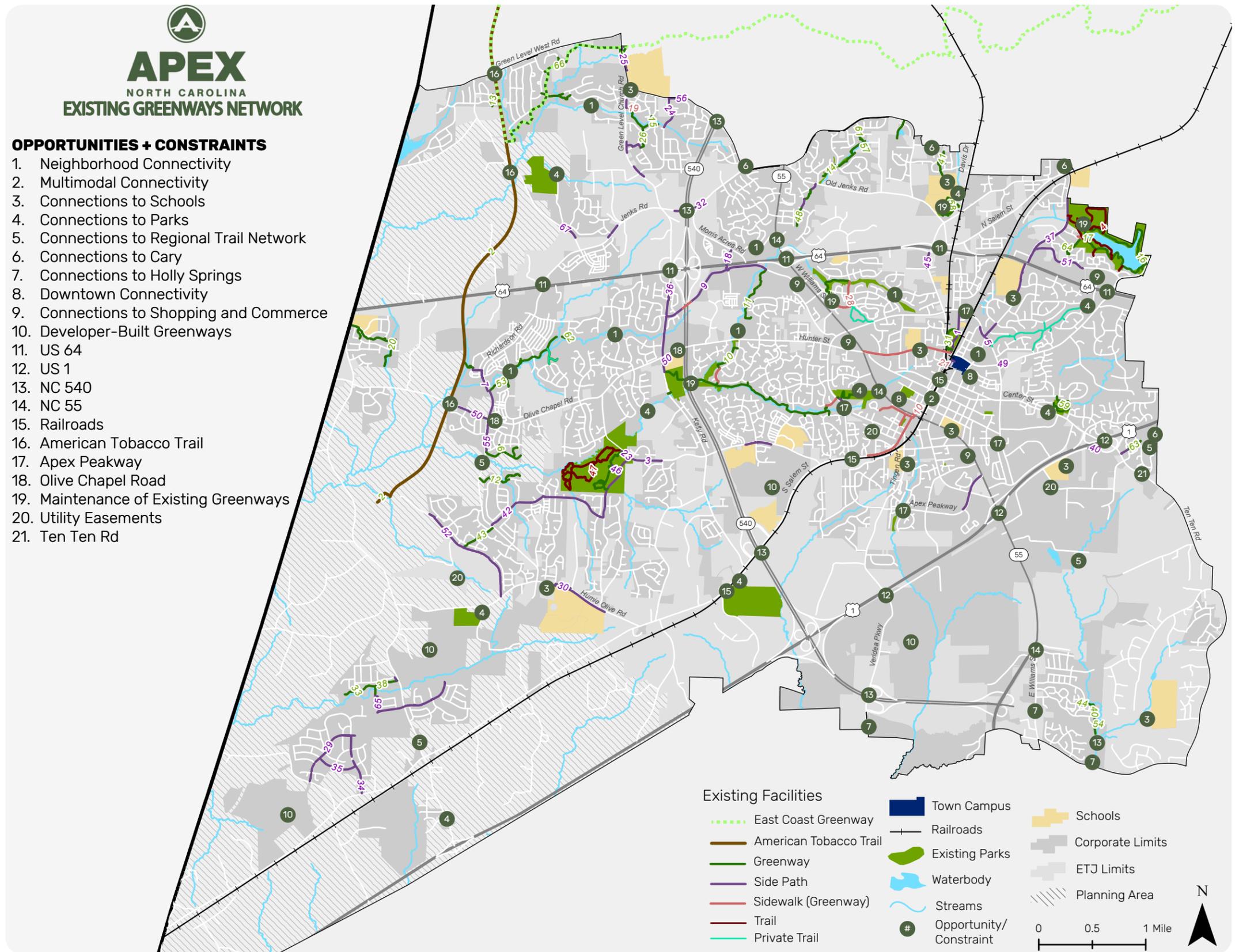


Figure 12.17 - Existing Greenways Network with Opportunities + Constraints Map



Opportunities + Constraints

| OPPORTUNITIES + CONSTRAINTS | DESCRIPTION |
|------------------------------|---|
| 1. Neighborhood Connectivity | The incremental development of greenways largely constructed by developers has left Apex with gaps in its network. Along the Reedy Branch Greenway, gaps exist between Richardson Rd and Hasse Ave, between the Sweetwater and Stratford at Abbington neighborhoods, and east of Stratford at Abbington to Kelly Rd. A gap in the Beaver Creek Greenway prevents users from traveling between the Pearson Farms and Beckett Crossing neighborhoods across Olive Chapel Rd without a detour. Other gaps are located between the White Oak Creek Greenway and Beaver Creek Commons, within the Haddon Hall neighborhood, and between the privately maintained Shephard's Vineyard Greenway and Downtown Apex. Some of these gaps can be closed with future development, while others will have to be constructed by the Town. |
| 2. Multi-modal Connectivity | While transit access in Apex is currently limited, many of Apex's current bus stops are along corridors that are accessible by greenway or side path. A proposed intercity rail service between Sanford and Norlina creates the possibility of a station in Apex, which could be linked to the greenway network to provide a true multi-modal connection. |
| 3. Connections to Schools | <p>A robust greenway network with safe connections to schools would enable many children to walk or bike to school. Some examples of schools with existing side paths in front of the properties include Apex High School, Laurel Park Elementary School, Green Level High School, Scotts Ridge Elementary, and the Apex Friendship Schools Campus. The Salem Schools Campus also has a greenway trail that ties into the property line on the north side of the property. Despite these examples, several schools still lack similar facilities.</p> <p>In Downtown Apex, it is more context sensitive to provide sidewalks rather than side paths so there are existing sidewalks along roadways fronting Baucom Elementary School, Apex Elementary School, and Apex Middle School. Currently, multi-use connections (e.g., greenways and side paths) are lacking at Salem Elementary School, Salem Middle School, Apex High School, Apex Friendship High School, Green Level High School, and Lufkin Road Middle School. The Town of Apex continues to coordinate with Wake County Schools to improve bicycle and pedestrian connections to local schools. The development of new schools, including the planned Felton Grove High School, will allow for greenways to be included within the design process from the beginning.</p> |

| OPPORTUNITIES + CONSTRAINTS | DESCRIPTION |
|--|--|
| 4. Connections to Parks | Connecting parks via greenways and side paths is a top priority in Apex. Although many parks have walking trails within their borders, connectivity between parks is lacking. The Beaver Creek corridor offers the potential to link Apex Nature Park to Kelly Road Park, Apex Jaycee Park, and other neighborhood parks in the downtown area. Greenway connections are also missing or lacking for Pleasant Park, Olive Farm Park, Shearon Harris Park, Salem Pond Park, Apex Community Park, and Seagrove Park. As the Town continues to develop and acquire more land for parks, the need for greenway connectivity will remain a priority. |
| 5. Connections to Regional Trail Network | Apex is one piece of a larger regional network of greenways and trails that improves the quality of life for everyone. Several regionally known corridors, such as the East Coast Greenway pass through Apex, including greenways along New Hill Holleman Rd, Swift Creek, and Middle Creek. An extension of the Beaver Creek Greenway would allow the Town to create a new connection to the American Tobacco Trail similar to what is provided by the White Oak Creek and Reedy Branch Greenways. Development of these trails will allow residents of Apex to travel safely across southwestern Wake County and beyond without a car. |
| 6. Connections to Cary | Apex and Cary are closely intertwined, and it is important to ensure that greenway and trail planning is coordinated across municipal lines. Several locations offer the opportunity to strengthen transportation connections between the two jurisdictions, including the Swift Creek corridor (which will ultimately extend to Lake Wheeler and Lake Benson in Garner), Laura Duncan Rd, Middleton Greenway, and Roberts Rd. |
| 7. Connections to Holly Springs | As Apex continues to grow to the south and west, it can strengthen greenway links with the Town of Holly Springs. Completing the Middle Creek Greenway corridor and side path along New Hill Olive Chapel from the American Tobacco Trail to Harris Lake Park would provide much needed connectivity. Side paths along Veridea Pkwy and Williams St would enable additional connections in a fast-growing part of the county that is currently lacking in greenway connections. |
| 8. Downtown Connectivity | Apex has a vibrant historic downtown, but without a car it is difficult to access for some people. The existing Beaver Creek Greenway ends at Apex Jaycee Park, leaving users without a safe connection to Downtown and users must follow along streets that lack sidewalks. A similar lack of connectivity between Downtown and residential neighborhoods north of the Apex Parkway presents an opportunity to improve bicycle and pedestrian connections along major roadways within the Town core. |



| OPPORTUNITIES + CONSTRAINTS | DESCRIPTION |
|---|--|
| 9. Connections to Shopping and Commerce | Many of Apex’s existing greenways are outside of Downtown in more recently developed areas, but gaps remain between neighborhoods and some of the shopping destinations residents would like to access by walking or biking. Access to and within Lake Pine Plaza, Olive Chapel Village, Haddon Hall Commons, Peakway Market Square, Beaver Creek Commons, and other shopping destinations along Williams St is currently difficult and unsafe for bicyclists and pedestrians. Proposed side paths in these locations will address safety concerns and create new opportunities for Apex residents to use greenways and trails to reach useful daily destinations. |
| 10. Developer-Built Greenways | Under development ordinances in Apex, new development may be required to construct sidewalks, greenways, and trails planned by the Town. As Apex continues to grow, there are many locations where development is concentrated, including Southwest Apex along Old US 1 and Humie Olive Rd, as well as the Depot 499 and Veridea master-planned, mixed-use developments. |
| 11. US 64 | US 64 is a major travel corridor through Apex with a growing number of retail and entertainment uses; however, it lacks bicycle or pedestrian infrastructure at present. The corridor is set to be modified to a limited-access highway (U-5301), which will eliminate any need for trails along the highway. Crossings at Lake Pine Dr, Laura Duncan Rd, Shepherds Vineyard Dr, and Salem St should be improved in coordination with NCDOT work on U-5301. Other crossings outside the project limits offer the potential for additional improvements, including NC 55, Kelly Rd, and Richardson Rd/Jenks Rd. |
| 12. US 1 | Bicycle and pedestrian connectivity across US 1 is limited with only the NC 55 bridge providing narrow sidewalks. Opportunities exist to improve this crossing as well as add new crossing options at Veridea Pkwy. |
| 13. NC 540 | The Triangle Expressway, NC 540, serves as a major barrier to bicycle and pedestrian connectivity in western and southern Apex with very few greenway crossings. Several existing roadway crossings could be upgraded to accommodate multi-use paths across the highway, including Roberts Rd, Jenks Rd, S Salem St, and Veridea Pkwy. The Southern Wake Expressway, which will extend 540 from NC 55 to I 40 in Garner, includes a section of grade-separated greenway along Middle Creek which will connect to existing greenways in Apex and the Holly Springs Greenway. |
| 14. NC 55 | Multiple projects along the NC 55 corridor offer the opportunity to improve greenway connectivity in Apex. Extending the Beaver Creek Greenway to NC 55 is a priority for the Town. Side paths proposed on both sides of the roadway (U-2901) offer the opportunity to greatly enhance safety and mobility in this region, and a proposed tunnel under the roadway at Jaycee Park would offer a safe crossing of this busy corridor. This also provides the opportunity to connect to Holly Springs via side path. |

| OPPORTUNITIES + CONSTRAINTS | DESCRIPTION |
|---------------------------------------|---|
| 15. Railroads | The CSX S-Line rail corridor runs through the heart of Apex and presents a major barrier to connectivity within the town. Few bicycle and pedestrian crossings exist, and safety concerns with the railroad make future at-grade crossings unlikely. However, in one case, the 2021 Streets & Sidewalks bond included funding to construct at-grade pedestrian crossings of the railroad at Center St and E Chatham St. Grade separation projects such as the Apex Peakway Southwest Connector (NCDOT project U-5928) also offer the potential to improve greenway connectivity in Apex. The possibility of future commuter rail service along this corridor also raises the possibility of developing a greenway corridor alongside the tracks. |
| 16. American Tobacco Trail | The American Tobacco Trail, which runs along a former rail bed in western Apex, is a major regional activity draw. The trail is unpaved within Apex’s jurisdiction, and some sections are prone to occasional flooding. Opportunities exist for new or improved trail heads at Olive Chapel Rd, Ragan Rd, along Wimberly Rd or associated with the future Wimberly Rd parkland, and Green Level West Rd. |
| 17. Apex Peakway | Once complete, the Apex Peakway will offer a looping connection to many neighborhoods near Apex’s core. The completion of the final segments of the Peakway will offer opportunities to provide new side path and greenway connections. |
| 18. Olive Chapel Rd | Olive Chapel Rd provides one of the primary connections from Apex Peakway to the American Tobacco Trail. However, the lack of connected sidewalks and side paths make it unsafe and inconvenient for many users. There are bike lanes planned along the corridor, and an existing side path at Richardson Rd could be extended to increase off-street connectivity for pedestrians and bicyclists. |
| 19. Maintenance of Existing Greenways | Apex has an existing greenway system which is well-used, but some sections need repair after years of use. Greenways in Salem Pond Park and the Haddon Hall neighborhood are showing their age and may benefit from widening to accommodate an increase in users. Beaver Creek needs to be resurfaced, have shoulders repaired, and has some other cross slope issues. One of the flooded areas was relocated, but it is still flooding. A nearby area is currently undergoing stream restoration. The Apex Community Park trail needs to be widened due to the high traffic use, conflict of user types, and the tight curves and hills. Flooding issues are also present at Apex Community Park, as well as along the Beaver Creek Greenway beneath NC 540. |

| OPPORTUNITIES + CONSTRAINTS | DESCRIPTION |
|-----------------------------|---|
| 20. Utility Easements | In addition to roadway and stream corridors, utility easements offer opportunities for greenway construction. One existing easement provides possible connections within Apex including Duke Energy easements near Humie Olive Rd and along US 1. Most of the easement for the Southwalk Greenway has been acquired but will require a realignment at the Peakway since the existing alignment goes through a trailer park. This easement is located in the Justice Heights neighborhood between Apex Peakway and S Salem St. |
| 21. Ten Ten Rd | NCDOT project U-5825 would widen Ten Ten Rd from Kildaire Farm Rd in Cary to Apex Peakway and includes a replacement bridge over US 1 with a side path on the north side. Additionally, U-2525 includes bicycle lanes along Ten Ten Rd. |

- Ensuring affordability to users (33%)
- Physical connectivity through Town (33%)
- Creating community connections (32%)
- › When prompted to share additional comments regarding values, wishes, or concerns for the future development of the Parks, Recreation and Cultural Resources Department, respondents listed the following comments:
 - Would like to see light displays within walking trails at Lake Pine (Apex Community Park) around the holidays.
 - Interested in more flower gardens and fountains/lakes within the parks.
 - Consider providing blueway access points at Beaver Creek.
 - Interested in supporting and encouraging more public art and cultural events.
 - Initiate nature walk and history walk programs at the senior center.
 - Endorse mountain biking in the area.
 - Include the special needs community in outdoor programming.

Public Meetings

The project team held two open house events for the community to learn more about the Project and provide their input.

Open House #1

The first open house took place on October 8th, 2021, via Zoom. The purpose of this meeting was to solicit input from the public regarding recreational facility, greenways and trails, and program needs. The 56 open house participants were given a brief presentation about the Town’s past planning efforts, the current comprehensive planning process, components/contents of the plan, and a snapshot of Apex’ current recreation inventory. Attendees took part in several polling questions and had the opportunity to ask questions and express opinions by way of Zoom’s question and answer widget. As anticipated, virtual open house participants were vocal about greenways in Apex. Key findings related to greenways from this event are listed below.

Key Findings:

- › In an exercise geared at figuring out what evokes a sense of pride in the community, greenways were listed as a top response.
- › During the pandemic, a poll found that respondents used greenways and parks primarily for exercise and exploring nature.
- › Conversations generally focused on closing greenway gaps, adding neighborhood connections, and overall feelings of safety accessing the greenways.
- › Several participants discussed perceived hazards associated with crossing Highway 55 near Jaycee Park. Others voiced their concern with the influx of cyclers on the roads and asked why they resist using greenways for cycling.
- › Apex PRCR staff conveyed that (1) future development and prior plans guide recommendations for and prioritize future greenway connections; (2) a recent amendment to the Town’s transportation plan identified the opportunity for a greenway trail to run under Highway 55; (3) the Town has additional funding for greenway planning beyond the current report; and (4) in order to provide the right opportunities for the experience long-distance cyclers want, Apex Engineering and Transportation are looking at ways to balance bike lanes with pedestrian sidewalks and multi-use paths.

COMMUNITY + STAKEHOLDER ENGAGEMENT

Public Survey

The public survey was launched on October 7, 2022, through PublicInput.com to gain insight into the Town’s values, facility use (greenways and trails), amenity needs and more. The survey had 748 total respondents with over 700 comments. The survey was closed on October 24, 2022, and the results related to greenways and trails are described below.

- › Community Values: Environment + Nature was the top preference in terms of community values in the survey. This was followed by Health + Wellness. Culture + Arts was ranked as the lowest priority.
- › Greenways + Trail Use: Respondents marked that they would like to use greenways and trails to walk (followed by bicycling). Few respondents currently use the facilities for commuting purposes.
- › Greenways + Trails Experiences: The top three experiences that respondents would like to have while using Apex’s greenways and trails include the following:
 - Improving Health + Wellness
 - Connect with Nature
 - Connectivity to Parks, Downtown, and Other Destinations
- › Amenity Needs: Respondents marked the following amenities as their top five needs within the Town:
 - Greenways and trails with trail heads (56%)
 - Water sports access (33%)
 - Environmental conservation, restoration, and enhancement (31%)
 - Aquatics facility (29%)
 - Community gardens (27%)
- › Criteria for Prioritization: The top three priorities to consider as the Parks, Recreation, and Cultural Resources Department develops the 10-year master plan include the following:
 - Promoting health and wellness programming (54%)
 - Promote environmental sustainability (44%)



Open House #2

The second open house took place on June 22, 2022, at the Apex Community Center. The project team provided information on the master plan, project process, and the schedule. Both informational and interactive boards were set up for attendees to learn more about the recommendations made for greenways, future park areas, guiding principles within the Town. Site-specific boards for existing parks were shared with attendees so they could add notes on additional opportunities for each. Key findings related to greenways from this event are listed below.

- › One attendee expressed interest in promoting greenways through a badge program. Those who complete all greenways and trails would receive an honorary badge.
- › Discussions were also centered around promoting downtown connectivity through the expansion of the greenway network.
- › One attendee asked the project team to add a side path parallel to the railroad to the NC 540 bridge. This would connect to the Apex Friendship Schools and Pleasant Park.
- › Environmental stewardship and preservation of existing natural resources and features was marked as top priority in the guiding principles framework exercise.

Focus Groups

Town staff held a series of four focus group meetings on January 31 and February 1, 2022. The purpose of these meetings was to understand the recreation needs of otherwise underrepresented groups in the community engagement process. Specific groups engaged included cultural arts and special events, seniors and disabled populations, non-athletic programs, and athletic programs. There were approximately 23 participants across all four focus groups. Each group was asked a consistent set of questions relating to programs, parks, facilities, and greenways usage and overall needs, as well as specific concerns and barriers to park and facility usage and program participation. The key findings relating to greenways are summarized below.

Cultural Arts + Special Events

Participants felt that continuing to link greenways to Town facilities such as parks and cultural centers was beneficial to residents. Having access to Town facilities via active transportation infrastructure enhanced the health and cultural involvement of residents and visitors.

Seniors + Disabled Populations

Participants voiced a desire to ensure parks are connected and accessible for users of all ages and abilities.

Non-Athletic Programs

Participants in this focus group expressed satisfaction with the wide range of park facilities and amenities offered in Apex, but also noted that the rapid development of the community presented the need to preserve space for park and recreation facilities. Filling gaps in the greenway system was cited as a priority.

Athletic Programs

There were no discussions of greenway needs in this focus group.

Interdepartmental Meeting

Town staff and leadership were integral in the development of Apex's Comprehensive Parks, Recreation, Greenways, and Open Space Plan, providing valuable insight into the existing and planned facilities of Apex's greenway network. Following meetings with Parks, Recreation & Cultural Resources Department staff, other departments were engaged to understand each department's relationship and responsibility regarding greenway facilities. Town departments interviewed include Planning and Community Development, Public Works and Transportation, and Water Resources. Prior to the meeting, staff were asked to complete a survey, responding to general questions on individual roles and responsibilities for greenway facilities. During the meeting, staff were asked specific questions for each department. The meeting summary is outlined below.

Planning + Economic Development Departments

- › Staff roles in greenway planning, development, and maintenance include reviewing site plans; updating planning documents such as the Bike Apex Plan, Bicycle and Pedestrian System Plan and Map, and the Comprehensive Plan; updating GIS shapefiles as greenway facilities are planned and developed; and coordinating with the Parks and Recreation Department on site plan review and updating greenway design standards.
- › Staff voiced the need to improve policies and practices that ensure greenway network connectivity by coordinating more closely with Parks, Recreation & Cultural Resources Department staff during plan review and with Water Resources on greenway design and development along utility easements.
- › The UDO currently requires greenways be constructed prior to the time that 25% of the building permits are issued for PUD's and 50% of the building permits for all other residential development. With the location of greenways often in the remote parts of project boundaries, staff are interested in exploring revisions to the UDO that requires greenway construction to be better aligned with how property is typically developed.

Transportation & Infrastructure Development Department

- › Staff shared that greenway projects are often not prioritized by either the Transportation & Infrastructure Development Department or the Parks, Recreation & Cultural Resources Department. The two departments meet monthly to coordinate projects, but long-range planning staff often work between them. A separate funding request is needed in the Town's Capital Improvement Program to initiate projects.
- › Implementing bicycle and pedestrian infrastructure is often piecemeal as development occurs and roads are improved or constructed to new Town standards, leaving gaps in long-range networks. For larger projects, shared funding opportunities are sometimes possible when outside funding sources are used.
- › The Town is working on a Vision Zero program and is developing standards of protected and separated bicycle facilities on shared corridors.

Public Works Department

- › Staff noted that greenway maintenance is performed by Parks, Recreation & Cultural Resources Department staff rather than Public Works. No budget is provided for greenway maintenance except in the case of emergency repairs.
- › When greenways are constructed within floodplains and along utility corridors there are sometimes conflicts between uses for the corridor. Staff voiced a desire to work with other Town departments on designing greenway corridors to ensure access for utility maintenance.
- › Greenways should be offset 10 ft from a utility line to ensure access. While boardwalks are sometimes the only viable material for a section of greenway, boardwalk structures are not generally designed for utility traffic and can lead to safety concerns.

Interjurisdictional Meeting

Town staff held a meeting with staff from neighboring jurisdictions to coordinate greenway and side path recommendations across planning boundaries. The Town of Cary, Town of Holly Springs, Wake County, and Chatham County were invited to discuss corridor recommendations and priority projects to ensure regional connectivity. Staff also discussed greenway design standards, maintenance programs and responsibility, and greenway development ordinances.

Wake County

Several greenway connections to the American Tobacco Trail in Wake County were considered at the meeting, including from the Reedy Branch Greenway and side paths on Ragan Rd and Wimberly Rd. A proposed extension of the American Tobacco Trail south of its current terminus is a priority project as it would enable connections to side paths on Humie Olive Rd and New Hill Holleman Rd, a planned recreation activity center on New Hill Olive Chapel Rd, and the Little Beaver Creek Greenway which is another priority corridor.

Chatham County

Discussions with Chatham County focused primarily on providing greenway access to Jordan Lake, which is a major recreation attraction with campground areas and beach access.

Town of Cary

Connections with Cary are possible along many corridors including side path on Green Level Church Rd, Roberts Rd, NC 55, Davis Drive, and Ten Ten Rd. The Swift Creek Greenway would connect Apex Community Park to Koka Booth Amphitheater and staff was supportive of the Swift Creek Connector which would also connect Middle Creek Greenway to Regency Park/Koka Booth and is included on the Great Trails State Plan. Staff also discussed connecting the Sherwood Greens Greenway in Cary to the Middleton Greenway and Salem Pond Park Greenway in Apex. Grade separated facilities were also discussed for Green Level Rd, US 64, and US 1.

Town of Holly Springs

Staff discussed three connections to Holly Springs, including Middle Creek Greenway (also known as Arbor Creek in the past) which is a part of the Great Trails State Plan, a side path on Veridea Pkwy connecting to the proposed Big Branch Greenway, and a side path connection along an extension of Pleasant Plains Rd to Pleasant Park in Apex which will require a grade-separated crossing of US 1.

Wake County Safe Routes to School

A general desire to connect to schools was expressed by communities present at the meeting. Staff should continue to coordinate with the Wake County Public School System on new and existing school sites to ensure students can walk and bike to school safely.

GREENWAY NETWORK RECOMMENDATIONS

Overview

Greenway recommendations primarily address the recreational needs of Apex residents and visitors by developing a comprehensive network. The proposed greenway system builds off recommendations developed in previous planning efforts and greenway network needs expressed by community members during the planning process. This section translates the vision for an accessible greenway system that connects people, parks, and destinations in the community into a strategic set of recommendations with proposed strategies for developing the network, amenities, and policies.

Greenway Facility Recommendations

Apex’s greenway facility recommendations establish a comprehensive system that compliments recent active transportation and park planning efforts. Recommendations were developed based on community and stakeholder input, a review of existing conditions, key destinations, and connections identified through the planning process, and a prioritization process. The proposed system provides a network of greenways and side paths that is accessible and feels safe for people of all ages and abilities.

DESIGN STANDARDS + TYPICAL SECTIONS

The standards and methods in which greenways are designed impact the experience and safety of the diverse set of users that take to greenways for a variety of recreational, health, and transportation purposes. This section illustrates aspects of facility design to help guide future actions by Apex and its partners in planning for, designing, constructing, and maintaining greenways that connect to a variety of destinations, promotes a diverse user experience, and is built to a maintainable scale. Current design standards and typical sections for the Town are also provided in this section. The Town should update their design standards to reflect the recommendations in this plan.

Materials Selection

Factors to be considered in the selection of materials for greenways include anticipated facility type (recreational versus commuter), expected use activities (i.e., walking, bicycling, running, and rollerblading), age and ability of users, environmental conditions, construction cost, maintenance burden and costs, and funding source requirements among others. A variety of materials are described and illustrated below.

Paved Surface

Paved greenway surfaces such as asphalt or concrete offer great accessibility to accommodate users of all ages and abilities. Asphalt pavement tends to be the most popular and cost effective for paved greenways. Concrete pavement is more durable, but it costs more than asphalt pavement. As such, concrete greenways are typically more common in urban settings (where projected user volumes are high or the greenway may be subject to vehicular loading more often) or in areas subject to heavy flooding forces that may cause damage to the greenway.



Figure 12.18 - Paved Asphalt - Lower McApLine Creek Greenway, Charlotte, North Carolina



Figure 12.19 - Concrete Surface Greenway - Cross City Trail in Granville County, North Carolina

Natural Surface

Compacted aggregates and compacted native soil are two types of natural surfaces that can be used for greenways. Both are budget-friendly options that have been implemented in greenway systems across North Carolina and beyond to provide a durable alternative to paved paths.

Compacted aggregates have proven to be a durable, affordable, and readily available means of providing a natural surface for greenway construction. Granite fines are a commonly used material due to their availability from local quarries and their ability to achieve compaction of a level surface that is accessible to most users. Proper compaction and handling adjacent drainage are keys to the success of using this material. Annual maintenance is required to ensure that the facility's crown pitches drain. This typically includes laying and grooming additional aggregate as necessary to ensure that water rills and deep grooves do not form within the surface as a result of regular rain events. It is critical to establish drainage adjacent to the facility during construction to ensure concentrated runoff is not allowed to cross the greenway perpendicularly. Over time, these types of flows will erode the greenway and surfacing.



Figure 12.20 - Compacted Soil Trail - American Tobacco Trail

One of the most cost effective and easily constructed natural surface options is compacted native soil. Like compacted aggregate, this surfacing method relies heavily on material compaction and adjacent drainage. The existing soil must be able to achieve compaction levels of 95-98% to ensure facility integrity. If native soil is unsuitable, material may be imported at additional cost and installed with a roller and small excavating equipment depending on topography. Surface drainage should not be allowed to cross perpendicular to the facility to prevent washout and rills within the walking surface. Annual maintenance is required and includes re-compaction to ensure the facility remains crowned to properly pitch water to adjacent drainage features. Installation of additional soil in rain wash out areas may also be required.

Boardwalk

Material options for boardwalk decks include timber and concrete (cast-in-place or pre-cast). Timber has traditionally been used for its lower construction cost but requires regular maintenance and deck repairs/replacement to extend its functional life. The Town should consider using a concrete (pre-cast or cast-in-place) boardwalk deck as construction budgets allow to reduce the long-term maintenance burden associated with timber decking. Concrete deck options typically cost more upfront but have lower life-cycle costs due to reduced maintenance requirements.

In accordance with AASHTO pedestrian structure loading requirements, boardwalks 10 ft wide or less should be designed for H5 loading (10,000 lb vehicle) and boardwalks greater than 10 ft in width should be designed for H10 loading (20,000 lb vehicle).

Safety rails and handrails should be provided in accordance with applicable building codes. Timber, metal, and composite railing options are available depending on site conditions, desired aesthetics, and budget. Boardwalk substructure design and materials may vary depending upon specific site conditions and geotechnical recommendations.

According to existing design standards for boardwalks within the Town of Apex, the following must comply:

- ▶ All fence material shall meet the requirement of Section 1050 of the NCDOT Standard Specifications
- ▶ Galvanize all steel parts and hardware in accordance with Article 1079 of the NCDOT Standard Specifications.

All chain link fence fabric, posts, rails, fitting hardware, and accessories shall be black vinyl coated in accordance with Article 1050 of the NCDOT Standard Specifications.

Concrete Approach Slab

The area between the slab and approach rail should be a 2 in granite screening or other material to prevent grass or weeds from filling in the space. This will mitigate the need for weed eating.



Figure 12.21 - Concrete Boardwalk Deck - Toby Creek Greenway, Charlotte, North Carolina



Figure 12.22 - Timber Boardwalk Deck - White Oak Creek Greenway, Cary, North Carolina

TYPICAL CROSS SECTIONS

Greenways (Preferred)

The existing design standards for paved greenways (asphalt and concrete) in the Town of Apex are 10 ft wide with 2-ft shoulders/shy zones. A 10- to 12-ft-wide paved greenway is recommended for the preferred greenway typical section, as it requires the least amount of long-term maintenance and greater eligibility from the widest variety of funding sources. Asphalt pavement is recommended based on site conditions within Apex, anticipated greenway use, and cost considerations. Limited sections of concrete pavement may be required to accommodate site conditions as necessary.

Trail Width

With the rise in popularity of greenways and user volumes, a variety of user types (walkers, runners, bicyclists, scooters, those with pets on leash, etc.) of all ages and abilities are now using the greenways in their everyday lives. To reduce user conflicts and increase safety, providing a 12-ft paved width along mainline greenways is desirable. For neighborhood connections to the mainline greenway, the paved width may be reduced to 10 ft. If a neighborhood connection is in an area where the mainline greenway has limited access for emergency vehicles, consideration should be given to increasing the width of the connection to 12 ft to improve emergency access. Cross slopes of the paved mainline greenways and neighborhood connections shall not exceed 2%.

Shoulder Width

Shoulder widths of 5 ft are desirable to help keep trees, roots, and vegetation off the edge of the trail. Shoulder cross slopes shall not exceed 4%. The inner 2 ft of the shoulder (adjacent to the paved greenway) shall be comprised of compacted granite screenings and the remaining outer 3 ft may be comprised of mowed grass. In areas of constrained topography where retaining walls are necessary to limit grading impacts, the total shoulder width may be reduced to only the 2 ft of compacted granite screenings. Shoulders should be kept clear of any obstacles to ensure the full greenway width remains usable.

Clearance Requirements

Per Section 903.J of Town Specifications, a minimum lateral clearance of 5 ft shall be maintained from the edge of the trail and vertical clearance of 10 ft from the trail surface, whenever possible. In shared greenway and utility corridors, the edge of pavement should be a minimum of 2 ft from the edge of any utility surface covers/plates (e.g., water valve covers, blow-offs, manholes), and boardwalk and bridge footings should be no closer than 4 ft from any utility. Trees shall be limbed up a vertical distance of 10 ft from the forest floor, within 5 ft from the outside edge of the trail. Tree limbs and dead trees that present a danger to pedestrians utilizing the trail shall be removed during construction, as directed by the Parks and Greenways Planner or other Town staff. Minimum vertical clearance from trail surface to the lowest horizontal structural member of bridges shall be 10 ft.



Figure 12.23 - Greenway Typical Section (Preferred)

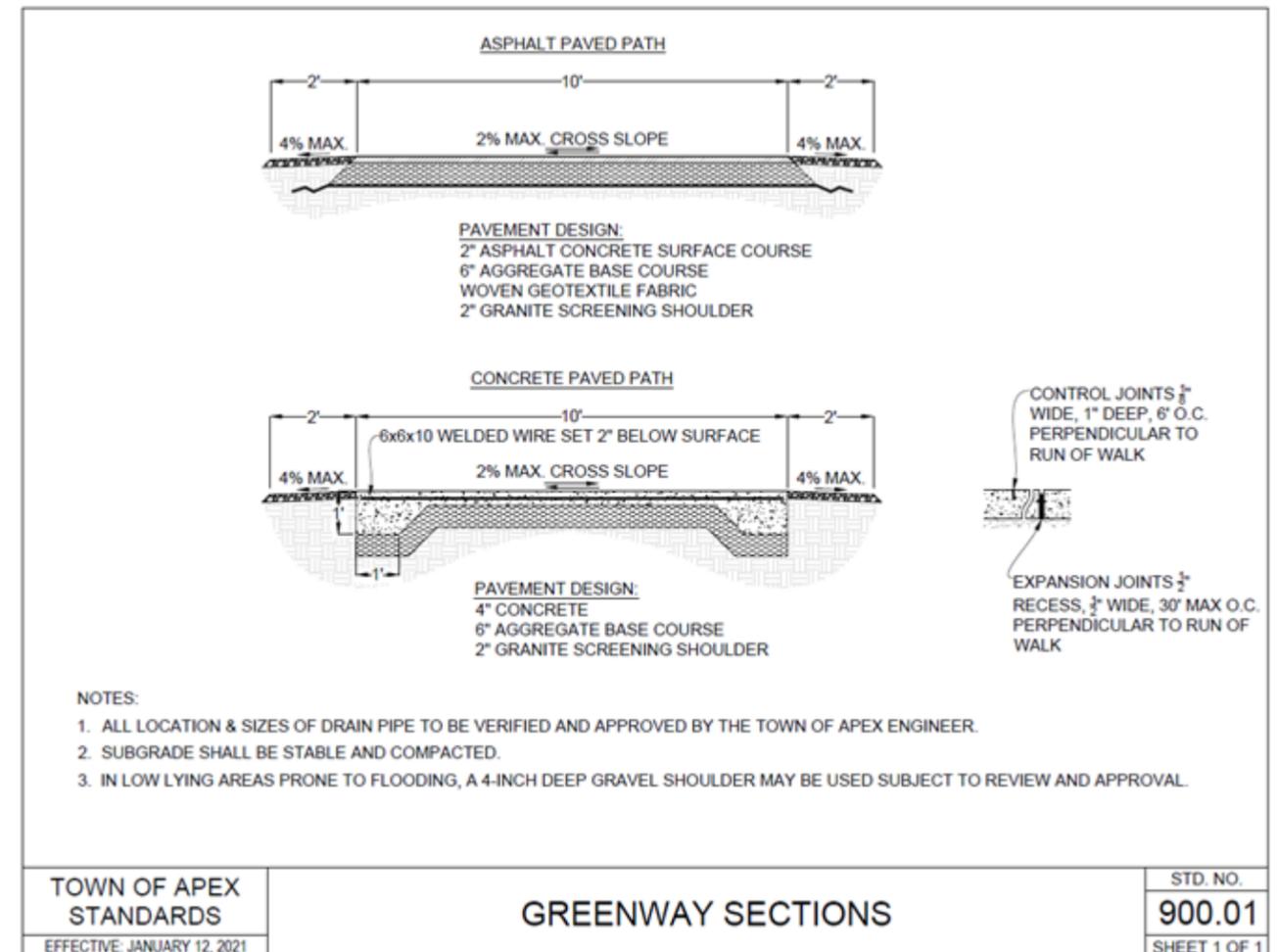


Figure 12.24 - Existing Design Standard for Greenways / Town of Apex

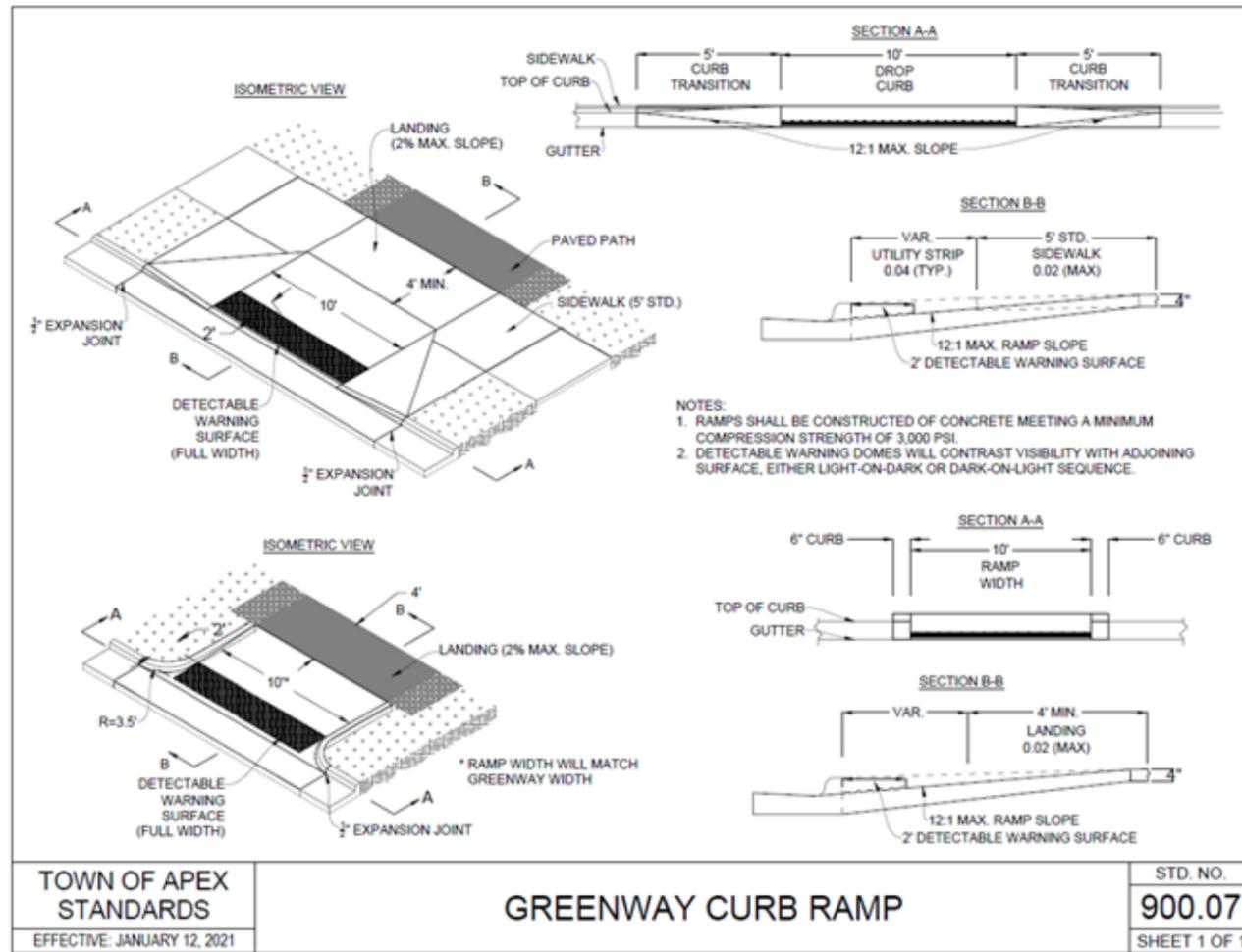


Figure 12.25 - Existing Design Standard for Existing Design Standard for Greenway Curb Ramps / *Town of Apex*

Greenways (Constrained)

A slightly narrower 8-ft-wide natural surface or asphalt greenway may be considered for segments within the greenway network that are constrained due to environmental or right-of-way issues. This typical section may also be considered for neighborhood connections to greenway corridors.

When considering the use of natural surface for constrained or connector segments, it is important to evaluate the overall life-cycle costs of unpaved surfaces, which may be higher due to long-term maintenance requirements. In constrained areas, shoulders or shy zones of 2 ft or greater should be kept clear of any obstacles to ensure full greenway width remains usable.

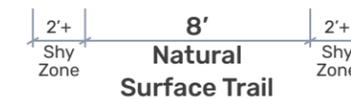


Figure 12.26 - Greenway Typical Section (Constrained)

Boardwalk

A 10- to 12-ft-wide clear width elevated boardwalk is recommended in areas where greenways cross streams or wetland areas. The clear width of the boardwalk shall be equal to the paved width of the adjacent greenway. For boardwalks on mainline greenways and along emergency access routes, a 12-ft clear width is desirable. For boardwalks on neighborhood connections to the mainline greenway, the clear width may be reduced to 10 ft. In no case shall the clear width of the boardwalk shall be less than the paved width of the adjacent greenway. For deck surface considerations, concrete provides greater friction to reduce the risks of slips and falls and reduces long-term maintenance burdens compared to those associated with other materials such as timber. Timber safety rails and handrails are shown with a timber pile substructure system in the typical section below. Boardwalk substructure design and materials may vary depending upon specific site conditions and geotechnical recommendations.

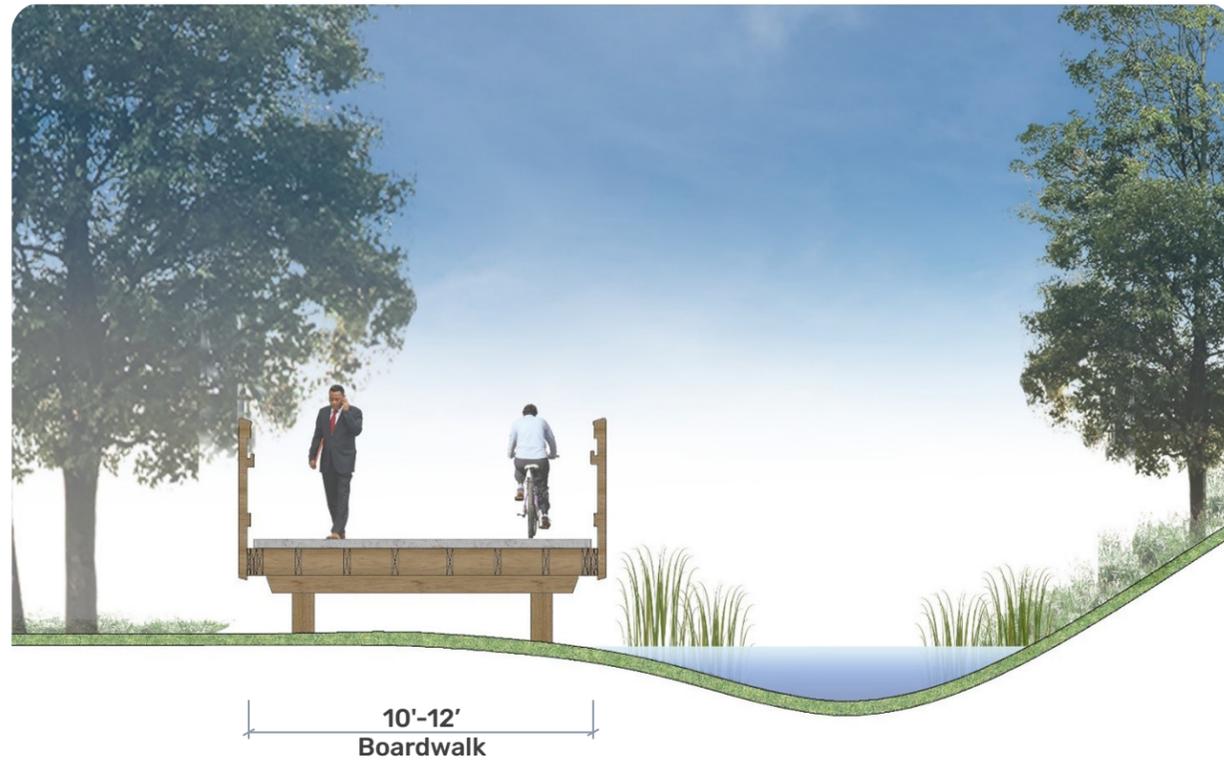


Figure 12.27 - Boardwalk Typical Section

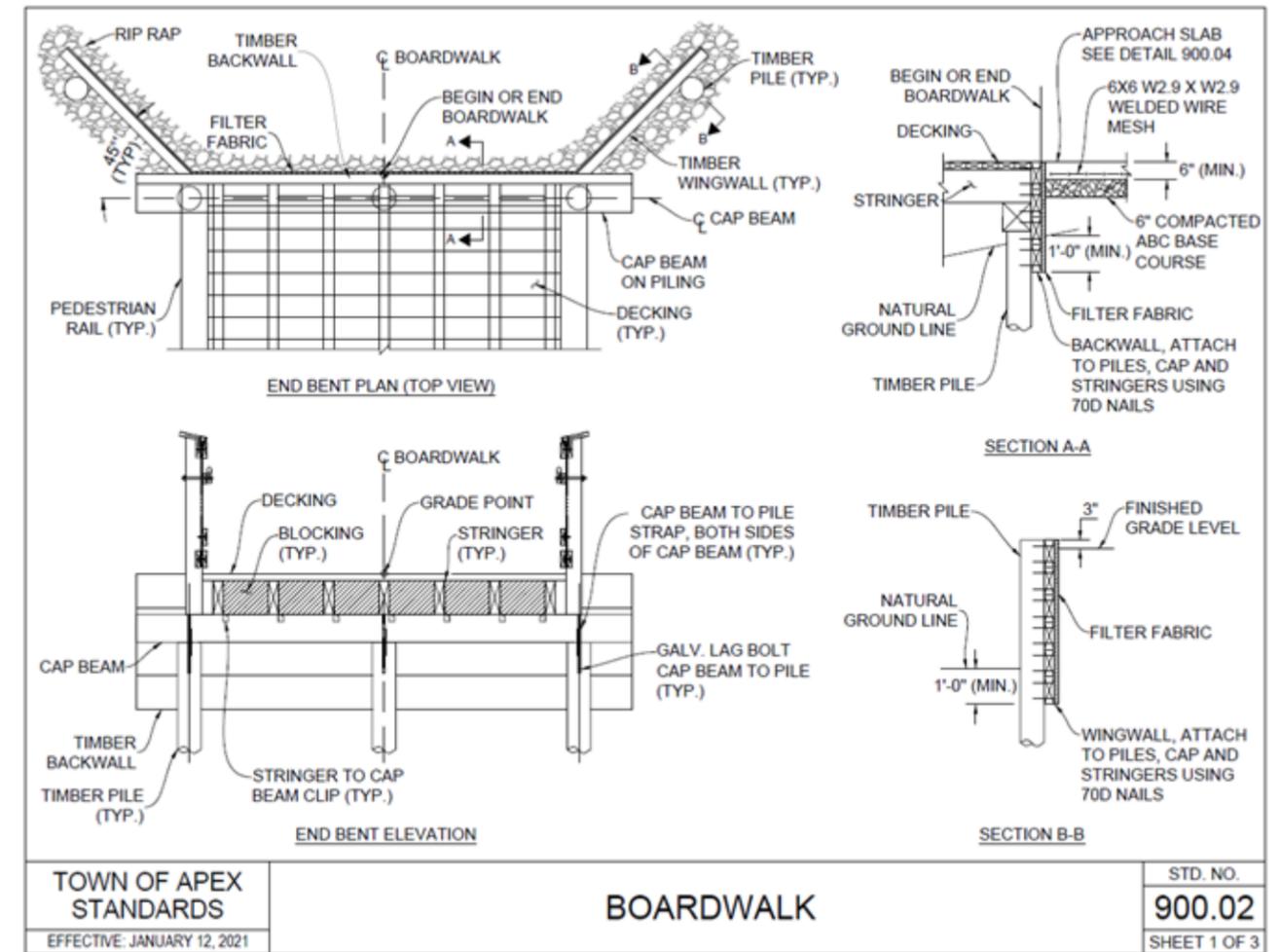


Figure 12.28 -Existing Design Standard for Boardwalks / Town of Apex

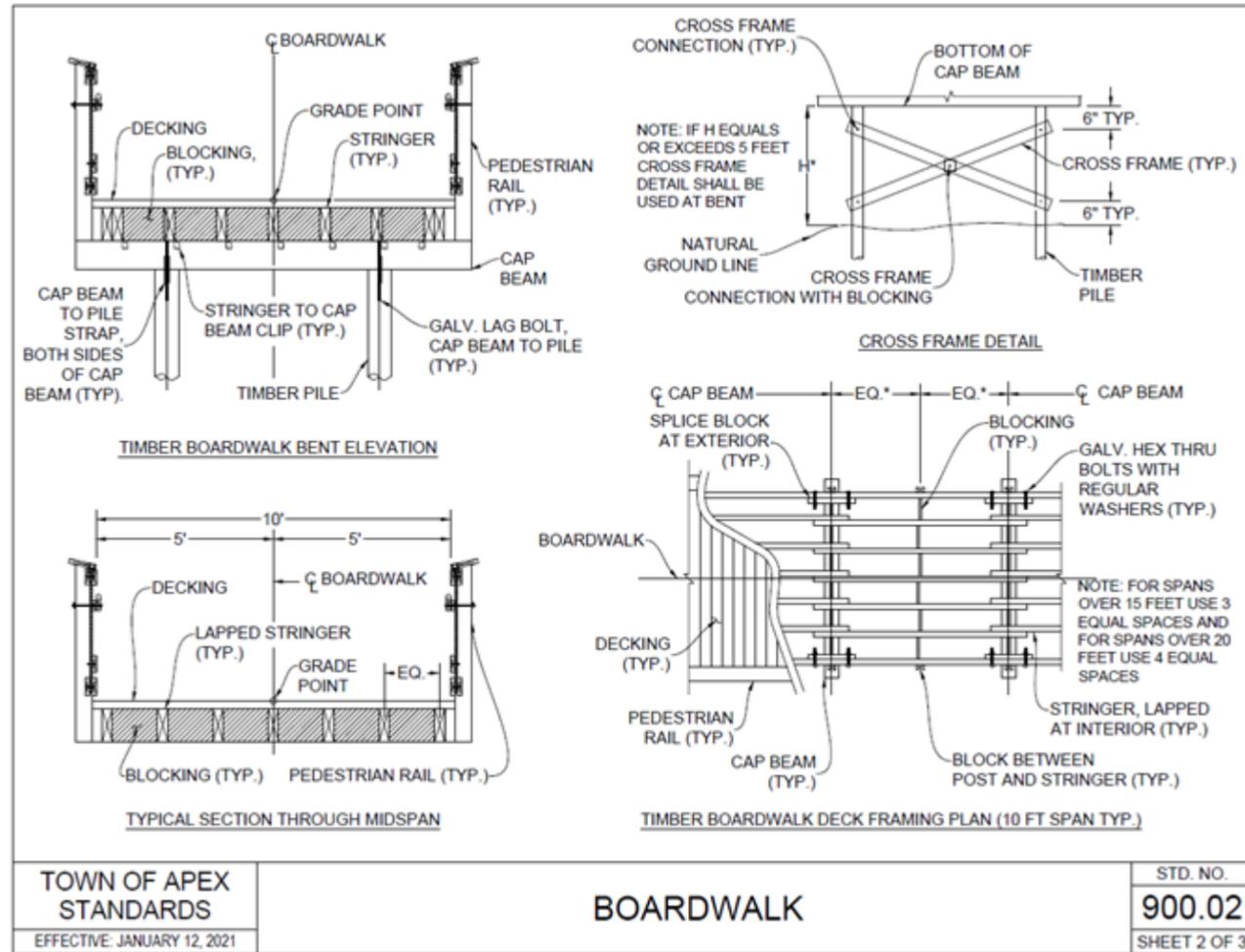


Figure 12.29 -Existing Design Standard for Boardwalks / Town of Apex

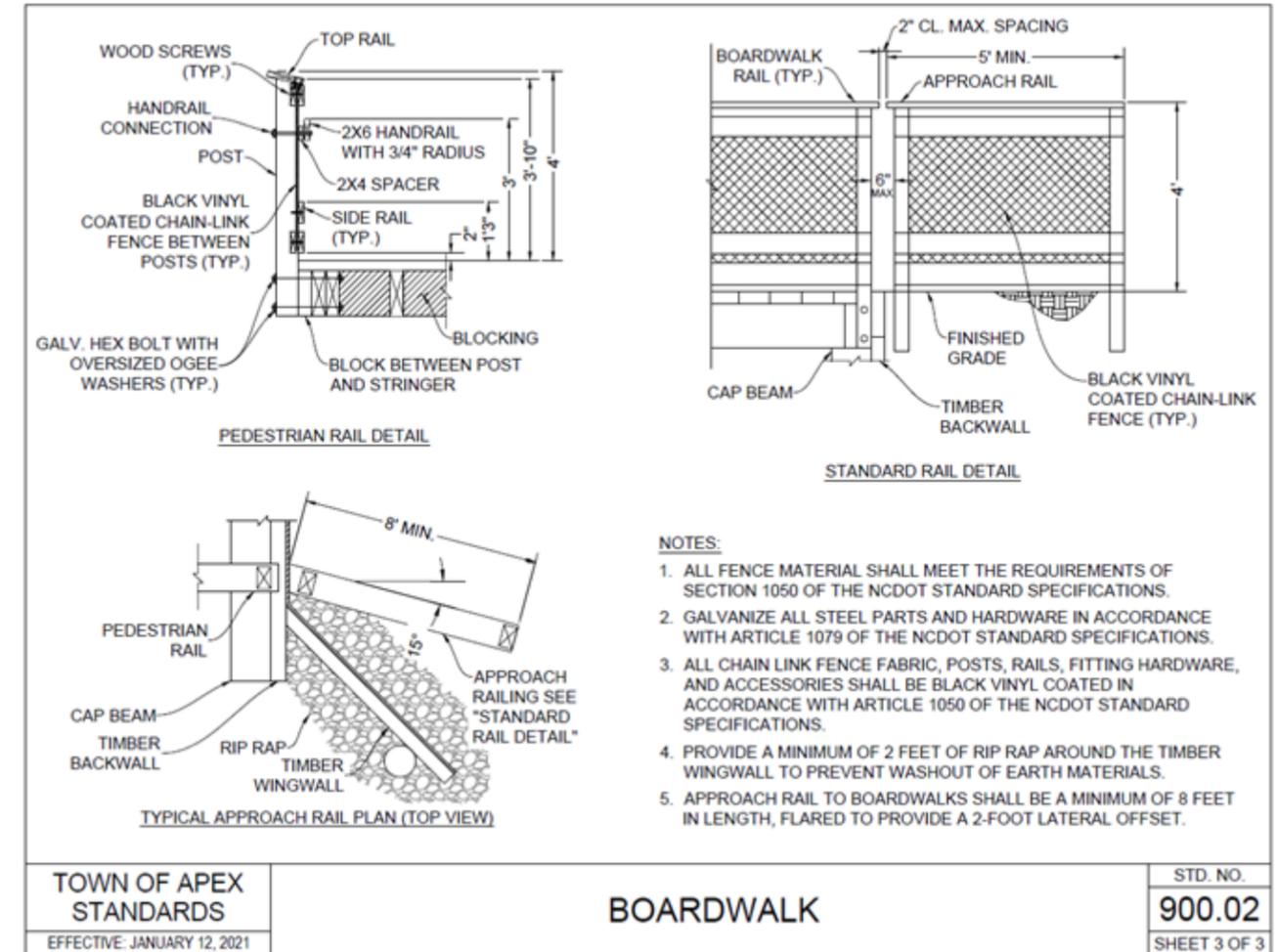


Figure 12.30 -Existing Design Standard for Boardwalks / Town of Apex

Concrete Approach Slab

According to the existing design standards for concrete slabs within the Town, concrete approach slabs should be 6 inches wide with welded wire mesh and compacted ABC base course between the end of an asphalt path and beginning of a boardwalk. The Town should ensure the concrete approach slabs are designed in accordance with the adjacent structure's loading requirements.

The following design standards must be followed for a concrete approach slab within the Town:

- The approach slab shall be 6-inch-thick concrete pavement (4,000 PSI or greater) with a 6-inch by 6-inch welded wire mesh placed 3 inches from the bottom of the concrete slab.
- The length of the standard approach rail shall vary depending on site conditions.
- Where site conditions require safety rail on the approaching trail, tie standard approach rail to safety rail at the end of the flared transition.

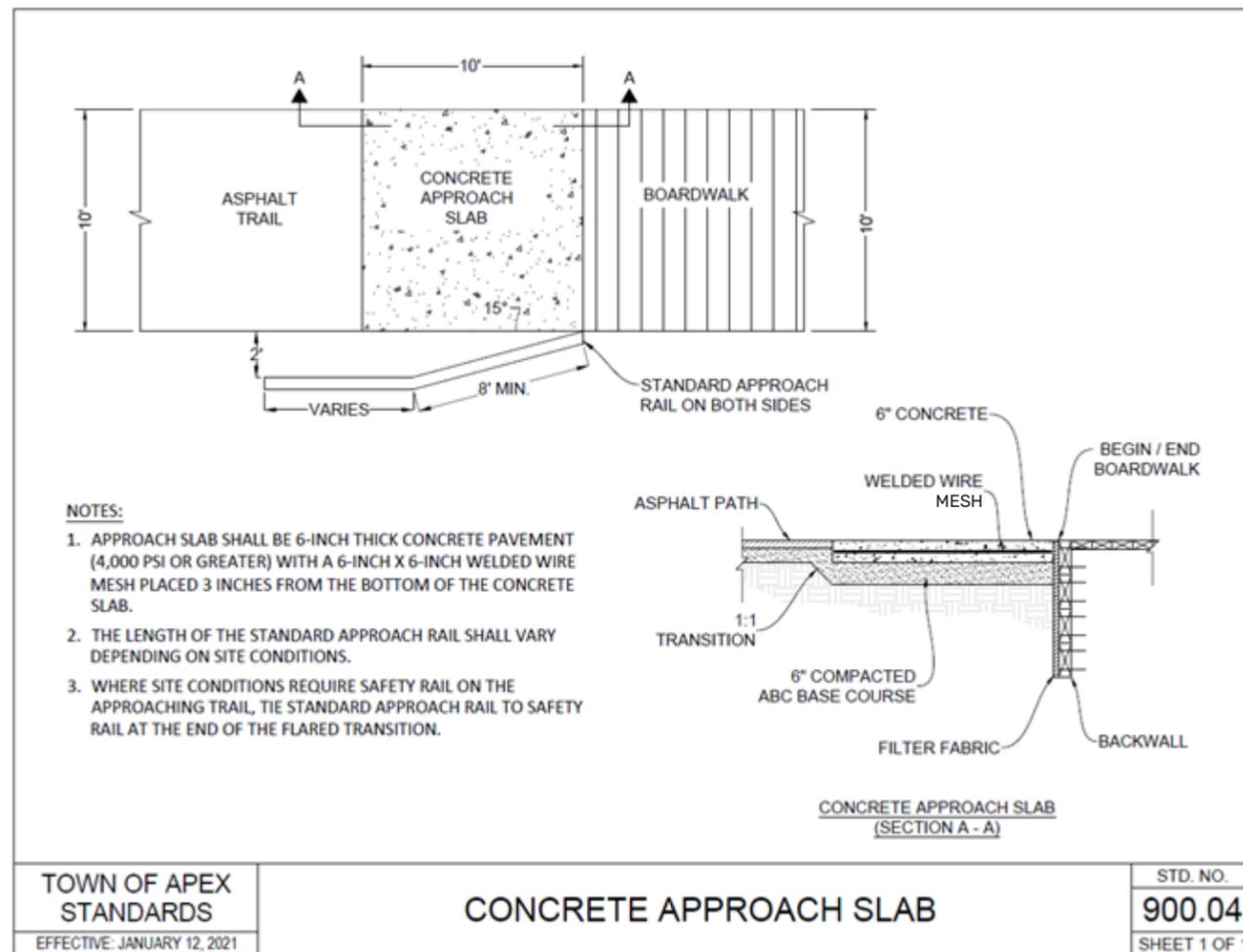


Figure 12.31 -Existing Design Standard for Concrete Approach Slabs / Town of Apex

Side Path

A 10- to 12-ft-wide paved side path is recommended along roadway corridors where the greenway network connects with the transportation network, allowing residents and visitors to reach destinations in residential neighborhoods and commercial areas. A slightly narrower 8-ft-wide side path may be considered for segments within the greenway network that are constrained due to environmental or right-of-way issues. Asphalt pavement is recommended based on site conditions within Apex, anticipated greenway use, and cost considerations. Limited sections of concrete pavement may be required to accommodate site conditions as necessary. A 5-ft planting strip is provided to separate users from motorized traffic on the adjacent roadway. The width of a planting strip may be reduced in highly constrained areas where curb and gutter are present. The width of a planting strip may also be increased depending on the roadway context.

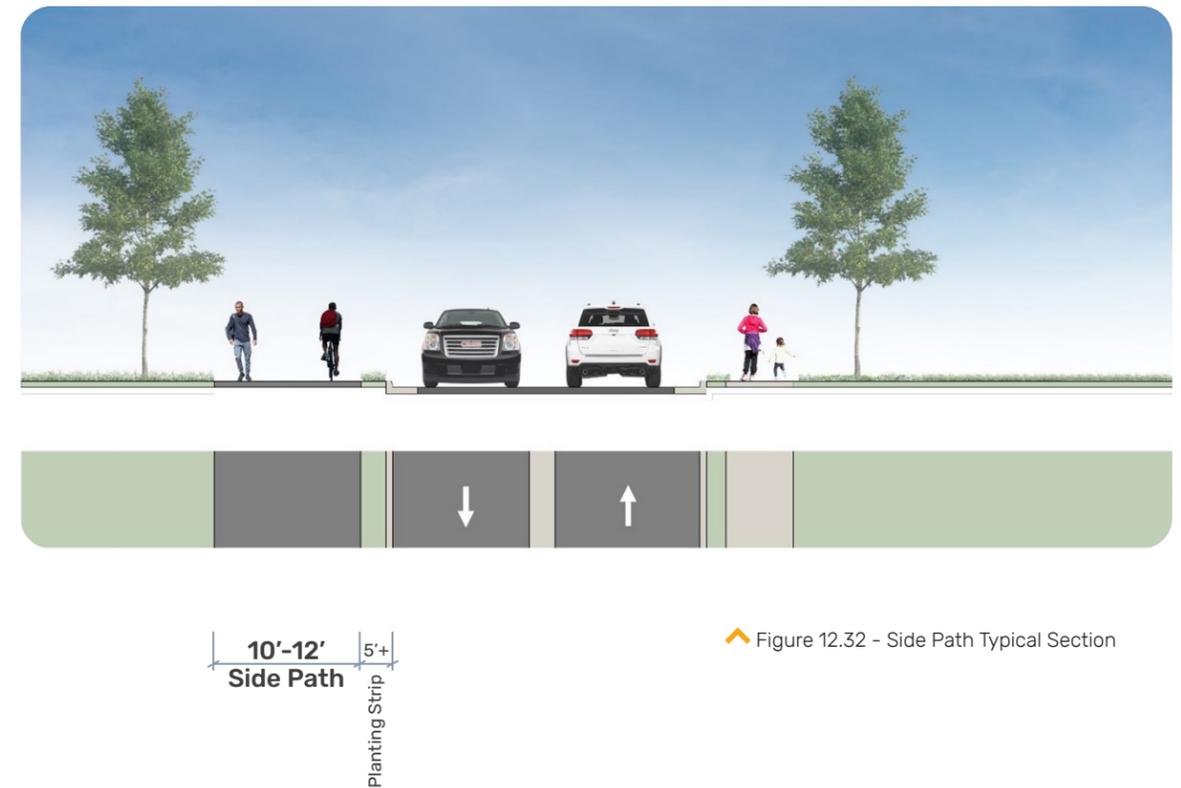


Figure 12.32 - Side Path Typical Section

Street-Side Greenway

A street-side greenway is a meandering shared-use path with a landscaped buffer along a roadway that provides a travel area for bicyclists and pedestrians. Street-side greenways are located outside of the roadway right-of-way and setback at least 5 ft from the roadway. According to Apex’s current design standards, street-side greenways should be 10-ft-wide and constructed within a Town of Apex greenway easement with a 20 ft width minimum. The easement can overlay streetscape buffers without affecting setbacks or buffer widths, so long as required planting density can be achieved.

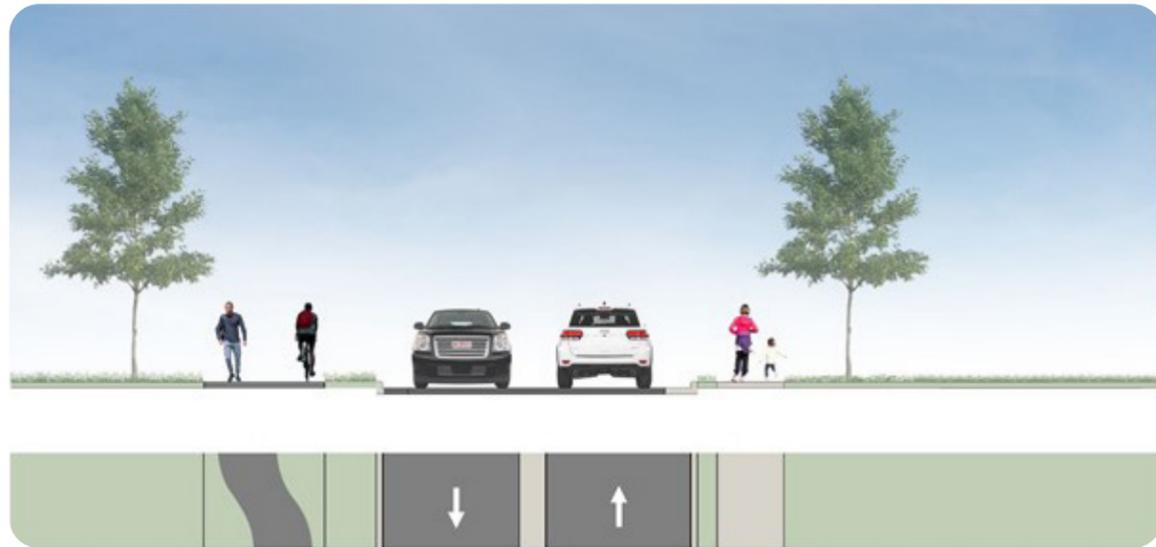


Figure 12.33 - Street-Side Greenway Typical Section

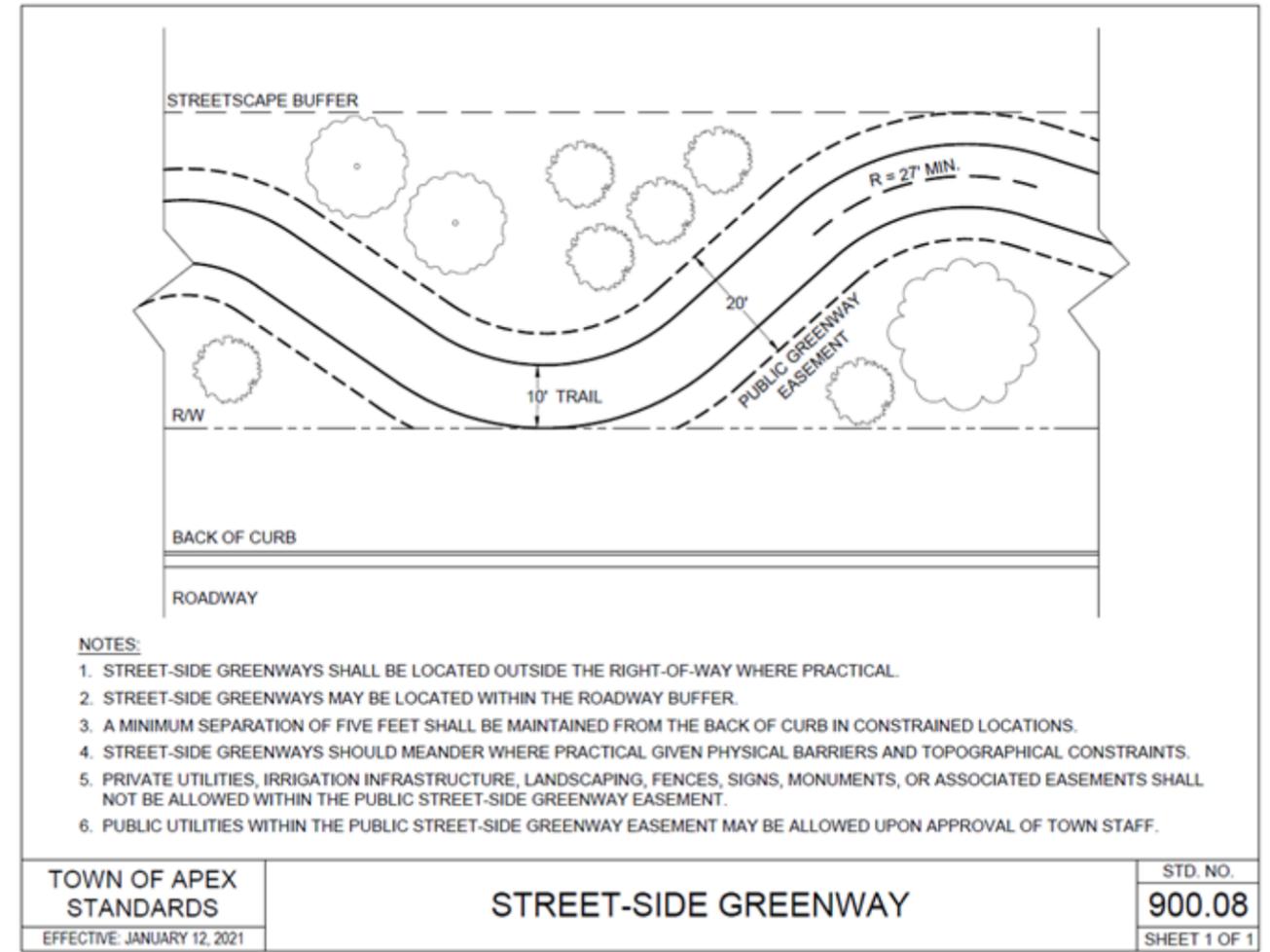


Figure 12.34 - Existing Design Standard for Street-Side Greenways / Town of Apex

INTERSECTION TREATMENTS + CROSSINGS

Most conflicts between greenway users and motor vehicles occur at intersections. Current roadway design decisions increase exposure and risk for bicyclists and pedestrians, reduce user safety and comfort of the greenway network, and discourage biking and walking between destinations. As communities work to make facilities safer for users of all ages and abilities, intersection design is key. Apex Parks, Recreation and Cultural Resources coordinates with the Engineering and Planning Departments on intersection treatments where greenways and street-side greenways cross roadways.

Crosswalk

A crosswalk is a designated place for pedestrians and greenway users to cross a road at an intersection or mid-block crossing. High-visibility crosswalk markings, such as bar pairs, continental, and ladder are recommended to alert motorists of greenway crossing points across roadways. Inlay or thermoplastic tape is also recommended for highly reflective crosswalk markings. Crosswalks should be accompanied by Manual on Uniform Traffic Control Devices (MUTCD) pedestrian warning and advance yield signs W11-2, W16-7P, and R1-6 to alert motorists of a crosswalk.

Rectangular Rapid Flash Beacon (RRFB)

A Rectangular Rapid Flash Beacon (RRFB) is a pedestrian-actuated signal used in combination with pedestrian or greenway crossing warning signage to improve safety at uncontrolled, marked crosswalks. The device includes two rectangular-shaped yellow indications, each with an LED-array-based light source, that flash with high frequency when activated. RRFBs should be accompanied by MUTCD pedestrian warning and advance yield signs W11-2 and W16-7P to alert motorists of a crosswalk.

RRFBs are placed on both ends of a crosswalk. If the crosswalk contains a pedestrian refuge island or other type of median, an RRFB should be placed to the right of the crosswalk and on the median (instead of the left side of the crosswalk). RRFBs typically draw power from standalone solar panel units but may also be wired to a traditional power source.



Figure 12.37 - HAWK Signal

High Intensity Activated Crosswalk (HAWK)

A High-Intensity Activated Crosswalk (HAWK) signal, also known as a Pedestrian Hybrid Beacon, is a traffic control signal designed to help pedestrians and greenway users safely cross streets. HAWK signals, like other push-button activated traffic signals, stop traffic with a red signal, allowing pedestrians to cross with a WALK signal. In addition to the signal head displays, stop lines, and marked crosswalks are required at HAWK crossings. Advance stop lines should be used on multi-lane crossings to reduce the potential for additional crashes. HAWKs should be accompanied by MUTCD pedestrian warning and advance yield signs W11-2, W16-7P, R10-23, and R9-8 to alert motorists of the signalized pedestrian crossing.



Figure 12.35 - Crossing Over Renaissance Parkway - American Tobacco Trail, Durham



Figure 12.36 - Rectangular Rapid Flashing Beacon (RRFB) at a Trail Crossing

Shared-Use Bridge

A 10- to 12-ft clear width bridge is recommended for grade-separated crossings over streams and roadways to connect greenway sections at either end of the bridge. A variety of design types are available including truss bridges, girder (beam) bridges, arch bridges, suspension bridges, and cable-stayed bridges among others. Bridge design type selection will vary depending on specific site conditions, cost constraints, and potential impacts to traffic during construction. Safety rails and handrails should be provided in accordance with applicable building codes and NCDOT’s Bridge Policy. Minimum vertical clearance over roadways shall be provided based on NCDOT’s Bridge Policy requirements. For deck surface considerations, concrete provides greater friction to reduce the risks of slips and falls and reduces long-term maintenance burdens compared to those associated with other materials such as timber.

Shared-Use Tunnel

A 10- to 12-ft clear width, concrete paved tunnel is recommended for grade-separated crossings under roadways to connect greenway sections at either end of the tunnel. The desired minimum vertical clearance inside the tunnel is 12 ft. Designs should maximize the vertical clearance within the tunnel to the extent practicable based on specific site constraints to maintain a sense of openness and security for users. Lighting inside the tunnel is recommended to ensure continual visibility and user safety. Consideration should also be given to the potential incorporation of dynamic lighting, vibrant murals, mirrors, or other public art elements that create a comfortable and inviting environment for users.



10-12'
 Shared-Use Bridge

Figure 12.38 - Shared-Use Bridge Typical Section



10-12'
 Shared-Use Tunnel

Figure 12.39 - Shared-Use Tunnel Typical Section

RECOMMENDED GREENWAY NETWORK

The comprehensive greenway recommendations provided in the adjacent map addresses the recreational and transportation needs of Apex residents and visitors. The proposed greenway system builds off recommendations developed in previous planning efforts and input expressed by community members and stakeholders during the planning process.

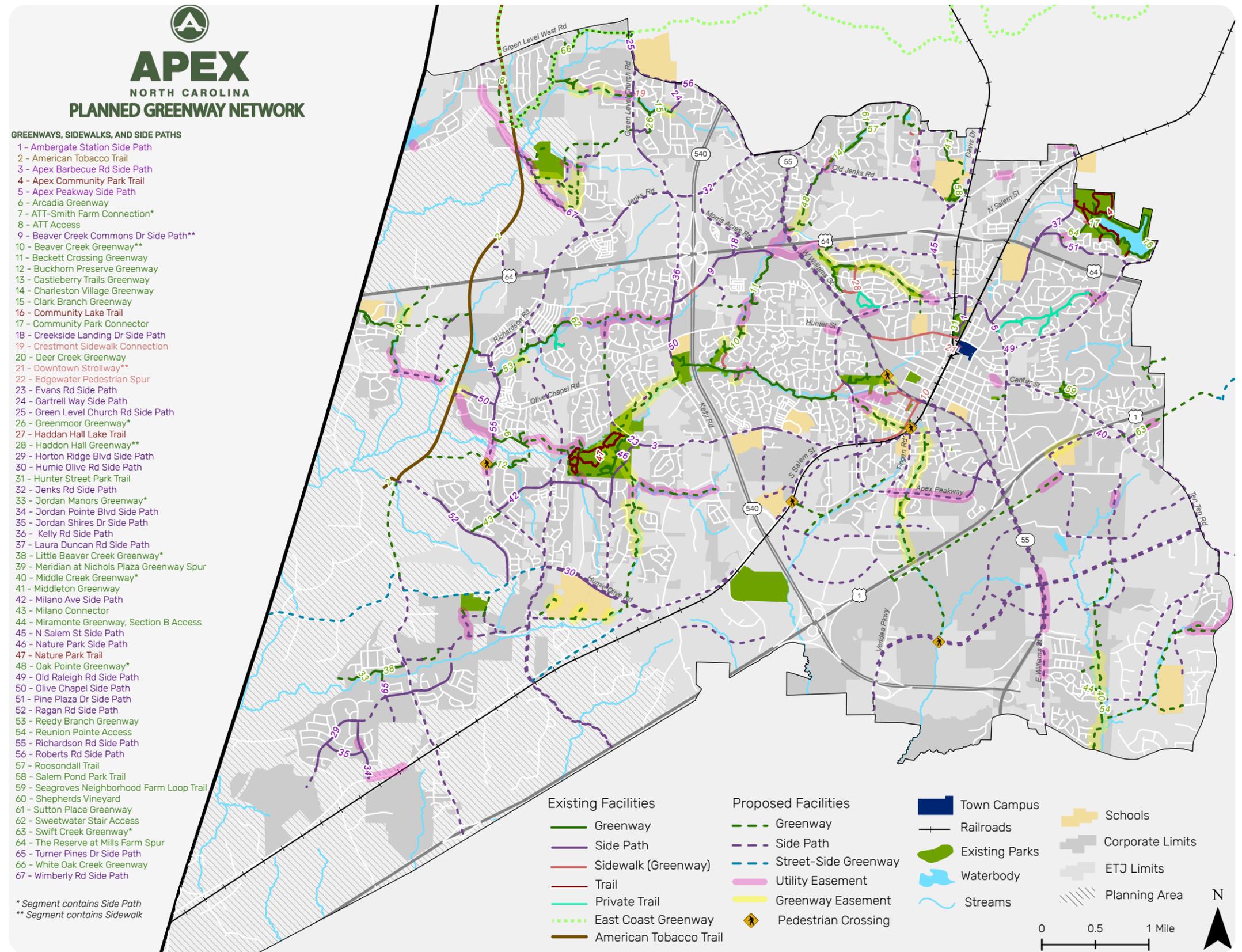


Figure 12.40 - Planned Greenway Network Map

GREENWAY NETWORK PRIORITIZATION

Ten priority projects were identified by Town staff to guide the development of Apex’s greenway network. The priority projects are listed below. While these priority projects should be strongly considered for development in the near or mid-term, opportunities to develop other projects in the recommended greenway network should also be considered as they arise.

1. Beaver Creek Greenway
2. Big Branch
3. Reedy Branch Greenway
4. Little Beaver Creek Greenway
5. Haddon Hall Greenway
6. Salem Pond Park Greenway
7. Camp Branch Greenway
8. Apex Community Park Greenway Connector
9. Clark Branch Greenway
10. Southwalk Greenway

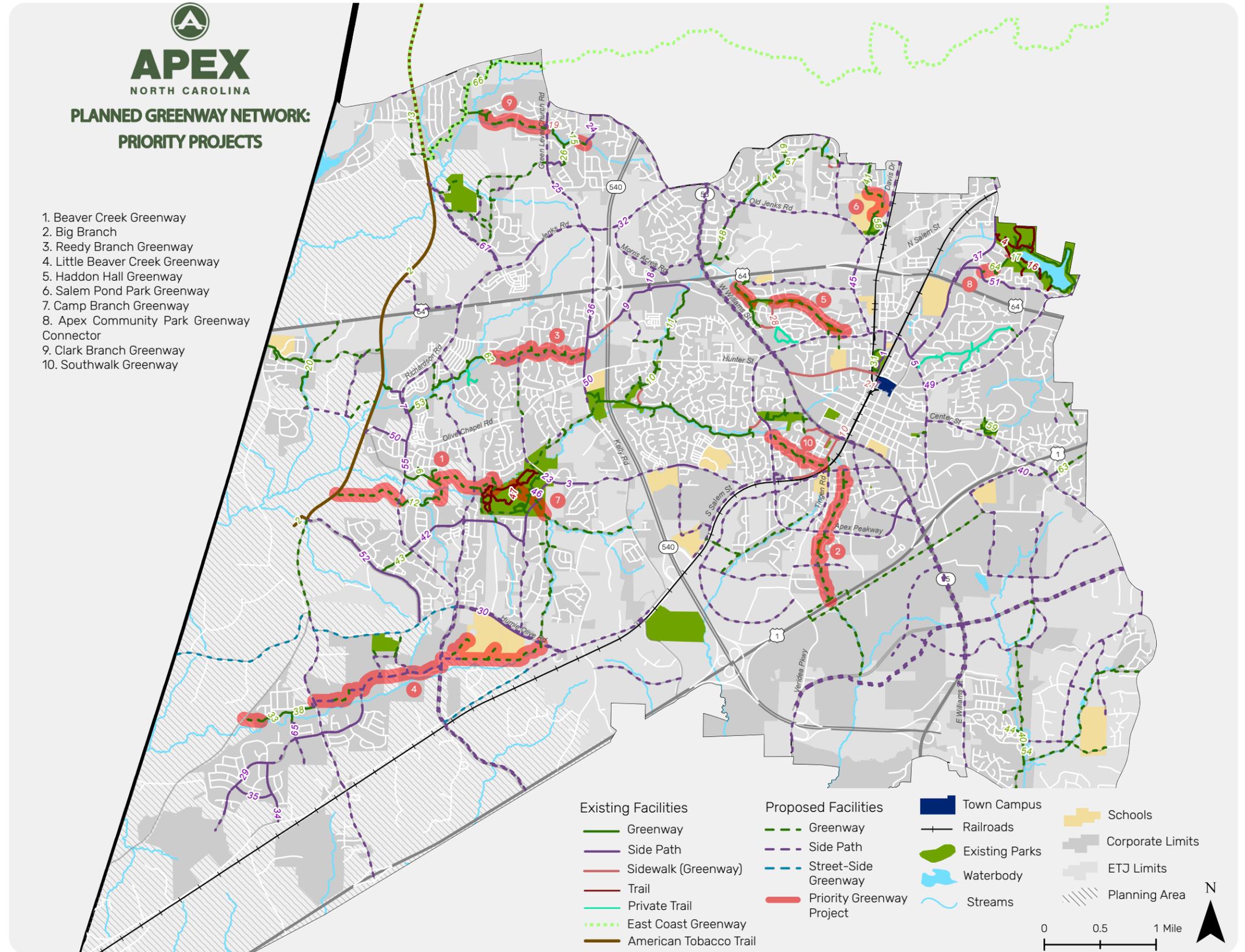


Figure 12.41 - Planned Greenway Network: Priority Projects Map

Prioritization Criteria

The development of the criteria for the prioritization of the top 10 priority projects was an iterative process. Notes on several viewpoints are provided below by Town departments and commissioners. Town Council and Parks, Recreation & Cultural Resources (PRCR) Advisory Commission's comments are outlined below.

The following comments were collected from Town Council and the PRCR Advisory Commission:

- › The school system does not consider greenways as a “safe route”. This term and rule come from the North Carolina Department of Public Instruction. It impacts only where Wake County Public School System needs to provide bus transportation. Greenways can flood and generally are not lit after dusk. It (safe route) is a technical term related to walk zones/bus zones.
- › Wake County Public School System is interested in greenway connectivity.
- › The Commission wants to provide scoring for school connectivity.
- › Greenway connections to schools are more valuable and safer than sidewalk connections.
- › Criteria should be weighted equally. Criteria related to connections to parks, existing greenways, equity, and project cost may rise above the others in terms of importance.
- › Project cost may need to be its own category. The measurement for this would be a cost per mile rather than a point value based on magnitude.
- › The Commission supports the prioritization methodology but want to know who will complete the scoring. They are also concerned that the number of criteria may make it challenging to evaluate consistently over time.
- › For residential land uses, quantify the number of units that are easily walkable to the greenway and use the metric of total units per greenways mile.
- › The Commission would like to know how the criteria are aligned with external funding sources that may have their own criteria.
- › The list of criteria does not include the environmental impact of greenway construction and maintenance/repair costs over time (e.g., environmentally sensitive areas require elevated boardwalks or similar materials that result in initial higher costs and would have a substantially higher long-term cost for repair and replacement when compared to crushed gravel or asphalt surfacing).

The Town revised the criteria with the ranking measurements and weights and asked the Engineering and Planning staff to provide a second review. Their comments on the process are listed below.

- › Staff supported the prioritization approach to lead to the feasibility studies.
- › There is concern that “improving overall bicycle and pedestrian safety” is too similar to “improving areas with high rates of bicycle and pedestrian crashes”.
- › Connections to transit are weighted low, but staff want to identify projects that score high on the criteria in the future. Funding sources vary when projects provide access to transit.
- › In the past, if a project was already awarded outside funding, it was automatically listed as a high-priority project.
- › Staff are interested in collaborating on the alternative routes criteria when they receive resident requests for sidewalks.
- › Staff would like for the Town to consider if community input and requests should weigh more or less than the equity criteria. They question if the low ranking “Town received no public comments identifying needs or concerns along the corridor” is really equitable.

These comments were used to construct a two-phase process for prioritization. Each of the two phases are described on the following pages.

Prioritization Phase I:

The first scoring is for funding feasibility studies through the annual Capital Improvements Project allocation. The following criteria were applied to the greenway priority projects by the project team during phase I of the prioritization process:

- › Connects to existing greenways, bicycle, and pedestrian facilities
- › Connects to parks and/or conservation land or provides access to recreation amenities
- › Connects to high-density residential land uses
- › Improves overall bicycle and pedestrian safety
- › Improves areas with high rates of bicycle and pedestrian crashes
- › Equity
- › Connects to activity centers: Downtown, Community Center and Senior Center, and/or the Recreational Activity Center
- › Connects to schools
- › Available land/easement
- › Connects to transit
- › Connects to high-density employment/commercial land uses
- › Community input/request



Figure 12.42 - Middle Creek Greenway



Prioritization : Feasibility

| CRITERIA | DESCRIPTION | RANK | MEASUREMENT | POINTS |
|---|--|--------|---|--------|
| Connects to Existing Greenways, Bicycle and Pedestrian Facilities | Greenway/side path corridor provides connections to existing bicycle and pedestrian facilities. | High | Corridor closes a gap between existing greenways or side paths. | 20 |
| | | Medium | Corridor connects to existing sidewalks or bike lanes. | 10 |
| | | Low | Corridor does not connect to existing bike/ped facilities. | 0 |
| Connects to Parks and / or Conservation Land or provides Access to Recreation Amenity | Greenway/side path corridor provides connections to parks and/ or conservation land or provides access to open space such as reserved greenway corridors, providing recreation amenities to residents | High | Corridor segment connects to a park or provides first or only recreation amenity (such as a greenway or conservation area) within a quarter mile. | 20 |
| | | Medium | Corridor segment connects to existing greenways, side paths, sidewalks or bike lanes that provide access to a park and/or conservation land. | 10 |
| | | Low | Corridor segment does not connect to a park. | 0 |
| Connects to High-Density Residential Land Uses | Greenway/side path corridor connects to high-density residential land uses (as defined in Advance Apex 2045 Future Land Use Plan). | High | Corridor connects to a high density residential land use area. | 15 |
| | | Medium | Corridor connects to a medium density residential land use area. | 10 |
| | | Low | Corridor connects to a low/rural density / or does not connect to a residential land use area. | 0 |
| Improves Overall Bicycle and Pedestrian Safety | Greenway/side path corridor provides bicycle and pedestrian safety improvements along and/or across roadways and water ways and provides connections to the American Tobacco Trail and adjacent communities. | High | Corridor is along or crosses a highway, thoroughfare, railroad, or connects to the ATT. | 15 |
| | | Medium | Corridor is along or crosses a collector street or floodway, or connects to an adjacent community. | 10 |
| | | Low | Corridor is along or crosses a residential street or creek. | 0 |
| Improves Areas with High Rates of Bicycle and Pedestrian Crashes | Greenway/side path corridor provides safety improvements in an area with a history of bicycle and pedestrian crashes. | High | 5+ bicycle and pedestrian crashes. | 15 |
| | | Medium | 1-4 bicycle and pedestrian crashes. | 10 |
| | | Low | 0 bicycle and pedestrian crashes. | 0 |
| Equity | Greenway/side path corridor provides connections to vulnerable census tracts. | High | Corridor is within a census tract with a social vulnerability index rate over 0.35. | 10 |
| | | Medium | Corridor is within a census tract with a social vulnerability index rate between 0.25-0.35. | 5 |
| | | Low | Corridor is within a census tract with a social vulnerability index rate under 0.25. | 0 |
| Connects to Activity Centers: Downtown, Community and Senior Center, and / or the Recreational Activity Center | Greenway/side path corridor provides connections to Apex's activity centers. | High | Corridor connects to an activity center. | 10 |
| | | Medium | Corridor connects to existing sidewalks or bike lanes that provide access to an activity center. | 5 |
| | | Low | Corridor does not connect to an activity center. | 0 |
| Connects to Schools | Greenway/side path corridor provides connections to schools. | High | Corridor connects to a school. | 10 |
| | | Medium | Corridor connects to existing sidewalks or bike lanes that provide access to a school. | 5 |
| | | Low | Corridor does not connect to a school. | 0 |
| Available Land / Easement | Greenway/side path corridor is proposed within an existing Town of Apex easement. | High | Corridor is proposed within an existing Town of Apex greenway easement. | 10 |
| | | Medium | Corridor is proposed within an existing Town of Apex utility easement. | 5 |
| | | Low | Corridor is not proposed within an existing easement. | 0 |
| Connects to Transit | Greenway/side path corridor provides bicycle/pedestrian connections to transit stops. | High | Corridor connects to a transit stop. | 5 |
| | | Medium | Corridor connects to existing sidewalks or bike lanes that provide access to a transit stop. | 2 |
| | | Low | Corridor does not connect to a transit stop. | 0 |
| Connects to High-Density Employment / Commercial Land Uses | Greenway/side path corridor connects to high-density office, industrial employment, and/or commercial services land uses (as defined in Advance Apex 2045 Future Land Use Plan). | High | Corridor connects to high density office employment/ industrial/ commercial services land use area. | 5 |
| | | Medium | Corridor connects to medium density office employment/ industrial/ commercial services land use area. | 2 |
| | | Low | Corridor connects to a single or no office employment/ industrial/ commercial services property. | 0 |
| Community Input / Requests | Greenway/side path corridor addresses community requests, input and /or concerns for improved bicycle and pedestrian facilities. | High | Town received 5 or more public comments identifying needs or concerns along the corridor. | 5 |
| | | Medium | Town received 1-4 public comments identifying needs or concerns along the corridor. | 2 |
| | | Low | Town received no public comments identifying needs or concerns along the corridor. | 0 |



The top three projects identified in Prioritization Phase I will determine which projects from this plan will be selected for a feasibility study. Projects that undergo a feasibility study will then be placed in Prioritization Phase II. This scoring process will provide guidance on prioritizing projects to move forward with design development and construction. The top ten projects identified by Town staff are scored in Prioritization Phase I and ranked below. Each project may receive a maximum score of 140 points.

1. Beaver Creek Greenway (80 points)
2. Big Branch (77 points)
3. Reedy Branch Greenway (75 points)
4. Little Beaver Creek Greenway (75 points)
5. Haddon Hall Greenway (70 points)
6. Salem Pond Park Greenway (70 points)
7. Camp Branch Greenway (65 points)
8. Apex Community Park Greenway Connector (65 points)
9. Clark Branch Greenway (65 points)
10. Southwalk Greenway (62 points)

Prioritization Phase II:

Prioritization results from phase II will be used to request funding for design development and construction. The following criteria will be applied to the greenway priority projects by Town of Apex staff during phase II of the prioritization process:

- › Original prioritization score
- › Feasibility study completed
- › Environmental impacts
- › Project costs
- › Alternative routes
- › Maintenance
- › Available land/easement
- › Funding
- › Equity



› Figure 12.43 - Image pictured to the right is the greenway at Apex Community Park

Prioritization : Design

| CRITERIA | DESCRIPTION | RANK | MEASUREMENT | POINTS |
|--------------------------------------|---|--------|--|--------|
| Original Prioritization Score | Scoring Range of project prior to completion of a Feasibility Study. | High | The project scored between 140-110. | 5 |
| | | Medium | The project scored between 109-80. | 1 |
| | | Low | The project scored below 79. | 0 |
| Feasibility Study Completed | Feasibility study of corridor completed providing site specific in-depth analysis of constraints and opportunities for trail development. | High | The feasibility study indicated project provides opportunities for project implementation. | 15 |
| | | Medium | The feasibility study indicated project has constraints that impact project implementation. | 10 |
| | | Low | The feasibility study indicated it is not possible to implement project as indicated in Master Plan. | 0 |
| Environmental Impacts | Are there environmental impacts identified in the Feasibility Study and are there measures available to mitigate the impacts. | High | The feasibility study indicated project has limited environmental impacts for project implementation. | 15 |
| | | Medium | The feasibility study indicated project has environmental impacts that requires mitigation and/or project specific items implementation that are consistent with standard development, specifications and details. | 10 |
| | | Low | The feasibility study indicated environmental impacts that greatly inhibit project implementation. | 0 |
| Project Cost | Greenway corridor cost estimates are reflective of a budget that the Town can feasibly invest in the project. | High | The magnitude of costs meets the budget for project implementation. | 15 |
| | | Medium | The magnitude of costs meets the budget with additional funding assistance. | 10 |
| | | Low | The magnitude of costs exceeds the budget for project implementation. | 0 |
| Alternative Routes | Greenway corridor route provides an alternative for other bike/ ped system prioritized requests. | High | The corridor would provide a bike/ped route creating connectivity and can be implemented in a manner that would allow it to meet requests for other requested bike/ ped facilities. | 10 |
| | | Medium | The corridor could provide a bike/ped route creating connectivity and if implemented it generally meets requests for other requested bike/ ped facilities but through a more circuitous route. | 5 |
| | | Low | The corridor does not provide an alternate for a requested bike/ped route. | 0 |
| Maintenance | The location of the trail, type of trail construction (Asphalt, Concrete, Boardwalk, Bridges), shoulders and access have a impact on routine and long-term maintenance costs. | High | The project is easily accessible, over 75% pavement at-grade and is outside of riparian areas and shared utility corridors. | 10 |
| | | Medium | The project has minimal access issues, between 50-75% is pavement at-grade and over 50% is outside of riparian areas and shared utility corridors. | 5 |
| | | Low | The project has restricted access for maintenance/ equipment, has less than 25% pavement at-grade and is within riparian areas and shared utility corridors. | 0 |
| Available Land / Easement | Greenway/side path corridor is proposed within an existing Town of Apex easement. | High | Corridor is proposed within an existing Town of Apex greenway easement. | 10 |
| | | Medium | Corridor is proposed within an existing Town of Apex utility easement which has opportunities to provide necessary area required for greenway construction. | 5 |
| | | Low | Corridor is not proposed within an existing easement. | 0 |
| Funding | Greenway corridor/ project scope aligns with alternative funding priorities/ opportunities. | High | The project has been awarded outside funding for project implementation. | 10 |
| | | Medium | The project scope achieves desired objectives to be a strong candidate for award of additional funding assistance from outside of the Town of Apex. | 5 |
| | | Low | The project does not fit alternative funding objectives. | 0 |
| Equity | Greenway/side path corridor provides connections to vulnerable census tracts and/ or provide facilities for underserved portions of the Town | High | Corridor is within a census tract with a social vulnerability index rate over 0.35 and/or provides for underserved populations of the Town with limited or no access to parks and recreation facilities. | 10 |
| | | Medium | Corridor is within a census tract with a social vulnerability index rate between 0.25-0.35 and /or provides for underserved populations of Town that must drive 5 or more minutes to have access to parks and recreational facilities. | 5 |
| | | Low | Corridor is within a census tract with a social vulnerability index rate under 0.25 and population has access to parks and recreation facilities either through existing greenways or within a 5-minute drive. | 0 |



RECOMMENDED GREENWAY POLICIES + AMENITY GUIDANCE

In tandem with infrastructure recommendations, greenway policies and amenities improve user safety and experience and enhance recreational and multi-modal accommodations in the Town’s ordinances and codes. A summary of recommended policies and an overview of key greenway amenities for the Town of Apex are provided below.

Policy Recommendations

| POLICY RECOMMENDATION | DESCRIPTION |
|---|---|
| Add Definitions for Active Transportation Facilities in the UDO | The Town should add a glossary of common active transportation terms that include definitions for each facility type (i.e., bike facilities, sidewalks, and greenways) within the UDO. Greenways are currently defined in the UDO in Section 4.3.4 Recreational Uses, but the UDO does not list street-side greenways or side path facilities. Consider extracting the facility type descriptions in the Advance Apex 2045 Transportation Plan. |
| Adopt a Complete Streets Ordinance and/or Program | <p>The Town of Apex should adopt a municipal Complete Streets Policy, similar to NCDOT’s statewide policy, to guide multi-modal improvements for the local street network. This policy recommendation was documented in the Advance Apex 2045 Transportation Plan. The City of Raleigh is a local example of a municipality that has adopted a similar policy.</p> <p>The City of Raleigh recently adopted a Complete Streets Policy and initiated a Complete Streets Implementation Program with the goal to construct projects that improve safety, access, mobility, and connectivity of existing streets for all users. Improvements made under this program may include, but are not limited to:</p> <ul style="list-style-type: none"> › Sidewalks and pedestrian safety improvements, such as traffic signals, roundabouts, curb extensions, high visibility crossings, and shared-use pathways; › Bicycle safety improvements, such as bike lanes, separated bicycle facilities, sharrows, and signal detection; › ADA compliance and accessibility; › Transit infrastructure, such as bus shelters, benches, trash cans, and pads; › Street trees, landscaping, pedestrian-level lighting, street furniture; › Adequate storm water/drainage facilities; › Updated traffic markings, and signage. |

| POLICY RECOMMENDATION | DESCRIPTION |
|---|--|
| Continue to Build Infrastructure Like Greenways, Side Paths, and Sidewalks with Site Development Projects | The Town of Apex should continue to ask developers to construct planned side paths, greenways, trails, and sidewalks as a requirement to development in municipal limits. Planning staff should coordinate with developers to provide guidance on ordinance requirements and processes. In addition, they may also include specifications for greenway design standards. Planning and Parks, Recreation, and Cultural Resources staff should also refer to adopted plans for opportunities to fill in gaps within the bicycle and pedestrian system. |
| Update the Town’s Design Guidelines for Greenways | Town staff should update the Town of Apex Standard Specifications and Standard Detail guidance (Section 900 Greenway Trails) to include context-sensitive design standards and consider the character of the area that a greenway (or similar facility) is constructed within. Greenways often traverse many different land uses and communities so it will be important for the Town to focus on incorporating consistent design elements, wayfinding signage, and amenities that will help contribute to a sense of place. |
| Continue to Assess, Plan, and Fund Active Transportation Infrastructure Needs | The Advance Apex 2045 Transportation Plan recommends to continue to assess, plan, and fund infrastructure needs through the annual capital needs assessment, capital improvements program, and capital improvements budget process. Continue to document greenway projects in a Capital Improvements Plan and include project justifications that state greenways and open space will need to be acquired and/or constructed to maintain the current level of recreation service. |
| Adopt an Active Transportation Overlay District | The Town should make zoning updates such as an active transportation code for new development or reconstruction projects. The addition of an overlay district could mandate the inclusion of active transportation infrastructure as part of mitigation efforts to prevent flooding within the community. The district could include all adopted linear greenway network projects mapped within the Town. |

Lighting

Well-placed and properly maintained lighting can improve visibility, increase overall greenway access, and give users a greater sense of security. If lighting is implemented along the greenway network, consider the following lighting guidance:

- › Meet the American Association of State Highway and Transportation Officials' (AASHTO) Guide for the Development of Bicycle Facilities requirements for shared-use paths.
- › Light only what is needed and comply with dark-sky requirements to help minimize light pollution, which impacts people, animals, and the environment.
- › Use lighting that is of appropriate scale and spacing to ensure adequate coverage.
- › Place lights where recommended for safety at tunnels and overpasses; parking areas; bridges; gathering places; along streets; crosswalks; where a greenway crosses another path or sidewalk; and on signage.

A variety of lighting types are available including wired, battery-powered, and solar-powered options. Each lighting option offers unique advantages or disadvantages regarding cost, maintenance burden, and environmental impacts. For example, dark sky lighting fixtures are designed to direct light to the ground instead of to the sky. In return, this type of fixture helps decrease light pollution and can be placed near environmentally sensitive areas.

The use of colored and/or dynamic lighting schemes in select areas (such as tunnels and bridges) can enhance the user experience, contribute to the overall brand/identity of the greenway network, and raise awareness of the facility to the traveling public.



Figure 12.44 - Tunnel Lighting on Honeycutt Creek Trail - Raleigh, NC

Wayfinding

Wayfinding consists of comprehensive signage, mapping, and marking systems that help inform and educate users as they make their way to, from, and along the greenway. A cohesive wayfinding system across the corridor will enhance access, provide a greater sense of security and comfort, promote desired user behaviors, improve awareness of nearby greenway and transit networks, and reinforce the brand and/or identity of the facility. The following principles should guide the continued implementation of Apex's wayfinding system:

- › CONSISTENCY - User experience should feel consistent and continuous across the entire corridor, regardless of jurisdiction.
- › CONNECTIVITY - A primary function of wayfinding is to connect users to destinations and other routes. It should clearly communicate current locations, access points, adjacent streets, distances, directions, destinations, estimated travel times, and historical/cultural/environmental information where applicable.
- › IDENTITY - A strong wayfinding identity will make the greenway more recognizable and memorable to visitors and residents alike. Custom designs and graphics should be used to create a unique identity which reflects the goals of the greenway network in Apex and the character of the region it will serve.
- › PREDICTABILITY - Apply wayfinding in a predictable manner (including sign placement, design, and content) to allow users to quickly understand the information being presented. For users, this builds trust, increases comfort, reduces stress, and provides a welcoming and low-stress experience as they navigate the greenway.
- › SIMPLICITY - Present information in a clear, logical, universal way to reach the widest possible demographic. The longer it takes to understand the information presented, the less likely the system will be used or relied upon.



Figure 12.45 - Town of Apex Wayfinding Signage along the Middle Creek Greenway

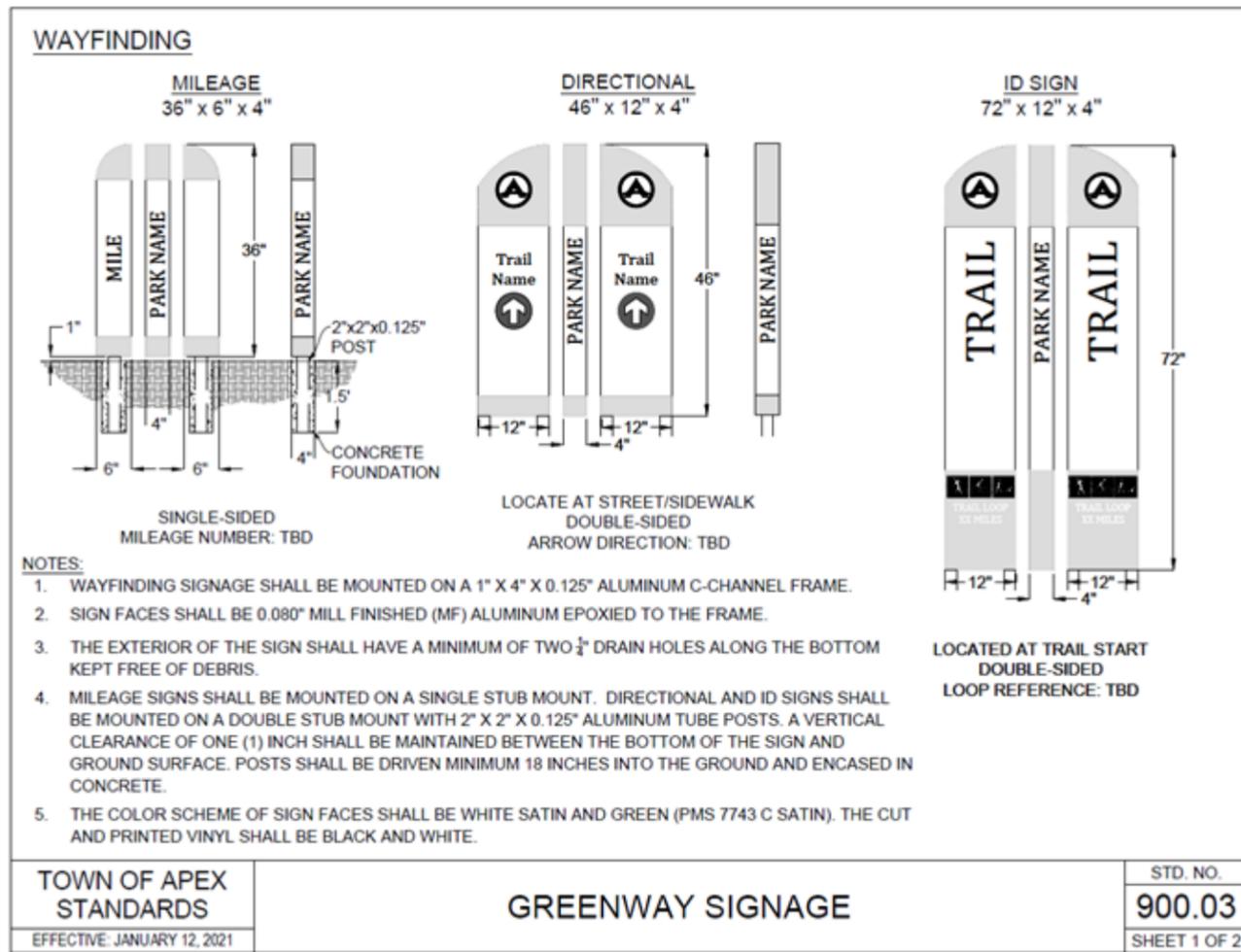


Figure 12.46 - Existing Standards for Greenway Signage / Town of Apex

Branding

Popular greenway systems establish strong brands and identities to drive recognition at the local and regional levels and beyond to attract users. A consistent, high-quality user experience may be achieved through repeating brand elements such as typical sections (including materials selection), wayfinding (including logos, graphics, and color palette), lighting, furnishings, and other amenities. At a minimum, good signage will increase the awareness of greenways within a community, even outside of the system itself. Effective network signage should strike a balance between establishing a consistent look and feel, promoting the system, and respecting individual greenway corridors.

There are a variety of methods available to improve the branding and wayfinding of a greenway network beyond the installation of traditional signage. Logos can be painted on greenway surfaces, and smaller signs or stickers can be added to existing street-scape elements like benches, bike racks, trash receptacles and street signs to catch the attention of passers-by and entice new users into the system. These efforts can complement the installation of dedicated network signage, or in some cases, make more expensive signage unnecessary. A branding study is recommended with community input to establish these elements to be used along the greenway system within the Town of Apex.



Figure 12.47 - Greenway Branding - Greensboro, NC



Figure 12.48 - New Hope Church Road Trailhead - Cary, NC

Trail heads

Trail heads provide public access points to trails and greenways. They are typically in places where users begin or end their journeys and where they get oriented to the greenway or greenway network. While there are minor access points along greenways such as road crossings, within neighborhoods, or where two greenways intersect, a trailhead tends to be a developed site, purposefully designed to provide amenities to greenway users such as parking, signage, informational kiosks, restrooms, drinking fountains, bike racks, bike repair stations, seating, public art, landscaping, and trash receptacles.

Guidance for trailhead placement includes:

- › Endpoints are natural places to locate trail heads, but any place where a large volume of users is expected should be considered as a possible trailhead location.
- › Utilize areas where amenities already exist, such as parks.
- › Consider placing a trailhead where greenways intersect.
- › Consider placing a trailhead within residential neighborhoods. Trail heads that are located within neighborhoods should be designed to be compatible with their surrounding uses.
- › Consult with the community and seek public input on locations. Residents may have insights or preferences for areas that best meet user's needs.

At all greenway access points, including trail heads, enhance user safety by implementing access management tools. Bollards, gates, fences, landscaping, and signage can prevent motorized vehicles from accessing the greenway. These barriers should be accessible for persons with disabilities to ensure that users of all ages and abilities can access the greenway. Barriers should also allow emergency or maintenance vehicles to access the greenway.

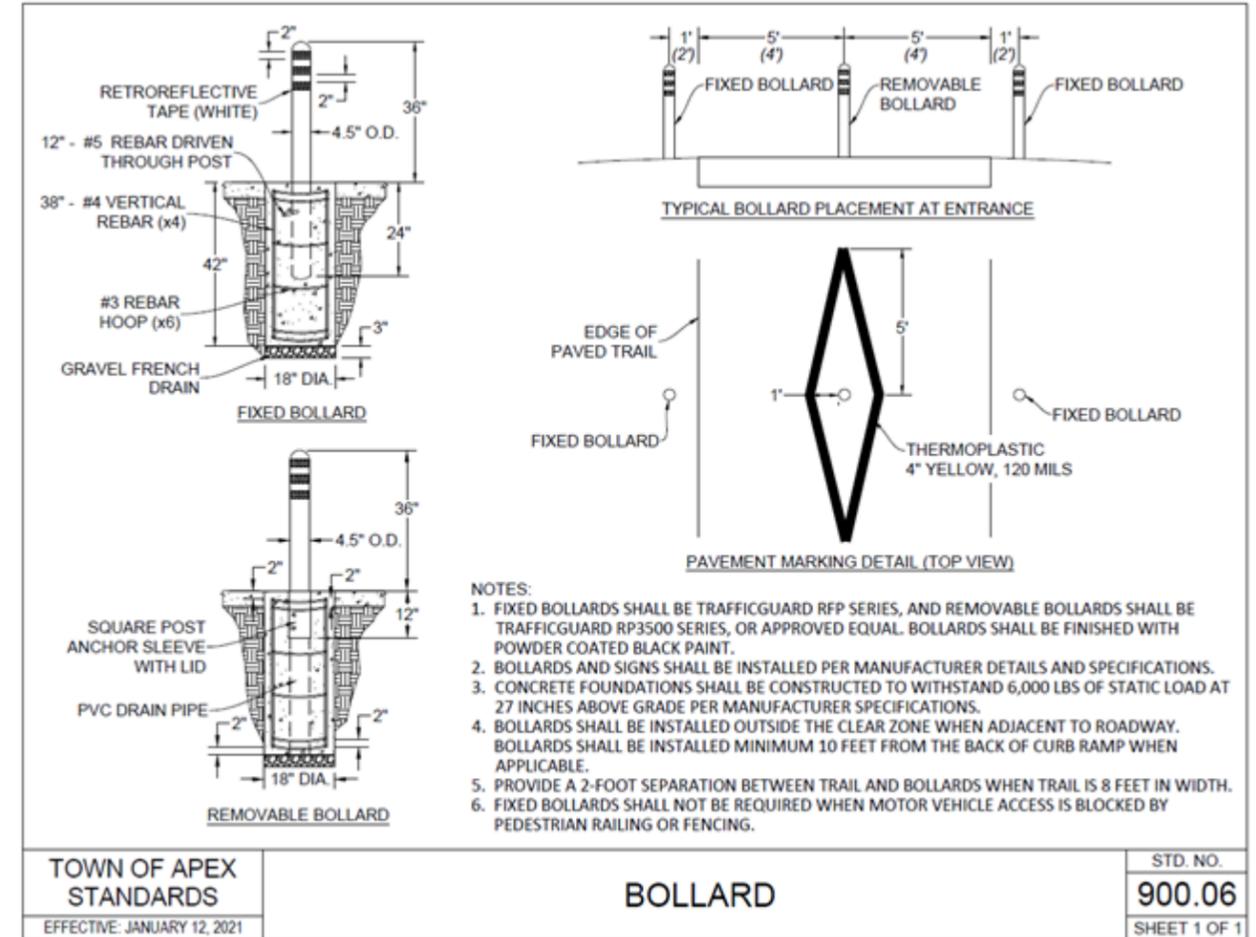


Figure 12.49 - Existing Standards for Bollards / Town of Apex

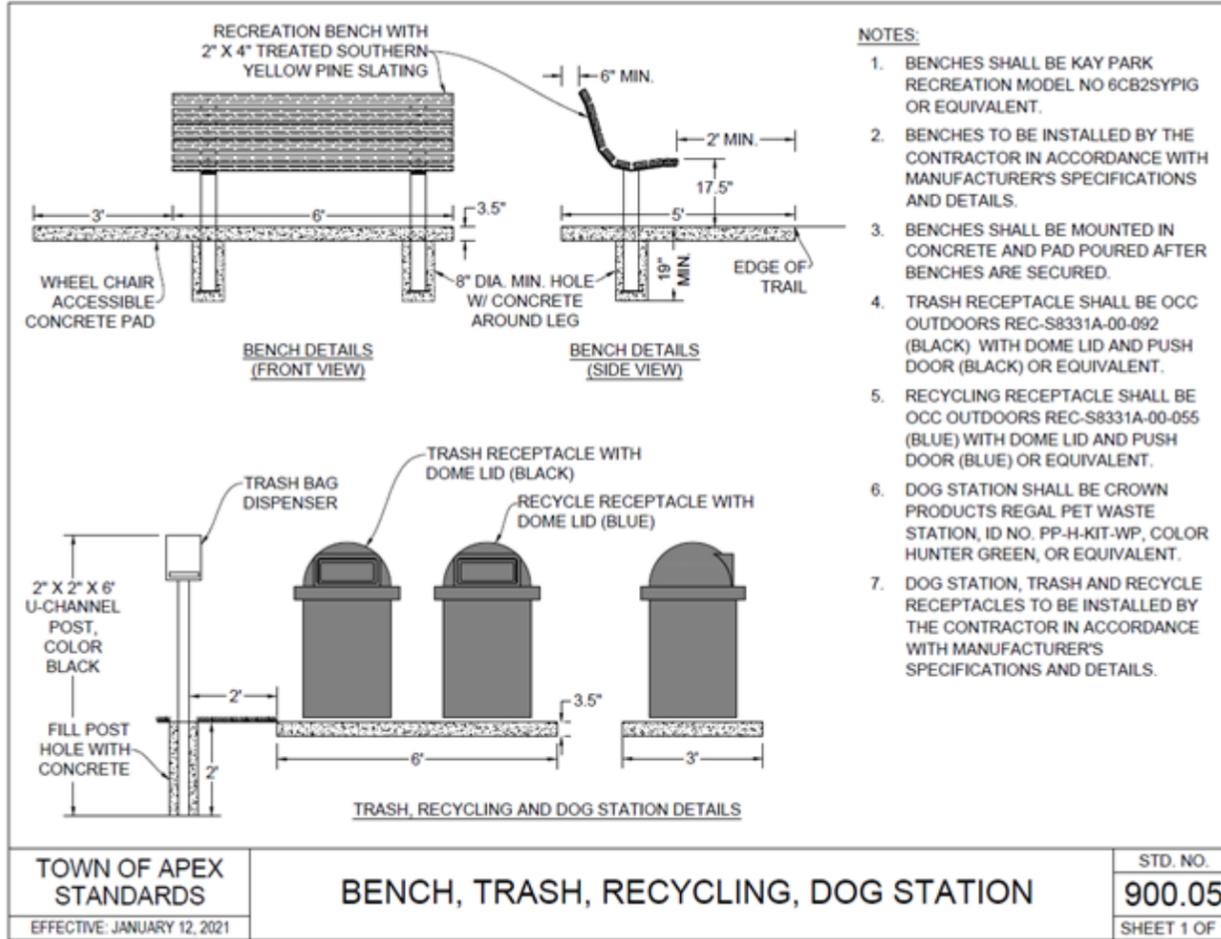


Figure 12.50 - Existing Design Standards for Benches, Trash, Recycling, + Dog Stations / Town of Apex

Data Collection

Bicycle and pedestrian count data are an essential tool to justify investments in greenway and active transportation infrastructure and communicate needs with the public, elected officials, and other stakeholders. Collecting this data provides insights into temporal user volume trends (time of day and seasonal), user type trends (biking vs. walking), and user volume trends by geographic location (which sections are most frequently used). This information can also help identify potential areas of need as municipalities plan their future pedestrian and bicycling infrastructure projects.



Figure 12.51 - Bicycle + Pedestrian Counter in Dallas, TX

A variety of counting technologies and products are available depending on the specific application and budget. These range from inductive loop detectors, pneumatic tube detectors, and passive infrared detectors among others. Mobile counters provide the flexibility to collect data in one location before moving to another collection location and are typically battery-powered. Fixed counters are used at locations where long-term data collection is desired and may be wired or battery-powered. Some blend in with their surroundings and others utilize real-time display totems to present daily and yearly counts and engage directly with those users being counted.

Depending on the specific product, count data may be retrieved manually from the counter or may streamline the process via wireless transmission, reducing trips to the field. Online, easy-to-use data platforms are also offered to analyze and visualize the data. Features include dashboards and interfaces to provide access to count data for the development of custom websites and mobile applications. The emerging use of "Big Data" crowd-sourced from mobile phone users, via services such as Streetlight and Strava, may also be an option for collecting user count data.

The Town of Apex currently has four bicycle and pedestrian counters. One of them is located on the Beaver Creek Greenway. The others are located on N Salem Street in downtown Apex and on Olive Chapel Road.



IMPLEMENTATION

Recommendations outlined in the Apex Greenway Master Plan present major investments in greenway infrastructure that will significantly expand recreational opportunities for residents, employees, and visitors. Successful implementation of this plan will require a coordinated and consistent effort with a wide range of community partners. Key agencies and partners include the Apex Town Council, Town of Apex Parks, Recreation & Cultural Resources Department, Town of Apex Public Works Department, Town of Apex Transportation and Infrastructure Development, Town of Apex Planning Department, Town of Apex Water Resources Department, Wake County, Capital Area Metropolitan Planning Organization (CAMPO), North Carolina Department of Transportation (NCDOT), NCDOT Integrated Mobility Division (IMD), as well as advocacy organizations, private partners, and members of the community.

This chapter outlines partner roles and action steps to guide key agencies and stakeholders in the funding, design, and construction of greenway network recommendations, as well as the implementation of recommended policies and amenities. Action steps prioritize implementation strategies over a 10-year planning horizon. Funding resources available to the Town of Apex for implementation are outlined in Appendix A: Funding.

Key Partners in Implementation

Achieving success in the development of the Apex Greenway Master Plan relies on collaboration with community partners and stakeholders at the local, regional, and state levels. Implementation will require both individual and coordinated efforts by all project stakeholders. Key roles in the implementation of this plan are outlined below.

Role of the Apex Town Council

The Town of Apex operates under a Council-Manager form of government. The Town Council, which includes the Mayor of Apex, establishes policies, and the Town Manager is responsible for the implementation and administration of established policies. Therefore, the Town Council is responsible for adopting this plan, establishing recommended policies, and supporting the action steps required to implement plan recommendations. By adopting the plan, the Town Council expresses its commitment to expanding greenway infrastructure, policies, and amenities in Apex. They also demonstrate their intent to support the efforts of other key partners, such as Town departments and Wake County.

Role of the Town Departments

Town departments lead or support the development of greenway projects in Apex. On projects they play a leading role, municipal staff are the primary coordinators for project development, community engagement, policy development, funding strategies, and maintenance. Town departments involved in the implementation of the Apex Greenway Master Plan include the Parks, Recreation & Cultural Resources, Planning, Public Works, Transportation and Infrastructure Development, and Water Resources departments. The Parks, Recreation & Cultural Resources Department is responsible for the planning, design, and maintenance of existing and future parks and providing recreation services and programs. The Planning Department advises citizens, staff, and elected officials on policies for land use, housing, transportation, zoning, and growth management. The Public Works Department is responsible for the maintenance and repair of Town-owned roadways, buildings, and grounds.

Role of the NCDOT

North Carolina Department of Transportation (NCDOT) allocates federal and state funding and establishes policies for transportation improvements in communities across the state of North Carolina. Every two years, NCDOT develops the State Transportation Improvement Program (STIP), which identifies projects that will receive funding during a 10-year period. NCDOT policies such as Complete Streets provide guidance and oversight for permitting

and implementing bicycle and pedestrian projects. The Complete Streets Policy, adopted in August 2019, requires NCDOT to consider and incorporate bicycle and pedestrian facilities in the design and improvement of the state's transportation projects. As the lead state agency allocating funding, guiding implementation of the Complete Streets policy, and approving activities along NCDOT-maintained roadway corridors, NCDOT plays a critical role in the implementation of the Apex Greenway Master Plan. NCDOT agencies involved in project development include Division 5 and the Integrated Mobility Division (IMD).

Role of the Regional + County Stakeholders

Other governmental organizations that have jurisdictional authority or administer services in Apex play a key role in project implementation by working with lead agencies to advance shared goals of improving multi-modal connectivity and expanding travel choices in the region. Key agency partners include Capital Area Metropolitan Planning Organization (CAMPO) and Wake County. CAMPO allocates federal funds to local projects through the Locally Administered Projects Program (LAPP). CAMPO also ranks and prioritizes projects submitted to the Strategic Transportation Prioritization (SPOT), which is the methodology NCDOT uses to develop the State Transportation Improvement Program (STIP). Wake County Parks, Recreation, and Open Space administers funding to municipalities in the County to develop greenways through the 2018 Parks, Greenways, Recreation and Open Space Bond, and Wake County Public School System administers a county-wide Safe Routes to School Program to develop encouragement and safety programs for students walking and bicycling to school.

Role of the Town Parks + Recreation Advisory Commission

The Parks and Recreation Advisory Commission provides guidance to department staff and Town Council on issues relating to parks and recreational policies, facilities, finances, programs, and long-range plans. The Parks and Recreation Advisory Commission provides their review and expertise to elected officials and agency staff, provides constructive guidance on greenway system issues, and ensures that residents have an opportunity to give input and receive a response by Town staff.

Role of Local Residents + Community Groups

Residents and community groups that promote greenway system expansion serve a key role in advocating for greenway infrastructure investment. Community members and groups generate support for projects by raising awareness amongst the public, advocating to elected officials to prioritize funding for greenways and greenway amenities, and fostering collaboration amongst jurisdictional partners. Key advocacy organizations that may also support implementation of the greenway network and policy recommendations include East Coast Greenway Alliance, Triangle Trails Initiative, and Live Well Wake.

Role of Private Developers

Private developers play an important role in the development of greenways. Developers may be required to construct planned greenways, side paths, and sidewalks as a requirement for development in municipal limits, as specified in the Apex Unified Development Ordinance. Town of Apex staff from the Parks, Recreation & Cultural Resources, Planning, and Transportation and Infrastructure Development departments should coordinate with developers to provide guidance on code requirements and processes on greenway and side path design standards. Developers should be prepared to include greenway facilities in future developments that provide connections to Apex's comprehensive greenway network.

ACTION PLAN

The following table provides key action steps and descriptions to implement greenway network and policy recommendations over a 10-year planning horizon. Detailed action steps with corresponding pathways, responsibilities, and status are included in the Action + Implementation Plan chapter of this plan. The action steps presented in this chapter support the following guiding principles under the theme “EXPANSION” as identified in the *Parks, Recreation, Greenways, Open Space, and Cultural Resources Master Plan*:

EXPANSION:

- › 1.1 Connectivity: Prioritize interconnected public realm through greenways, bike-ways, and transportation.
- › 1.2 Recreation offerings: Expand recreation offerings to attract new participants, retain current ones, and meet the needs of diverse and growing demographics of Apex.

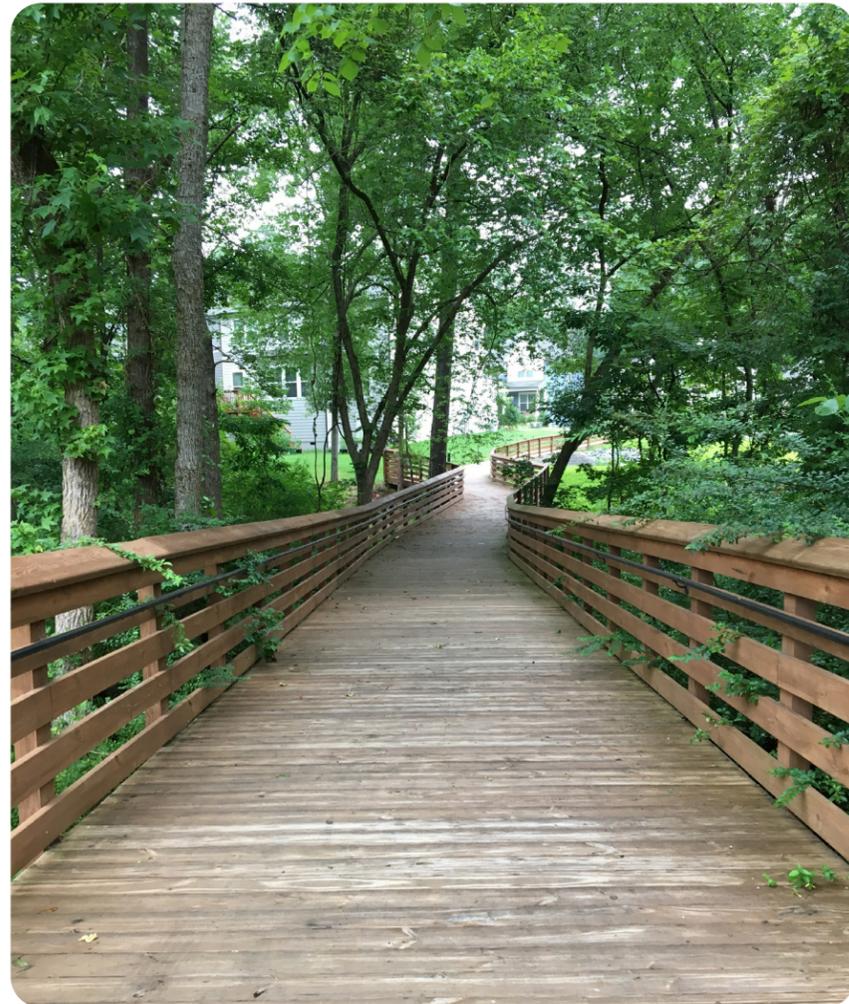


Figure 12.52 - Acadia Ridge Greenway Access Bridge

Action Plan for Town of Apex Greenways

| THEMES/ GUIDING PRINCIPLES | RECOMMENDATIONS | ACTION ITEMS | DESCRIPTION |
|--|--|--|--|
| 1. EXPAND | | | |
| 1.1 Connectivity: Prioritize interconnected public realm through greenways, bike-ways, and transportation. | | | |
| 1.1.1 | Implement the proposed greenway network plan to improve access to parks, other greenways, and other local and regional destinations. | a. Build ADDITIONAL 12 miles of greenways in the next ten years to achieve level of service (LOS) 0.46 miles/ 1,000 population. | Parks, Recreation & Cultural Resources, Planning, Public Works, and Transportation & Infrastructure Development departments should collaborate to identify, prioritize, and construct greenways within the Town to achieve LOS. |
| | | b. Continue inter-departmental collaborations on <i>Bike Apex</i> , the <i>Comprehensive Transportation Plan</i> , and the <i>Master Plan for Parks, Recreation, Greenways, Open Space, and Cultural Resources</i> to improve system-wide connectivity, implement recommended infrastructure, amenities, and policies outlined in adopted plans. | Continue to convene the PRCR Advisory Commission to guide Town staff (Parks, Recreation & Cultural Resources and Planning departments) in the implementation of recommended infrastructure, amenities, and policies. |
| | | c. Continue inter-jurisdictional collaborations to improve regional connectivity. | The Parks, Recreation & Cultural Resources and Planning departments should continue to coordinate with inter-jurisdictional parties to ensure the Town’s greenway network connects to other planned active transportation systems in the region. |
| | | d. Address current gaps in the system to expand the network connectivity through side path, greenway, and street-side greenway development. | The Parks, Recreation & Cultural Resources, Planning, Public Works, and Transportation & Infrastructure Development departments should identify and document gaps in the greenway network to support an interconnected and continuous system of side paths, trails, and greenways. |

| THEMES/ GUIDING PRINCIPLES | RECOMMENDATIONS | ACTION ITEMS | DESCRIPTION |
|----------------------------------|--|--|---|
| 1.1.1 | Implement the proposed greenway network plan to improve access to parks, other greenways, and other local and regional destinations. | e. Identify 'commuter corridors' to offer regional connectivity with major employment destinations. | The Parks, Recreation & Cultural Resources and Planning departments should identify paths within the greenway network that could potentially serve as 'commuter corridors' that connect to employment destinations or offer regional connectivity through connections to nearby greenway systems or transit. |
| | | f. Coordinate with NCDOT Division 5 on future STIP projects to prioritize and construct side paths, safe connections, and intersection treatments in roadway projects. | The Parks, Recreation & Cultural Resources, Planning, Transportation & Infrastructure Development departments should coordinate with NCDOT Division 5 and NCDOT IMD on future State Transportation Improvement Program (STIP) projects to incorporate side paths and intersection treatments in roadway enhancements, especially along Williams St, Ten Ten Rd, US 64, Kelly Rd, New Hill Olive Chapel Rd, Old Raleigh Rd, Lake Pine Dr, and Laura Duncan Rd. |
| | | g. Develop a greenway work plan and construct greenway development as part of essential infrastructure development across the Town. Designate Town staff to lead implementation of plan recommendations. | The Town Manager and Department Directors of Parks, Recreation & Cultural Resources, Planning, Transportation & Infrastructure Development, and Public Works departments should identify staff leads and duties for plan implementation. Staff leads should be selected to guide project development, data collection, policies, and maintenance. |

| THEMES/ GUIDING PRINCIPLES | RECOMMENDATIONS | ACTION ITEMS | DESCRIPTION |
|----------------------------------|--|---|--|
| 1.1.1 | Implement the proposed greenway network plan to improve access to parks, other greenways, and other local and regional destinations. | h. Provide staff resources and training related to greenway infrastructure and amenities. | Provide resources and funding for staff (Parks, Recreation & Cultural Resource, Planning, Transportation & Infrastructure Development, and Public Works departments) involved in plan implementation to attend webinars, trainings, and conferences on greenway planning, design, and programming. Invest in guidance materials available from FHWA, NCDOT, NACTO, AASHTO, Rails to Trails Conservancy, and American Trails. |
| | | i. Develop funding strategies and allocate funding for greenway development annually and seek funding opportunities for right-of-way acquisitions, easement acquisitions proactively. | Review funding resources provided in Appendix A and coordinate with Town Staff, CAMPO, Wake County, and NCDOT IMD to determine funding strategies for plan recommendations. |



| THEMES/ GUIDING PRINCIPLES | RECOMMENDATIONS | ACTION ITEMS | DESCRIPTION |
|----------------------------------|---|---|---|
| 1.1.2 | Prioritize completion of greenway corridors that meet most criteria established in the prioritization matrix. | a. Use the prioritization criteria to inform decisions regarding project implementation priorities. | The Parks, Recreation & Cultural Resources and Planning departments should score each greenway and side path corridor using criteria developed through this planning effort to prioritize Apex's greenway network. Prioritization criteria should be evaluated periodically based shifts in community needs and funding and development opportunities. |
| | | b. Conduct feasibility studies for the high priority greenway projects. | The Parks, Recreation & Cultural Resources and Planning departments should coordinate with NCDOT, regional partners, and adjacent municipalities to conduct feasibility studies for the top ten priority greenway projects. |
| | | c. Following feasibility study completion, score high-priority greenway corridors for design development and construction funding using the prioritization criteria developed through this planning effort. | The Parks, Recreation & Cultural Resources, Planning, Transportation & Infrastructure Development, and Public Works departments should work together to score high priority greenway corridors to determine priority projects for 30% design development and construction funding based on phase two of the prioritization criteria developed through this planning efforts. High priority greenway corridors should be scored following the completion of feasibility studies. |



| THEMES/ GUIDING PRINCIPLES | RECOMMENDATIONS | ACTION ITEMS | DESCRIPTION |
|----------------------------------|---|---|--|
| 1.1.3 | Encourage and support greenway use through place-making strategies. | a. Use place-making strategies to enhance user experience along greenway nodes and trail head locations. | The Parks, Recreation & Cultural Resources and Planning departments should identify place-making strategies that consider appropriate uses, activities, access, linkages, safety, levels of comfort, image, and sociability experiences along greenways and at trail heads. The Town should engage with the public to ensure the place-making vision is consistent with the community's expectations and desires. |
| | | b. Develop a hierarchical system of trail heads and amenities associated with each. | The Parks, Recreation & Cultural Resources and Planning departments should identify and document a hierarchical system of trail heads within the greenway network. For example: major trail heads should have a restroom, small weather shelter, seating opportunities, car and bike parking, a bike repair station, and drinking water facility. A minor trailhead should have a bench and a trash receptacle at a minimum. All trail heads should have wayfinding information. |
| | | c. Provide easy access to amenities (e.g., restrooms, drinking water, seating areas, mile markers etc.) to encourage fitness and health outcomes. | The Parks, Recreation & Cultural Resources and Planning departments should identify and document potential access locations for amenities along the greenway network. While greenways can be used for recreational purposes, they can also support and encourage fitness, resulting in positive health outcomes for users. |

| THEMES/ GUIDING PRINCIPLES | RECOMMENDATIONS | ACTION ITEMS | DESCRIPTION |
|----------------------------------|---|--|---|
| 1.1.3 | Encourage and support greenway use through place-making strategies. | d. Develop a Greenway Maintenance & Operations Plan and allocate resources for maintenance of aging sections as part of the asset management plan. | The Parks, Recreation & Cultural Resources, Planning, and Public Works departments should develop a greenway and amenities maintenance and operations plan to define maintenance responsibilities, budget, and staff resources required to maintain facilities. |
| | | e. Incorporate digital capabilities such as QR codes on greenway signage, bike rentals, and phone apps to encourage greenway use. | The Parks, Recreation & Cultural Resources, Planning, and Marketing departments should identify opportunities for digital marketing within the Town's greenway network. Utilizing digital marketing will result in sustainable promotion of the greenway system. Digital information can also be easily updated as the network expands in the future. |
| | | f. Facilitate and participate in programs and events such as bike rodeos and other educational programming, group walks and bike rides, nature hikes, etc. to attract new users. | The Parks, Recreation & Cultural Resources and Planning departments should engage the Town in bicycle and pedestrian programs to help highlight the Town's efforts in greenway planning. |
| | | g. Ensure connectivity to internal parks trails from greenway corridors. | The Parks, Recreation & Cultural Resources Department should collaborate with Planning to identify potential connections between trails within the Town's parks and major greenway corridors. |
| | | h. Continue to implement the current wayfinding signage along new greenway corridors. | The Parks, Recreation & Cultural Resources and Planning departments should refer to the existing standards for wayfinding signage and identify appropriate locations along the Town's greenways to implement new signage. |

| THEMES/ GUIDING PRINCIPLES | RECOMMENDATIONS | ACTION ITEMS | DESCRIPTION |
|---|--|---|--|
| 1.1.4 | Evaluate performance of the greenway network annually. | a. Develop performance measures and conduct annual reviews of the greenway system to understand facility needs, funding and resource needs, and usage rates. | The Parks, Recreation & Cultural Resources and Planning departments should develop performance measures and conduct annual reviews of the greenway system to understand facility needs, funding and resource needs, and usage rates. |
| | | b. Coordinate with NCDOT IMD to continue future participation in the Bicycle and Pedestrian Count Program. | The Parks, Recreation & Cultural Resources and Planning departments should coordinate with NCDOT IMD to be involved in the NC State Institute for Transportation Research and Education (ITRE) Non-Motorized Volume Data Program to collect bicycle and pedestrian counts along greenways and side paths. |
| 1.2 Recreation offerings: Expand recreation offerings to attract new participants, retain current ones, and meet the needs of diverse and growing demographics of Apex. | | | |
| Parks and Facilities Recommendations | | | |
| 1.2.3 | Develop the existing vacant parkland to continue to provide recreation offerings for growing population. | a. Update current land acquisition and fee-in-lieu policy and conduct a fee study for identifying and prioritizing land acquisition for future parks and open space and recreational amenities including greenways. | Coordinate with the Planning Department to conduct a fee study to analyze the Town of Apex fee structure. In the current fee structure, greenways are defined as a recreational amenity, and as such are only required to be constructed by developers in residential developments. Explore the potential to define greenways as infrastructure in the land development ordinance to expand requirements so that planned greenways are required to be constructed in non-residential developments as well. |

Maintenance

The maintenance of Apex’s greenway system is essential to the long-term viability of the network. Greenways that are consistently maintained have lower costs over time and provide a safer and more positive user experience than greenways that require major rehabilitation work from a lack of consistent maintenance. Focusing on best practices for maintenance also prolong the useful life of greenways, promote positive relationships with adjacent landowners, and create a sense of stewardship in the community.

This plan recommends a comprehensive approach to maintenance with the development of a maintenance plan to prioritize funding and responsibilities amongst Town departments. The maintenance plan should be reviewed and updated annually, responding to lessons learned and changes in tasks, operational policies, standards, and maintenance goals. Key considerations for Apex’s greenway system maintenance plan include:

- › Understanding the anticipated needs of the greenway system and assessing the capacity of Town staff to meet those maintenance needs.
- › Developing a facility inventory to understand the routine and substantial maintenance needs of greenway signs, amenities, bridges, culverts, and pavement conditions.
- › Estimation of baseline maintenance costs by determining necessary maintenance activities, such as mowing, edging, landscaping, trash removal, debris clearing, lighting, drainage, seasonal maintenance needs, sealcoating, repaving, patching, and bridge repair.
- › Consideration of labor costs based on which maintenance activities can be completed in-house versus contracted out.
- › Assessment of available technologies to collect data on facility conditions and facilitate maintenance functions.
- › Developing methodology to prioritize annual maintenance needs based on facility conditions and available funding.
- › Consideration of emergency services including designated ingress/egress locations, mile-marker signage along the facility for location identification, and emergency notification systems.



Figure 12.53-Asphalt Patching along Salem Pond Park Trail, Apex, NC

Sample Maintenance Tasks

| MAINTENANCE TASK | TASK TYPE | RECOMMENDED FREQUENCY |
|--|----------------------|---|
| Tree/Brush Trimming Mowing Sweeping Signage/Map/Kiosk Updates/ Replacement Trash Removal/Litter Clean-Up Planting, Pruning, Landscaping Flooding Repairs Repainting/Restriping Minor Patching Minor Bridge Repairs Lighting Replacement Bollard Locks/Replacement Pest Management | Routine | On-Going / Annually |
| Greenway and Side path Sealcoating | Minor Repairs | Every 5 Years |
| Greenway and Side path Resurfacing: Asphalt Concrete Boardwalk | Major Reconstruction | Every 10-15 Years Every 20 Years Every 10 Years |
| Complete Greenway and Side path Replacement, Regrading, and Resurfacing | Major Reconstruction | Every 20 Years |

*Best Practices in Trail Maintenance: A Manual by the Ohio River Greenway, Perdue University

Maintenance Key Steps in the Project Development Process

While this chapter provides an overall framework for the development of greenway amenities, it is only the first step in a larger process. As a living document, recommendations and priorities outlined in the greenway plan may evolve with changing development pressures, funding opportunities, and community growth trends. Further, Apex may need to conduct feasibility studies to understand the environmental conditions, routing challenges, and costs of priority corridors. This detailed analysis allows design and right-of-way acquisition to be finalized, which is followed by construction. Operational and programming plans are developed once greenways are constructed to determine maintenance and evaluation needs. The diagram below illustrates the typical planning, design, and construction process for greenway amenities with key phases and individual tasks.

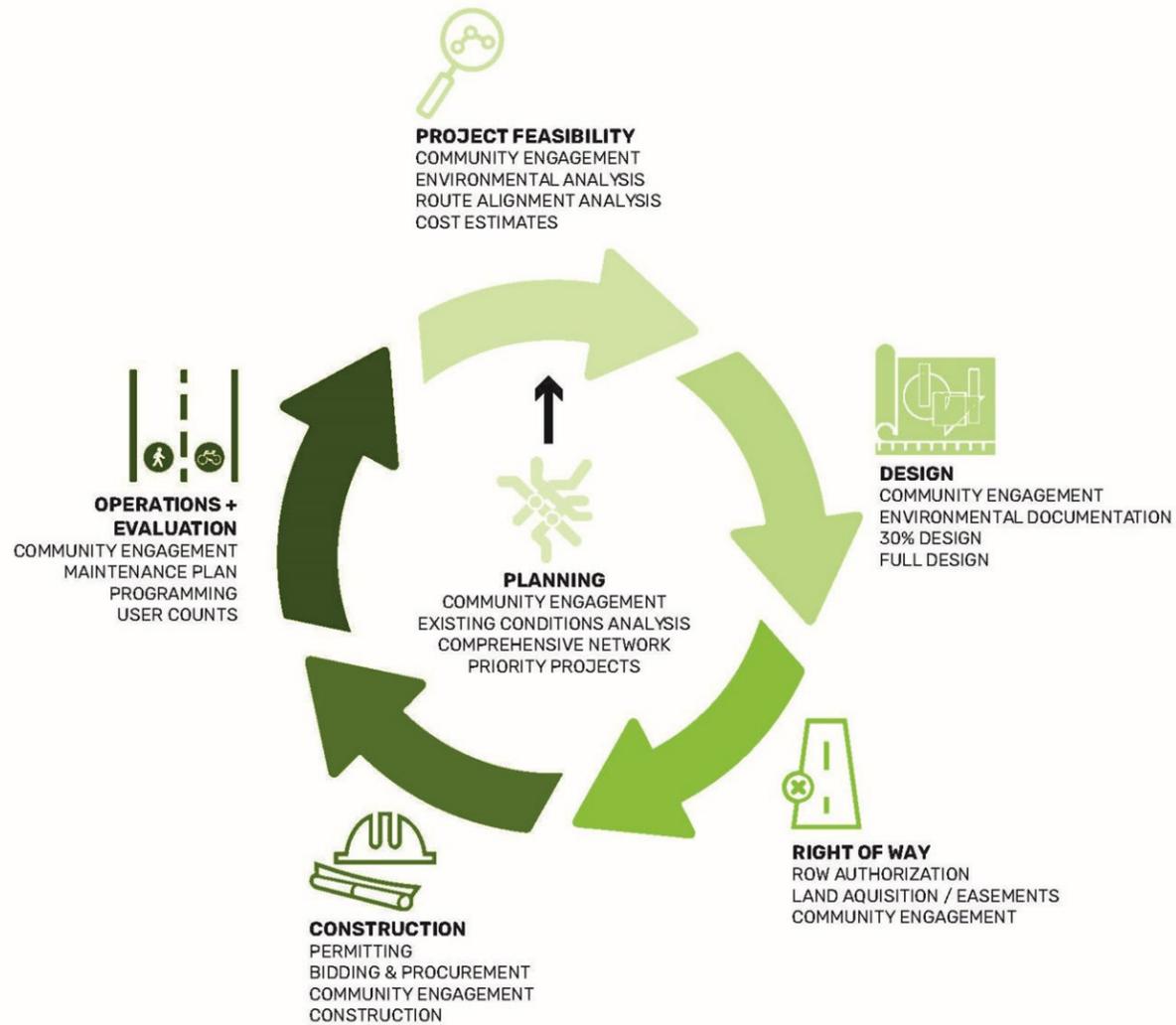


Figure 12.54- Project Development Process

Figure 12.55- Image pictured to the right is the greenway at Apex Community Park





APPENDIX A: GREENWAY FUNDING RESOURCES

Below are several funding sources that can be leveraged to provide the necessary dollars to plan, design, and/or construct bicycle, pedestrian, and greenway facilities. The following sources of funding have been instrumental in the successful development of bicycle and pedestrian networks in North Carolina communities.

Federal Funding

North Carolina communities have partnered with Federal agencies to build multi-use paths, greenways, sidewalks, bike lanes and improve crossings. Federal funding is primarily distributed to municipalities through state agencies and Metropolitan Planning Organizations (MPO), as well as through discretionary grant programs.

The Fixing America's Surface Transportation (FAST) Act authorizes transportation funding for highway, transit, rail, bicycle and pedestrian, and safety programs and infrastructure. FAST Act funding is administered by the Federal Highway Administration (FHWA). FHWA distributes funding to NCDOT and directly to MPOs through the Locally Administered Projects Program (LAPP). Communities wishing to access Federal funding must submit their candidate projects to their MPO or RPO to then be entered into the NCDOT's Strategic Transportation Investment (STI) Mobility Formula. This formula ranks projects and identifies those to be funded in the State Transportation Improvement Program (STIP). These funds require a 20% match from the municipality. Federal transportation funds for bicycle and pedestrian projects are primarily distributed through four programs: Transportation Alternatives (TA), Congestion Mitigation & Air Quality (CMAQ), Recreational Trails Program, (RTP), and Highway Safety Improvement Program (HSIP).

Additional federal funding sources for bicycle and pedestrian projects are administered through the Department of Housing and Urban Development (HUD) with the Community Development Block Grant (CDBG) Program, and several discretionary grant programs administered by the US Department of Transportation (USDOT), National Park Service (NPS), and the National Endowment for the Arts (NEA).

State + MPO Administered Funding Transportation Alternatives (TA)

Transportation Alternatives provides federal funds for community-based projects that expand travel choices and enhance the transportation experience by integrating modes and improving the cultural, historic, and environmental aspects of our transportation infrastructure. In North Carolina, TA funds are administered by NCDOT. Program-eligible projects must be submitted through STI and require a 20 percent local match.

Project types include:

- › On and off-road pedestrian and bicycle facilities.
- › Infrastructure projects for improving non-driver access to public transportation and enhanced mobility.
- › Community improvement activities.
- › Environmental mitigation.
- › Safe routes to school projects.
- › Street-scape improvements.
- › Refurbishment of historic transportation facilities.
- › Other investments that enhance communities.

NCDOT has created a bicycle and pedestrian scoping guidance document for local governments that have been awarded Transportation Alternatives funding. The Bike/Ped Project Scoping Guidance for Local Governments provides an overview of the four scoping tools used for locally managed, federally funded transportation projects

in North Carolina. The document provides guidance on the project delivery process, scoping, identifying project risks, and project cost estimation. The document is available at the link below.

<https://connect.ncdot.gov/projects/BikePed/Documents/BikePed%20Project%20Scoping%20Guidance%20for%20Local%20Governments.pdf>
https://www.fhwa.dot.gov/environment/transportation_alternatives/

Congestion Mitigation + Air Quality (CMAQ)

CMAQ is a federal program that funds transportation projects and programs in air quality non-attainment and maintenance areas to help achieve and maintain national standards for air quality. In North Carolina, NCDOT serves as the administrator for this program. Funding is apportioned to North Carolina based on the population in non-attainment and maintenance areas of the state and the severity of air quality problem. North Carolina's allocation of CMAQ funding is split in three pots available for funding, as follows:

- › Statewide CMAQ funds are administered by NCDOT and are awarded to prioritized NCDOT-driven CMAQ eligible projects either on a statewide tier facility or involving a system wide improvement within non-attainment and maintenance areas. Statewide CMAQ funds are not subject to regional or subregional allocations or the allocation formula. This category accounts for 35% of the total North Carolina CMAQ apportionment.
- › Regional CMAQ funds are locally administered and awarded to projects spanning more than one air quality region that cannot be considered subregional projects. Air quality regions are Catawba, Great Smoky Mountains National Park, Metrolina, Rocky Mount, the Triad, and the Triangle. The local project sponsor is responsible for providing the required match. This category accounts for 5% of the total North Carolina CMAQ apportionment.
- › Subregional CMAQ funds are locally administered and awarded at the MPO/RPO level to projects within eligible counties. The local project sponsor is responsible for providing the required match and meeting federal funding requirements. This category accounts for 60% of the total North Carolina CMAQ apportionment.

https://www.fhwa.dot.gov/environment/air_quality/cmaq/

Highway Safety Improvement Program (HSIP)

The purpose of the North Carolina Highway Safety Improvement Program (HSIP) is to provide a continuous and systematic procedure that identifies and reviews specific traffic safety concerns throughout the state. The goal of the HSIP process is to reduce the number of traffic crashes, injuries, and fatalities by reducing the potential for these incidents on public roadways. Areas with bicycle and pedestrian safety concerns are primarily analyzed based on bicycle and pedestrian crash data.

<https://connect.ncdot.gov/resources/safety/Pages/NC-Highway-Safety-Program-and-Projects.aspx>

Recreational Trails Program (RTP)

The Recreational Trails Program provides funds to state agencies to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses. RTP is an assistance program of the Department of Transportation's Federal Highway Administration (FHWA). In North Carolina, the Recreational Trails Program is a \$1.5 million grant program that funds trails and trail-related recreational needs identified by the Statewide Comprehensive Outdoor Recreation Plan. Grant funding is available for trail planning, construction of new trails; maintenance and repair of existing trails; land acquisition; purchase of trail tools; and legal, environmental, and permitting costs. RTP is a reimbursement grant program. Municipalities must provide project funds upfront and are reimbursed upon completion of deliverables. Eligible applicants are state, federal,



or local government agencies or qualified nonprofit organizations. Grants range from \$10,000 - \$100,000 and require a 25% match by the municipality.

https://www.fhwa.dot.gov/environment/recreational_trails/

<https://trails.nc.gov/trail-grants>

Community Development Block Grant (CDBG)

The Community Development Block Grant Program provides annual grants on a formula basis to states, cities, and counties to develop viable urban communities by providing decent housing, suitable living environments, and expanding economic opportunities for low- and moderate-income persons. The program is authorized under Title 1 of the Housing and Community Development Act of 1974. CDBG funds are allocated at the federal level by HUD and at the state level by the NC Department of Commerce. All municipalities are eligible to receive State CDBG funds except for entitlement communities, which receive funds directly from HUD. North Carolina's 24 entitlement municipalities are: Asheville, Burlington, Cary, Chapel Hill, Charlotte, Concord, Durham, Fayetteville, Gastonia, Goldsboro, Greensboro, Greenville, Hickory, High Point, Jacksonville, Kannapolis, Lenoir, Morganton, New Bern, Raleigh, Rocky Mount, Salisbury, Wilmington, and Winston-Salem. In addition, all counties are eligible to receive State CDBG funds except Mecklenburg County, Wake County, Union, and Cumberland County, which have been designated by HUD as urban entitlement counties.

CDBG funds may be used for activities which include, but are not limited to:

- › Acquisition of real property.
- › Relocation and demolition.
- › Rehabilitation of residential and non-residential structures.
- › Construction of public facilities and improvements, such as water and sewer facilities, streets, neighborhood centers, and the conversion of school buildings for eligible purposes.
- › Public services, within certain limits.
- › Activities relating to energy conservation and renewable energy resources.
- › Provision of assistance to profit-motivated businesses to carry out economic development and job creation/retention activities.

https://www.hud.gov/program_offices/comm_planning/communitydevelopment

Discretionary Grants Rebuilding American Infrastructure with Sustainability + Equity (RAISE)

The Infrastructure Investment and Jobs Act appropriated \$1.5 billion to be awarded by the Department of Transportation (DOT) for National Infrastructure Investments, formerly known as TIGER and BUILD Grants and now as Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Grants. RAISE Grants are for capital investments in surface transportation that will have a significant local or regional impact. The FY2022 RAISE Notice reflects the current Administration's priorities for creating good-paying jobs, improving safety, applying transformative technology, and explicitly addressing climate change and advancing racial equity. Consistent with the FY 2022 Appropriations Act requirement, the Secretary shall award projects based solely on the selection criteria. The primary selection criteria are safety, environmental sustainability, quality of life, economic competitiveness, and state of good repair, and the secondary selection criteria are partnership and innovation. The Federal share of project costs may not exceed 80 percent for a project located in an urban area. The Secretary may increase the Federal share of costs above 80 percent for projects located in rural areas and for planning projects located in areas of persistent poverty.

Project Awards:

- › Total Funding: \$1.5 billion.
- › Minimum Project Awards: Urban Projects: \$5 million, Rural Projects: \$1 million.
- › Planning Grants: \$75 million total funding; No project minimum required.
- › Maximum Awards: Urban/Rural Projects: \$25 million, Per State: \$225 million.
- › Geographic Distribution: 50% of total funds (\$750 million) awarded to both urban and rural projects.

<https://www.transportation.gov/RAISEgrants>

Federal Lands Access Program (FLAP)

The Federal Lands Access Program (FLAP) provides funds for projects to improve Federal Lands Access Transportation Facilities that provide access to, are adjacent to, or are located within federal lands. This can include public roads, bridges, paved trails, or transit systems that are owned and/or maintained by the state, county, town, township, tribal, municipal, or local government. Funds may be used for the costs of transportation planning, research, engineering, preventive maintenance, rehabilitation, restoration, construction, and reconstruction of transportation facilities located on or adjacent to, or that provide access to, federal lands. Applicable activities include parking areas; acquisition of scenic easements or historic sites; bicycle and pedestrian provisions; environmental mitigation; public safety; and roadside rest areas. Other eligible activities include the operation and maintenance of transit facilities, and any transportation project that is within, adjacent to, or provides access to federal land. The program requires a minimum 20% local match.

<https://highways.dot.gov/federal-lands/programs-access/nc>

Federal Land + Water Conservation Fund (LWCF)

The Land and Water Conservation Fund was established by Congress in 1964 to fulfill a bipartisan commitment to safeguard natural areas, water resources and cultural heritage, and to provide recreation opportunities to all Americans. The LWCF program is divided into the "State Side" which provides grants to State and local governments for the acquisition and development of public outdoor recreation areas and facilities, and the "Federal Side" which is used to acquire lands, waters, and interests therein necessary to achieve the natural, cultural, wildlife, and recreation management objectives of federal land management agencies. State Side funds are distributed by the State and Local Assistance Programs Division of the National Parks Service. Funding is available as 50/50 matching grants to states and territories to plan, acquire, and develop public lands for outdoor recreation. Projects are selected by states and submitted to NPS for approval. In North Carolina, grants are selected by the Parks and Recreation Division in the NC Department of Cultural and Natural Resources. To be eligible for LWCF assistance, every state must prepare and regularly update a statewide comprehensive outdoor recreation plan (SCORP). Applicants can request a maximum grant of \$500,000. An applicant must match the grant with a minimum of 50 percent. Due to a federal share cap of \$500,000, a greater match is required for projects that exceed total costs of \$1 million.

<https://www.nps.gov/subjects/lwcf/stateside.htm>

<https://www.ncparks.gov/more-about-us/grants/lwcf-grants>

Rivers, Trails, + Conservation Assistance Program (RTCA)

The National Parks Service (NPS) Rivers, Trails and Conservation Assistance Program supports community-led natural resource conservation and outdoor recreation projects across the nation. Although RTCA is not a traditional



funding program, NPS staff provide planning, design and technical expertise for trails and outdoor recreation projects. Depending on the project scale, RTCA can invest up to four years of planning and project development assistance. Eligible entities include community groups, nonprofit organizations, tribes, and governments.

Technical Assistance Services:

- › Define project vision and goals.
- › Set priorities and build consensus.
- › Inventory and map community resources.
- › Identify funding strategies.
- › Identify and analyze key issues and opportunities.
- › Design community outreach, participation, and partnerships plans.
- › Create project management and strategic action plans.
- › Develop concept plans for trails, parks, and natural areas.

<https://www.nps.gov/orgs/rtca/index.htm>

Safe Streets + Roads for All Grant Program

The Safe Streets and Roads for All Grant Program (SS4A) was established in 2021 under the Infrastructure Investment and Jobs Act (IIJA) as a discretionary grant. \$5 billion was appropriated for the 5-year period starting with fiscal year 2022. Regional, local, and tribal agencies are eligible to apply for funding to develop or update a comprehensive safety action plan and carry out planning and development of projects and strategies within the action plan. Two types of grants are available: Action Plan Grants and Implementation Grants.

Action Plan Grants may be used for activities such as:

- › Leadership commitment and goal setting
- › Safety analysis
- › Engagement and collaboration
- › Policy and process changes
- › Strategy and project selections

Implementation Grants may be used for activities such as:

- › Improving pedestrian crossings and closing sidewalk gaps
- › Complete Street improvements
- › Developing bicycle networks
- › Creating safe routes to school

Reconnecting Communities Pilot Program

The BIL established the new Reconnecting Communities Pilot (RCP) discretionary grant program which is funded with \$1 billion over the next 5 years. It is the first-ever Federal program dedicated to reconnecting communities that were previously cut off from economic opportunities by transportation infrastructure. Funding supports planning grants and capital construction grants, as well as technical assistance, to restore community connectivity through the removal, retrofit, mitigation, or replacement of eligible transportation infrastructure facilities.

<https://www.transportation.gov/grants/reconnecting-communities>

Neighborhood Access + Equity Grants

Neighborhood Access and Equity Grants is a new program included in the Inflation Reduction Act. Approximately one-third of the funding can be used towards lower-income areas. This bill establishes discretionary grants for removing, replacing, or retrofitting highways and freeways to improve connectivity in communities and for planning and capacity building to increase community involvement in transportation planning and related activities. The bill prioritizes grants that fund projects in economically disadvantaged communities or that meet other criteria. Funding can be used for several different type of projects, including covering a highway, turning a highway into a boulevard, adding trails and bike lanes, installing sound barriers, providing better connections to transit, using green infrastructure to mitigate storm runoff, reducing urban heat island hot spots, installing safety features, and curbing air pollution. The FHA must award the grants to state, tribal, territorial, local governments, and metropolitan planning organizations.

<https://www.congress.gov/bill/117th-congress/house-bill/5267>

Active Transportation Infrastructure Investment Program

This new program includes \$200 million annually and is subject to appropriations. The program establishes competitive connectivity grants that strategically invest in projects that connect active transportation networks and trail networks, accelerating local and regional plans to create safe and convenient routes to everyday destinations. This program is not yet funded (currently working on appropriations); funding for the program should be appropriated at \$500 million per year.

https://www.railstotrails.org/media/1173656/caats_atiip_2922.pdf

National Endowment for the Arts (NEA) Our Town Program

Our Town is the National Endowment for the Arts' creative place-making grants program. Through project-based funding, the NEA supports projects that integrate arts, culture, and design activities into efforts that strengthen communities by advancing local economic, physical, and/or social outcomes. These projects require a partnership between a local government entity and nonprofit organization, one of which must be a cultural organization; and should engage in partnership with other sectors (such as agriculture and food, economic development, education and youth, environment and energy, health, housing, public safety, transportation, and workforce development). Cost share/matching grants range from \$25,000 to \$150,000, with a minimum cost share/match equal to the grant amount.

<https://www.arts.gov/grants/our-town>

State Funding

North Carolina communities have partnered with state agencies to build bicycle and pedestrian facilities. State agency funding sources for bicycle and pedestrian planning, infrastructure, and programs are administered primarily through the North Carolina Department of Transportation (NCDOT), North Carolina Department of Natural and Cultural Resources, and North Carolina Department of Commerce. Discretionary grant programs focusing on public health and community development are administered by the North Carolina Department of Health and Human Services (DHHS), North Carolina Department of Environmental Quality (NCDEQ), and the North Carolina Department of Agriculture when funding is available.

North Carolina Department of Transportation (NCDOT) Strategic Transportation Investments (STI)

The Strategic Transportation Investments law, passed in 2013, establishes the Strategic Mobility Formula, which allocates available funding based on data-driven scoring and local input. The Strategic Mobility Formula is used to develop the State Transportation Improvement Program (STIP), which identifies projects that will receive funding during a 10-year period. The STIP is state and federally mandated and updated by NCDOT every 2 years. The Strategic Mobility Formula groups projects in three categories: Division Needs, Regional Impact, and Statewide Mobility.

Independent bicycle and pedestrian projects are programmed in the Division Needs category. Eligible bicycle and pedestrian projects submitted for prioritization must be included in a locally adopted plan and have a minimum project cost of \$100,000. Eligible activities include right-of-way acquisition, design, and construction. Additionally, the STI law prohibits the use of state funding for bicycle and pedestrian projects, requiring municipalities to provide the 20% match for federally funded projects.

NCDOT Funding Distribution

| FUNDING CATEGORY | FUNDING DISTRIBUTION | OVERVIEW |
|--------------------|----------------------|---|
| Division Needs | 30% | Funding in this category is shared equally between NCDOT's 14 transportation divisions. Project scores are based 50% on data and 50% on rankings by MPOs and RPOs and the NCDOT Divisions. |
| Regional Impact | 30% | Projects on this level compete within regions made up of two NCDOT Divisions with funding based on population. Project scores are based 70% on data and 30% on rankings by MPOs and RPOs and the NCDOT Divisions. |
| Statewide Mobility | 40% | Projects in this category are of statewide significance and are based 100% on data. |

Bicycle and Pedestrian STI Prioritization Qualitative Scoring:

Local input points represent 50% of the scoring for bicycle and pedestrian projects. 25% of local input points are assigned by MPOs and RPOs, which are determined by municipal and county project priorities and public comment. The remaining 50% of the local input points are assigned by NCDOT Division Engineers.

NCDOT Criteria Measurements + Division Needs

| CRITERIA | MEASURE | DIVISION NEEDS (50%) |
|------------------------------|--|----------------------|
| Safety | (Number of crashes x 40%) + (Crash severity x 20%) + (Safety risk x 20%) + (Safety benefit x 20%) | 20% |
| Accessibility / Connectivity | Points of Interest pts + Connection pts + Route pts | 15% |
| Demand / Density | # of households and employees per square mile near project | 10% |
| Cost Effectiveness | (Safety + Accessibility / Connectivity + Demand / Density) / Cost to NCDOT | 5% |

Project Bundling:

Multiple bicycle and pedestrian projects can be bundled to better compete with other projects submitted in the Division Needs category. Bundled projects are allowed across various geographies and project types. Projects do not have to be contiguous or related, and projects can be within a single municipality or across multiple jurisdictions. Bundled projects must be under one project manager, which must be a TAP eligible entity.

<https://www.ncdot.gov/initiatives-policies/Transportation/stip/Pages/strategic-transportation-investments.aspx>

Incidental Bicycle + Pedestrian Facilities with Roadway Projects

The NCDOT Complete Streets Policy Update was adopted by the Board of Transportation in August 2019. This policy requires NCDOT to consider and incorporate multi-modal facilities in the design and improvement of all transportation projects in North Carolina. The adopted Comprehensive Transportation Plan (CTP) is considered the controlling plan for the identification of non-motorized facilities to be evaluated as part of a roadway project. The CTP may include and/ or reference locally adopted plans for public transportation, bicycle and pedestrian facilities, and greenways. Bicycle, pedestrian, and public transportation facilities that appear in the CTP directly or by reference will be included as part of the proposed roadway project, and NCDOT is responsible for the full cost of the project. Bicycle, pedestrian, and transit facilities incidental to a roadway project where a need has been identified through the project scoping process but not identified in an adopted plan may be included in the project. Inclusion of these incidental facilities requires the local jurisdiction to share the incremental cost of constructing the improvements based on population thresholds. Projects that have not completed environmental review prior to August 2019 are subject to the Complete Streets Policy.

<https://connect.ncdot.gov/projects/BikePed/Pages/Complete-Streets.aspx>



Statewide Projects Funds

Small Construction Funds: These funds were established in 1985 to fund small projects in and around cities and towns that could not be funded in the Statewide Transportation Improvement Program (STIP). Funds are allocated equally to each of 14 Transportation Divisions. Funds can be used on a variety of transportation projects for municipalities, counties, businesses, schools, and industries throughout the State. Funds projects up to \$250,000 per fiscal year, unless otherwise approved by the Secretary of Transportation. Right-of-way and utility relocations should be provided and accomplished at no cost to NCDOT. Funding requests should be submitted to the Division Engineer providing technical information such as location, improvements being requested, and project timeline.

Statewide Contingency Funds: These funds were created for statewide rural or small urban highway improvements and related transportation enhancements to public roads/ public facilities, industrial access roads, and spot safety projects. The President Pro Tempore of the Senate, the Speaker of the House, and the Secretary of Transportation sponsor project requests from this fund. \$12 million in funds are administered by the Secretary of Transportation. Requests can be submitted from municipalities, counties, businesses, schools, citizens, legislative members, and NCDOT staff. Request should include a clear description and justification of the project.

Economic Development Funds: These funds were created to expedite transportation projects that promote commercial growth as well as either job creation or job retention. \$2500 per job (new & retained) allowed unless waived by the Secretary of Transportation. Funds projects up to \$400,000 per fiscal year, unless otherwise approved by the Secretary of Transportation. New access roads must be approved by NCDOT and serve multiple property owners or government owned property; roads will become part of the State Highway System or serve as public roads maintained by a government agency.

High Impact / Low-Cost Funds: This program provides funds to complete low-cost projects with high impacts to the transportation system including intersection improvement projects, minor widening projects, and operational improvement projects. Funds are allocated equally to each of 14 Transportation Divisions. Each Division is responsible for selecting their own scoring criteria for determining projects funded in this program. At a minimum, Divisions must consider all the following in developing scoring formulas: (1) The average daily traffic volume of a roadway and whether the proposed project will generate additional traffic. (2) Any restrictions on a roadway. (3) Any safety issues with a roadway. (4) The condition of the lanes, shoulders, and pavement on a roadway. (5) The site distance and radius of any intersection on a roadway. Funds projects up to \$1.5 million per fiscal year, unless otherwise approved by the Secretary of Transportation. Projects are expected to be under contract within 12 months of funding approval by the Board of Transportation.

<https://connect.ncdot.gov/projects/planning/economic%20development/forms/allitems.aspx>

SPOT Safety Program

The Spot Safety Program is used to develop smaller improvement projects to address safety and potential safety and operational issues. The program is funded with state funds and currently receives approximately \$9 million per fiscal year. Other monetary sources (such as Small Construction or Contingency funds) can assist in funding Spot Safety projects, however, the maximum allowable contribution of Spot Safety funds per project is \$400,000. A Safety Oversight Committee (SOC) reviews and recommends Spot Safety projects to the Board of Transportation (BOT) for approval and funding. Criteria used by the SOC to select projects for recommendation to the BOT include, but are not limited to, the frequency of correctable crashes, severity of crashes, delay, congestion, number of signal warrants met, effect on pedestrians and schools, division and region priorities, and public interest.

<https://connect.ncdot.gov/resources/safety/pages/nc-highway-safety-program-and-projects.aspx>

State Planning + Research Funds (SPR)

The State Planning and Research Program funds States' statewide planning and research activities. This program funds metropolitan and statewide planning for future highway programs and local public transportation systems. The FAST Act expanded the statewide transportation planning process' scope of consideration to include projects, strategies, and services that will improve transportation system resiliency and reliability; reduce (or mitigate) the storm water impacts of surface transportation; and enhance travel and tourism. In 2017, NCDOT extended the use of SPR funds to Rural Planning Organizations (RPOs) by establishing an annual call for proposals to fund planning and research projects for rural communities. Since the program expansion, RPOs have used SPR funds for a range of transportation planning activities, including to develop greenway and trail feasibility studies. SPR funding requires a 20% local match. However, the local match is 5% for Tier 1 Counties with NCDOT contributing 15% of the local match and 10% for Tier 2 Counties with NCDOT contributing 10% of the local match. RPOs must administer the funds. Since 2017, RPOs have used SPR funds for a range of transportation planning activities, including to develop bicycle and pedestrian facility and trail feasibility studies.

<https://www.fhwa.dot.gov/fastact/factsheets/statewideplanningfs.cfm>

<https://connect.ncdot.gov/projects/planning/Pages/Transportation-Planning-Program-and-Services.aspx>

Safe Routes to School (Non-Infrastructure Transportation Alternatives Program)

NCDOT's Safe Routes to School (SRTS) Program was established in 2005 through SAFETEA-LU as a federally funded program to provide an opportunity for communities to improve conditions for bicycling and walking to school. The SRTS Program has set aside \$1,500,000 per year of Transportation Alternative Program (TAP) funds for non-infrastructure programs and activities over a three-year period. Funding requests may range from a yearly amount of \$50,000 to \$100,000 per project. Projects can be one to three years in length. Funding may be requested to support activities for community-wide, regional, or statewide programs.

<https://connect.ncdot.gov/projects/BikePed/Pages/Non-Infrastructure-Alternatives-Program.aspx>

Powell Bill Funds

The State Street Aid to Municipalities Program, also known as Powell Bill Funds, assists local governments with transportation system improvements. The Powell Bill requires municipalities to use the money primarily for street resurfacing, but it can also be used for the construction and maintenance of roads, bridges, drainage systems, sidewalks, and greenways.

Funding amounts for each municipality are based on a formula set by the N.C. General Assembly, with 75 percent of the funds based on population, and 25 percent based on the number of locally maintained street miles.

<https://connect.ncdot.gov/municipalities/State-Street-Aid/Pages/default.aspx>

North Carolina Department of Natural + Cultural Resources Parks + Recreation Trust Fund (PARTF)

PARTF provides dollar-for-dollar matching grants to local governments for parks and recreational projects to serve the public. PARTF is the primary source of funding to build and renovate facilities in the state parks as well as to buy land for new and existing parks.

<https://www.ncparks.gov/more-about-us/parks-recreation-trust-fund/parks-and-recreation-trust-fund>

North Carolina Land + Water Fund (NCLWF)



The NCLWF (formerly known as the Clean Water Management Trust Fund) was created in 1996 by the General Assembly to conserve North Carolina's streams, rivers, and open space. The NCLWF funds land acquisition, stream restoration, storm water, and planning projects that protect and conserve riparian buffers for the purpose of providing environmental protection for surface waters and urban drinking water supplies and establishing a network of riparian greenways for environmental, educational, and recreational uses. NCLWF also funds mini grants of up to \$25,000 for donated property or the value of the conservation donation to pay transaction costs associated with the donation of property in fee simple, or a permanent conservation agreement. NCLWF has one grant cycle per year. Applications are available in early December and close in February. Final award decisions are made in the fall.

<https://nclwf.nc.gov/apply>

North Carolina Department of Commerce Main Street Solutions Fund

The Main Street Solutions Fund supports small businesses in designated micropolitans located in Tier 2 and Tier 3 counties or designated North Carolina Main Street communities. The grants assist planning agencies and small businesses with efforts to revitalize downtowns by creating jobs, funding infrastructure improvements and rehabilitating buildings.

<https://www.commerce.nc.gov/grants-incentives/downtown-development-funds>

Rural Infrastructure Program

The Rural Economic Development Division provides grants and loans to local government units to support economic development activity that will lead to the creation of new, full-time jobs. The program gives priority to projects located in the 80 most distressed counties in the state; and resident companies as defined in N.C.G.S. 143B-472 (a) 4. The Rural Infrastructure Program funding is available for publicly owned infrastructure including water, sewer, electric, broadband, rail, and road improvements that will lead to the direct creation of new, full-time jobs. Eligible applicants are units of local government with priority given to the Tier 1 and Tier 2 counties. A cash match equivalent to at least 5% of the grant amount is required for all projects.

Eligible project activities include:

- › Construct public infrastructure improvements
- › Upgrade or repair of public drinking water or wastewater treatment plants
- › Upgrade, extensions, or repair of public water or sewer lines
- › Publicly owned natural gas lines (requires an executed Pipeline Construction, Operating and Resale Agreement)
- › Installation or extension of public broadband infrastructure
- › Construction of public rail spur improvements
- › Construction of publicly owned access roads not funded or owned by the Department of Transportation

<https://www.nccommerce.com/grants-incentives/public-infrastructure-funds/infrastructure-state-rural-grants>

North Carolina Neighborhood Revitalization Program

The NC Neighborhood Program offers non-entitlement municipalities and counties the opportunity to tailor a project to meet the community development needs specific and most critical to their locality, primarily for their low- and moderate-income residents. NC Neighborhood Program projects must incorporate at least one of the following three livability principles as an area of focus:

- › Promote equitable, affordable housing. Expand location and energy-efficient housing choices for people of all ages, incomes, races, and ethnicities to increase mobility and lower the combined cost of housing and transportation.
- › Support existing communities. Target federal funding toward existing communities - through strategies like transit-oriented, mixed-use development, and land recycling - to increase community revitalization and the efficiency of public works investments and safeguard rural landscapes.
- › Value communities and neighborhoods. Enhance the unique characteristics of all communities by investing in health, safe, and walkable neighborhoods - rural, urban, or suburban.

All municipalities are eligible to receive State CDBG funds except for entitlement communities, which receive funds directly from HUD. The maximum grant amount is \$750,000 per grantee with some restrictions for specific activities. There is no minimum grant amount, and the program does not have a matching fund requirement.

<https://www.nccommerce.com/grants-incentives/community-housing-grants#neighborhood-revitalization-federal-cdbg>

Local Funding

Bond

Wake County, City of Raleigh, City of Wilmington, Town of Chapel Hill, Town of Cornelius, and City of Greenville have all passed bonds to protect open space corridors and build greenway networks. Multi-use paths and greenways are also frequently included in municipal transportation bond packages. Successful bond campaigns require a well-defined plan with specific projects supported by the community. Bond campaigns should be well organized with a community's public affairs department and thoroughly coordinated across all internal departments. Public outreach during the campaign is essential to educate residents about the benefits of infrastructure investment and to understand which projects garner the highest community support.

In 2018, voters approved a \$120 million Parks, Greenways, Recreation and Open Space bond in Wake County. This funding was used to move forward with the Apex West Greenway and the Middle Creek Greenway in the Town of Apex.

Developer Built Trails/In-Lieu Fees

The Town of Cary built its first greenway 40 years ago and now has more than 80 miles of greenway trails. A significant portion of their network development has been the result of developer-built trails. The Town of Cary requires developers to set aside important open space providing trail connectivity, wildlife habitat corridors, and water quality protection. Per the Cary Land Use Ordinance, developers must dedicate land or make payment in-lieu of public park and/or greenway development to serve the recreational needs of residents. Land dedications for greenways are required for both residential and commercial development for those locations indicated in the Town's greenway master plan.

Impact Fees

Impact fees represent financial payments made to a local government by a developer to fund certain off-site capital improvements needed to accommodate future growth. Many communities impose impact fees for transportation, parks and recreation, and open space facility needs. The City of Durham imposes transportation impact fees to fund for a portion of the costs for new streets and sidewalks, paving, grading, resurfacing, and widening of existing streets, traffic control signals and markings, lighting, and crosswalks. The City's development fees for open space



and parks and recreation are used for the acquisition of park land and the provision of facilities, including athletic fields, parks, playgrounds, courts, recreation centers, shelters, stadiums, arenas, swimming pools, lighting, trail construction, and bike paths.

Capital Improvement Program (CIP)

A Capital Improvement Program (CIP) is one element in a municipality's long-term planning process. It is a bridge between the municipality's Comprehensive Plan and short-term planning for infrastructure and operations. A Capital Improvement Program analyzes major facility and equipment needs, establishes priorities, estimates fiscal resources, and schedules the development of funded projects. The City of Raleigh funds parks, greenways, and active transportation facilities through the city's Capital Improvement Program. The Parks, Recreation and Cultural Resources Department's CIP primary sources of funding come from Parks and Recreation Bonds, Facility Fees, General Fund (Tax Base), grants, and donations.

Municipal Service Districts (MSD)

Municipal Service Districts provide an equitable method for funding special improvements to public right-of-way areas because property owners share in the cost. The Town of Morrisville uses Municipal Service Districts in several neighborhoods to perform pavement, curb and gutter, and sidewalk enhancements and repairs on the public streets throughout neighborhoods in the MSD.

Public/Private Partnerships

The City of Greensboro is leading North Carolina in leveraging public-private partnerships to complete their Downtown Greenway Loop. Through the Action Greensboro Foundation, the project has raised over \$10 M in private funds by working with foundations and private givers. This money leverages over \$21 M in local and federal funds.

Private Funding

North Carolina Land Trust Conservancies

North Carolina land trusts partner with landowners and local communities to permanently protect natural resources with agricultural, cultural, recreational, ecological, and scenic value across the state. In Watauga County, the Blue Ridge Conservancy is leading the effort to develop the Middle Fork Greenway along the Middle Fork New River to connect Boone and Blowing Rock via trail. The Blue Ridge Conservancy has purchased property and easements along the Middle Fork New River to preserve the corridor and develop the greenway in partnership with Watauga County, the Town of Blowing Rock, and the Town of Boone. The conservancy is also leading planning, design, and construction of each phase of the greenway's development.

- › Provided below is a list of Land Trusts & Conservation Organizations in North Carolina:
- › Conservation Trust for North Carolina
- › Blue Ridge Conservancy
- › Carolina Mountain Land Conservancy
- › Catawba Lands Conservancy
- › Davidson Lands Conservancy
- › Eno River Association
- › Foothills Conservancy of North Carolina
- › Land Trust for Central North Carolina
- › Land Trust for the Little Tennessee
- › National Committee for the New River

- › NC Coastal Land Trust
- › Tar River Land Conservancy

<https://www.presnc.org/nc-land-trusts-conservation-organizations/>

North Carolina Community Foundation (NCCF)

The NCCF is the statewide community foundation serving North Carolina and sustains more than 1,200 endowments established to provide long-term support of a broad range of community needs, nonprofit organizations, institutions, and scholarships. The NCCF partners with a network of affiliate foundations to provide local resource allocation and community assistance across the state. NCCF's community grant-making programs are advised by its network of affiliate foundations. Each affiliate is advised by a local board who help to assemble resources through their unique knowledge and understanding of local needs and opportunities. Organizations must be qualified as tax-exempt public charities under Section 501(c) (3) of the Internal Revenue Code or be classified as a unit of local government or public school.

<https://www.nccommunityfoundation.org/apply/grants>

Golden Leaf Foundation

The Golden LEAF Foundation is a nonprofit organization established in 1999 to receive a portion of North Carolina's funding received from the 1998 Master Settlement Agreement with cigarette manufacturers. Golden LEAF works to increase economic opportunity in North Carolina's rural and tobacco-dependent communities through leadership in grantmaking, collaboration, innovation, and stewardship as an independent and perpetual foundation. Golden LEAF's grantmaking focuses on the following priorities: Job creation and economic investment; workforce preparedness; agriculture; and community competitiveness, capacity, and vitality. Golden LEAF has two standard programs open to eligible entities seeking grants: Open Grants Program and Economic Catalyst Program. These programs complement other ongoing initiatives of the Foundation, such as the Community-Based Grants Initiative.

Open Grants Program: The Open Grants Program is open to all governmental entities and 501(c)(3) organizations that propose projects in Golden LEAF's priority areas. This program funds economic development projects aligned with the Golden LEAF priority areas. Most awards will be for \$200,000 or less.

Economic Catalyst Program: The Economic Catalyst process is open to governmental entities and 501(c)(3) organizations with projects that will create jobs at risk without Golden LEAF funding. Grants include funds for public infrastructure, job training, upfit for buildings owned by governmental or nonprofit entities, or equipment acquisition where the building or equipment will be leased or sold at fair-market value to a company creating jobs. Grants are available only for projects that include a specific company's commitment to create full-time jobs in NC.

Community-Based Grants Initiative: Each year, the Golden LEAF Foundation invites organizations from counties from a different Prosperity Zone to participate in the Community-Based Grant Initiative (CBGI). The process is competitive, but organizations from all counties within the Prosperity Zone will have an opportunity to apply. The CBGI is designed to identify projects with the potential to have a significant impact. It is a focused process with grants targeted toward investments in the building blocks of economic growth. Funds are limited to projects that address economic development, agriculture, workforce preparedness, infrastructure, and capital costs necessary to create health care jobs. County managers serve a key role in the process. Each county manager will submit a slate of up to four projects for consideration. Applicants must be 501(c)(3) organizations or governmental entities (county and municipal governments, community colleges, universities, etc.) Funds do not have to be administered

or implemented by the county government. Awards are limited to no more than three projects per county and will total no more than \$1.5 million per county.

<https://www.goldenleaf.org/>

The Conservation Fund

The Conservation Fund works with public, private, and nonprofit partners to protect land and water resources through land acquisition, sustainable community and economic development, and leadership training. The City of Durham partnered with the Conservation Fund to assist with negotiations to purchase the Durham Belt Line rail corridor from Norfolk Southern to convert the rail line into an urban trail. In 2017 the Conservation Fund successfully purchased the property as the interim owner while the city secured the necessary funding. The property was transferred to the City of Durham in 2018, which allowed for the rail-trail's development.

<https://www.conservationfund.org/where-we-work/north-carolina>

Blue Cross Blue Shield of North Carolina Foundation

The Blue Cross Blue Shield of North Carolina Foundation funds a range of programs from targeted, mini grants to multi-year partnerships. Their grantmaking supports initiatives that focus on early childhood, healthy communities, healthy food, and oral health. The Foundation does not operate regular grant cycles. Instead, the Foundation invites applications based on specific strategic objectives or announces broader opportunities to apply for funding on a periodic basis.

<https://www.bcbsncfoundation.org/grants-programs/grantmaking-overview/>

National Association of Realtors Smart Growth and Place-making Grants

The National Association of Realtors (NAR) funds place-making and smart growth grants to make communities better places to live by transforming unused or underutilized sites into welcoming destinations accessible to everyone in a community.

Smart Growth Grants: Smart Growth Grants fund efforts to engage in local land-use, growth, and transportation policy issues with other stakeholders and elected officials. Eligible projects include Better Block events, place-making visioning processes, charettes, pop-up workshops, project mock-ups, developer open houses, public open houses, utility roundtables, Main Street analysis, walkable community workshops/audits, assistance with updating land use ordinances and codes and community plans, and hosting conferences and webinars. Applications can only be submitted by a state or local REALTOR® association, and grants provide up to \$5,000 per award.

Place-making Grants: Place-making Grants fund the creation of new, outdoor public spaces and destinations in a community. Funds can be used for amenities such as street furniture, paint, signage, materials, landscaping, murals, site preparation, and artist fees. Applications can only be submitted by a state or local REALTOR® association, and grants provide up to \$5,000 per award.

<https://realtorparty.realtor/community-outreach/>

AARP Community Challenge Grant

The AARP Community Challenge provides small grants to fund quick-action projects that can help communities become more livable for people of all ages. Applications are accepted for projects to improve public spaces, housing, transportation, civic engagement, coronavirus recovery, diversity, and inclusion, and more. Project types include those that provide permanent physical improvements in the community, temporary demonstrations that lead to long-term change, and innovative programming or services. The program is open to 501(C)(3), 501(C)(4) and 501(c)(6) nonprofits and government entities. Grants can range from several hundred dollars for smaller, short-term activities to several thousand or tens of thousands of dollars for larger projects.

<https://www.aarp.org/livable-communities/community-challenge/>



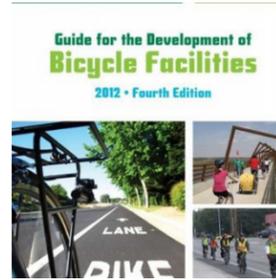
Figure 12.56- Middle Creek Greenway

APPENDIX B: GREENWAY DESIGN RESOURCES

Below are several design resources that can be used to inform greenway and side path design decisions. Organizations such as Federal Highway Administration (FHWA), American Association of State Highway and Transportation Officials (AASHTO), National Association of City Transportation Officials (NACTO), and North Carolina Department of Transportation (NCDOT) offer general guidelines and project-specific tools to help professionals make design decisions. These guidelines promote flexibility to ensure context-sensitive applications.

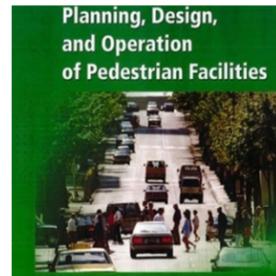
AASHTO Guide for the Development of Bicycle Facilities

The AASHTO Guide for the Development of Bicycle Facilities is the authoritative national standard for bikeway design. The document provides guidance to designers and planners by referencing a recommended range of design values and describing alternative design approaches. The guide provides information on how to accommodate bicycle travel and operations in most environments. Sufficient flexibility is permitted to encourage designs that are sensitive to local context and incorporate the needs of bicyclists, pedestrians, and motorists.



AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities

The AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities provides guidance for pedestrian facilities along streets and highways. The primary audiences for this manual are planners, roadway designers, and transportation engineers, whom make decisions on a daily basis that affect pedestrians. The guide focuses on identifying effective measures for accommodating pedestrians on public rights-of-way, and it recognizes the effect that land use planning and site design have on pedestrian mobility and addresses these topics as well.



Manual on Uniform Traffic Control Devices (MUTCD)

The Manual on Uniform Traffic Control Devices for Streets and Highways, or MUTCD defines the standards used by road managers nationwide to install and maintain traffic control devices on all public streets, highways, bike-ways, and private roads open to public travel. The MUTCD is published by the Federal Highway Administration (FHWA) and is a compilation of national standards for all traffic control devices, including road markings, roadway signs, and traffic signals.



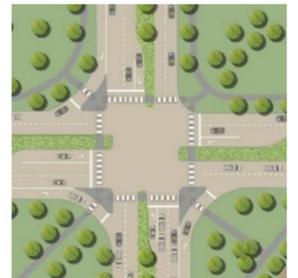
NCDOT Roadway Design Guide

The North Carolina Department of Transportation (NCDOT) Roadway Design Guide defines standards for roadways owned and maintained by NCDOT, including typical sections for roadways. Typical sections establish design elements that emphasize safety, mobility, complete streets, and accessibility for multiple modes of travel. Typical sections also provide guidelines for comprehensive transportation planning, project planning, and project design activities.



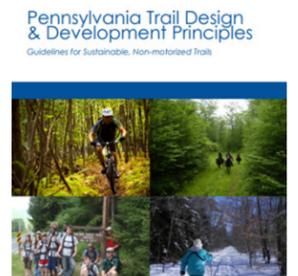
NCDOT Complete Streets Implementation Guidance

The North Carolina Department of Transportation (NCDOT) Complete Streets Implementation Guide is designed to assist NCDOT staff engineers, project managers and designers in implementing the Complete Streets Policy adopted by the Board of Transportation in August 2019. This document provides comprehensive guidance for incorporating a complete streets approach into NCDOT's planning, programming, design, and maintenance processes.



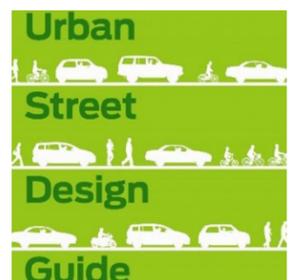
Pennsylvania Trail Design + Development Principles: Guideline for Sustainable, Non-Motorized Trails

This document compiles the best practices and guidelines for the planning, design, construction, and management of trails. Techniques are presented for developing trails that create desirable and enjoyable experiences for trail users. These techniques employ sustainable design elements and construction practices that allow the trail to make use of natural systems so that the trail remains both physically and environmentally sustainable.



NACTO Urban Streets Design Guide

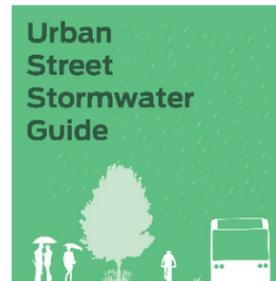
The Urban Street Design Guide charts the principles and practices of the nation's foremost engineers, planners, and designers working in cities today. A blueprint for designing 21st century streets, the guide unveils the toolbox, and the tactics cities use to make streets safer, more livable, and more economically vibrant. The Guide outlines both a clear vision for complete streets and a basic road map for how to bring them to fruition.





NACTO Urban Street Storm water Guide

The Urban Street Storm water Guide advances the discussion about how to design and construct sustainable streets. The guide provides cities with national best practices for sustainable storm water management in the public right-of-way, including core principles about the purpose of streets, strategies for building inter-departmental partnerships around sustainable infrastructure, technical design details for siting and building bioretention facilities, and a visual language for communicating the benefits of such projects. The guide sheds light on effective policy and programmatic approaches to starting and scaling up green infrastructure, provides insight on innovative street design strategies, and proposes a framework for measuring performance of streets comprehensively.



FHWA Achieving Multi-modal Networks: Applying Design Flexibility and Reducing Conflicts

This publication is resource for practitioners seeking to build multi-modal transportation networks. It highlights ways that planners and designers can apply the design flexibility found in current national design guidance to address common roadway design challenges and barriers. It focuses on reducing multi-modal conflicts and achieving connected networks so that walking and bicycling are safe, comfortable, and attractive options for people of all ages and abilities.



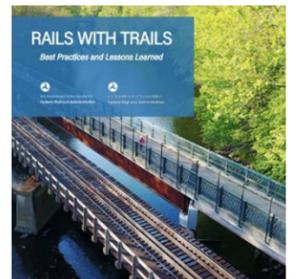
FHWA Small Town + Rural Multi-modal Networks

The Federal Highway Administration (FHWA) Small Town and Rural Multi-modal Networks applies existing national design guidelines in a rural setting and highlights small town and rural case studies. It addresses challenges that are specific to rural areas and focuses on opportunities to make improvements despite the geographic, fiscal, and other challenges that many rural communities face. It also includes several design concepts applicable to National Scenic and Historic Trails.



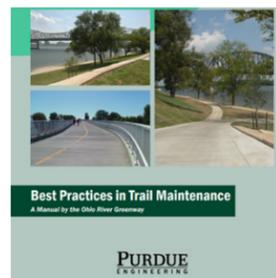
Rails to Trails Conservancy (RTC) Rails with Trails: Best Practices and Lessons Learned

This updated USDOT Rails-with-Trails: Lessons Learned report documents how the state of the practice, perspectives, and context for rails-with-trails have evolved since the first report in 2002 and includes updated effective practices. Best practices are based on extensive research into existing and planned rails-with-trails that involved interviews with railroad officials and trail managers; a literature review of previous rail-with-trail studies; a review of trail planning guidance documents; and input from various railroad and trail professionals.



Best Practices in Trail Maintenance: A Manual by the Ohio River Greenway

This manual is intended for practical use by trail maintenance managers. It will also be useful for policy makers who are tasked with anticipating and planning for maintenance budget and personnel needs. The recommendations included in this manual were chosen, in part, to facilitate widespread adoption by other trail operators. They are cost-effective solutions that require minimal technological or financial commitments. This manual also provides guidance for trail construction and design where a maintenance issue can best be resolved by constructing new trail segments.



ADA Standards for Accessible Design

This guide explains requirements in the current editions of the Americans with Disabilities Act (ADA) Standards issued by the Department of Justice (DOJ) and the Department of Transportation (DOT). It provides the scoping and technical requirements for new construction and alterations resulting from the adoption of revised 2010 Standards in the final rules for Title II and Title III.

