

Troutman Bicycle and Pedestrian Plan



April 2023



PREPARED FOR

PREPARED BY



Executive Summary

This executive summary provides a brief overview of the Troutman Bicycle and Pedestrian Plan and key recommendations.

About this Plan

The Town of Troutman Bicycle and Pedestrian Master Plan (“the Plan”) provides guidance for the Town, North Carolina Department of Transportation (NCDOT), Charlotte Regional Transportation Planning Organization (CRTPO) and other stakeholders in developing improvements to its bicycle and pedestrian infrastructure, programs, and policies. The Plan was developed through extensive public outreach, review of existing conditions, coordination with a dedicated Steering Committee, and consideration of the Town’s vision and goals for making Troutman a more walkable and bicycle-friendly place where safe bicycle and pedestrian infrastructure supports a great quality of life and small-town charm in a community close to Lake Norman recreational opportunities.

During the planning process, Troutman residents and stakeholders voiced their concerns and hopes for walking and bicycling throughout the Town and to other destinations in Iredell County. Barriers towards walking and bicycling more included:

- A lack of connected sidewalks and bicycle lanes were among the top noted barriers to more active transportation (28% of survey respondents indicated they were concerned about missing cycling and walking routes and facilities)
- Many sidewalks are outdated, typically 4-foot wide, and walking paths are sometimes obstructed with the presence of utility poles and other barriers
- There are no marked crosswalks across US 21 (Main Street) for a distance of about a mile through downtown Troutman, and several intersections in and around Downtown were perceived as unsafe
- There is a lack of on-road bicycle facilities including along US 21 (Main Street) and bicyclists will sometimes ride in the road with share the road conditions but the traffic volumes and speeds make it unsafe and uncomfortable for most users
- Richardson Greenway serves as a primary off-road (multi-use path) facility in Troutman; the multi-use path section stops at Old Murdock Road and does not currently continue further to the south; a rail-trail section that exists between Old Murdock Road and Rumble Street was not built wide enough for bicycling

This Plan recognizes the benefits of implementing infrastructure, policies, and programs to support bicycling and walking. These benefits include:

- Improving bicycle and pedestrian safety
- Supporting improved economic development opportunities
- Promoting physical activity to reduce the likelihood of chronic diseases
- Increasing the share of people who walk and bike to work as well as for other shorter everyday trips

Priority Recommendations (Top 7 Projects)

The Plan identified a total of 78 projects to improve walking and bicycling in Troutman. These projects were created through a process that began with identifying the Town’s goals, then mapping priority and secondary networks, and creating projects to match the Town’s mobility and safety needs. Finally, all projects were ranked according to criteria developed with the Town that prioritized funding eligibility, safety, and connectivity to the Town’s key destinations, among other factors. The Top 7 projects are shown in the figure below.

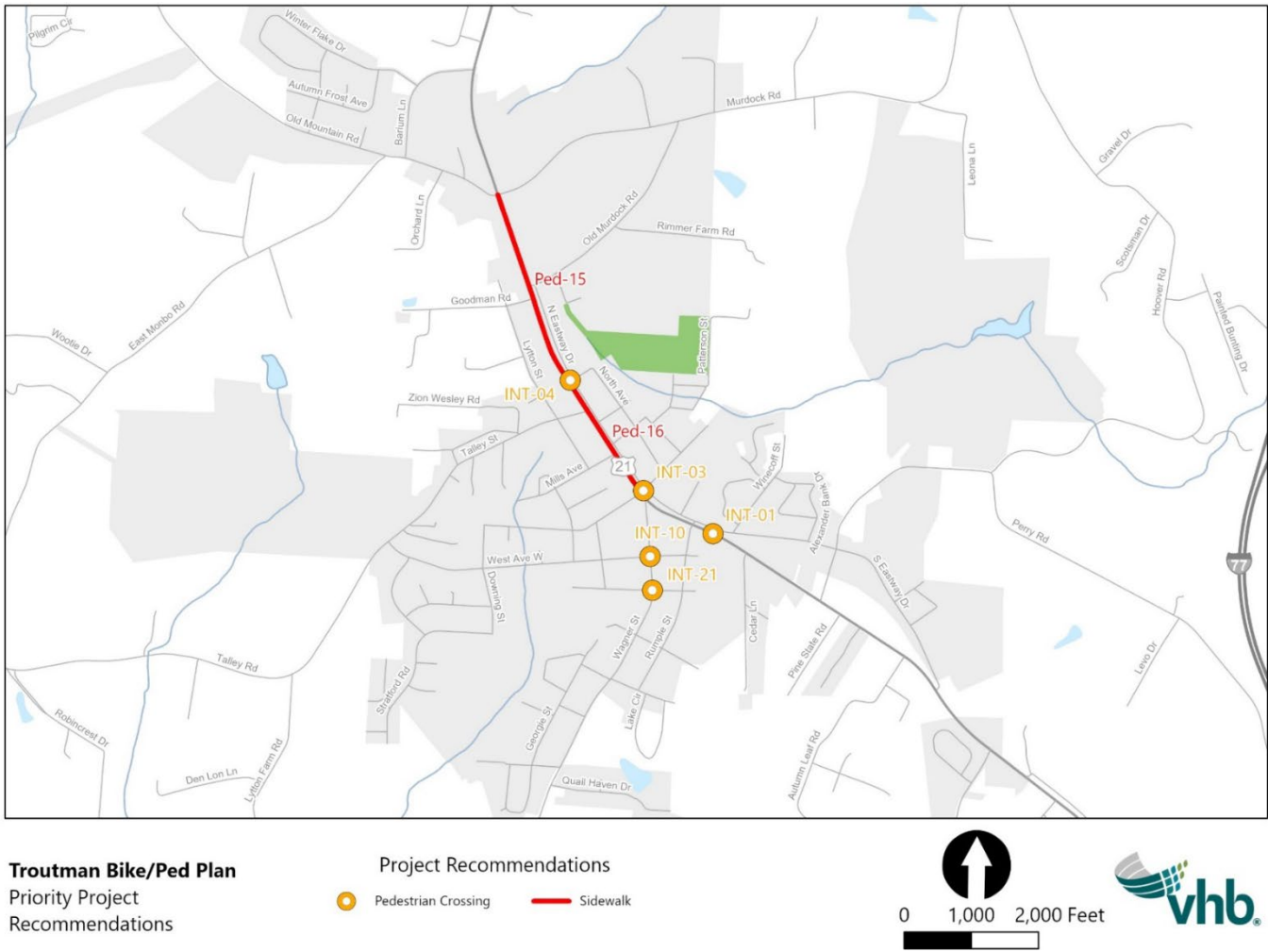


Figure I-1 Troutman Bicycle and Pedestrian Plan Priority Project Recommendations

The top seven projects support the Town of Troutman active transportation needs. There are intersection safety projects along the Town’s Main Street corridor (US 21) and on connecting streets as well as sidewalk projects along Main Street. Together, these projects will expand on the existing spine of active transportation facilities (Richardson Greenway and the downtown sidewalk network) and will support Troutman as a safer, and more enjoyable and vibrant place to walk and bike.

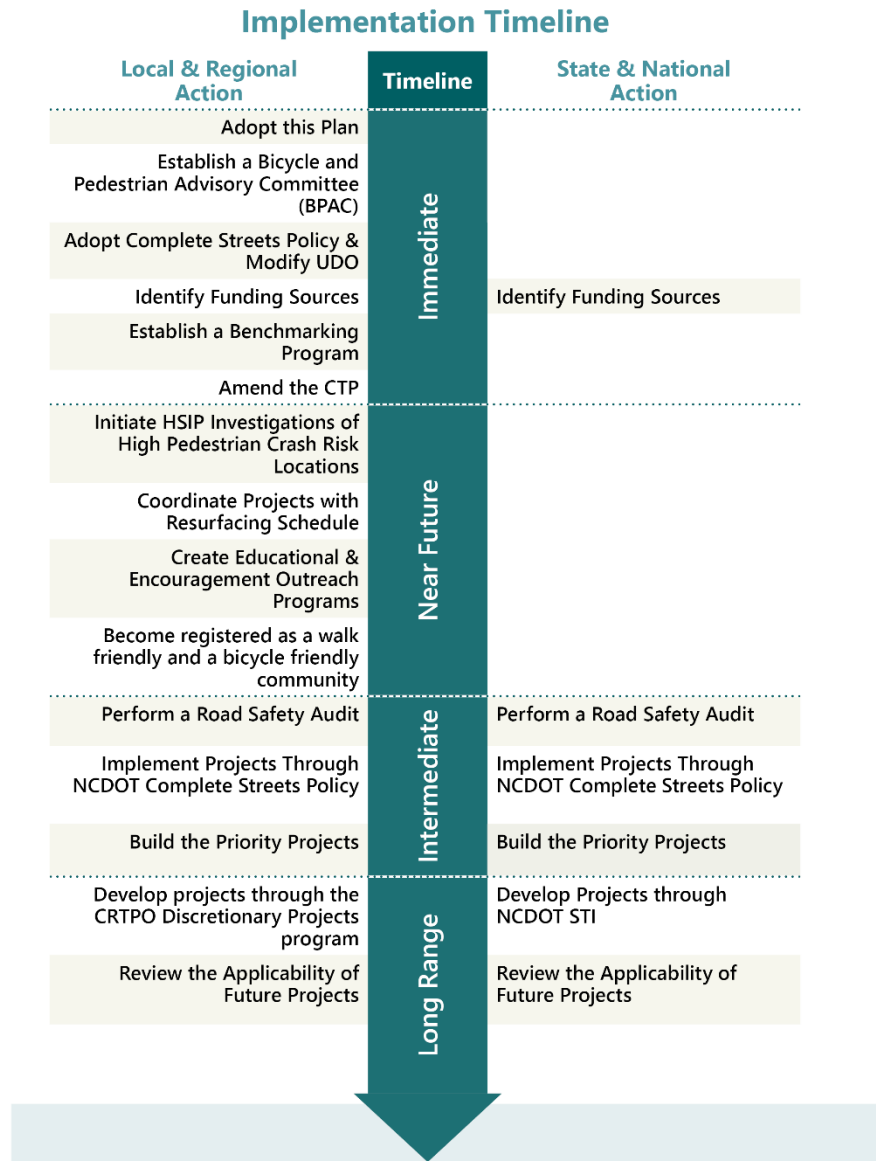
Criteria, rankings, and estimated planning-level costs are included in Section 3.3 of the Plan. Six of the top 25 projects were selected as Pilot Projects based on their impact and to illustrate a variety of improvements feasible.

These Pilot Projects feature illustrations and additional details on implementation, and they are shown in Section 3.5.

Implementation

Successful implementation of the Plan will require the cooperation of several agencies and organizations. These include the local and regional partners like the town of Troutman, Iredell County, and the Charlotte Regional Transportation Planning Organization, as well as state and federal support from NCDOT Division 12, the NCDOT Division of Integrated Mobility, and the FHWA (Federal Highway Administration).

Not all of the Plan’s recommendations are expected to be implemented simultaneously. There are certain steps, such as adoption of the plan, that should occur before projects are constructed or new educational programs are conducted. These recommended implementation steps, their champions, frequencies, and other supporting details are identified in Section 5, Implementation.



Acknowledgments

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The project team would like to thank the following Steering Committee members for providing guidance throughout the planning process:

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1. Introduction

This chapter reviews the background and the purpose for the Troutman Bicycle and Pedestrian Plan update. The plan vision and goals are reviewed. And the plan approach and process is described.

1.1 Project Background

In 2021, NCDOT awarded the Town of Troutman a grant from its Multimodal Planning Grant Program (MMPG). Established in 2004, the grant program encourages local communities to develop comprehensive bicycle and pedestrian plans. The program is open to all municipalities as well as counties below a certain threshold in North Carolina. NCDOT's Division of Integrated Mobility administers the program, and it has allocated approximately \$7.5 million to 238 municipalities and 6 counties through this grant program as of March of 2022. This plan is intended to provide a framework for identifying bicycle and pedestrian needs, both in terms of physical infrastructure and encouragement programs. The opportunities and challenges identified in this plan will match the content standards set by NCDOT's Division of Integrated Mobility. The project recommendations outlined in this document will be eligible for inclusion in local Comprehensive Transportation Plans (CTP) and project prioritization.

1.2 Project Vision and Goals

The Study Steering Committee provided feedback to help develop a vision and goals for the bicycle and pedestrian plan. The Steering Committee utilized the Troutman Pedestrian Plan (2008) as the basis for developing the updated Plan's vision, goals, and objectives. The Vision Statement for Troutman Bicycle and Pedestrian Plan is as follows:

The Town of Troutman will be a vibrant, welcoming community where safe walking and bicycling paths connect neighborhoods to the downtown center, Lake Norman, and other key activities and destinations and allow for healthy recreation, mobility, and accessibility for people of all ages and abilities.

As part of the project vision, a set of six goals were created for the Plan. These goals directly relate to the Plan's vision and seek to set up comparative measures of the success of the Plan. These goals include:

- **Safety:** prioritize safe transportation for vulnerable road users
- **Mobility and Accessibility** for all to be able to walk and bicycle
- **Outdoor Recreation and Health**
- **Connectivity** to destinations and to the larger regional networks
- **Equitable Access** for all in the community
- **Economic Development:** support local businesses and bicycle tourism.

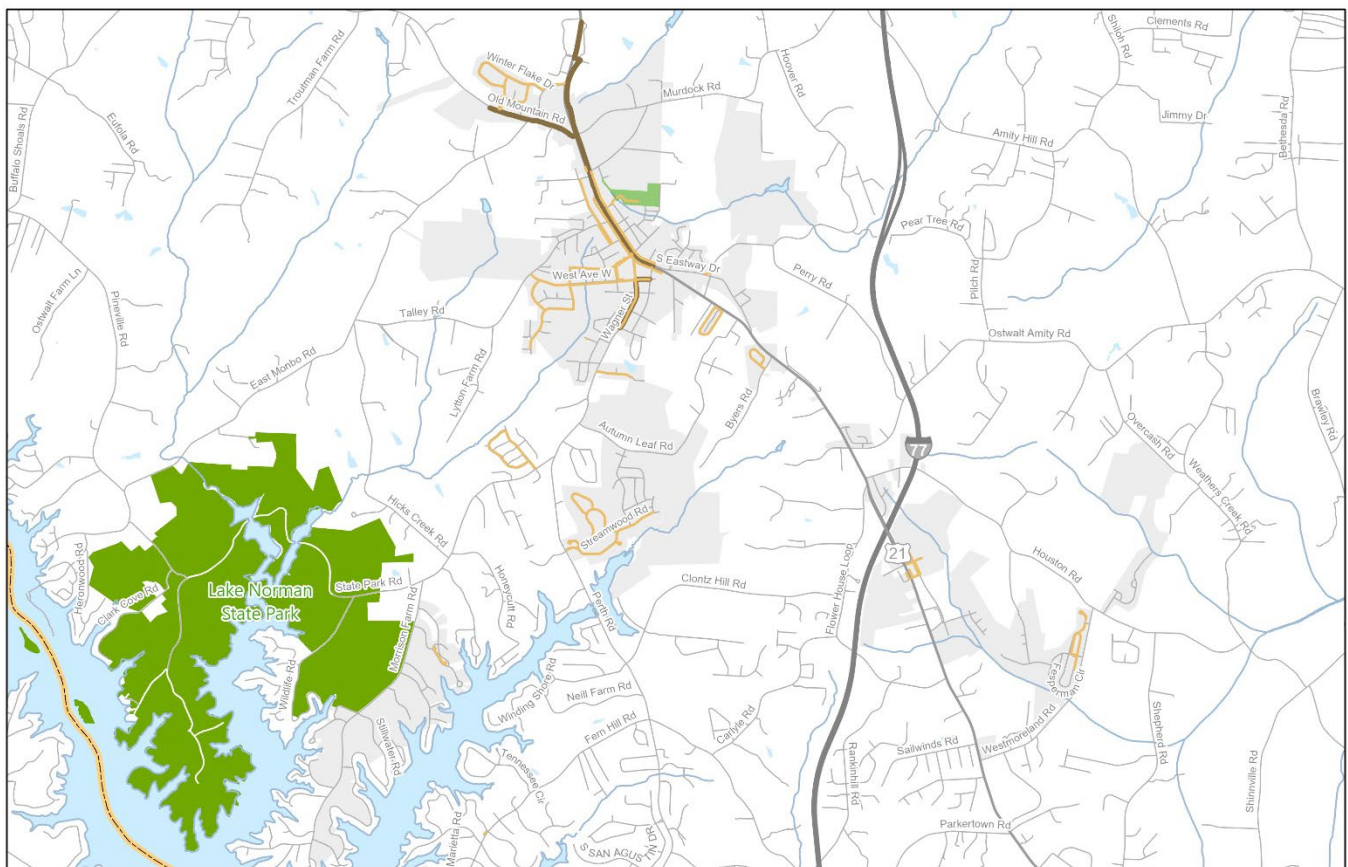
To make the goals quantifiable objectives for each goal were established. These objectives will help the Town measure its progress towards accomplishing each goal and the overall vision of the plan. These objectives include:

- **Safety:** Prioritize safe transportation for vulnerable road users
 - Decrease the average number of pedestrian and bicycle crashes resulting in injuries
 - Address unsafe crossing locations
- **Mobility and Accessibility** for all to be able to walk and bicycle
 - Increase the number of miles of sidewalks, bicycle lanes, and greenways
 - Prioritize upgrading sidewalks and curb ramps to ADA standards near key community destinations
- **Outdoor Recreation and Health**
 - Support bicycle and pedestrian improvements that connect to gyms, parks, and Lake Norman State Park
 - Implement greenways for people to be able to walk, bike, and run
- **Connectivity** to destinations and to the larger regional networks
 - Prioritize bicycle and pedestrian improvements in downtown and near schools and work destinations, as well as short greenway links between neighborhoods
 - Prioritize connections to the Carolina Thread Trail and state and regional bicycle routes
 - Encourage commuting (to work/school) by active transportation modes
- **Economic Development:** support local businesses and bicycle tourism
 - Support sidewalk and greenway improvements in proximity to commercial activity centers
 - Enhance wayfinding and signage for pedestrian and bicycle routes
- **Equitable Access** for all in the community
 - Ensure equitable access to bicycle and pedestrian improvements for transportation disadvantaged populations

1.3 Why this Plan is Important

1.3.1 Accessibility

Improving accessibility to local destinations by foot or wheel and reducing the dependence of many residents on a motor vehicle is a top priority. To do this, many higher-trafficked corridors will need dedicated pedestrian and/or cyclist facilities installed along the roadside or along parallel routes, and safety countermeasures will need to be installed for safe crossing locations. These will be especially important along US-21 /NC-115 (Main Street) between Cedar Lane and Grannis Lane, Wagner Street between US-21 / NC-115 (Main Street) and Thomas Street, and Main St (US-21 / NC-115) at Winecoff Street, Talley Street, Scroggs Street, and Murdock Road. A detailed map of existing bicycle and pedestrian facilities can be found in Figure 1.



Troutman Bike/Ped Plan
 Existing Facilities
 Shared Use Path
 Sidewalk

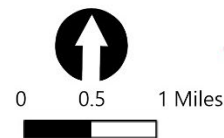


Figure 1: Existing Facilities

1.3.2 Safety

From a national perspective, pedestrian and bicycle fatalities have increased both in number of fatalities and proportion of all traffic fatalities in recent years. Pedestrian and bicyclist fatalities in the United States rose by 35 and 9 percent, respectively, from 2008 to 2017, even though total traffic fatalities declined nearly 1 percent during the same time period.¹ According to the Pedestrian and Bicycle Information Center (PBIC), 5,977 pedestrians and 783 bicyclists were killed in collisions with motor vehicles in the United States in 2017. These trends underscore the need for safety improvements to protect these vulnerable users through active safety-focused planning and programming.

Roadways that lack sidewalks force pedestrians to walk with vehicular traffic, leading to potentially unsafe conditions. Likewise, the absence of adequate crossing facilities along certain corridors within Troutman may force pedestrians to cross at unsafe intersections or mid-block locations. Bicycle and pedestrian facilities will provide easier and safer access to elderly, non-driving, and low-income residents in Troutman. Section 2.1.4 presents crashes within the Town of Troutman between 2010 and 2019.

According to Walk Bike NC, North Carolina's comprehensive plan for walking and bicycling (2012), investments in infrastructure can significantly improve pedestrian safety. The Statewide Ped/Bike Plan cites a 2008 Federal Highway Administration publication that suggests sidewalk installation results in a 65- to 89-percent reduction in pedestrian crashes.² The safety benefits reported not only include collisions with motor vehicles, but other types of injuries as well. Many injuries sustained by pedestrians and bicyclists do not involve a motor vehicle³; sufficient infrastructure and routine maintenance help reduce many incidents of tripping or falling.

1.3.3 Public Health

Choosing to walk or cycle for short trips to and from schools, local parks, restaurants, retail stores, or even work is one of the best ways to lead a healthier lifestyle. The Centers for Disease Control and Prevention (CDC) recommends 150 minutes of moderate physical activity per week. Infrastructure and encouragement programs can directly support this physical activity goal.⁴ Additionally, a 2010 study found that communities were more likely to achieve that activity goal and have lower incidences of diabetes and obesity if they tended to commute to work by bicycle or on foot.⁵

By connecting residences with desired destinations, residents feel empowered to walk and bike to complete daily activities for recreation. Social interactions between neighbors are another benefit of being more physically active. Steering Committee members discussed the importance of connecting destinations within Town to county-wide recreational opportunities. This not only contributes to a stronger sense of place, but it also instills civic pride and reinforces the perception that Troutman is a wonderfully unique place to live and work.

¹ <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813079>

² <https://www.safety.fhwa.dot.gov/countermeasures>

³ http://www.pedbikeinfo.org/data/factsheet_crash.cfm

⁴ <https://www.cdc.gov/physicalactivity/basics/adults/>

⁵ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2937005/>

1.3.4 Economic Impacts

Walkability and bikeability can have a positive economic benefit to the local community through indirectly increasing property values, job creation, economic development, and tourism. The Town emphasized the importance of revitalization and reinvestment in its community through its Bicycle and Pedestrian Planning Grant application. A 2018 study by NCDOT found that every \$1.00 of shared-use path construction supports \$1.72 annually from local business revenue, sales tax revenue, and benefits related to health and transportation.⁶ Additionally, WalkBikeNC suggested that a one-time public investment of \$6.7 million in paths and paved shoulders along the Outer Banks has returned \$60 million in annual revenue from tourism and supported 1,400 jobs.⁷ The Ecusta rails-to-trails project in Henderson County, North Carolina was estimated to potentially generate \$50 million in total benefit for the local community based on a \$13.4 million project cost.⁸

Investing in active transportation may also have indirect economic benefits of lowering health care costs, improving safety, and reducing congestion or improving commute times. These benefits stem from lower incidents of chronic disease, reduced injuries from crashes, and fewer vehicle miles driven.⁹ For instance, the American Heart Association estimated that every \$1 spent on building bicycle and pedestrian trails could yield \$3 in savings on medical costs.¹⁰ Additionally, the installation and maintenance of bicycle and pedestrian facilities in low-income areas will both increase access to jobs and services for these residents and provide additional revenues for Troutman's local merchants and economy. While these are not the most visible results of encouraging active transportation, they are essential in achieving the goal of making Troutman a more livable community for residents.

1.3.5 Environmental Benefits

Choosing an active transportation option rather than using a traditional vehicle—called mode shift—will reduce vehicular traffic along roadways and shift capacity to sidewalks or bicycle lanes. This moves toward a more efficient use of space in the transportation system. In addition to reduced roadway demand, this shift towards alternative transportation also reduces parking demand. Provision of parking is particularly important for downtowns and environmentally-sensitive areas where impervious surfaces generate the need to manage stormwater runoff. Travel mode shifts also indirectly improve air quality and reduce greenhouse gas emissions. According to the EPA, transportation accounts for roughly a quarter of all greenhouse gas emissions in the United States.¹¹ By allowing for walking or biking for short trips or trip-chaining with public transportation instead of driving, walkable communities can help reduce the number of vehicular miles traveled, and, consequently, vehicular emissions.¹²

⁶ <https://itre.ncsu.edu/focus/bike-ped/SUP-Economic-Impacts/>

⁷ https://issuu.com/walkbike/docs/walkbikenc_fullplan/141

⁸ <http://www.hendersonvillenc.gov/ecusta-rail-trail-planning-study-economic-impact-analysis>

⁹ <https://www.ncdot.gov/bikeped/walkbikenc/pictures/EconomyImpact-Analysis.pdf>

¹⁰ http://www.heart.org/idc/groups/heart-public/@wcm/@adv/documents/downloadable/m_ucm_301674.pdf

¹¹ <http://www.epa.gov/ghgemissions/us-greenhouse-gas-inventory-report-1990-2014>

¹² Gotchi, T. & Mills, K. (2008). Active transportation for America. Rails-to-Trails Conservancy.

1.4 Plan Components

This Plan assists the Town of Troutman with moving from planning into implementation phase. The Plan is composed of the following sections:

- Section 1 establishes a clear purpose
- Section 2 reviews current conditions
- Section 3 identifies facility recommendations
- Section 4 documents policy and program recommendations, and
- Section 5 outlines a plan for implementation

Appendices include a summary of facility types and guidelines, potential funding sources, proposed infrastructure projects, and public comments received by the project team.

1.5 Plan Process

1.5.1 Data Collection, Analysis, and Documentation

Using data collected from previous related projects, available GIS data, and historic and recent crash data, the project team documented existing conditions and prepared a series of maps. This assessment also included field investigations to confirm physical conditions, photo-document the project area, and observe pedestrian, bicyclist, and automobile behavior. The project team presented the existing conditions mapping, as well as preliminary findings and observations, to the Steering Committee and during the public event in October 2021.

1.5.2 Plan Development and Public Involvement

The planning process began with a virtual Kickoff Meeting with the Town staff and NCDOT IMD staff on July 8, 2021. Project team members reviewed the study schedule, key tasks, expectations, and immediate next steps.

The Steering Committee first meeting took place on August 6, 2021 at the Troutman Fire Department. The Steering Committee members were asked to share feedback regarding the vision for the plan and what their goals for the plan were. In addition, a mapping exercise took place to document known opportunities to improve active transportation connections in Troutman and to identify problematic locations and safety concerns. During the second Steering Committee meeting on October 21, 2021, the results of field site visits were shared with the Committee and the goals and objectives for the Plan were further developed and refined.



First Steering Committee Meeting

Improving networks for both new residents and residents who need access, community engagement, and improved bicyclist and pedestrian safety were identified as essential to the success of this initiative.

The third meeting of the Steering Committee in late January 2022 focused on reviewing and updating a list of draft facility improvement recommendations prior to project scoring. Project scoring approach was reviewed and refined.

In addition to the Steering Committee meetings, there were two public events held in October 2021 and March 20, 2022. At these events, the project team gathered observations of existing conditions and engaged the public to identify potential opportunities and obstacles within the City.

At the October 2021 meeting, the project team presented on existing conditions, pedestrian and bicyclist safety, and potential facility types. Attendees were encouraged to provide feedback via an online survey.



Field Visit in September 2021 with Participation from Several Steering Committee Members

At the March 20, 2022 meeting, the project team presented results of the public outreach, a draft network plan, and non-infrastructure recommendations at the Sprint into Spring 5k race at town hall. The event had 160 participants signed up for the race, of which the project team interacted with 28 members of the public. Public feedback on the draft set of recommended projects was positive, with excitement around the proposed network of multi-use paths.



In-Person Public Engagement during Sprint into Spring Race Event, March 20, 2022

A final Steering Committee meeting was conducted on July 14, 2022. Steering Committee members reviewed the priority network, project recommendations, and implementation strategies. The completed plan was presented to the Town Council for adoption on April 13, 2023.

The appendices C and D provide summary documentation of the public comments and themes.

2. Current Conditions

A comprehensive Bicycle and Pedestrian Master Plan builds upon and enhances the existing network of sidewalks, paths, and roadway crossing infrastructure. An important first step is to accurately document the current conditions as a benchmark moving forward.

2.1 Local Context

The Town of Troutman is a community with nearly 3,800 residents, and is located in south-central Iredell County, seven miles south of Statesville, North Carolina and 30 miles north of Charlotte. The Town is served by US 21 / NC 115 that serves as its Main Street and connects the Town to I-77 to the south and Statesville to the north.

There are a wide variety of natural resources and attractions that make Troutman a great place for families, active adults and seniors. The community has one park, Troutman ESC Park that features two baseball fields, a playground, and dog park. The nearby Lake Norman State Park provides an excellent recreational opportunity with hiking and mountain bike trails, beach access, and boat slips. Among the local attractions, Daveste Vineyards is a vineyard, winery and private event venue on sixty acres located between downtown Troutman and Lake Norman State Park.

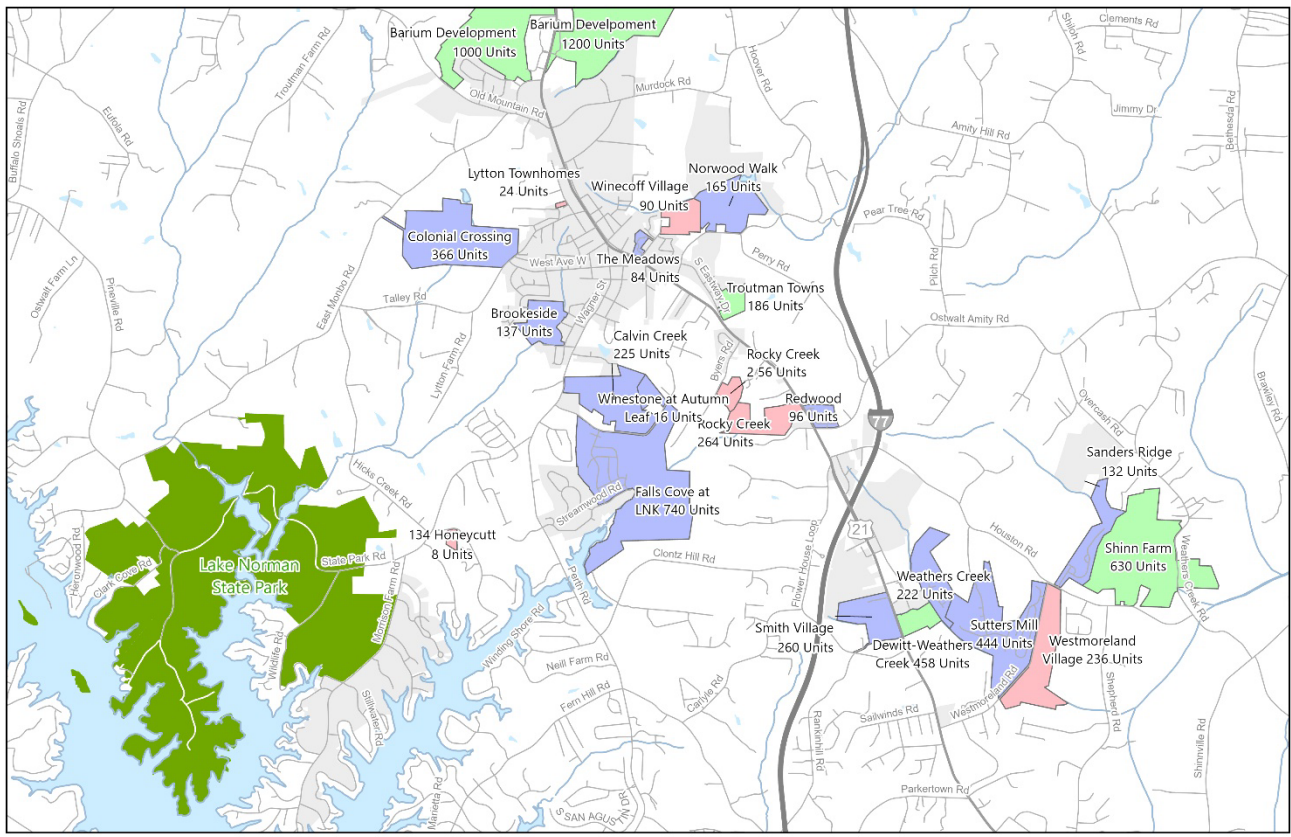
As the Charlotte region continues to grow, Troutman is facing increased development pressure. As reflected in Figure 2 and Figure 3 below, there are several major residential developments in Troutman that are expected to occur over the next few years.



Troutman ESC Park



Lake Norman Serves as a Recreational Amenity for Troutman Residents and Visitors



Troutman Bike/Ped Plan
Residential Developments

Residential Development Status

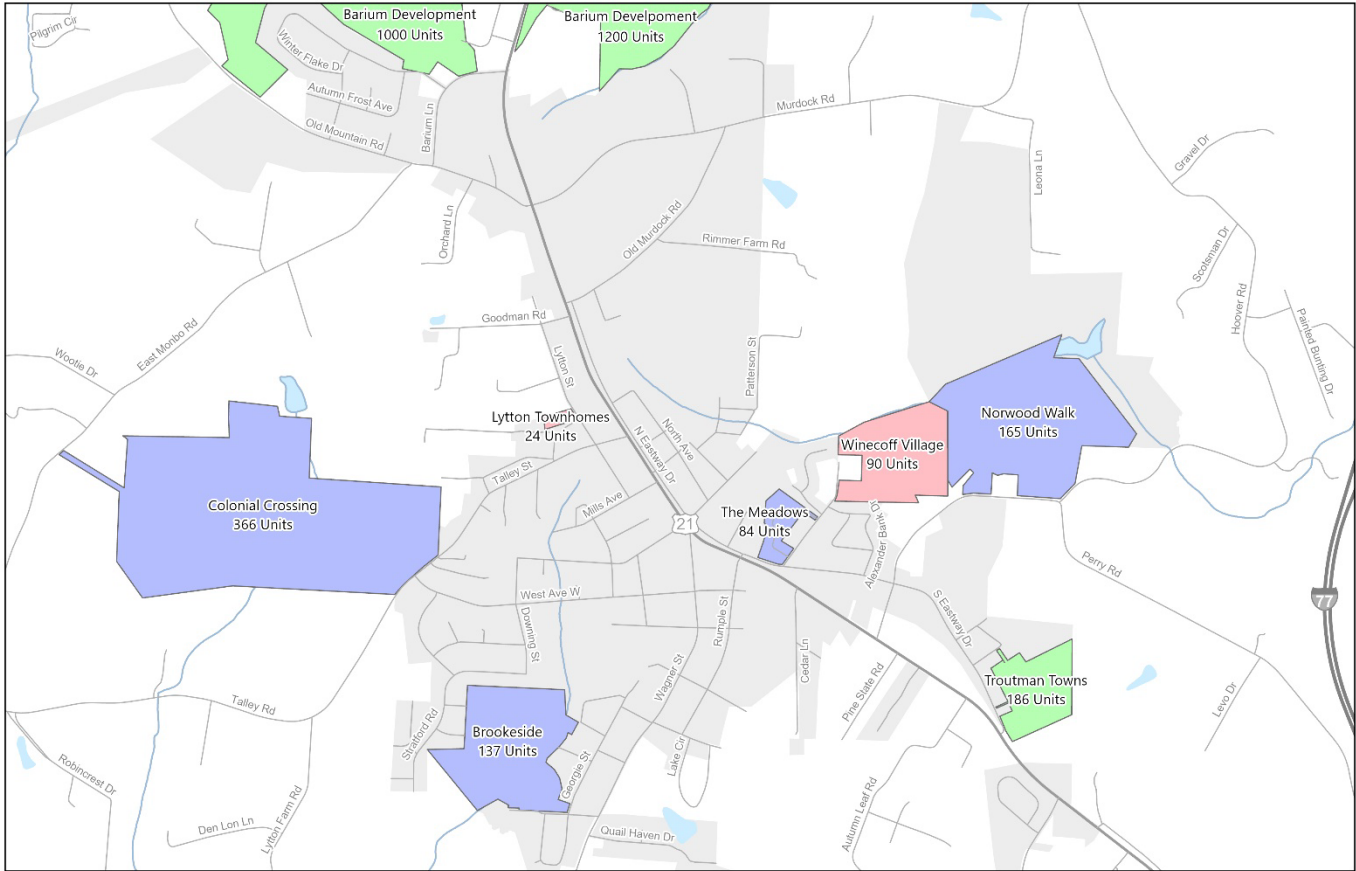
- Approved
- Proposed
- Under Construction



0 0.5 1 Miles



Figure 2 - Troutman Downtown Residential Development



Troutman Bike/Ped Plan
Residential Developments

Residential Development Status

- Approved
- Proposed
- Under Construction

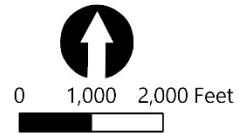


Figure 3 - Troutman Residential Developments, Downtown Focus

2.1.1 Demographics and Mode Share

Since local travel and commuting data were not available, the US Census Bureau’s American Community Survey (ACS) (Table 1) dataset was utilized to review the commute patterns. This dataset is a rolling five-year average. Indicating that the latest year in the five-year window would only account for 20 percent of the data.

Table 1 - Demographics Comparison

Location	Total Population	Median Household Income (\$)	Median Age	Zero Vehicle Households	% Zero Vehicle Households	% Bike to Work	% Walk to Work
Troutman	3,698	\$56,968	35.7	20	2%	0%	1.3%
Mooreville	50,193	\$69,188	35.2	631	4%	0%	0.5%
Statesville	28,419	\$39,987	38.8	689	6%	0.1%	0.9%
Iredell County	186,693	\$60,955	40.6	2298	3%	0.1%	0.7%
North Carolina	10,439,388	\$26,482	38.4	240,158	6.30%	0.1%	0.8%

**Based on the U.S. Survey Data (Total Population column) and 2019 ACS 5-year estimates (other columns. The ACS uses sample data to estimate these figures.*

The median age of Troutman residents (35.7) is below the state average (38.4), but similar to some of its peer communities. According to the 2019 ACS 5-year estimates, an estimated 1.3% percent of Troutman residents walk or bike to work, which is higher than the State average, indicates the need for a system that supports the daily needs of the residents without access to a vehicle as well as those who already walk to work.

2.1.2 Opportunities

Troutman has a small town feel and a community of this size naturally allows for co-location of many destinations in close proximity. On the other hand, Troutman lacks a well-connected street network that would allow people to efficiently walk or cycle to their destinations outside of downtown core. Many commercial businesses in Troutman are located along US 21 (Main Street) corridor in downtown Troutman, and along some of the connecting streets such as Wagner Street. Downtown Troutman provides opportunities for the Town residents and visitors to access a variety of key destinations. Key community destinations and attractions identified in Troutman with public and stakeholder feedback include the following:

- Downtown area
- Parks (ESC Park and Zootastic Park)
- Grocery stores and pharmacies (Food Lion, Dollar General, Dollar Tree, and Walgreens)
- Troutman Elementary and Middle School
- Iredell Charter Academy
- Children’s Hope Alliance Barium Springs Campus
- Public Library
- Iredell County Fairgrounds
- Iredell County Recreation Center
- Town Hall
- Iredell Career Academy & Technical School (CATS)
- Daveste Vineyards on Lytton Farm Road
- Lake Norman State Park



Restaurants and commercial establishments in Troutman are largely concentrated along US 21 (Main Street) and along connecting streets such as Wagner Street. An additional major node of commercial development exists at Lowe's Commercial Center near I-77 Exit 42.

2.1.3 Existing Bicycle and Pedestrian Network

The Town of Troutman provides an opportunity for short walking and bicycling trips to a variety of destinations clustered in downtown. Lake Norman State Park serves as a major recreation draw, both for water access and for people coming to use the mountain biking trails. Some of the challenges to walking and bicycling include a lack of roadway network connectivity outside of downtown core, a lack of dedicated on-road bicycle facilities (Richardson Greenway serves as the shared use path spine through Troutman), and a lack of safe crossings in downtown Troutman across US 21 (Main Street) between Wagner Street to the south and Old Mountain Road to the north, which is a span almost a mile in length. With the Town's Main Street also serving as a major highway (US 21), freight traffic and general through traffic routed through town can be an impediment to safe bicycling and walking experience in downtown Troutman. As an additional challenge, I-77 corridor serves as a barrier cutting off the growing development cluster around Lowe's shopping center at I-77 exit 42, southeast of downtown. Connecting both Lake Norman State Park and the growing node around Lowe's to the downtown with safe bicycling and walking facilities is a long-term goal that the Town can achieve through working with stakeholder agencies and pursuing both stand-alone bicycle and pedestrian improvement projects and incremental improvements as part of roadway improvements and redevelopment.

Recently, the Town has been successful in securing several discretionary project grants through the CRTPO in order to implement the following sidewalk and multi-use path improvements:

- EB-5930 Upgrade Sidewalk on both sides on Wagner St from West Ave to US 21 / NC 115 and add pedestrian scale lighting
- EB-5931 Add sidewalks on Talley Rd from US-21 / NC-115 to West Ave and add pedestrian scale lighting
- EB-5932 Extend Richardson Greenway from Ruple St to Byers Rd

- EB-5933 Add sidewalks to Rumble St from US-21 / NC-115 to E Thomas St and add pedestrian scale lighting

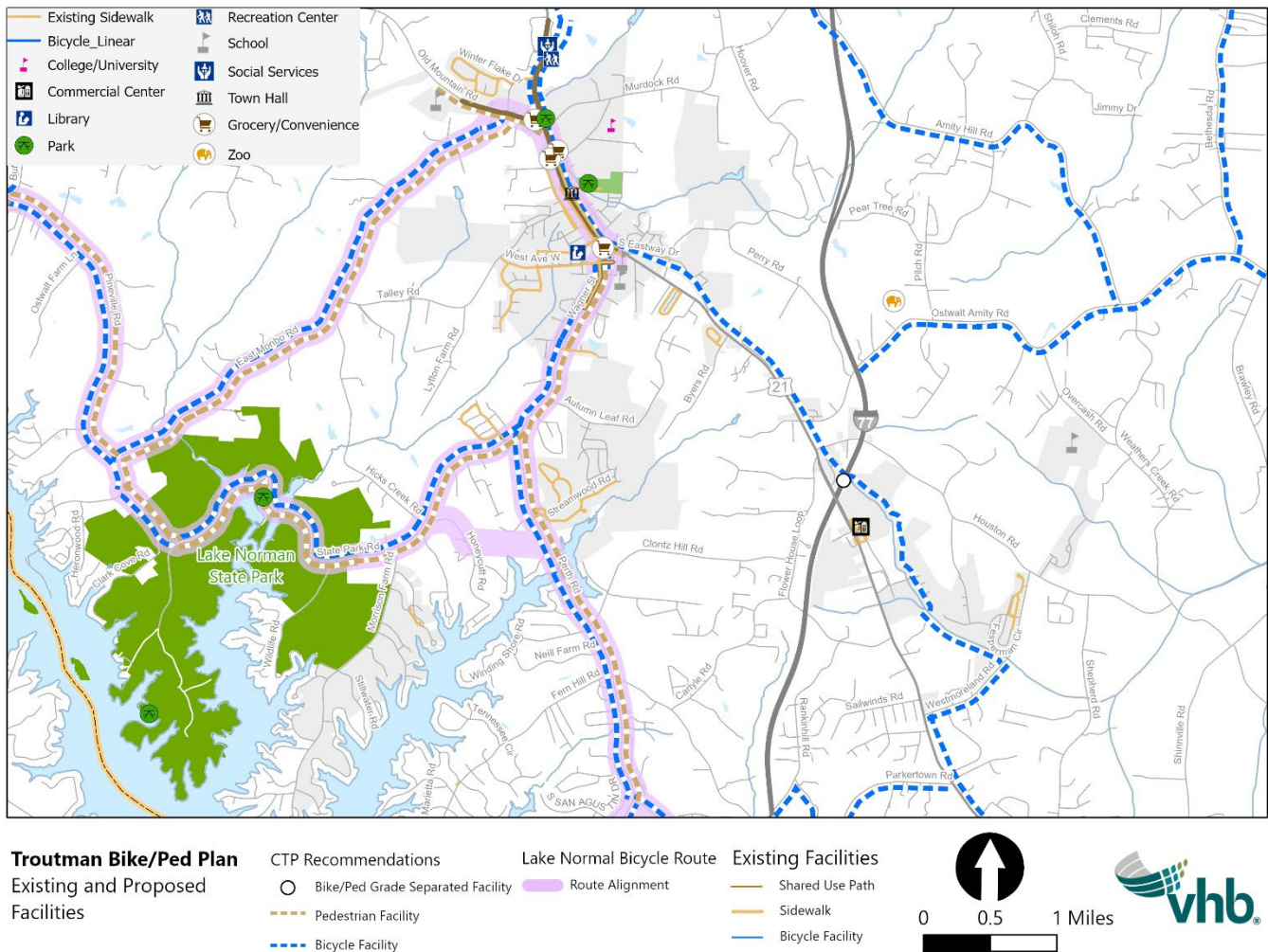


Figure 4 - Troutman Existing and Proposed Facilities

Walk Score is an online service that provides measures of walkability and search tools for apartments and retail businesses. Walk Score helps people find walkable places to live. Troutman has a Walk Score of 39 (www.walkscore.com), with above average scores for proximity to errands and shopping, but almost no proximity to culture/entertainment venues (Figure 6). This score indicates a community that has low walkable assets, but

there are opportunities to improve connectivity between destinations like parks, groceries, and culture & entertainments. The town is currently identified as Car-dependent, and the compact urban form provides a clear opportunity to increase the walkability and bankability of Troutman along downtown corridor and in areas outside of the downtown core.

2.1.4 Challenges

Troutman faces challenges to improving and expanding walking and biking. These challenges include a heavy presence of freight vehicle traffic along US 21 (Main Street), limited right of way, a lack of on-road bicycle facilities, lack of safe pedestrian crossing opportunities and Americans with Disabilities Act (ADA)-compliant walkways, a disconnected street network and a limited existing system of sidewalks and trails. I-77 serves as an important regional transportation network spine and connects Troutman residents and businesses with the rest of the region; I-77 also acts as a barrier to walking and bicycling in the absence of safe and improved underpasses and overpass bridges retrofitted with sidewalks and multi-use path facilities. The Town has a limited tax base available to support locally-funded bicycle and pedestrian improvements. A fast rate of growth in residential developments means that there will likely be some growing pains where the Town's infrastructure will need to catch up with the new demand to support the newly-added neighborhoods.

Troutman downtown area could support walking trips to multiple key destinations including a grocery store, schools, a park and the local library; however, a lack of safe pedestrian crossing opportunities across US 21 (Main Street) is a barrier. Lake Norman State Park is a little too far to walk from downtown (five miles away from the Troutman Town Hall) and is not connected to downtown with a multi-use path, nor any other bicycle facility, that would make it safe and convenient to access by bicycling for bicycle users of all ages and abilities. Finally, the

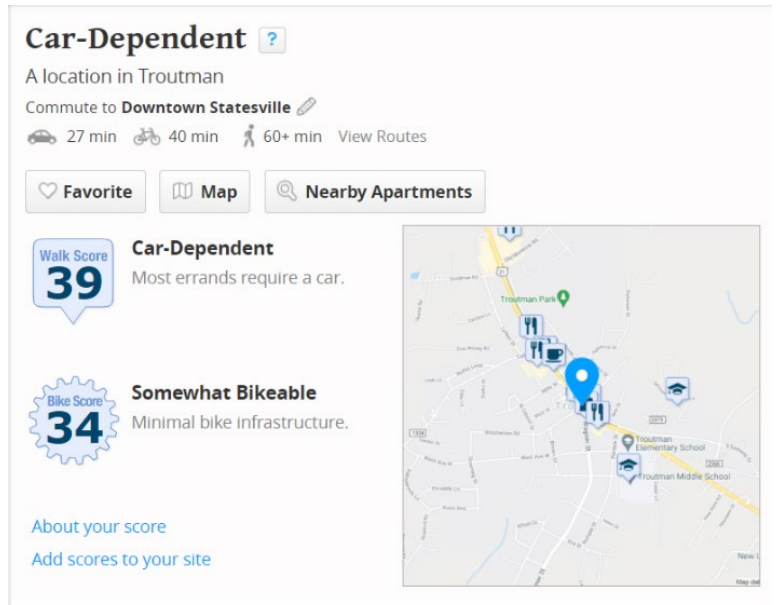


Figure 6 - Town of Troutman Walk Score



Walmart Fulfillment Center on Murdock Road northeast of downtown Troutman contributes to a heavy presence of freight traffic

Town’s main thoroughfare, US 21 (Main Street), brings commerce and visitors through Troutman but also generates noise and turning conflicts with pedestrians through the downtown. These challenges mean that a careful consideration of potential improvements with regards to implementation costs, likely barriers, safety challenges and other competing issues and priorities would be required to identify priority projects.

2.1.5 Crash Data

As illustrated in Table 2 below, 30 reported pedestrian and bicycle crashes occurred in Troutman between 2010 and 2019.

Table 2 - Pedestrian and Bicycle Crash Data Summary (2010 - 2019) Source: NCDOT IMD Bicycle and Pedestrian Crash Data

Crash Type	Total	Percent of Total
Assault with Vehicle	1	3%
Backing Vehicle	1	3%
Backing Vehicle - Parking Lot	1	3%
Bicycle Only	1	3%
Bicyclist Left Turn - Same Direction	1	3%
Bicyclist Ride Out - Sign-Controlled Intersection	1	3%
Dart-Out	3	10%
Motorist Left Turn - Parallel Paths	1	3%
Motorist Overtaking - Bicyclist Swerved	2	7%
Motorist Overtaking - Misjudged Space	1	3%
Motorist Overtaking - Other / Unknown	1	3%
Motorist Right Turn - Same Direction	1	3%
Motorist Right Turn on Red - Perpendicular Paths	1	3%
Off Roadway - Parking Lot	2	7%
Pedestrian Failed to Yield	6	20%
Sign-Controlled Intersection - Other / Unknown	1	3%
Walking Along Roadway with Traffic - From Behind	4	13%
Walking in Roadway	1	3%
Total	30	

Analyzing the data helps to identify contributing factors and common trends in the crashes. These findings inform decision-makers to consider projects that will target specific contributing factors and trends with the goal to reduce the severity and number of crashes in the future. Table 2 presents a summary of pedestrian and bicycle crash data.

The crash data analysis suggests the following findings about observed concentrations of crash locations (see Figure 7 and Figure 8 below for maps of crash locations):

- Pedestrian and bicycle crashes are concentrated in the downtown area along US 21 Main Street, Old Mountain Road, and along Oswalt Amity Road.
- Pedestrians failing to yield and walking along the roadway with traffic coming from behind caused two suspected serious injuries, which may indicate the need to increase pedestrian crossing visibility and walking facility.
- The majority of crashes occurred at non-intersection locations with three suspected serious injuries near US 21 corridor.

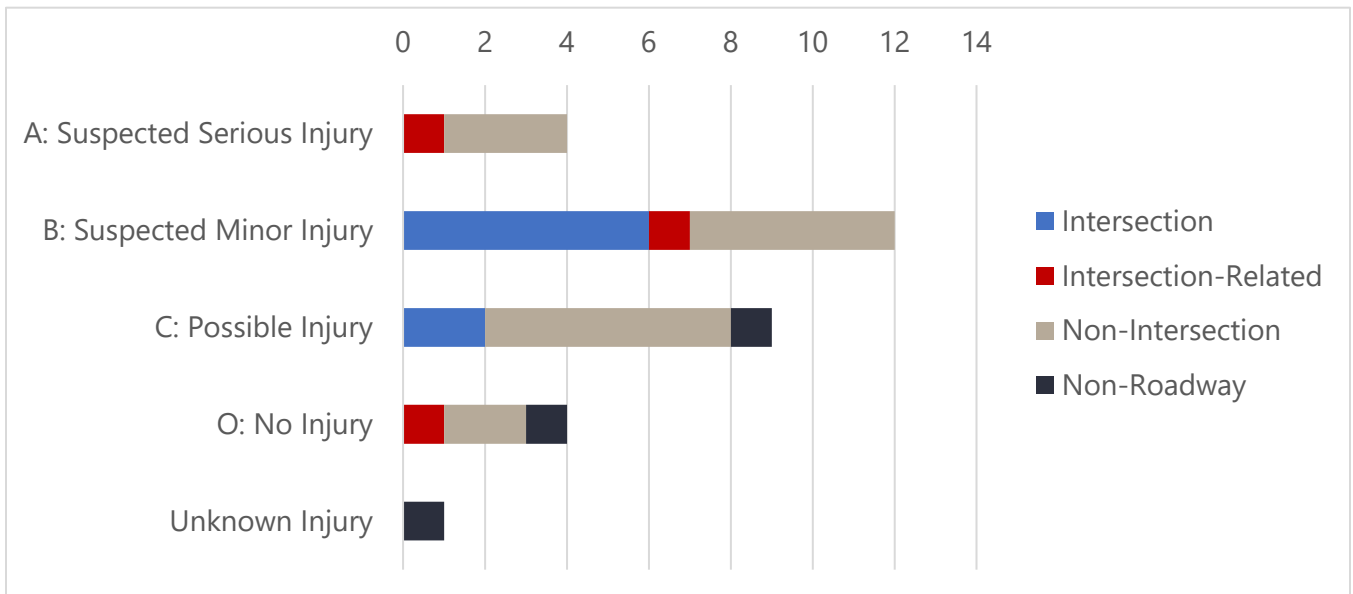


Figure 6 - Bicycle and Pedestrian Crashes by Severity and Location (2010 – 2019)

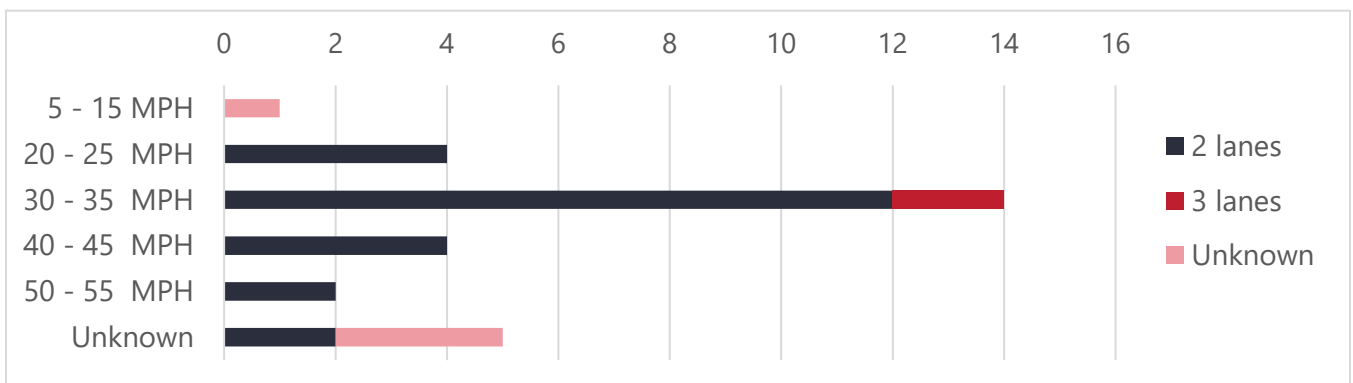


Figure 5 – Bicycle and Pedestrian Crashes by Speed Limit and Number of Lanes (2010 – 2019)

The summary statistics represent reported crashes. The data shows a recurring pattern of conflicts at intersections and crossing locations, as well as a lack of motorist compliance when passing or approaching intersections with a bicyclist present.

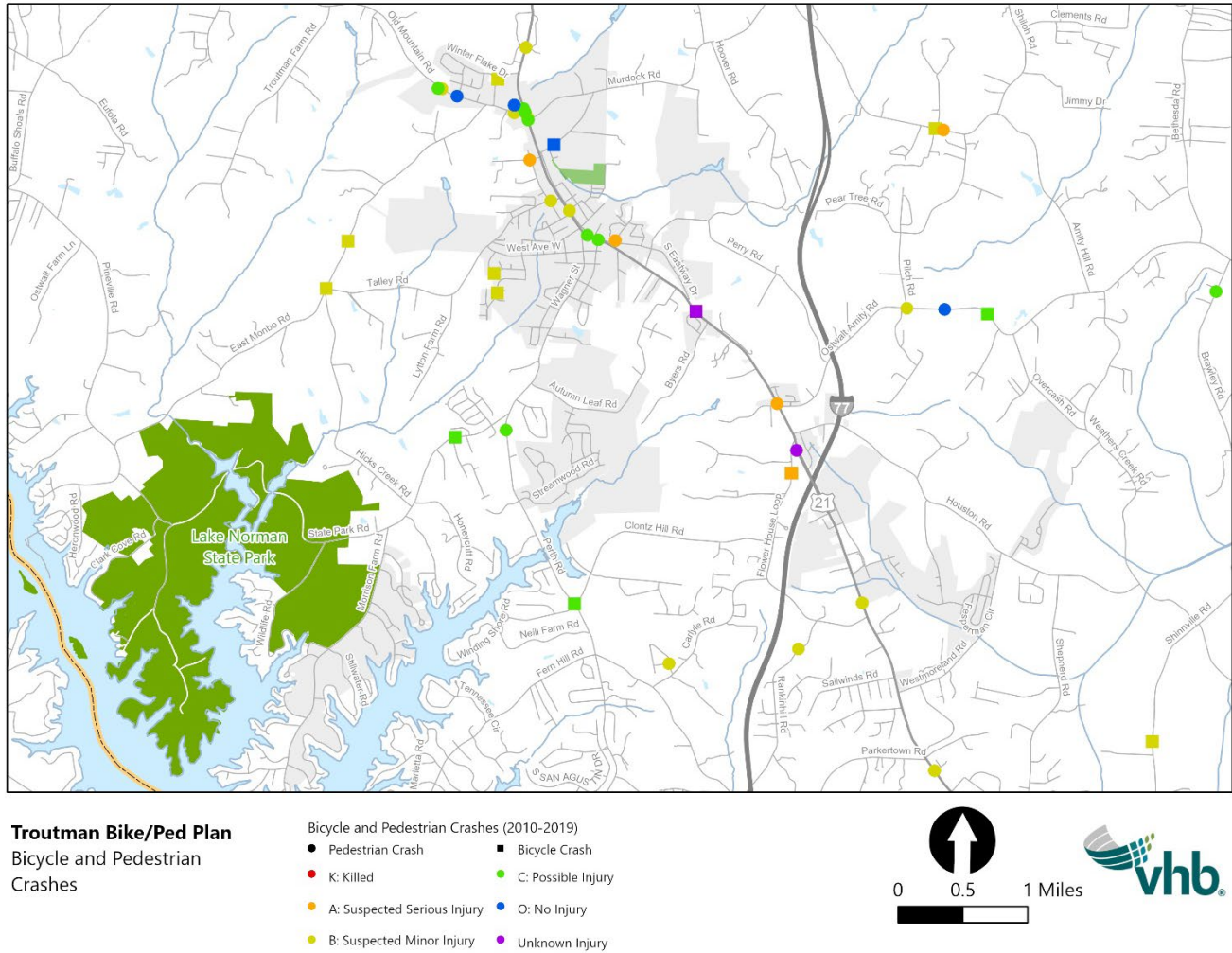


Figure 7 - Pedestrian and Bicycle Crashes (2010 - 2019)

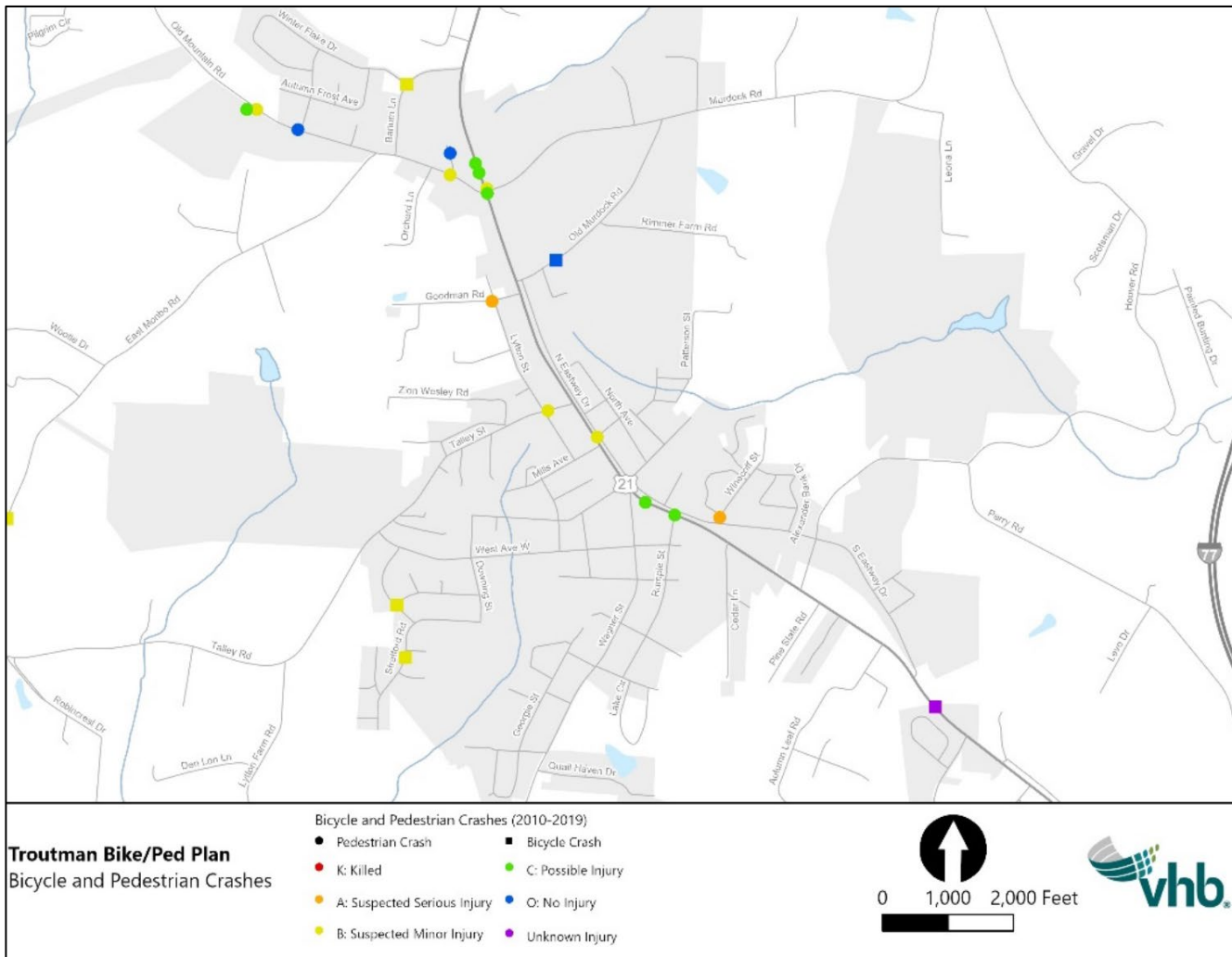


Figure 8 - Pedestrian and Bicycle Crashes (2010 - 2019), Downtown Focus Area

2.2 Public Input

2.2.1 Stakeholder Feedback Regarding Current Conditions

The group of stakeholders who made up the steering committee provided feedback regarding the existing conditions of the current pedestrian and bicycle facility network. The group indicated an overall support for the Richardson Greenway and Rail-Trail facility that runs down the spine of the Town along US-21/ Main Street and Eastway Drive. The group also approves of the work the Town has recently done to install crosswalks in the downtown area. However, the group notes that there are many shortcomings to the network as is.

Stakeholders have noted that the pedestrian network is disconnected, and sidewalks are outdated. Currently, most of Troutman's sidewalk network exists in the downtown area and along the US-21 / Main Street corridor. These

sidewalks are typically 4-foot wide, built back of curb, and can be crowded with utility poles, fencing, and other items. Further, the existing sidewalk network is disjointed, making it hard to navigate throughout Town safely.

The bicycle network is also disjointed within the Town, mostly due to the lack of facilities. The Richardson Greenway serves as a primary off-road facility between Wagner Street and Barium Lane. It was noted that bicyclists will ride on the roadway with traffic or on the shoulder, where possible. Several stakeholders noted that they sometimes do not feel comfortable riding on roadways due to high volumes of traffic or the speed at which they are traveling.

2.2.3 Public Survey Results

The first public survey ran from September 20 – November 1, 2021. There were 306 survey responses received. Questions included project priorities, types of improvements desired, and programs and policy changes. Survey respondents were asked a series of demographic, geographic, and preference scale questions.

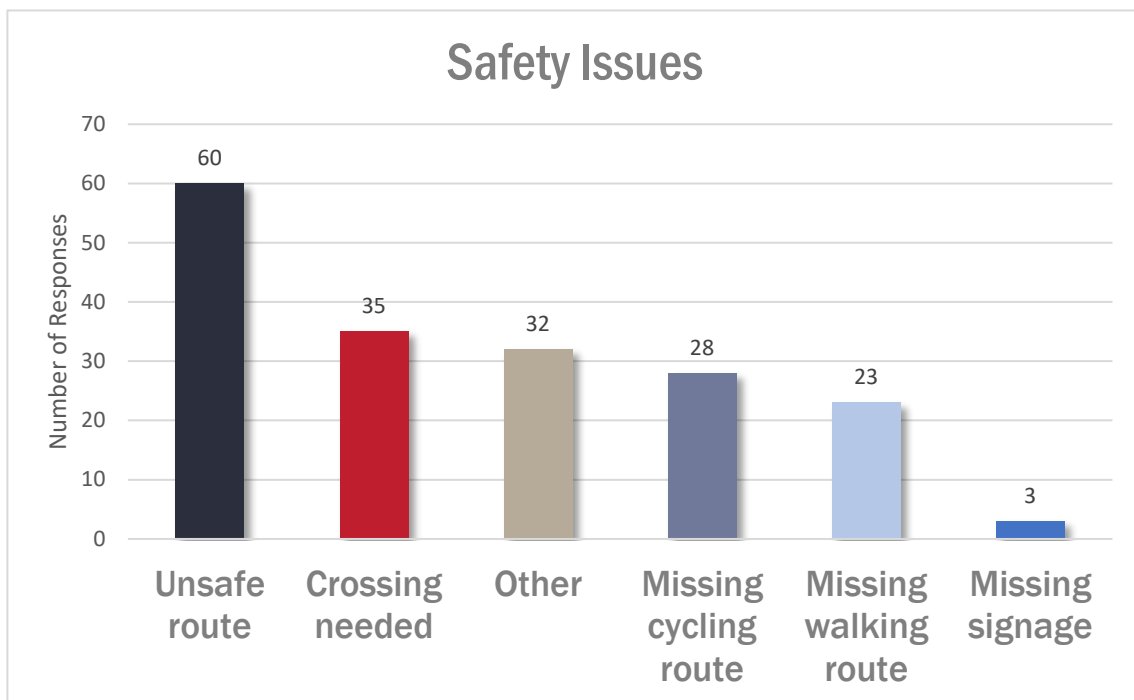


Figure 9 - Town of Troutman Bicycle and Pedestrian Safety Issues Reported by Online Survey Participants

As part of the online survey, survey participants were able to add map markers to indicate locations with observed safety or missing bicycle and pedestrian link concern, as well as to mark their typical origins and destinations. The top option selected as part of the map marker question response were safety issues and origins/destinations were the second most frequent type. Survey respondents noted four main destination areas: Lowe’s commercial center near I-77, Lake Norman State Park, Davesté Vineyards, and downtown Troutman along US-21/Main Street. Respondents noted their home locations throughout the Town as well as outside of the Town limits. Compared to the origin/destination points, safety concerns were much more concentrated. US-21/Main Street, Wagner Street / Perth Road, Old Mountain Road, and Ostwalt Amity Road were the primary facilities with safety concerns. Several intersections were also identified as safety concerns including: US-21/Main Street at Old Mountain Road /

Murdock Road, US-21/Main Street at Old Murdock Road, US-21/Main Street at Talley Street, US-21/Main Street at Wagner Street, US-21/Main Street at Flower House Loop / Houston Road, and Perth Road at State Park Road.

When asked about walking and bicycling routes, respondents showed a strong preference for walking opportunities in the downtown core of Troutman and bicycling routes connecting to the downtown. Walking improvements were preferred along US-21/Main Street, Eastway Drive, Old Murdock Road, Old Mountain Road, and Wagner Street. Bicycling improvements were preferred along US-21/Main Street, Wagner Street / Perth Road, State Park Road, and Ostwalt Amity Road.

When asked about safety, the top concerns were unsafe walking and bicycling routes and a need for crossing opportunities. See Figure 9 above for an illustration of noted safety concern, by type.

When asked about priorities with regards to prioritizing bicycle and pedestrian improvements, safety and accessibility were the top priorities for respondents, followed by supporting downtown Troutman and connections to key destinations. Respondents indicated that they would like to see facilities that address safety, accessibility, and connections to key destinations and downtown.

When asked about different facility types, respondents indicated a preference for bicycle and pedestrian facilities that separated them from vehicular traffic. Buffered bike lanes, bike lanes, and separated bike lanes were the most preferred on-road bicycle facilities.

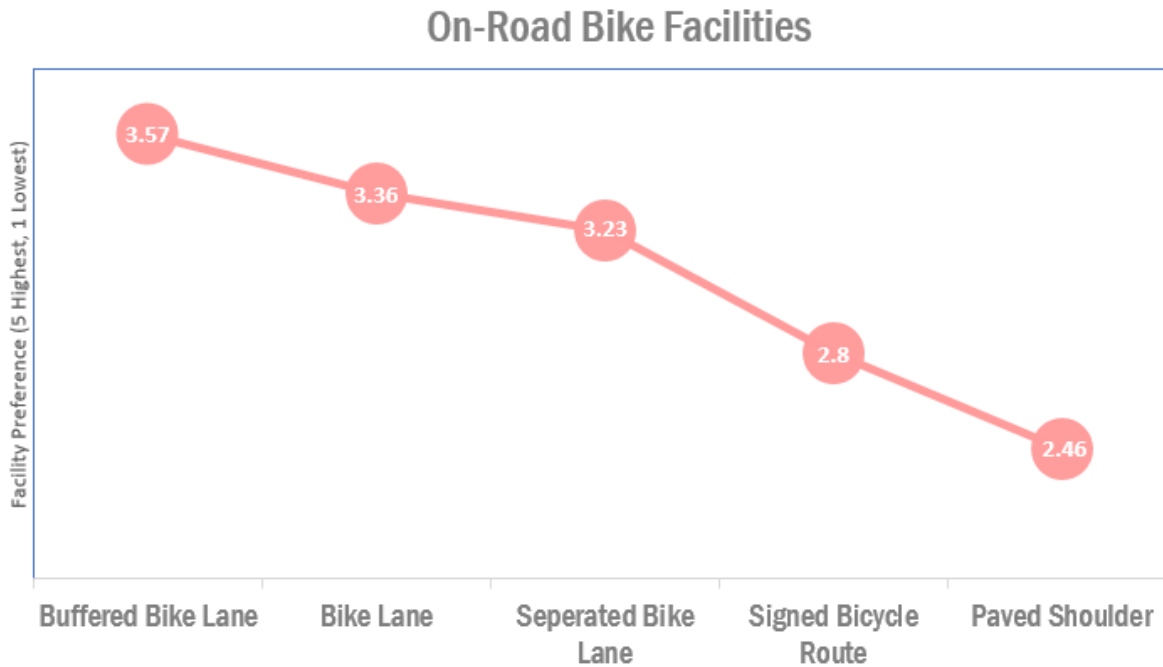


Figure 10 - On-Road Bicycle Facility Types Preferred by Online Survey Participants

Sidewalks & Shared Use Paths

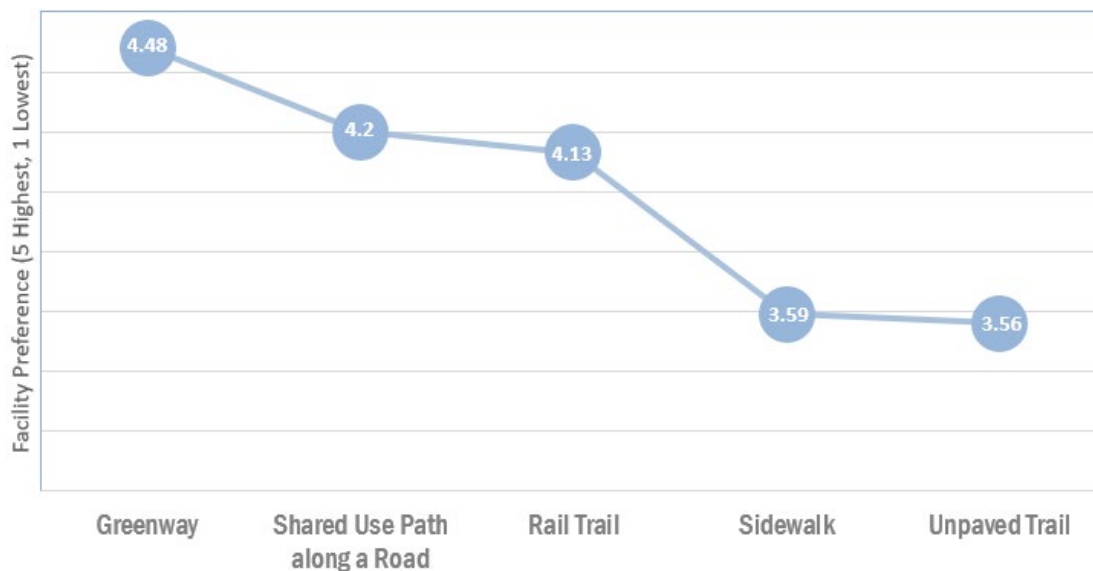


Figure 11 - Pedestrian and Shared Use Facility Types Preferred by Online Survey Participants

Pedestrian facilities preferences expressed by survey takers prioritized greenways, shared use paths, and rail-trails over sidewalks. Lighting, wayfinding signage, and bicycle parking were the most requested amenities by survey respondents.

2.3 Existing Institutional Framework

Troutman is located in Iredell County and falls within the regional transportation planning area served by the Charlotte Transportation Planning Organization (CRTPO). Many of the infrastructure projects undertaken in the Town, particularly those related to NCDOT initiatives, are planned through interrelated Town, County, and CRTPO planning processes. Carolina Thread Trail, a regional trails advocacy group that provides planning and implementation support for trails and greenways across a 16-County area, has planned parts of their network through and around the Town. Section 2.4 outlines the most recent and relevant plans guiding planning in Troutman.

The Town of Troutman Unified Development Ordinance (UDO) governs development within the Town limits. This document provides regulations for the dimensions and cost-share of installing new sidewalks, speed limits, parking, among other regulations. Section 4 of this Plan provides recommendations for improving existing policies to promote consideration and consistent installation of bicycle, pedestrian, and SUP facilities such as sidewalks and easements for greenways.

The UDO mentions several regulations with respect to active transportation. The town encourages the use of sidewalks for interconnectivity between developments. The UDO requires that all sidewalks and streets have street lighting on public roads to encourage safety. Sidewalks are to be constructed on both sides of the street in areas zoned RM (Mixed Residential), NC (Neighborhood Center), OI (Office/Institutional), CB (Central Business), and HB (Highway Business), within multi-family and planned developments, as well as in all areas specified in the Troutman Pedestrian Plan. Sidewalks are to have a planting strip of at least 6 feet. Updated cross-sections for new or improved roadways also include sidewalks on both sides of the street with planting strips. Greenway rights-of-

way (ROWs) will be required in new developments and soft-surface greenway facility should be constructed as part of new housing developments as part of the Comprehensive Parks and Recreation Plan. Bicycle facilities, such as bike lanes and sharrows, are required on new and updated roadways, excluding residential streets.

2.4 Related Plans and Policies

This section reviews relevant local and regional plans and policies applicable to Troutman active transportation planning recommendations.

2035 Comprehensive Land Use Plan (2015)

The Town of Troutman’s comprehensive land use plan aims to preserve and promote the town’s natural resources and open spaces while encouraging economic and residential growth. Commercial and industrial growth is primarily confined along the US-21 corridor and north of the corridor. Residential development is primarily constrained south of the US-21 corridor with a primary mix of low-density and medium-density developments. Small pockets of high density residential are proposed near downtown and the I-77 commercial node. The Town has also identified encouraging alternative transportation modes that link Troutman to neighboring municipalities and important community destinations for bicycle-pedestrian improvements. The Town also proposes re-using and revitalizing underused buildings and properties while working with outside organizations to locate additional site development locations.

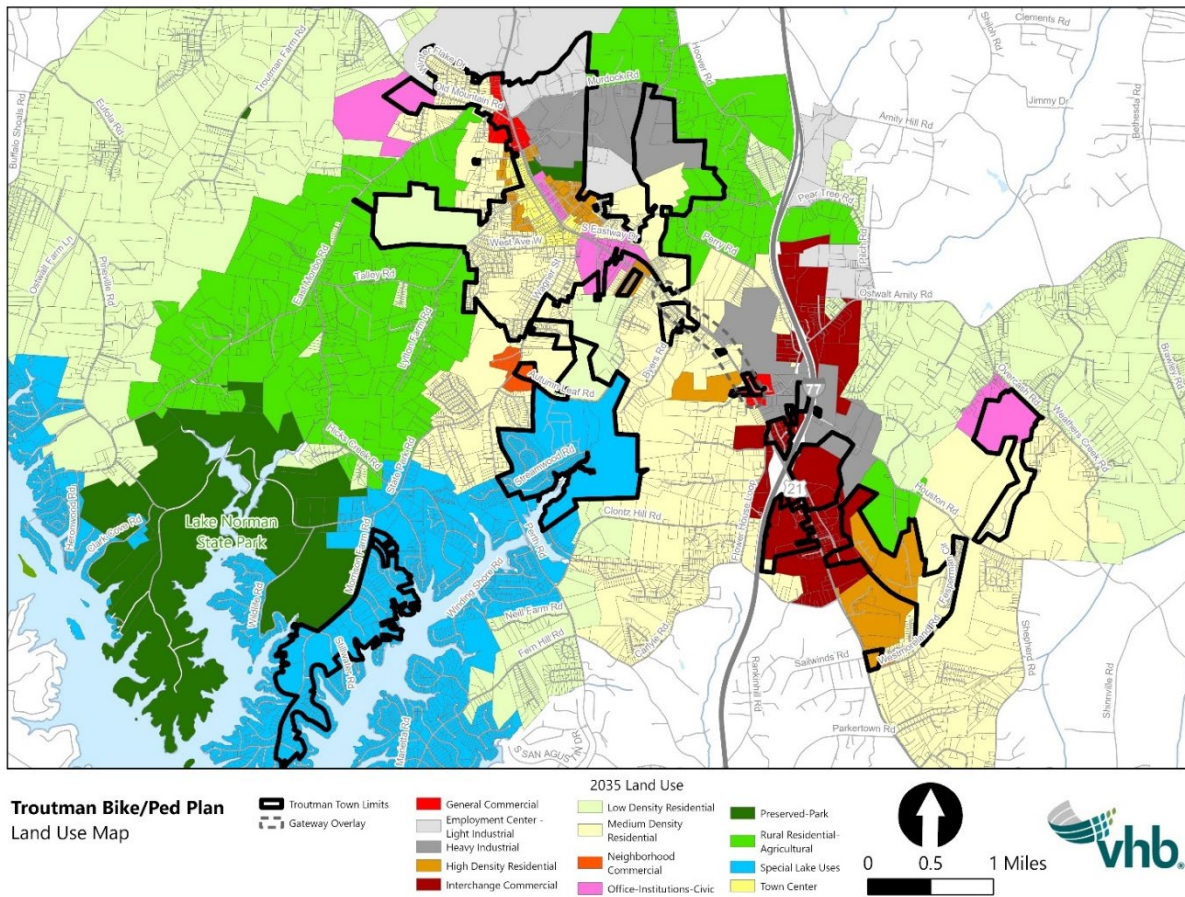


Figure 12 - Town of Troutman 2035 Future Land Use Map

Lake Norman Bicycle Plan (2010)

The plan offers two routes for cycling around the greater Lake Norman communities: the initial route and the ultimate route. Iredell County is planned to have a total of 38.5 miles of initial bicycle routes, of which, 33.5 miles will remain part of the Ultimate Route with an additional 12.4 miles of new bicycle facilities making up the Ultimate Route within Iredell County. The Troutman Loop is a planned 11.5-mile circuit to feature the Lake Norman State Park, a Vineyard, and downtown Troutman destinations. This route will follow East Monbo Rd, Old Mountain Rd, Main St, Eastway Dr, Wagner St, State Park Rd, and St. Johns Rd. The Troutman Loops will allow access to numerous downtown destinations and the Lake Norman State Park. Additional excursion routes are along Morrison Farm Rd, east of the State Park.

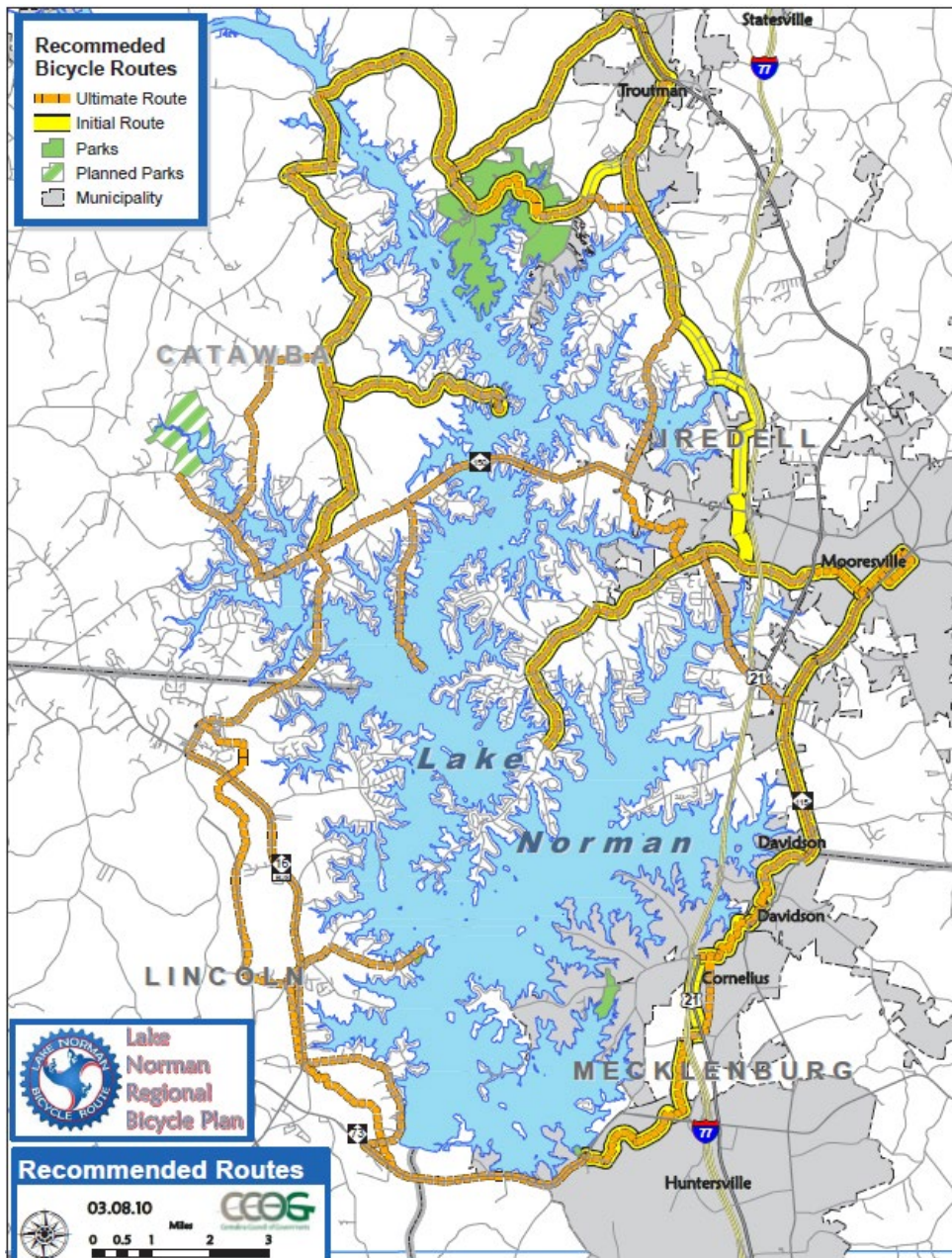


Figure 13 - Lake Norman Regional Bicycle Plan Recommended Bicycle Routes

Troutman CTP

The 2009 Town of Troutman CTP included several recommended on-road bicycle facilities to be implemented. They include:

- Perth Road from town limits to Wagner Street
- Wagner Street from Perth Road to S. Main Street
- North/South Main Street from Wagner Street to Talley Street
- Talley Street from N. Main Street to E. Monbo Road
- E. Monbo Road from Talley Street to town limits











Bicycle and Pedestrian							
FACILITY AND SEGMENT		Distance (mi)	Existing System		Proposed System		Other Maps
From	To		Cross-Section (ft)	Lanes	Type	Cross-Section	
East Monbo Road (SR 1328)							
Southwest Troutman Planning Area Boundary	Talley Street (SR 1324)	2.12	20	2	On-road	B-4	
Perth Road (SR 1303)							
South Troutman Planning Area Boundary	State Park Road (SR 1321)	1.37	28	2	On-road	B-4	
State Park Road (SR 1321)	Milepost 1.1	1.1	28	2	On-road	B-4	
Milepost 1.1	South City Limits - Troutman	0.88	28	2	On-road	B-4	
State Park Road (SR 1321)							
Perth Road (SR 1303)	South Troutman Planning Area Boundary	0.7	18	2	On-road	B-4	
Talley Street (SR 1324)							
US 21/NC 115	Western Town Limits	0.75	18	2	On-road	B-4	
Western Town Limits	E. Monbo Street (SR 1328)	1.4	18	2	On-road	B-4	
US 21/NC 115							
Talley Street (SR 1324)	Wagner Street (SR 1303)	0.3	22	2	On-road	B-4	
Wagner Street (SR 1303)							
South City Limits - Troutman	Milepost 1.5	1.5	28	2	On-road	B-4	
Milepost 1.5	US 21/NC 115	0.06	28	2	On-road	B-4	

Table 3 - Troutman CTP Bicycle and Pedestrian Projects

CRTPO CTP

The CRTPO Comprehensive Transportation Plan is a regional long range plan which includes recommendations by mode. Bicycle recommendations include on-road bicycle facilities improvements along Main Street, State Park Road, Perth Road, Monbo Road and NC 21 north of Moose Club Road. Multi-use path recommendations include extension of the existing Richardson Greenway corridor north towards Statesville and south to I-77. Pedestrian facilities include existing sidewalks along Old Mountain Road and planned sidewalk improvements along NC 21 corridor, Monbo Road, State Park Road, Perth Road and Main Street.

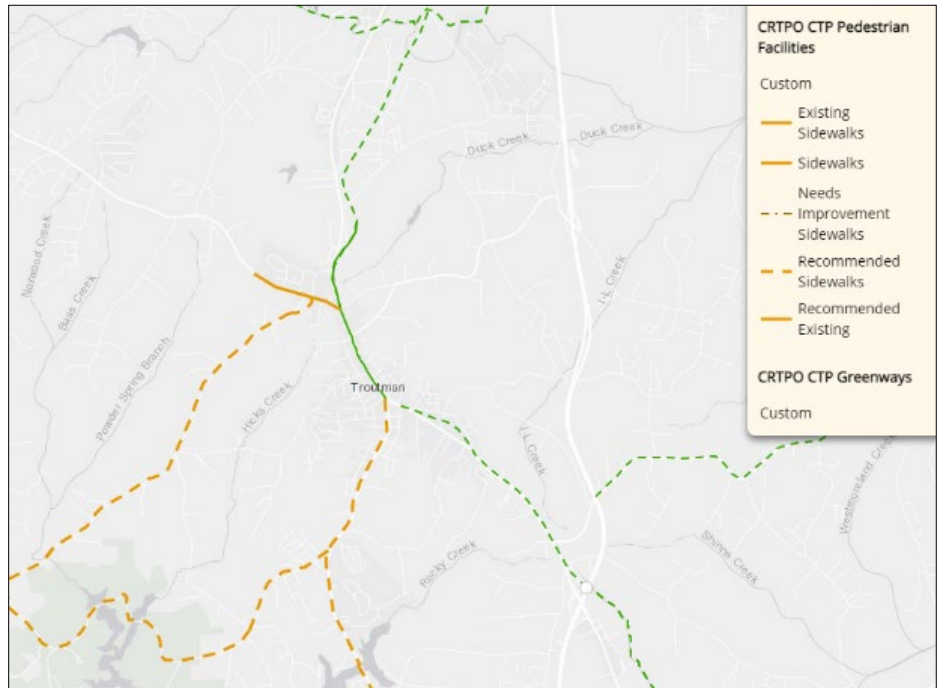


Figure 14 - CRTPO CTP Bicycle Recommendations (Source: CTP Interactive Map

<https://charlotte.maps.arcgis.com/apps/MapSeries/index.html?appid=0de6f0696d234b9499fbb985258486c0>)

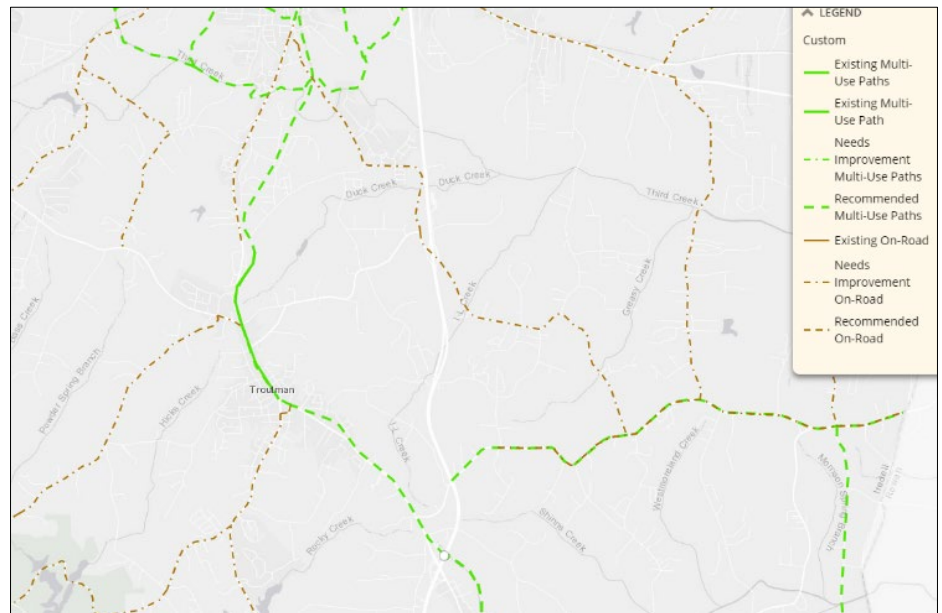


Figure 15 - CRTPO CTP Pedestrian Recommendations (Source: CTP Interactive Map

<https://charlotte.maps.arcgis.com/apps/MapSeries/index.html?appid=0de6f0696d234b9499fbb985258486c0>)

Troutman Strategic Master Plan (2018)

Troutman Strategic Master Plan developed recommendations to support the livability, growth, and placemaking for the Town of Troutman. The plan suggests adding additional parking along the town’s main street and park to relieve demand. Lytton Street is recommended for activation as a secondary main street with advisory bike lanes, filling in sidewalk gaps, street scaping, and additional street parking. Main Street poses a challenge due to its US highway designation but should preserve the town’s unique character. The town should also embrace its rural identity by billing itself as an active place to live and play due to its close proximity to Lake Norman and the Lake Norman State Park. Recommended transportation improvements include a combination of roadway connectivity and capacity with expanded sidepaths, greenways, and pedestrian linear and crossing facilities. Placemaking improvements recommended include signage, gateways, and pocket parks that encourage residents and visitors to engage within the community.

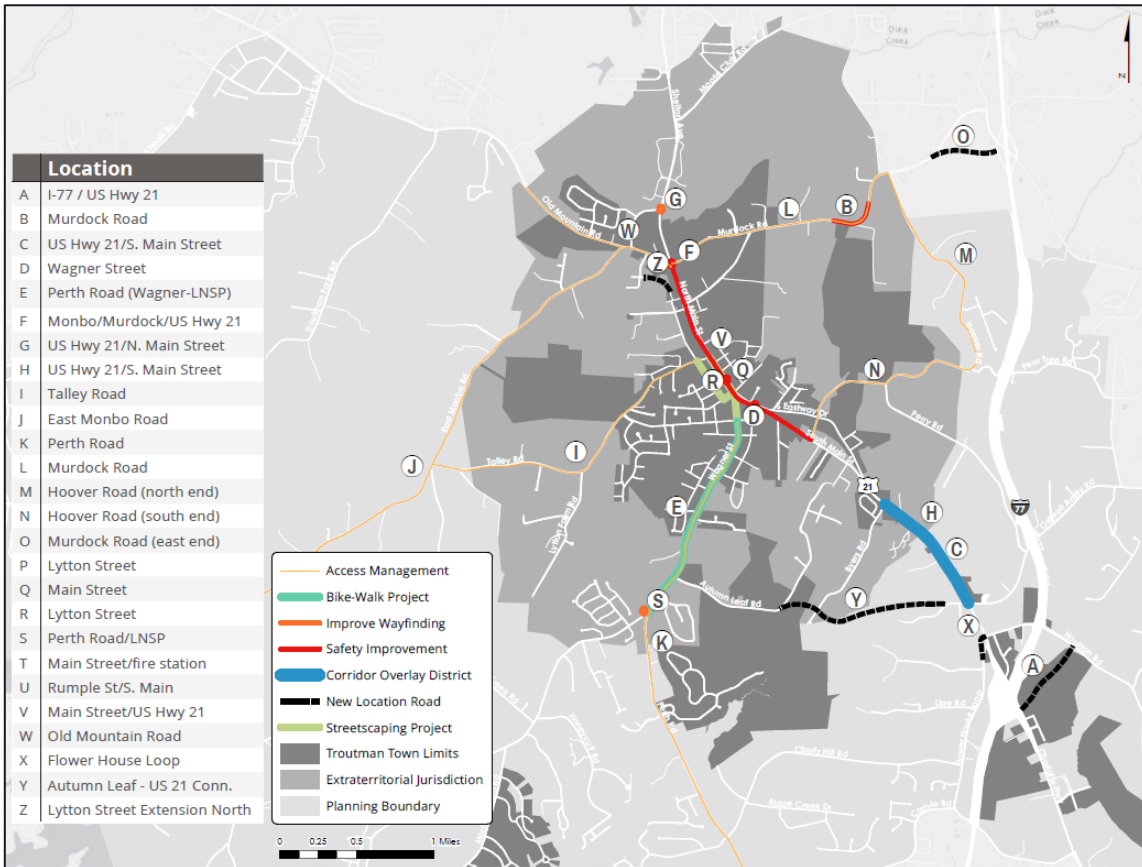


Figure 16 - Troutman Strategic Master Plan Recommendations

2020 Comprehensive Parks and Recreation Plan

The Comprehensive Parks and Recreation Plan highlights that the Town of Troutman is an active community and as such aims to provide more recreational opportunities to its residents. Based on the community survey distributed as part of the planning effort, residents often partake in walking, running, hiking, and bicycling and would like to see additional facilities such as walking trails, access to Lake Norman, and bicycle trails. As part of the plan, the Town would like to reinforce the sidewalk network throughout the town, widen existing thoroughfares to accommodate bicycle use, provide access to Lake Norman, create a greenway network, and develop innovative programming to encourage recreation.

Carolina Thread Trail Master Plan- Iredell County (2011)

The Carolina Thread Trail (CTT) Plan for Iredell County includes two priority segments that run through the Town of Troutman and two additional segments as part of the greater CTT and other connections. Segment Q is made up of existing sidewalk, existing trails, and proposed greenways and will run from the intersection of segments V and DD south of Troutman and follow the rail corridor north to Troutman. It will then follow North Main Street on the existing trail to a proposed sidewalk on North Main Street to a proposed trail on the rail corridor between Troutman and Statesville and end at segment S. Segment U will consist of a bike route that will run from downtown Troutman onto Rumble Street to West Avenue then to Wagner Street, to Perth Road, then to State Park Road and ending at Lake Norman State Park. The proposed CTT portion of segment U will pick up at Lake Norman State Park, cut through the park, and work its way northwest around the lake. Proposed segment EE is part of the Lake Norman Bike Plan and will run from Judas Road to Perth Road and connect to priority segment U at State Park Road.

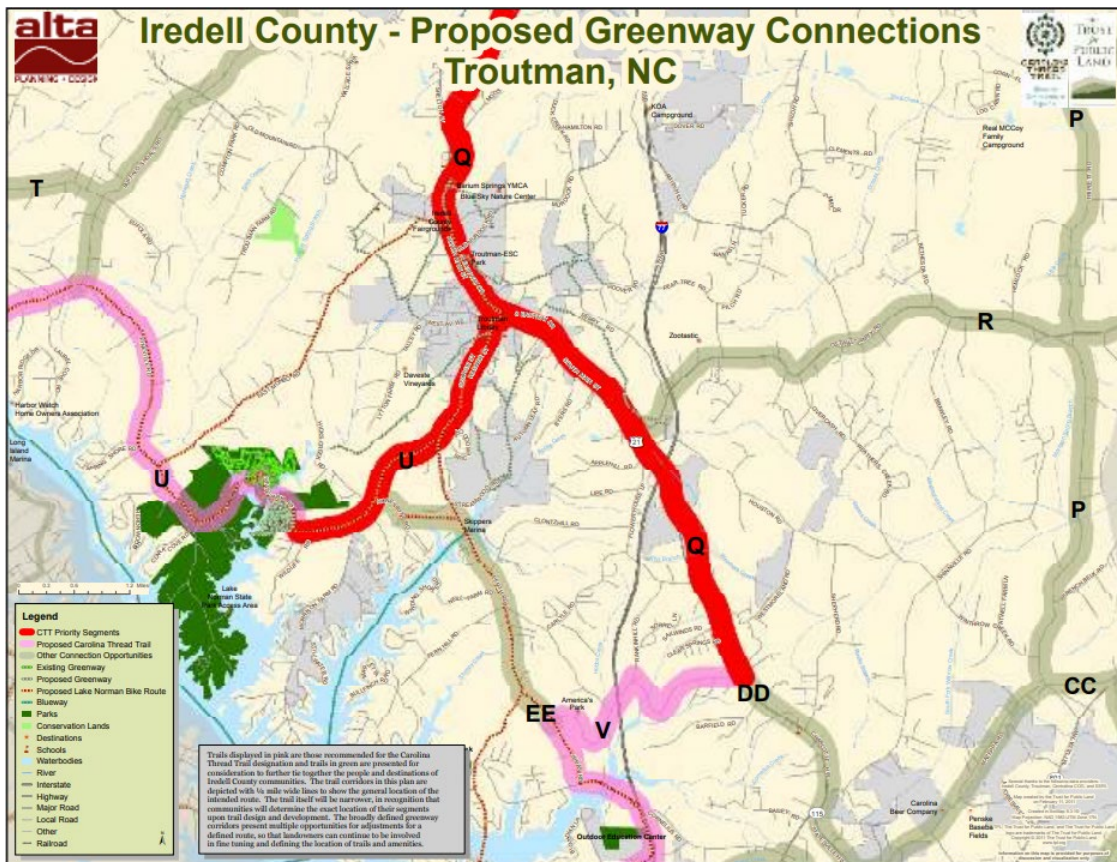
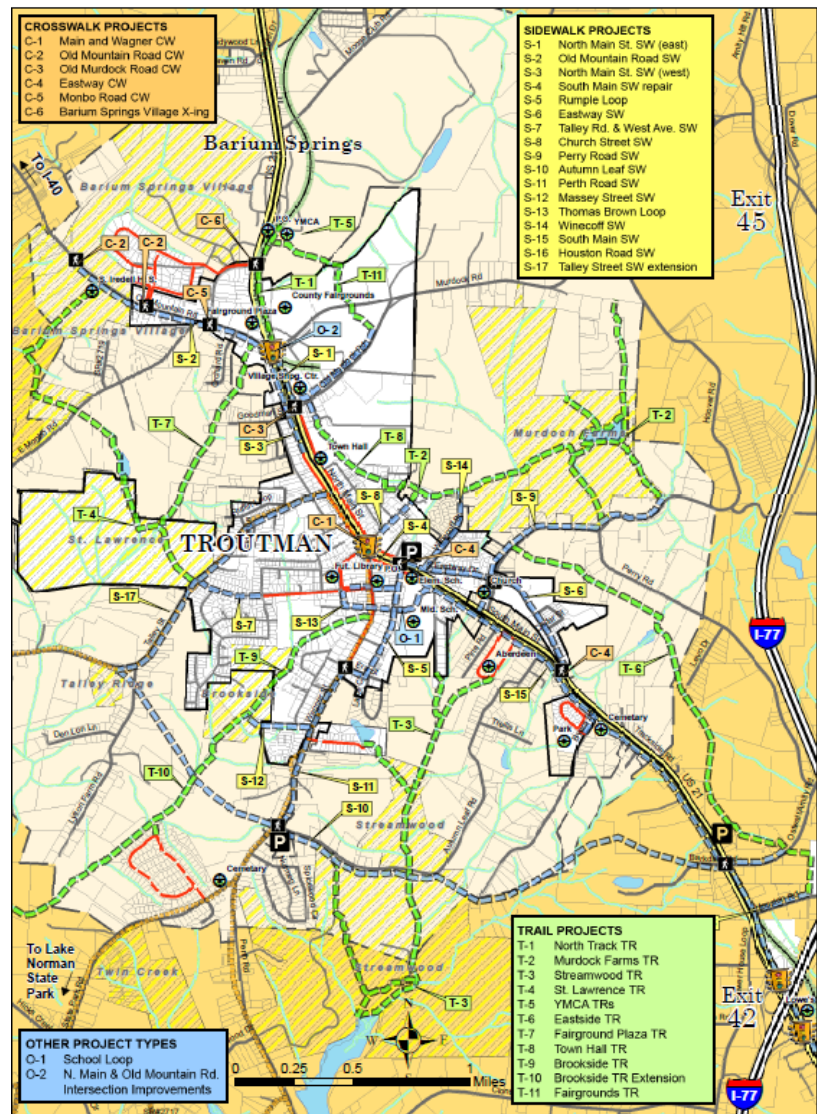


Figure 17 - Carolina Thread Trail Proposed Corridors for Iredell County

Troutman Pedestrian Plan (2008)

Troutman Pedestrian Plan from 2008 proposes a series of trails, new sidewalks, and intersection improvements throughout the town. Trails range in size from a half mile to 2.5 miles to provide additional connection points between destinations within the town. The proposed trail system will serve the town along its outer fringes, connecting proposed subdivisions to the existing and proposed sidewalk networks and to core services and destinations. Sidewalk projects include the creation of new facilities and maintenance of existing sidewalks. New sidewalk facilities are proposed to facilitate greater pedestrian connectivity within the current network and link up to future developments within the town. Sidewalks are largely recommended along major local roads and within the downtown area. Six crosswalk projects are also proposed and typically include signalization, signage, and striping. The pedestrian plan also calls for various ordinance recommendations to include a mix of land uses, improve street connectivity, and provide enhanced standards and requirements for active transportation facility implementation.



US 21/NC 115 Corridor Mobility Study (2017)

US 21/NC 115 Corridor study examined US 21/NC 115 (Main Street) through Troutman and considered potential improvements. The US 21/NC 115 study area included 5.8 miles of roadway from Westmoreland Road to the south to Moose Club Road to the north. At the time of the study, the corridor carried between 8,000 and 14,000 vehicles per day. Taking into account congestion issues while also being sensitive to a variety of uses and the Town's "Main Street" function, the study looked for a well-balanced set of transportation recommendations that would serve various user groups. The study recommendations included the following improvements:

- Add turn lanes at US 21 / NC 115 at Old Mountain Rd / Murdock Rd
- Add signal or dual-lane roundabout at US 21 / NC 115 at Old Murdock Rd

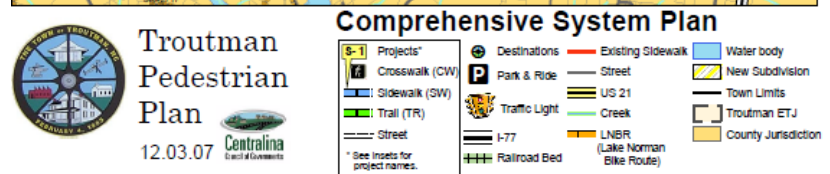


Figure 18 - Troutman Pedestrian Plan: Comprehensive System Plan

- Add signal at US 21 / NC 115 at Talley St
- Realign Wagner St at US 21/ NC 115 further to the north (at the current intersection as Church St)
- Add signal at US 21 / NC 115 at Ostwalt Amity Rd
- Add dedicated turn lane on State Park Rd at Perth Rd
- Widen the corridor to either a 5-lane or 4-lane divided cross-section
 - I-77 to Trackside Road – Four-lane Divided section
 - Trackside Road to Byers Road – Modified Four-lane divided section
 - Byers Road to Cedar Lane – Five-lane section
 - Cedar Lane to Old Murdock Road (Downtown section)– Couplet
 - Murdock Road to Old Mountain Road – Four-lane divided

The study did not focus on bicycle and pedestrian recommendations in detail but recommended that bicycle and pedestrian facilities be incorporated as part of recommendations implementation. As part of the couplet cross-section through downtown, Richardson Greenway was recommended to be retained and to better tied in with sidewalks on parallel and cross streets.

The figure below illustrates recommended Main Street and Wagner Street intersection realignment to the north (to current Church Street intersection), with Lytton Street connecting to realigned Wagner Street and existing intersection of Wagner Street and Main Street operating as a Right-In, Right-Out (RIRO) configuration.



Figure 19 - Wagner Street and Main Street Intersection Recommended Realignment, US 21/NC 115 Corridor Mobility Strategy

Troutman Alternatives Study (Southwest Bypass Study), 2020

Troutman Alternatives Study considered different alternatives to address congestion along US 21 (Main Street) through Troutman, including the Southwest Bypass, to review the needs of all transportation system users and to

select the appropriate option. Southwest Bypass and “Continue Main Street Widening” (i.e. extend widening planned as part of project R-2522 further to the south, from Winecoff Street to Appliance Avenue south of I-77 exit 42) were selected as the two potential preferred options during the course of the study. After extensive analysis “Continue Main Street Widening” was selected as the best option for the Town. Southwest Bypass alternative was recommended for removal from the long-range plans due to the high cost, ROW impacts and stream crossings involved (\$30 million estimated cost not taking ROW cost into account). New location collector street connections were also identified as an additional strategy which require further study as part of a comprehensive transportation plan.

As part of specific bicycle and pedestrian improvements recommended in the study, a 10’ multi-use path along Eastway Drive from Winecoff Street (near future recommended Gateway Park) to Main Street was identified at an expected cost of \$860,000. A multi-use path was also expected to be included as part of Main Street widening from Winecoff Street to Appliance Avenue. Bicycle and pedestrian wayfinding signage and a Complete Streets policy for the Town were also recommended.

Iredell County Transportation Master Plan (ICTMP)

The Iredell County Transportation Master Plan (ICTMP) was finalized in October 2021 and serves as an update to the county’s 2008 Comprehensive Transportation Plan Study Report and recommendations found in the CRTPO’s CTP.

As a part of the project screening approach, all of the bicycle and greenway improvements classified in CRTPO’s CTP as ‘recommended’ or ‘needs improvement’ in unincorporated Iredell County were initially considered. The plan included 17 priority active transportation projects with two proposed multi-use paths and one sidewalk project falling within Troutman’s jurisdiction. Both multi-use path projects received the maximum prioritization score in the screening process. A sidewalk project along US 21 through Troutman from Houston Road to Westmoreland Road was identified as

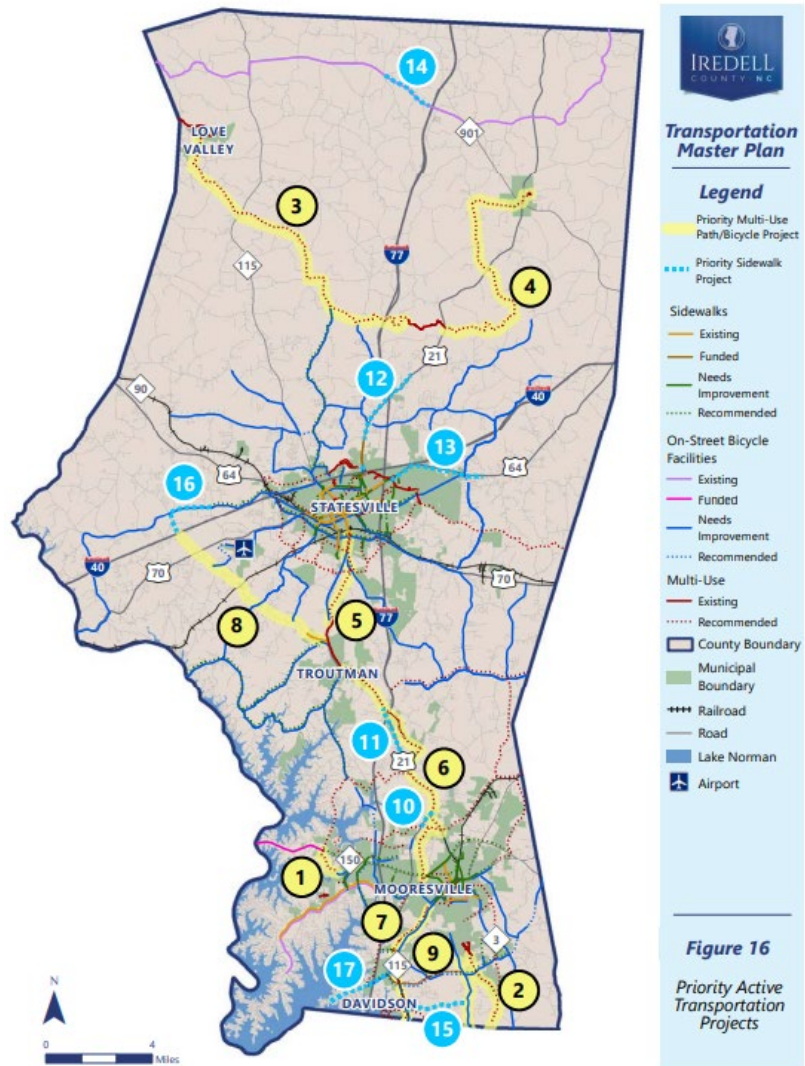


Figure 20 - Iredell County Transportation Master Plan (ICTMP) Priority Active Transportation Projects

Priority Active Transportation “Project #11. Table 4 and Figure 20 highlight priority active transportation projects identified in the ICTMP.

Table 4 - ICTMPO Priority Active Transportation Projects

#	Project Type	Project Description
1	Multi-Use Path	Doolie Rd (NC 150/River Hwy to Montibello Dr)
2	Multi-Use Path	Dye Creek Greenway (Segments 5 to 8 in CTP)
3	Multi-Use Path	South Yadkin River to Tori Pass Ln and West End of Girl Scouts Trail to S Chipley Ford Rd)
4	Multi-Use Path	Turnersburg Hwy east of Girl Scouts Trail to Herman Street in Harmony
5	Multi-Use Path	Shelton Ave from E Garner Bagnal Blvd (Statesville to Troutman)
6	Multi-Use Path	US 21 from Rumble St to Mazeppa Rd
7	Multi-Use Path	The SEAM Trail along NC 115 (Davidson to Mooresville)
8	Multi-Use Path	Old Mountain Rd from US 21 to Interstate 40
9	Bicycle	Shearers Rd from Mecklenburg County line to Timber Rd
10	Sidewalk	US 21/Charlotte Hwy from Cornelius Rd to NC 115/Statesville Hwy
11	Sidewalk	US 21/Charlotte Hwy from Houston Rd to Westmoreland Rd
12	Sidewalk	US 21/Turnersburg Hwy from Interstate 40 to Pump Station Rd and Fort Dobbs Rd to Bethany Rd
13	Sidewalk	Mocksville Rd from Statesville Greenway to US 64/Mocksville Hwy and US 64/Mocksville Hwy from Mocksville Rd to Pecan Tree Ln
14	Sidewalk	NC 901 from Howards Bridge Rd to Interstate 77
15	Sidewalk	Presbyterian Rd from Mecklenburg Hwy to Shearers Rd
16	Sidewalk	Island Ford Rd from Stamey Farm Rd to Old Mountain Rd and Old Mountain Rd from Island Ford Rd to Interstate 40
17	Sidewalk	Langtree Rd from approximately the All Season Marina and Boat Yard to NC 115

2020-2029 STIP Projects: R-2522

R-2522 project in the 2020-2029 STIP is described as widening US 21 / NC 115 from Cedar Lane in Troutman to Barium Lane in Barium Springs to multilanes. Eastway Drive will end and merge at Winecoff Street at an unsignalized intersection with US 21 / NC 115. A new signal will be installed at Rumble Street along the corridor. A peanut-shaped roundabout is planned to be installed at the intersection of Church Street, Wagner Street, and US 21 / NC 115 (in lieu of realignment of Wagner Street considered in prior plans). A new signal is expected to be installed at the intersection with Talley Street and at the intersection with Old Murdock Road. A five foot wide sidewalk with a planting buffer will be included on the west side of US 21 / NC 115 and a ten foot multi-use path will be installed on the east side (northbound side) of the corridor starting at Winecoff Street. The former Railroad ROW median that currently exists in-between Main Street and Eastway Drive and houses a portion of Richmond Greenway will be modified and partially removed as part of the widening project, with multi-use path shifting to the east side of the roadway.

The latest version of the 2020-2029 STIP reviewed included project R-2522 as an uncommitted project, with ROW phase scheduled for 2029.



Figure 22 - Future R-2522 Peanut Shape Roundabout at Main Street/Wagner Street/Church Street, Source: NCDOT R-2522 Public Meeting Map 1 (Meeting Held May 2, 2019), <https://www.ncdot.gov/news/public-meetings/Pages/R-2522-2019-05-02.aspx>

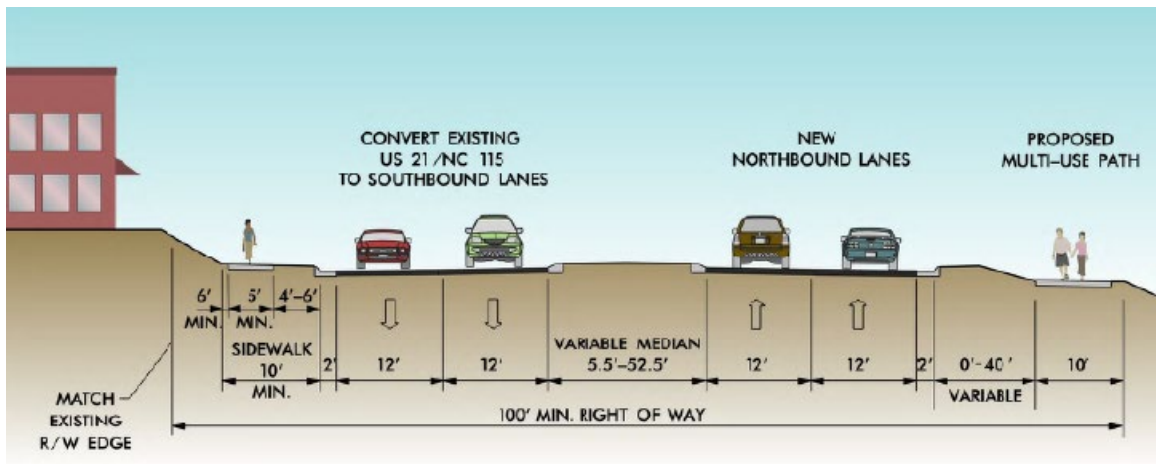


Figure 21 - Future R-2522 Cross-Section from Winecroft Street to Scroggs Street, Source: NCDOT R-2522 Public Meeting Map 1 (Meeting Held May 2, 2019), <https://www.ncdot.gov/news/public-meetings/Pages/R-2522-2019-05-02.aspx>

3. Recommended Facilities

3.1 Overview

This section documents a full list of facility improvement recommendations developed for the plan, the project selection and scoring approach identified based on the Plan Vision and Goals, the top seven priority projects selected, and the six Pilot Projects identified from the top 25 best-scoring projects based on a combination of high scores and representation of a variety of facility types for illustrative visuals.

3.2 Priority Corridors

The priority corridors for the plan focus on the major routes of the Town of Troutman. The main corridor includes US-21 / Main Street from Murdock Road / Old Mountain Road to Garden Center Avenue. Weathers Creek greenway corridor from Houston Road to Westmoreland Road and Westmoreland Road from Weathers Creek greenway to US-21 make up the priority corridors in the southwestern portion of Troutman. In the northern portion of the Town, Old Mountain Road from US-21 / Main Street to South Iredell High School is identified as a priority corridor. Within the downtown of Troutman, Talley Street from East Monbo Road to US-21 / Main Street and Wagner St / Perth Road from US-21 / Main Street to State Park Road are considered priority corridors. Outside of the downtown core, the recreational routes of East Monbo Road from Old Mountain Road to St Johns Road and State Park Road / St. Johns Road from Perth Road to East Monbo Road are identified as priority corridors. Figure 23 below shows the locations of these priority corridors within the Town.

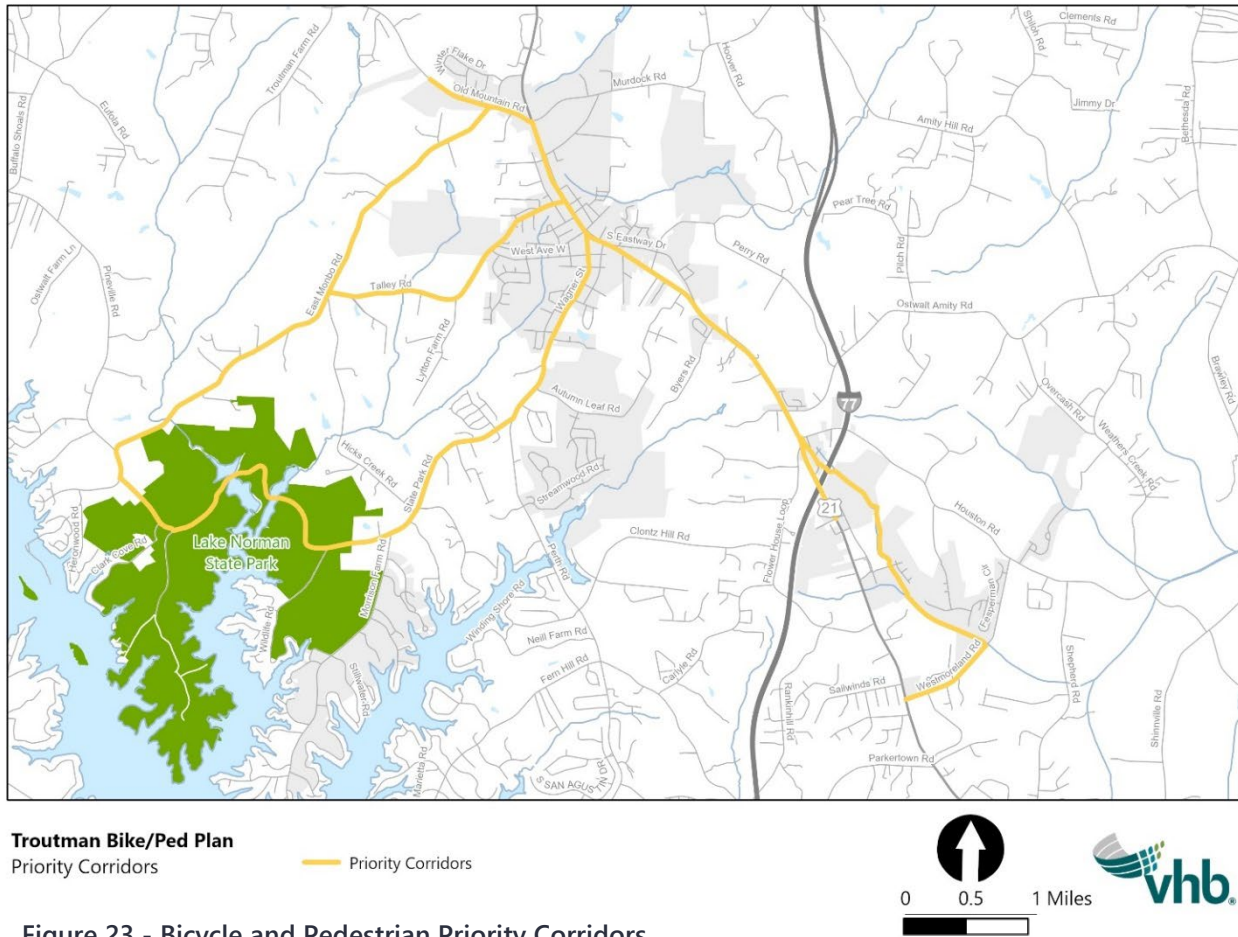


Figure 23 - Bicycle and Pedestrian Priority Corridors

3.3 Facility Recommendations

This section outlines the process for developing recommendations and the final list of recommended infrastructure projects.

Drafting a list of recommended facilities is an iterative process. The first step was a review of the Town’s prior pedestrian plan and any related plans where bicycle and pedestrian facilities may be recommended, including Lake Norman Bicycle Plan, Iredell County Transportation Master Plan (ICTMP), capital improvement plans, land use plans, and other related documents. An inventory of existing and proposed facilities was then created to understand which projects have already been implemented. A field visit was performed to identify additional facilities that need to be upgraded, new facilities that should be proposed, and to review existing active transportation for safety issues. Stakeholder, steering committee, and public feedback assisted with local knowledge to further highlight problem areas for consideration.

Once the initial draft of recommended facilities was complete, the project team reviewed these recommendations with the Steering Committee and also presented them for public comment. The public had the opportunity to comment in-person at the Sprint into Spring 2022 race at Troutman Town Hall and through a second online survey. Additional stakeholder and steering committee feedback was taken into account, and the draft list of

recommendations was revised based on public comment. The revised list of recommended facilities was then ready to be scored to identify top implementation priority projects.

The projects were scored and ranked according to a set of evaluation criteria described in the following section. The project team applied an iterative process involving stakeholder direction, geographic distribution, significant destinations, the existing bicycle and pedestrian network, and priority corridors to identify these projects. Specific facility recommendations, such as sidewalks and MUP locations, were identified partly upon best practices for active transportation design. These recommendations are anticipated for continued refinement throughout the project development process. It should be noted that the following projects have a planning level cost estimate and will change throughout the project development and implementation process.

Based on the existing conditions of the Town and a thorough needs assessment, 78 bicycle and pedestrian facility projects were identified. Of these projects, 56 are linear facilities and 22 are crossing, intersection, or bridge projects. There are 24 recommended sidewalk projects, 25 multi-use path projects, four on-road bicycle projects, and three unpaved trail projects. There are 18 pedestrian crossing recommendations, two intersection improvement recommendations, and two bridge improvements.

Table 5 - Linear Facility Recommendations

ID	Project Type	Facility	From	To	Description	Cost	Length (Mi)
Bike-02	On-Road Bicycle	Cedar Ln	US 21 / NC 115	End of Road	Add advisory bike shoulder on Cedar Ln from US 21 / NC 115 to end of road	\$525,000.00	0.39
Bike-05	On-Road Bicycle	State Park Rd / St John's Rd	Lake Norman State Park Eastern Boundary	East Monbo Rd	Add bikeable shoulder along State Park Rd / St John's Rd from eastern boundary of Lake Norman State Park to E Monbo Rd	\$2,145,000.00	2.63
Bike-06	On-Road Bicycle	Ostwalt Amity Rd	US-21 / NC-115	Pilch Rd	Add bikeable shoulder on Ostwalt Amity Rd from US-21 / NC-115 to Pilch Rd	\$1,170,000.00	1.38
Bike-07	On-Road Bicycle	Morrison Farms Rd	State Park Rd	INT-22, Lake Norman State Park Entrance	Add bikeable shoulder along Morrison Farm Rd from State Park Rd to INT-22, Lake Norman State Park Entrance	\$475,000.00	0.55
EB-5930	Sidewalk	Wagner St	West Ave	US 21 / NC115	Upgrade Sidewalk on both sides on Wagner St from West Ave to US 21 / NC 115 and add pedestrian scale lighting	\$250,000.00	0.16
EB-5931	Sidewalk	Talley Rd	US-21 / NC-115	West Ave	Add sidewalks on Talley Rd from US-21 / NC-115 to West Ave and add pedestrian scale lighting	\$925,000.00	0.69
EB-5932	MUP	Richardson Greenway	Rumple St	Byers Rd	Extend Richardson Greenway from Rumple St to Byers Rd	\$3,010,000.00	1.09
EB-5933	Sidewalk	Rumple St	US-21 / NC-115	E Thomas St	Add sidewalks to Rumple St from US-21 / NC-115 to E Thomas St and add pedestrian scale lighting	\$295,000.00	0.19

MUP-01	MUP	Richardson Greenway	Church St	Rumple St	Add multi-use path from Church St to Richardson Greenway at Rumple St	\$490,000.00	0.16
MUP-02	MUP	Eastway	Old Murdock Rd	Scroggs St	Add multi-use path along Eastway from old Murdock Rd to Scroggs St	\$790,000.00	0.29
MUP-03	MUP	Eastway	Scroggs St	Church St	Add multi-use path along Eastway from Scroggs St to Church St	\$1,040,000.00	0.37
MUP-07	MUP	Old Murdock Rd	US 21 / NC 115	Murdock Rd	Add multi-use path along Old Murdock Rd from US 21 to Murdock Rd	\$1,855,000.00	0.65
MUP-08	MUP	Old Mountain Rd existing sidewalk	End of existing MUP	End of school property	Upgrade existing sidewalk to multi-use path from end of current multi-use path to end of school property	\$875,000.00	0.32
MUP-10	MUP	East Monbo Rd	Old Mountain Rd	St Johns Rd	Add multi-use path along ES Monbo Rd	\$11,405,000.00	4.27
MUP-11	MUP	New Greenway	Rumple St	Aberdeen Dr	Add multi-use path connector from Hemi Dr to Aberdeen Dr with Cedar Ln Connector (can be unpaved path)	\$1,405,000.00	0.50
MUP-12	MUP	Wagner Street	West Avenue	Quail Haven Dr	Add multi-use path along Wagner Street from West Ave to Quail Haven Dr	\$1,985,000.00	0.72
MUP-13	MUP	School Loop Greenway	Talley St	Wagner St / Perth Rd	Add new greenway from Talley Street to Autumn Leaf Rd	\$2,865,000.00	1.00
MUP-14	MUP	Autumn Leaf Rd	Wagner St / Perth Rd	Bend of Autumn Leaf Rd	Add new greenway (School Loop Greenway) from Wagener St / Perth Rd to bend in Autumn Leaf Rd	\$2,020,000.00	0.72
MUP-15	MUP	School Loop Greenway	Bend of Autumn Leaf Rd	US-21 / NC-115	Add new greenway (School Loop Greenway) from bend of	\$3,710,000.00	1.33

					Autumn Leaf Rd to US-21 / NC-115		
MUP-16	MUP	New Greenway	Ostwalt Amity Rd	Houston Rd	Add new greenway from Ostwalt Amity Rd to Houston Rd on western edge of I-77	\$1,375,000.00	0.51
MUP-18	MUP	Richardson Greenway	Byers Rd	Houston Rd	Extend Richardson Greenway from Byers Rd to Houston Rd	\$2,965,000.00	1.11
MUP-19	MUP	Richardson Greenway	Houston Rd	Westmoreland Rd	Extend Richardson Greenway from Houston Rd to Westmoreland Rd	\$6,020,000.00	2.31
MUP-20	MUP	Westmoreland Rd	US-21 / NC-115	Richardson Greenway Extension	Add new multi-use path to Westmoreland Rd from US-21 / NC-115 to Richardson Greenway Extension	\$2,190,000.00	0.76
MUP-21	MUP	Perth Rd	Quail Haven Dr	State Park Rd	Add multi-use path to Perth Rd from Quail Haven Dr to State Park Rd, near-term create bikeable shoulder	\$1,860,000.00	0.69
MUP-22	MUP	State Park Rd	Perth Rd	Lake Norman State Park	Add multi-use path along State Park Rd from Perth Rd to Lake Norman State Park, near-term create bikeable shoulder	\$4,560,000.00	1.69
MUP-23	MUP	New Greenway	Patterson St	Murdock Rd	Add new greenway from Patterson St to Murdock Rd along current town limits	\$2,200,000.00	0.78
MUP-24	MUP	Houston Rd	Proposed MUP-16	Richardson Greenway Extension	Add MUP along Houston Rd from proposed MUP-16 to Richardson Greenway Extension	\$2,020,000.00	0.31
MUP-25	MUP	Murdock Rd	US-21 / NC-115	Iredell Ave	Add new multi-use path along Murdock Rd from US-21 / NC-115 to Iredell Ave	\$1,940,000.00	0.68

MUP-26	MUP	Weathers Creek Greenway Spur	Weathers Creek Greenway at I-77	Home Improvement Street	Add new multi-use path from Weathers Creek Greenway to Home Improvement Street	\$885,000.00	0.28
MUP-27	MUP	Flower House Loop	US-21 / NC-115	US-21 / NC-115	Add multi-use path along Flower House Loop from US-21 / NC-115 to US-21 / NC-115	\$6,270,000.00	2.07
MUP-28	MUP	US-21 / NC-115	Garden Center Ave	Westmoreland Rd	Add multi-use path along US-21 / NC-115 from Garden Center Ave to Westmoreland Rd	\$3,895,000.00	1.49
MUP-29	MUP	Smith Village Greenway Spur	US-21 / NC-115	Flower House Loop	Add multi-use path along Smith Village Development from US-21 / NC-115 to Flower House Loop	\$2,280,000.00	0.78
Ped-01	Sidewalk	US-21 / NC-115	Wagner St	Rumple St	Upgrade sidewalk with vertical separation from road, ADA compliance, and add pedestrian scale lighting	\$240,000.00	0.15
Ped-02	Sidewalk	Scroggs St	Eastway Dr	Existing Sidewalk near ESC Park	Add sidewalk from Eastway Dr to existing sidewalk near ESC Park and add pedestrian scale lighting	\$100,000.00	0.04
Ped-04	Sidewalk	West Ave	West Ave W	West Ave E	Upgrade sidewalk and modify curb ramps along West Ave and add pedestrian scale lighting	\$1,120,000.00	0.90
Ped-05	Sidewalk	Church St	Church St W	Church St E	Upgrade sidewalk and modify curb ramps along Church St and add sidewalks and pedestrian scale lighting on both sides from US 21 to Brown St	\$1,345,000.00	0.50
Ped-06	Sidewalk	Wagner St	West Ave	Quail Haven Rd	Fill in sidewalk gap and add pedestrian scale lighting	\$870,000.00	0.72

					along Wagner St from West Ave to Quail Haven Rd		
Ped-07	Sidewalk	Talley St	West Ave	E Monbo Rd	Add sidewalk from West Ave to East Monbo Rd along Talley St	\$1,735,000.00	1.45
Ped-08	Sidewalk	West Ave	Wagner St	Rumple St	Add sidewalks and pedestrian scale lighting on both sides of West Ave from Wagner St to Rumple St	\$165,000.00	0.10
Ped-10	Sidewalk	Brown St	Church St	West Ave	Upgrade sidewalk, fill in sidewalk gaps, and add pedestrian scale lighting along Brown St from Church St to West Ave	\$175,000.00	0.11
Ped-11	Sidewalk	West Ave	Wagner St	Brown St	Add sidewalks and pedestrian scale lighting on both sides of West Ave from Wagner St to Brown St	\$415,000.00	0.14
Ped-12	Sidewalk	Lytton St	Goodman Rd	Mills St	Add sidewalk on west side, close existing sidewalk gaps on east side, upgrade existing sidewalks for ADA compliance, and add pedestrian scale lighting	\$645,000.00	0.52
Ped-13	Sidewalk	Mills St	North Gibson St	Us 21 / NC115	Add sidewalk and pedestrian scale lighting on one side along Mills St from North Gibson St to US 21 / NC115	\$295,000.00	0.19
Ped-14	Sidewalk	Gibson St	Church St	Mills St	Add sidewalk and pedestrian scale lighting on one side along Gibson St from Church St to Mills St	\$190,000.00	0.12

Ped-15	Sidewalk	US 21 / NC 115	Old Mountain Rd	Scroggs St	Add sidewalk and pedestrian scale lighting on US 21 from Old Mountain Rd to where existing sidewalks begin across from Town Hall/Scroggs St	\$635,000.00	0.49
Ped-16	Sidewalk	US 21 / NC 115	Scroggs St	Wagner St	Upgrade existing sidewalks on west side, close sidewalks gaps, and pedestrian scale lighting from just north of Scroggs St to Wagner St	\$500,000.00	0.39
Ped-18	Sidewalk	US 21 / NC 115	Rumple St	Barkdale Rd	Add sidewalks on west side of US 21 from Troutman Elementary School to Barkdale Rd/ Oswalt Amity Rd	\$2,270,000.00	1.92
Ped-19	Sidewalk	Leon St	Rumple St	Wagner St	Add sidewalk and pedestrian scale lighting to one side of Leon St between Rumple St and Wagner St	\$145,000.00	0.08
Ped-20	Sidewalk	Eastway	Church St	Perry Rd	Add sidewalk and pedestrian scale lighting along Eastway from Church St to Perry Rd	\$720,000.00	0.58
Ped-21	Sidewalk	Eastway Dr	Perry Rd	US-21 / NC-115	Add sidewalk and pedestrian scale lighting from Perry Rd to US-21 / NC-115 along Eastway Dr	\$680,000.00	0.52
Ped-22	Sidewalk	US-21 / NC-115	Garden Center Ave	Flower House Loop	Add sidewalk along US-21 / NC-115 from Garden Center Ave to Flower House Loop	\$1,020,000.00	0.85
Ped-23	Sidewalk	Winecoff St	Eastway Dr	Approximately 403 Winecoff St	Add sidewalk and pedestrian scale lighting along Winecoff St from Eastway Dr to approximately 403 Winecoff St near entrance of pending housing development	\$395,000.00	0.27

Ped-24	Sidewalk	US-21 / NC-115	Ostwalt Amity Rd	Garden Center Ave	Add sidewalk to US-21 / NC-115 from Ostwalt Amity Rd to Garden Center Ave	\$1,815,333.00	0.92
Trail-01	Unpaved Trail	Brookside Trail	Wagner Street	Massey St	Add new unpaved trail (Brookside Trail) from Wagner St to Massey St	\$2,195,000.00	0.78
Trail-02	Unpaved Trail	Brookside Trail	Massey St	Meadow Glen Dr	Add new unpaved trail (Brookside trail) from Massey St to Meadow Glen Dr	\$1,660,000.00	0.62
Trail-03	Unpaved Trail	Brookside Trail	Meadow Glen Dr	St. John's Rd	Add new unpaved trail along Brookside Creek from Meadow Glen Dr to St. John's Rd	\$5,395,000.00	2.05

Table 6 - Point Facility Recommendations

ID	Facility Type	Facility	Intersection	Description	Cost
INT-01	Pedestrian Crossing	US-21 / NC-115	US-21 / NC-115 and Eastway Drive near Rumple St across from Troutman Elementary School	Add new pedestrian crosswalk to connect from rail-trail across US-21 / NC-115 towards Troutman Elementary and across Eastway Drive. Evaluate for PHB, RRFB and/or high visibility crossing markings	\$70,000.00
INT-02	Intersection Improvement	US-21 / NC-115	Wagner St	Upgrade curb-cuts and ramps for ADA compliance	\$170,000.00
INT-03	Pedestrian Crossing	Church Street	US-21 / NC-115 and Eastway Dr	Upgrade existing rail-trail crossing and add warning signage at E. Church St at US-21 /	\$110,000.00

				NC-115 and add crossing across Eastway on northern edge	
INT-04	Pedestrian Crossing	US-21 / NC-115	Mid-Block Crossing	Add high visibility mid-block pedestrian crossing near Town Hall across US 21; upgrade existing crossing across Eastway Drive for ADA compliance	\$130,000.00
INT-05	Pedestrian Crossing	US-21 / NC-115	North of Old Murdock Rd	Add pedestrian crossing north of Old Murdock Rd intersection with US-21 / NC-115 at striped median	\$105,000.00
INT-06	Intersection Improvement	US-21 / NC-115	Murdock Rd / Old Mountain Rd	Add ped signal heads and striped crosswalks across all approaches at Old Mountain Rd / Murdock Rd intersection, update intersection geometrics for ped safety; remove right-turn slip lane on Old Mountain Rd	\$410,000.00
INT-07	Pedestrian Crossing	US-21 / NC-115	Barium Ln	Upgrade crosswalk at Barium Ln at US-21 / NC-115 with additional warning signage, RRFB, updated lighting, and high visibility crosswalk markings	\$75,000.00

INT-08	Pedestrian Crossing	Old Mountain Rd	April Showers Ln	Upgrade existing crosswalk at April Showers Ln and upgrade lighting; consider RRFB and median refuge island	\$85,000.00
INT-09	Pedestrian Crossing	Wagner St	Leon St	Add high visibility crosswalk at Wagner St at Leon St	\$115,000.00
INT-11	Pedestrian Crossing	US-21 / NC-115	Garden Center Ave / Lexus Dr	Upgrade to pedestrian crossings on all sides, ped signal heads	\$300,000.00
INT-12	Pedestrian Crossing	Talley St	Lytton St	Add pedestrian crosswalks on all approaches, evaluate for additional treatments	\$290,000.00
INT-13	Pedestrian Crossing	Lytton St	Mills Ave	Add crosswalks, curb ramps, and evaluate for additional ped safety treatments	\$130,000.00
INT-14	Pedestrian Crossing	Church St	Gibson St	Add pedestrian crosswalks on all approaches, curb ramps, and evaluate for additional ped safety treatments	\$130,000.00
INT-10	Pedestrian Crossing	Wagner St	West Ave	Upgrade crosswalk with RRFB and high visibility crosswalks on all approaches, upgrade curb ramps for ADA Compliance	\$130,000.00
INT-15	Bridge Improvements	Houston Rd	I-77	Add bicycle and pedestrian facilities	\$2,395,000.00

				to Houston Rd Bridge over I-77	
INT-16	Pedestrian Crossing	US-21 / NC-115	Oswalt Amity Rd	Add pedestrian crosswalks, ped heads at US-21 / NC-115 at Oswalt Amity Rd intersection	\$110,000.00
INT-17	Pedestrian Crossing	US-21 / NC-115	Byers Rd	Add high visibility pedestrian crosswalks and advanced warning signage	\$235,000.00
INT-18	Pedestrian Crossing	Richardson Greenway	Food Lion Shopping Plaza	Improve pedestrian crossings at plaza driveways	\$265,000.00
INT-19	Pedestrian Crossing	US-21 / NC-115	Flower House Loop / Houston Rd	Add pedestrian crosswalks on all approaches, curb ramps, and ped signal heads as part of R-5711	\$235,000.00
INT-20	Bridge Improvements	Flower House Loop	I-77	Add bicycle and pedestrian facilities to Flower House Loop Bridge over I-77	\$3,625,000.00
INT-21	Pedestrian Crossing	Wagner St	E Thomas St / W Thomas St	Add high visibility pedestrian crosswalks on all approaches, evaluate for additional treatments	\$75,000.00
INT-22	Pedestrian Crossing	Morrison Farm Rd	Lake Norman State Park Gate	Add formal bicycle entry into Lake Norman State Park from Morrison Farm Rd	\$65,000.00

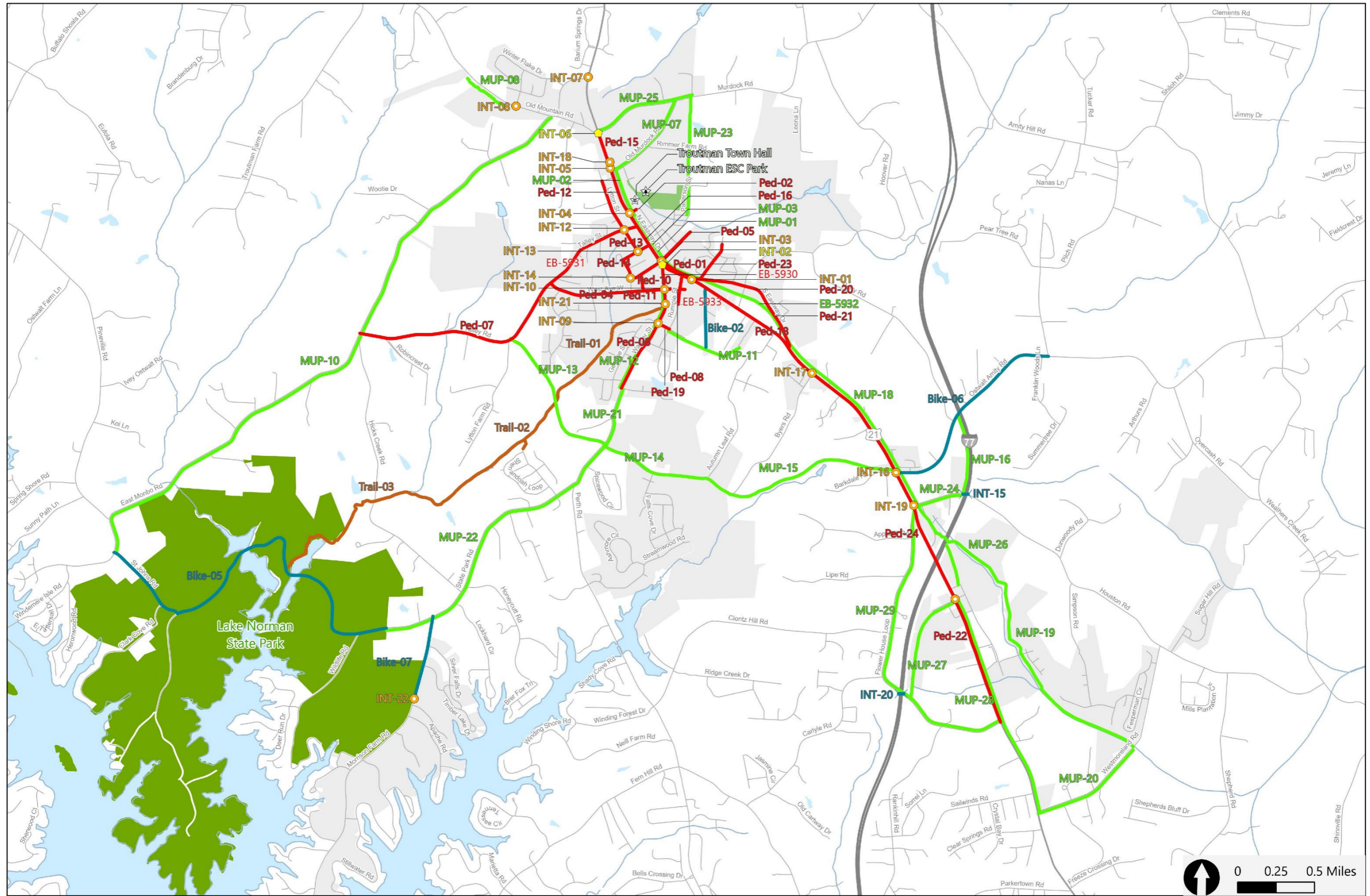


Figure 24 - Project Recommendations: Troutman Planning Area

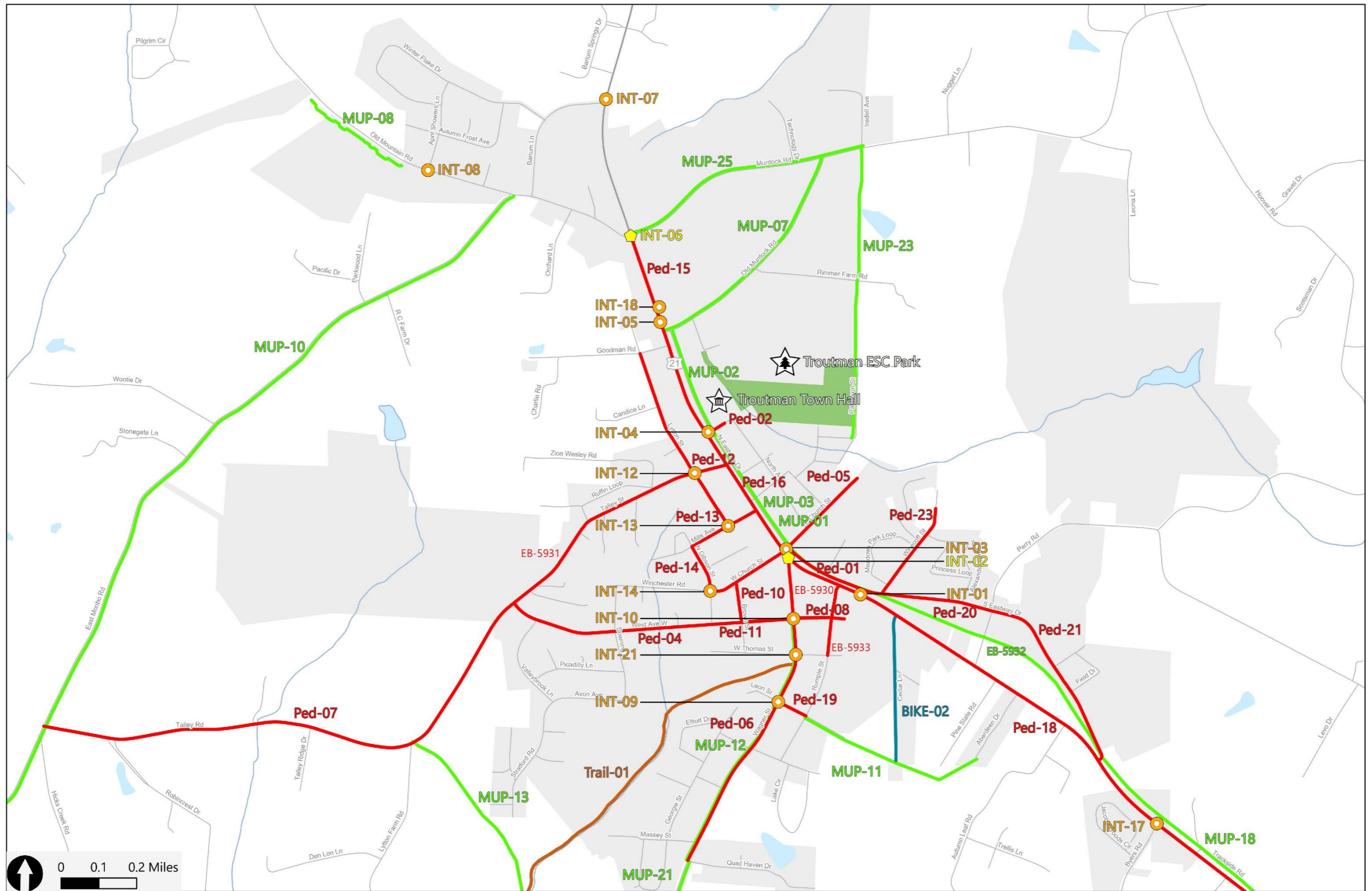


Figure 25 - Project Recommendations: Downtown Troutman

3.3.1 Evaluation Criteria

Recommended projects were objectively scored based on seven scoring criteria. These scoring criteria were developed based on the plan’s vision, goals, and objectives set forth at the beginning of the planning process. The scoring guidelines assigned a score out of 100 possible points to each project. The criteria used for scoring include: connections to destinations, connection to downtown Troutman or Lake Norman State Park, completion or extension of the existing network, pedestrian and bicycle safety, roadway traffic volume, cost effectiveness, and environmental justice. The project scoring matrix can be found in Table 7.

Table 7 - Project Scoring Matrix

Criteria	Score
Connections*	20%
Connects to 10+ Destinations	20
Connects to 1-9 Destinations	10
No Destination Connections	0
Connects to Downtown or Lake Norman State Park	10%
Project Connects to or is in Downtown or Lake Norman State Park	10
Not Connected to or is not in Downtown or Lake Norman State Park	0
Completing the Network	20%
Project Overcomes a Major Barrier (e.g. interstate overpass/underpass, railroad, bridge)	10
Fills a gap or extends the network	10
Does not fill a gap or extend existing network	0
Pedestrian and Bicyclist Safety/Conflict Minimization	20%
High Risk Location (upper quintile) or cluster of 4+ crashes	20
Moderate risk location or upper 3-4 quintiles	5
Projects meets neither of above criteria but provides separation	3
No separation	0
Traffic Volume	10%
AADT greater than 10,000	10
AADT 5,001 – 10,000	5
AADT 5,000 or less	0
Cost Effectiveness	10%
Lowest 33% by project cost	10

Middle 33% by project cost	5
Highest 33% by project cost	0
Environmental Justice (EJ)**	10%
Project overlaps with a block group higher than county average for 3+ transportation disadvantaged population categories	10
Project overlaps with a block group higher than county average for 1-2 transportation disadvantaged population categories	5
No overlap with block groups higher than county average for transportation disadvantaged population categories	0
<p>*Destinations defined as schools, colleges/universities, gyms, parks, recreation centers, grocery stores, social services, commercial centers, libraries, town hall, multi-family residential (existing or planned), or major employment site (50+ jobs)</p> <p>**Environmental Justice (EJ) is comprised of 5 transportation disadvantaged population categories including: Elderly Individuals (Aged 65+), Zero Vehicle Households, Households in Poverty, Limited English Proficiency, and Concentration of Minority Race/Ethnic Groups</p>	

Each scoring criteria is broken down into two to four scoring levels. The greater the match to the scoring criteria, the higher the project will score. Each project is scored on all seven criteria and assigned a composite score between 0 – 100 points. Projects are then compared to one another utilizing the composite score. Projects that have higher composite scores will be recommended for earlier implementation than those with lower composite scores.

3.3.2 Project Scoring

Table 8 below includes the scoring results for the bicycle and pedestrian projects considered, based on the scoring criteria identified.

Table 8 - Project Scoring Results

ID	Facility Type	Facility	Cost Effectiveness	Expand the Network	EJ	Downtown / Lake Norman SP	Traffic AADT	Key Connections	Safety	Composite Score
INT-04	Pedestrian Crossing	US-21 / NC-115	10	10	10	10	10	10	20	80
EB-5930	Sidewalk	Wagner St	10	10	10	10	5	10	20	75
Ped-15	Sidewalk	US 21 / NC 115	5	10	10	10	10	10	20	75
Ped-16	Sidewalk	US 21 / NC 115	5	10	10	10	10	10	20	75
Ped-19	Sidewalk	Leon St	10	10	10	10	5	10	20	75
INT-01	Pedestrian Crossing	US-21 / NC-115	10	10	5	10	10	10	20	75
INT-03	Pedestrian Crossing	Church Street	10	10	5	10	10	10	20	75
INT-10	Pedestrian Crossing	Wagner St	10	10	10	10	5	10	20	75
INT-21	Pedestrian Crossing	Wagner St	10	10	10	10	5	10	20	75
Ped-01	Sidewalk	US-21 / NC-115	10	0	10	10	10	10	20	70
Ped-06	Sidewalk	Wagner St	5	10	10	10	5	10	20	70
Ped-10	Sidewalk	Brown St	10	10	10	10	0	10	20	70
Ped-08	Sidewalk	West Ave	10	10	10	10	0	10	20	70
Ped-13	Sidewalk	Mills St	10	10	10	10	0	10	20	70
Ped-14	Sidewalk	Gibson St	10	10	10	10	0	10	20	70

Ped-24	Sidewalk	US-21 / NC-115	0	20	10	0	10	10	20	70
INT-02	Intersection Improvement	US-21 / NC-115	10	0	10	10	10	10	20	70
INT-05	Pedestrian Crossing	US-21 / NC-115	10	10	10	0	10	10	20	70
INT-12	Pedestrian Crossing	Talley St	10	10	10	10	0	10	20	70
INT-13	Pedestrian Crossing	Lytton St	10	10	10	10	0	10	20	70
INT-14	Pedestrian Crossing	Church St	10	10	10	10	0	10	20	70
MUP-22	MUP	State Park Rd	0	10	10	10	5	10	20	65
Ped-04	Sidewalk	West Ave	5	10	10	10	0	10	20	65
Ped-05	Sidewalk	Church St	5	10	10	10	0	10	20	65
Ped-11	Sidewalk	West Ave	5	10	10	10	0	10	20	65
Ped-12	Sidewalk	Lytton St	5	10	10	10	0	10	20	65
Ped-18	Sidewalk	US 21 / NC 115	0	10	5	10	10	10	20	65
MUP-12	MUP	Wagner Street	0	10	10	10	5	10	20	65
EB-5931	Sidewalk	Talley Rd	5	10	10	10	0	10	20	65
EB-5933	Sidewalk	Rumple St	10	10	5	10	0	10	20	65
Ped-22	Sidewalk	US-21 / NC-115	5	10	10	0	10	10	20	65
INT-06	Intersection Improvement	US-21 / NC-115	5	10	10	0	10	10	20	65
INT-08	Pedestrian Crossing	Old Mountain Rd	10	10	5	0	10	10	20	65
INT-09	Pedestrian Crossing	Wagner St	10	10	10	10	5	0	20	65
INT-18	Pedestrian Crossing	Richardson Greenway	10	10	5	0	10	10	20	65

Bike-02	On-Road Bicycle	Cedar Ln	5	10	5	10	0	10	20	60
MUP-01	MUP	Richardson Greenway	5	0	5	10	10	10	20	60
MUP-02	MUP	Eastway	5	10	5	10	0	10	20	60
MUP-03	MUP	Eastway	5	10	5	10	0	10	20	60
Ped-20	Sidewalk	Eastway	5	10	5	10	0	10	20	60
MUP-11	MUP	New Greenway	5	10	5	10	0	10	20	60
MUP-08	MUP	Old Mountain Rd existing sidewalk	5	10	5	0	10	10	20	60
MUP-28	MUP	US-21 / NC-115	0	10	10	0	10	10	20	60
Ped-02	Sidewalk	Scroggs St	10	0	5	10	0	10	20	55
EB-5932	MUP	Richardson Greenway	0	0	5	10	10	10	20	55
MUP-07	MUP	Old Murdock Rd	0	10	10	0	0	10	20	50
INT-07	Pedestrian Crossing	US-21 / NC-115	10	10	5	0	5	0	20	50
INT-11	Pedestrian Crossing	US-21 / NC-115	5	10	10	0	10	10	5	50
Trail-03	Unpaved Trail	Brookside Trail	0	10	10	10	5	10	3	48
MUP-26	MUP	Weathers Creek Greenway Spur	5	10	10	0	10	10	3	48
MUP-21	MUP	Perth Rd	0	10	10	0	5	0	20	45
MUP-10	MUP	East Monbo Rd	0	10	10	10	0	10	5	45
MUP-25	MUP	Murdock Rd	0	10	5	0	0	10	20	45
INT-16	Pedestrian Crossing	US-21 / NC-115	10	0	5	0	10	0	20	45
INT-17	Pedestrian Crossing	US-21 / NC-115	10	0	5	0	10	0	20	45
INT-19	Pedestrian Crossing	US-21 / NC-115	10	0	5	0	10	0	20	45

Bike-05	On-Road Bicycle	State Park Rd / St John's Rd	0	10	10	10	0	10	0	40
Ped-07	Sidewalk	Talley St	0	10	10	0	0	0	20	40
Ped-21	Sidewalk	Eastway Dr	5	0	5	0	0	10	20	40
MUP-29	MUP	Smith Village Greenway Spur	0	10	10	0	10	10	0	40
Trail-01	Unpaved Trail	Brookside Trail	0	10	10	10	5	0	3	38
Bike-06	On-Road Bicycle	Ostwalt Amity Rd	5	0	10	0	5	10	5	35
MUP-18	MUP	Richardson Greenway	0	0	5	0	10	0	20	35
MUP-27	MUP	Flower House Loop	0	10	10	0	0	10	5	35
INT-15	Bridge Improvements	Houston Rd	0	10	10	0	10	0	5	35
INT-20	Bridge Improvements	Flower House Loop	0	10	10	0	10	0	5	35
Trail-02	Unpaved Trail	Brookside Trail	5	10	10	0	5	0	3	33
MUP-19	MUP	Richardson Greenway	0	0	10	0	10	10	3	33
Ped-23	Sidewalk	Winecoff St	5	10	5	0	0	10	3	33
INT-22	Pedestrian Crossing	Morrison Farm Rd	10	0	0	10	0	10	0	30
Bike-07	On-Road Bicycle	Morrison Farms Rd	5	0	0	10	0	10	3	28
MUP-14	MUP	Autumn Leaf Rd	0	0	5	0	0	0	20	25
MUP-16	MUP	New Greenway	5	10	5	0	5	0	0	25
MUP-13	MUP	School Loop Greenway	0	10	10	0	0	0	3	23
MUP-23	MUP	New Greenway	0	0	5	0	0	10	5	20

MUP-20	MUP	Westmoreland Rd	0	0	10	0	0	0	3	13
MUP-24	MUP	Houston Rd	0	0	5	0	0	0	5	10
MUP-15	MUP	School Loop Greenway	0	0	5	0	0	0	3	8

Based on the project scoring results, a list of seven projects were identified as priority projects. Table 9 below includes the top seven priority projects.

Table 9 - Troutman Priority Bicycle and Pedestrian Projects Based on Scoring

ID	Facility Type	Facility	From	To	Intersection	Description	Miles	Cost	Total Score
INT-04	Pedestrian Crossing	US 21 / NC 115	n/a	n/a	Mid-block crossing across US-21 / NC-115 and Eastway Dr near Town Hall north of Scroggs St	Add high visibility mid-block pedestrian crossing near Town Hall across US-21 / NC-115 (Main St), evaluate for an RRFB or PHB, upgrade Eastway Drive crossing to address ADA compliance issues	n/a	\$130,000.00	80
Ped-15	Sidewalk	US 21 / NC 115	Old Mountain Rd	Scroggs St	n/a	Add sidewalk on US 21 from Old Mountain Rd to where existing sidewalks begin across from Town Hall/Scroggs St	0.49	\$635,000.00	75
Ped-16	Sidewalk	US 21 / NC 115	Scroggs St	Wagner St	n/a	Upgrade existing sidewalks on west side and close sidewalk gaps from just north of Scroggs St to Wagner St	0.39	\$500,000.00	75
INT-01	Pedestrian Crossing	US-21 / NC-115	n/a	n/a	US 21 and Eastway Drive near Rumble St across from Troutman Elementary school	Add new pedestrian crosswalk to connect from rail-trail across US 21 towards Troutman Elementary and across Eastway Drive. Evaluate for a PHB, RRFB and/or high visibility crossing markings.	n/a	\$70,000.00	75
INT-03	Pedestrian Crossing	Church Street	n/a	n/a	US-21 / NC-115 and Eastway Dr	Upgrade existing rail-trail crossing and add warning signage at E. Church St at US-21 / NC-115 and add crossing across Eastway on northern edge	n/a	\$110,000.00	75
INT-10	Pedestrian Crossing	Wagner St	n/a	n/a	West Ave	Upgrade crosswalk with RRFB and high visibility crosswalks on all approaches, upgrade curb ramps for ADA Compliance	n/a	\$130,000.00	75
INT-21	Pedestrian Crossing	Wagner St	n/a	n/a	E Thomas St / W Thomas St	Add high visibility pedestrian crosswalks on all approaches, evaluate for additional treatments	n/a	\$75,000.00	75



Troutman Bike/Ped Plan

Priority Project
Recommendations

Project Recommendations

- Pedestrian Crossing
- Sidewalk

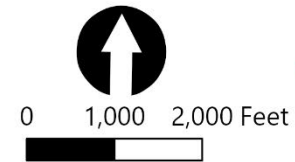


Figure 26 - Priority Project Recommendations

3.4 Placemaking and Small Improvements Recommendations

In addition to the facility recommendations, the Plan also recommends several placemaking and small improvement strategies in key locations. Placemaking focuses on transforming and defining a public space to strengthen the connection between those who use the space and the physical environment. For the purpose of this Plan, placemaking will focus on wayfinding and bicycle amenities. As described in Table 10, three locations are recommended for placemaking efforts: US 21 at Old Mountain Road / Murdock Road (where existing Richardson Greenway connects to a sidepath segment along Old Mountain Road), Troutman ESC Park, and the Troutman Depot. The inclusion of bicycle Fix-It (public repair) stations and a trails map kiosk will help orient bicyclists and pedestrians to how to safely navigate around the Town and would provide bicyclists with an opportunity to perform maintenance on their bicycles in a safe and convenient location. Figure 27 map identifies these locations within the Town.

Table 10 – Placemaking and Small Improvements Recommendations

Project ID	Recommendation	Location	Cost
PM-01	Bicycle Fix-It Station and trails map kiosk, US 21 at Old Mountain Road/Murdock Road	US 21 at Old Mountain Rd / Murdock Rd (southeastern quadrant of the intersection suggested)	\$10,000
PM-02	Bicycle Fix-It Station and trails map kiosk at Troutman ESC Park	Troutman ESC Park	\$10,000
PM-03	Bicycle Fix-It Station, trails map kiosk, and bicycle parking rack	Troutman Depot (137 S. Main Street)	\$11,500



Example of Bicycle Fix-It (Public Repair) Station with Attached Pump and Tools.

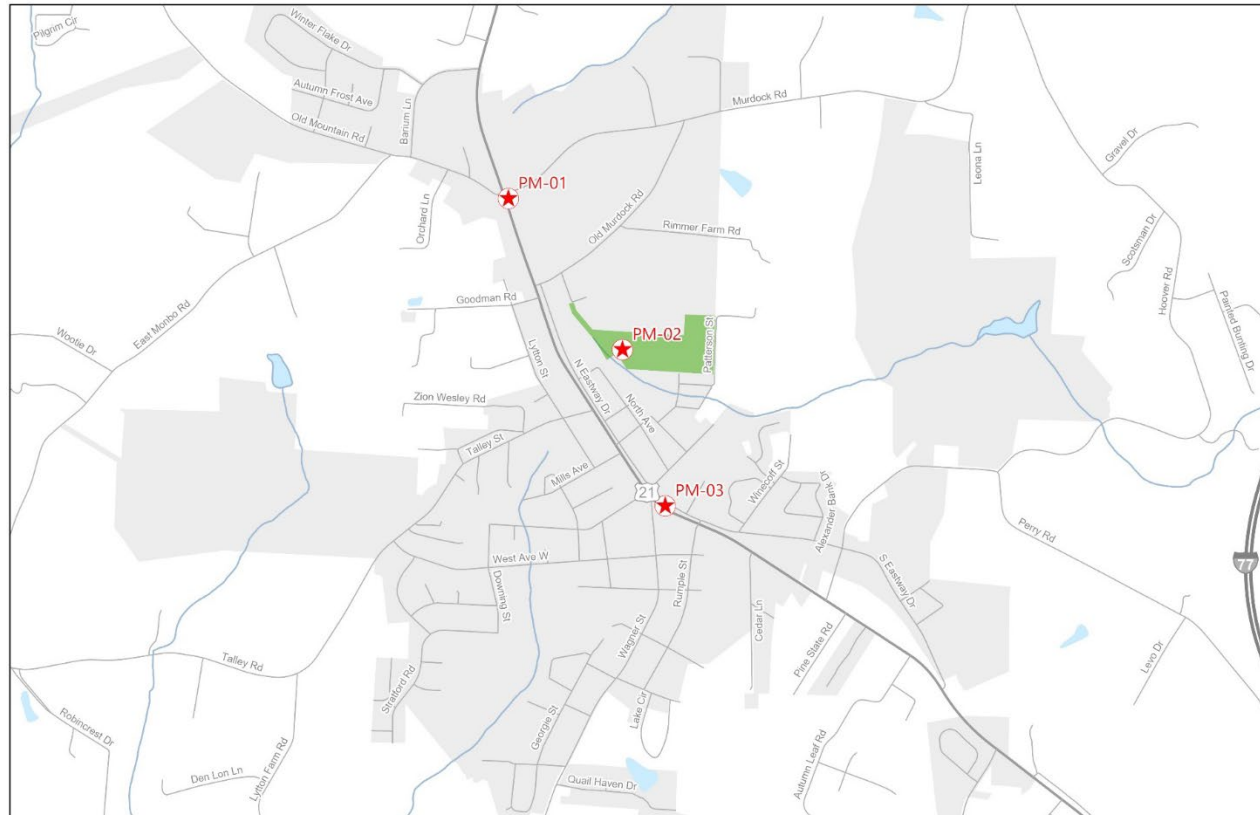


Figure 27 - Recommended Placemaking Locations

3.5 Six Pilot Projects: Project Examples and Visuals

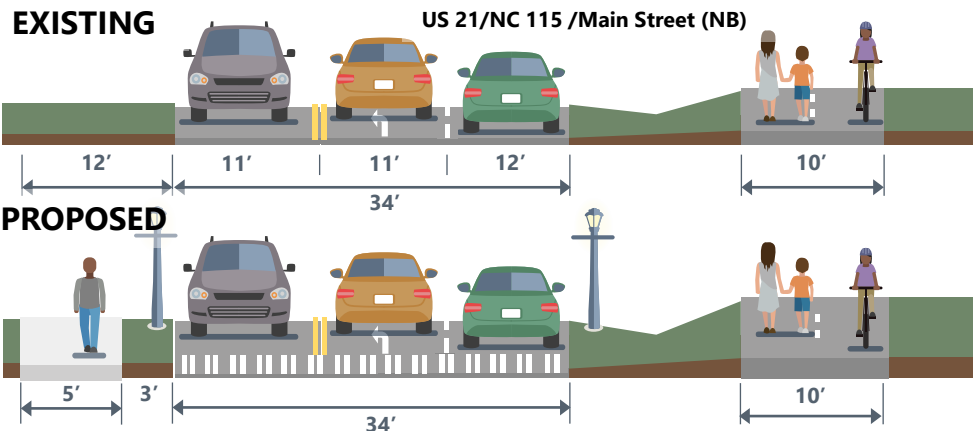
A subset of six pilot projects from the top 25 scoring projects was selected to provide more detailed illustrations and visuals. Those six projects were selected based on project scores, with additional consideration for providing examples of projects across multiple project types and categories.

Project
Int-06

Improved Crossing at US 21 and Old Mountain Road

EXISTING CONDITIONS

Route	AADT (2020)	Speed Limit	Length	Roadway Width (ft)	ROW (ft)	System
US 21 at Old Mountain Rd	9,300	35 mph	N/A	34'	60'	NCDOT
Old Mountain Rd	11,500	35 mph	N/A	25'	60'	NCDOT
Murdock Road	4,500	35 mph	N/A	34'	60'	NCDOT



Aerial image of the existing marked crossing at the signalized intersection of US 21 and Old Mountain Rd

CONSIDERATIONS

- Coordinate with NCDOT for roadway improvements and ROW
- Coordinate with Ped-15 Main Street sidewalks project
- Coordinate with MUP-25 Murdock Rd project

CONSTRAINTS

- High traffic intersection
- Iredell County Fairgrounds at the northeast corner and shopping plaza at the northwest corner
- Heavy freight volumes

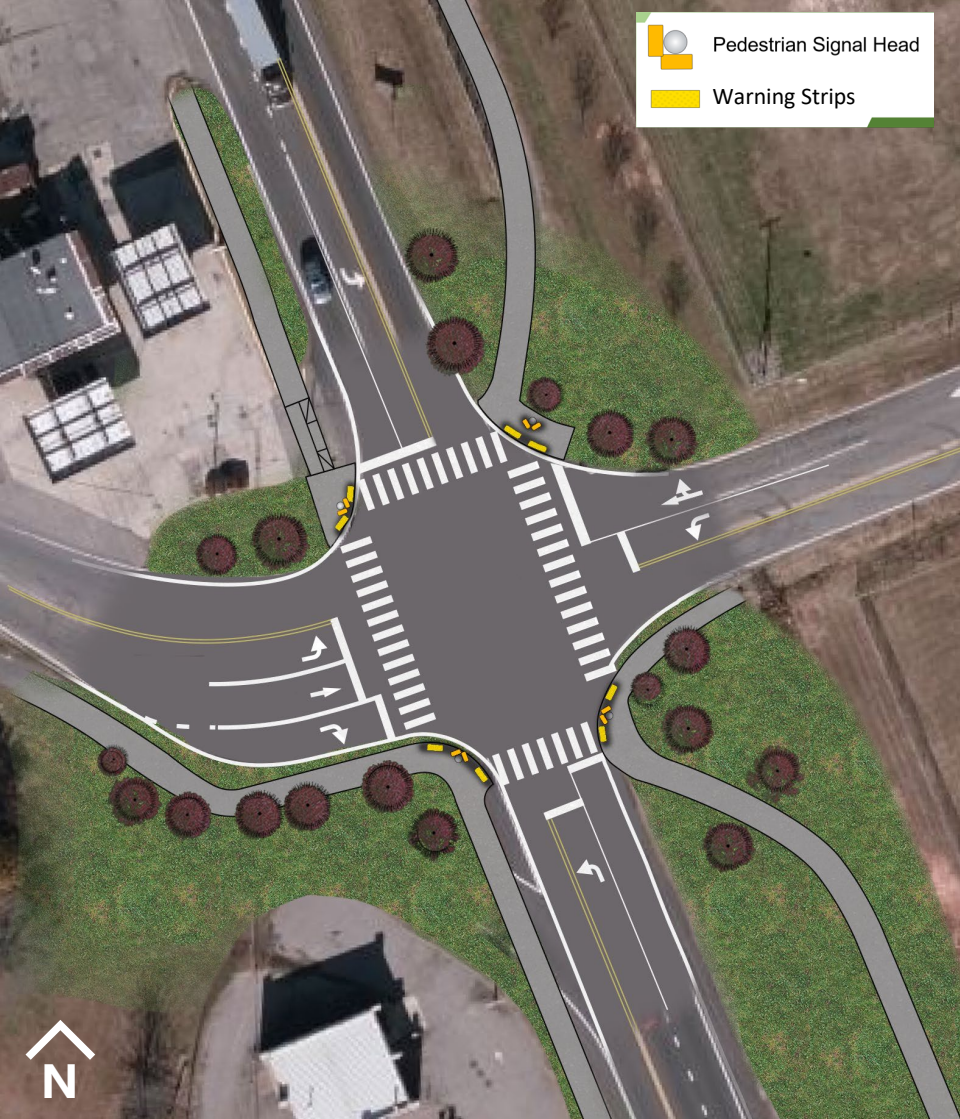
COST

High Level Planning Cost adjusted from 2019 to 2021 values: \$410,000

Design: \$50,000
 ROW: \$10,000
 Utilities: \$5,000
 Construction: \$345,000

Costs developed with NCDOT's Bicycle and Pedestrian Cost Estimation Tool and adjusted to 2021 USD (\$)





●
 Pedestrian Signal Head
 Warning Strips

RECOMMENDATIONS

Improve crossing at US 21 and Old Mountain Road by adding pedestrian signal heads and highly visible pedestrian crosswalk markings across all approaches. Update intersection geometrics for pedestrian safety by removing eastbound right-turn slip lane on Old Mountain Road. Upgrade curb ramps.



Project Int-06 conceptual rendering from person-level perspective showing the improved intersection with pedestrian phase and marked crosswalks.

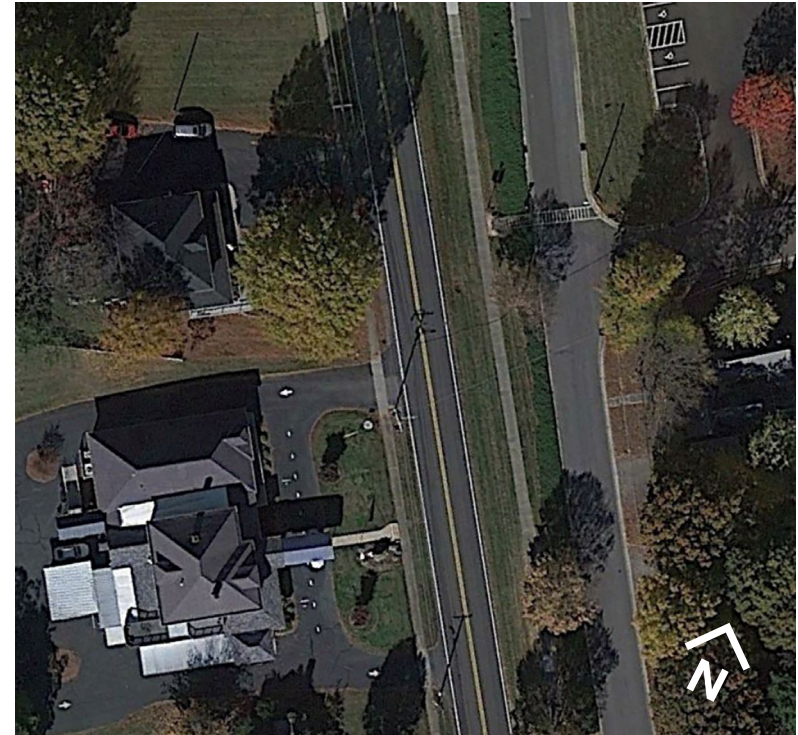
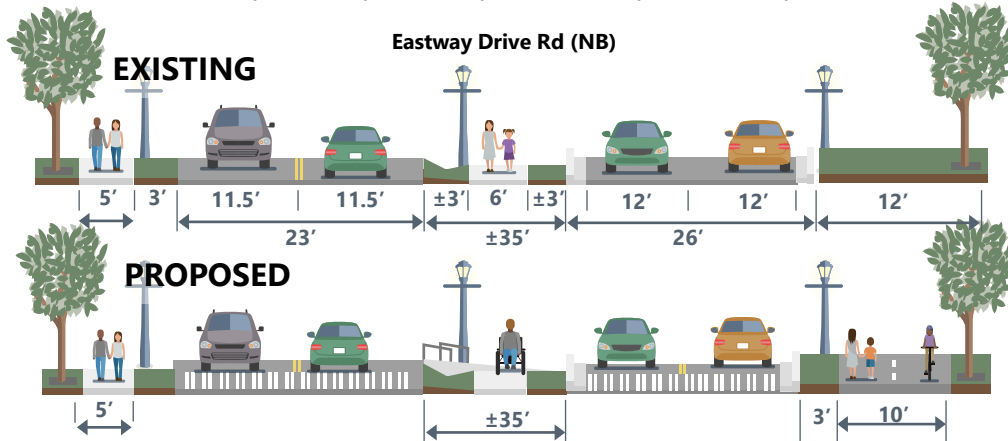
Aerial conceptual rendering of Project Int-06, showing the proposed marked crossing at the existing signalized intersection with high visibility marked crosswalks.

Project
Int-04

Mid-Block Crossing across US 21 (Main Street) and Eastway Drive at Town Hall

EXISTING CONDITIONS

Route	AADT (2020)	Speed Limit	Roadway Width (ft)	ROW (ft)	System
US 21 (Main Street)	19,500	35 mph	23'	60'	NCDOT
Eastway Drive	N/A	25 mph	26'	55'	Local
Scroggs Street	N/A	25 mph	21'	31'	Local



Aerial image of existing location for recommended midblock crossing location at US 21 (Main Street) and Eastway Drive near the Town Hall

CONSIDERATIONS

- Coordinate project with Ped-15, Ped-16, Ped-02, MUP-03
- There is approximately one mile between existing signalized crossings across US 21 (Main Street) in downtown Troutman; no safe alternatives to cross exist along that stretch
- The marked crosswalk across Eastway Drive is visible but lacks an ADA-compliant ramp to get up to the median/Rail-Trail corridor

CONSTRAINTS

- US 21 high traffic road
- Elevated median presents challenges for American Disability Act Standard facilities (ADA) accessible link to rail-trail

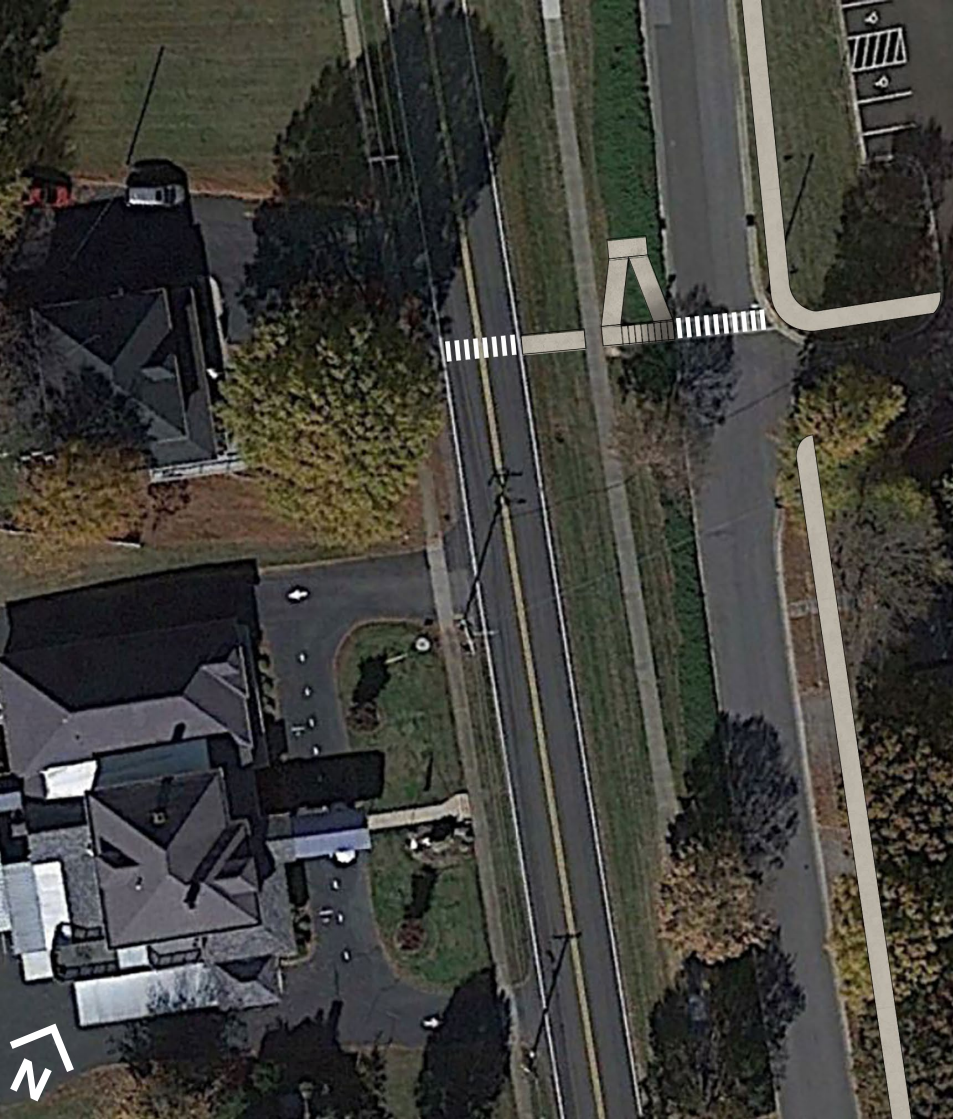
COST

High Level Planning Cost adjusted from 2019 to 2021 values: \$130,000

- Design: \$20,000
- ROW: \$5,000
- Utilities: \$5,000
- Construction: 100,000

Costs developed with NCDOT's Bicycle and Pedestrian Cost Estimation Tool and adjusted to 2021 USD (\$)





Aerial conceptual rendering of Project Int-04, showing the proposed mid-block crossing

RECOMMENDATIONS

Establish a mid-block crossing with high visibility crossing markings across US 21 (Main Street) and Eastway Drive at Town Hall. Evaluate for a Rectangular Rapid Flashing Beacon across US 21 (Main Street). Upgrade existing crossing of Eastway Drive with an ADA-compliant ramp to connect to the rail-trail.



Project Int-04 conceptual rendering from person-level perspective showing the mid-block crossing across US 21 (Main Street) with the inclusion of high visibility marked crosswalks and a Rectangular Rapid Flashing Beacon.

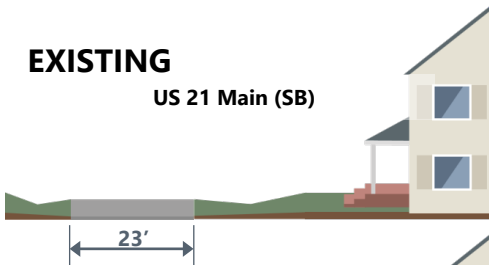
Project
Ped-
15

Main Street Sidewalks, from Old Mountain Road to Scroggs Street

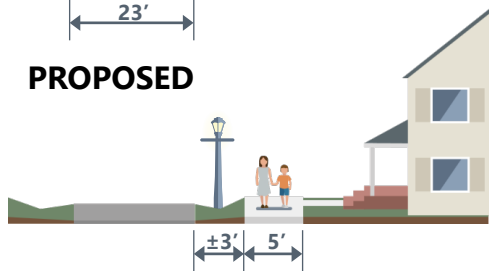
EXISTING CONDITIONS

Route	AADT (2020)	Speed Limit	Length	Roadway Width (ft)	ROW (ft)	System
US 21 (Main St)	18,000	35 mph	0.49	23'	60'	Town

EXISTING US 21 Main (SB)



PROPOSED



Person-level view of existing US 21 (Main Street) Corridor. Credit: Town of Troutman

CONSIDERATIONS

- Coordinate with projects INT-06, INT-04, INT-05, Ped-02 and MUP-03, Ped-16, MUP-07, MUP-02, MUP-25, Ped-12,
- Coordinate with NCDOT US 21 widening (R-2522)

CONSTRAINTS

- High traffic road
- Lack of curb and gutter
- Utility relocation might be required (power line poles)
- Sections of the existing sidewalks need to be upgraded for ADA compliance

COST

High Level Planning Cost adjusted from 2019 to 2021 values: \$635,000

Design: 120,000
ROW: \$20,000
Utilities: 45,000
Construction: \$450,000

Costs developed with NCDOT's Bicycle and Pedestrian Cost Estimation Tool and adjusted to 2021 USD (\$)





Aerial conceptual rendering of Project Ped-15, showing the proposed addition of the sidewalk along the west side of roadway.

RECOMMENDATIONS

Improve access for pedestrians to downtown Troutman by adding a new sidewalk link and closing sidewalk gaps along the west side of US 21 (Main Street) from Old Mountain Road to the north to Scroggs Street to the south. Coordinate with US 21 widening ((R-2522), INT-04, INT-06.



Project Ped-15 conceptual rendering from person-level perspective showing the addition of new sidewalk along the west side of US 21 (Main Street)

Project
MUP-
22

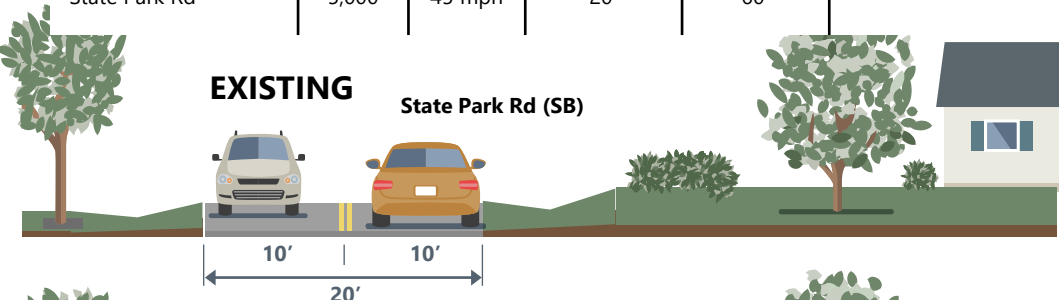
Wagner Street and State Park Road Corridor Multi-Use Path, from Perth Rd to Lake Norman State Park

EXISTING CONDITIONS

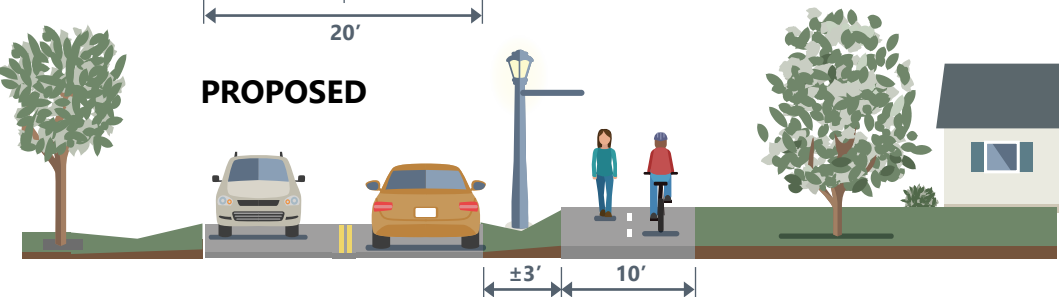
Route	AADT (2020)	Speed Limit	Roadway Width (ft)	ROW (ft)	System
State Park Rd	5,000	45 mph	20'	60'	NCDOT

EXISTING

State Park Rd (SB)



PROPOSED



Person-level view of existing two-lane roadway Credit: Town of Troutman



CONSIDERATIONS

- Coordination with Bike-05 and MUP-21
- Coordinate with Lake Norman State Park
- Coordinate with Wagner Street sidewalk improvements (EB-5930)
- Ongoing development along the corridor

CONSTRAINTS

- Lack of curb and gutter

COST

High Level Planning Cost adjusted from 2019 to 2021 values: **\$4,560,000**

Design: \$560,000

ROW: \$105,000

Utilities: \$155,000

Construction: \$3,740,000

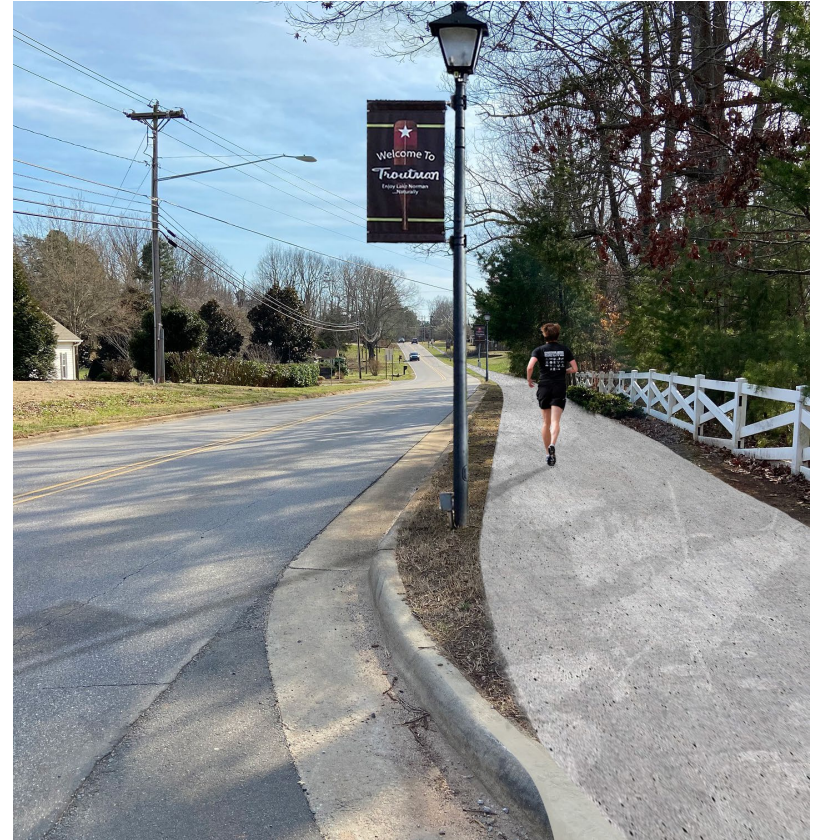
Costs developed with NCDOT's Bicycle and Pedestrian Cost Estimation Tool and adjusted to 2021 USD (\$)



Aerial conceptual rendering of Project MUP-22, showing the proposed multi-use path along Perth Road/State Park Road corridor

RECOMMENDATIONS

Improve access for pedestrians and bicyclists through the addition of a multi-use path along Wagner Street, Perth Road and State Park Road between Troutman and Lake Norman State Park.



Project MUP-22 Person-level view of project showing the proposed multi-use path along Wagner Street/State Park Road corridor

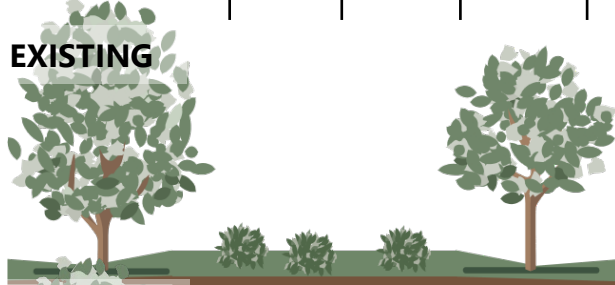
Project
Trail-03

Brookside Trail

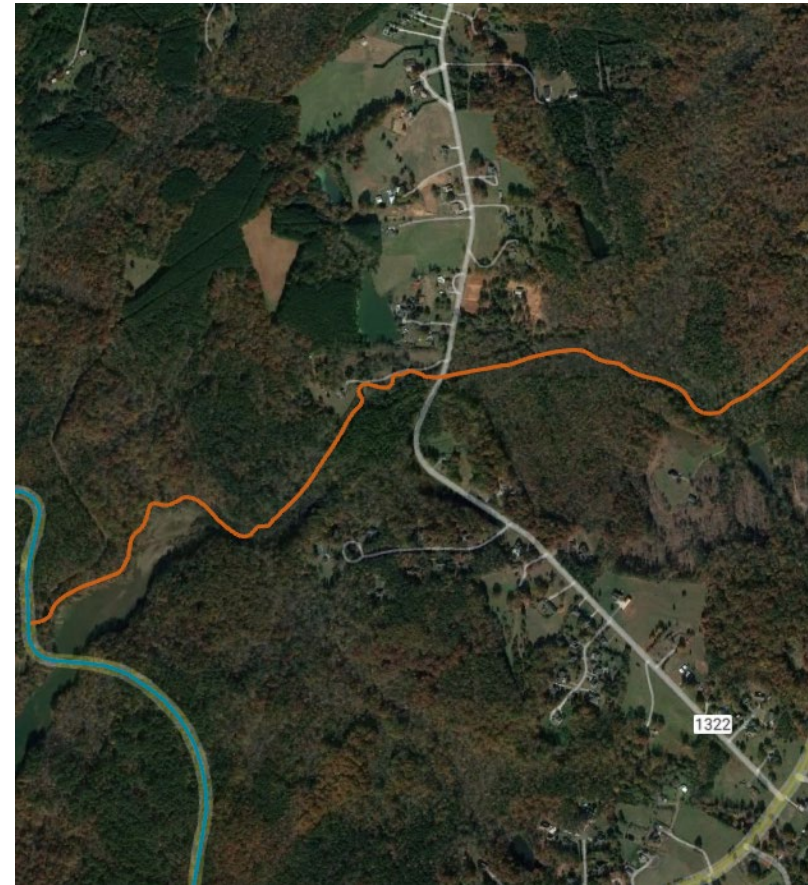
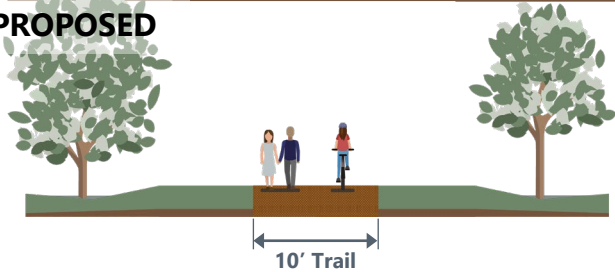
EXISTING CONDITIONS

Route	AADT (2020)	Speed Limit	Length	Roadway Width (ft)	ROW (ft)	System
Brookside Trail	N/A	N/A	2.05	N/A	N/A	Town/Private

EXISTING



PROPOSED



Aerial view of the potential north-south corridor for Trail-03, Brookside Trail

CONSIDERATIONS

- Coordinate with development of Trail-02, Bike-05, and MUP-13
- Access points for nearby neighborhoods would need to be evaluated

CONSTRAINTS

- Limited public ROW; multiple private landowners
- Lake Norman State Park easement would be required

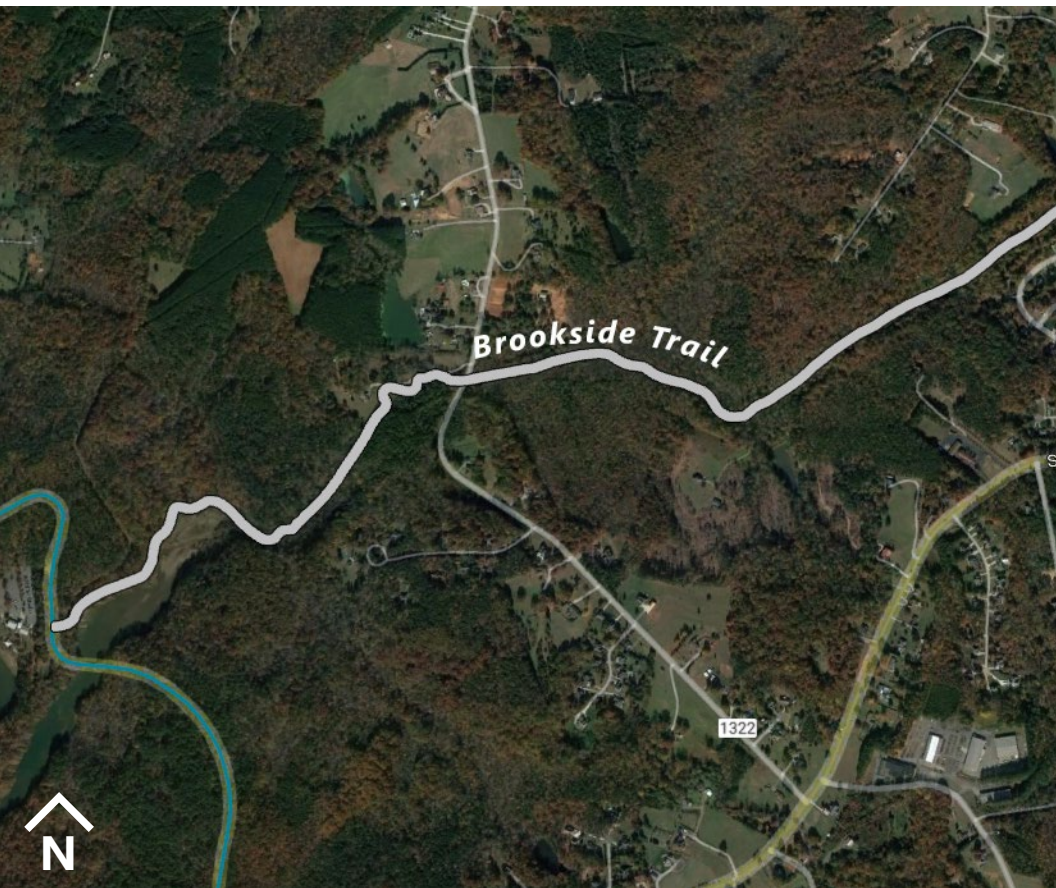
COST

High Level Planning Cost adjusted from 2019 to 2021 values: \$5,395,000

Design: \$720,000
 ROW: \$125,000
 Utilities: \$185,000
 Construction: \$4,365,000

Costs developed with NCDOT's Bicycle and Pedestrian Cost Estimation Tool and adjusted to 2021 USD (\$)





Aerial conceptual rendering of Project Trail-03, showing the proposed unpaved trail that would help form a connecting corridor for people walking and bicycling between neighborhoods, the Downtown and Lake Norman State Park.

RECOMMENDATIONS

Establish a new unpaved trail along Brookside Creek from Meadow Glen Drive to St. John's Road. Evaluate access points for nearby neighborhoods.



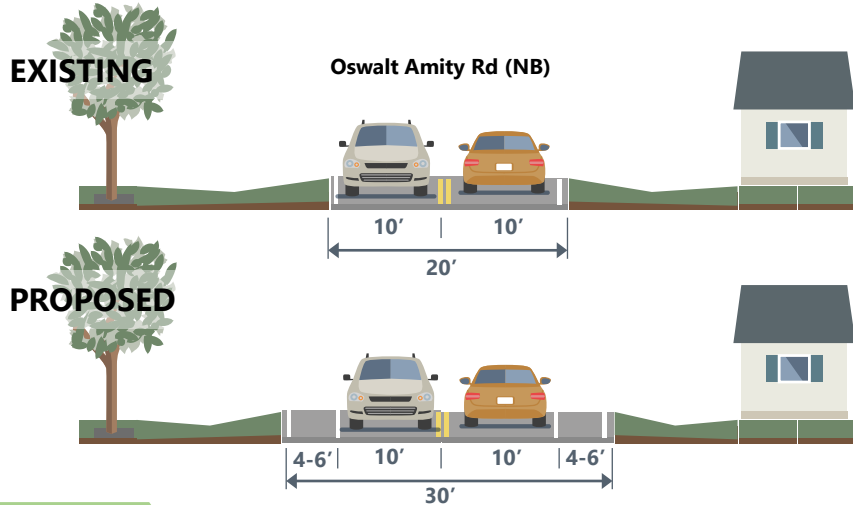
Project Trail-03 conceptual rendering from person-level perspective showing the unpaved trail for pedestrians and bicyclists that would connect downtown Troutman to several neighborhoods and Lake Norman State Park.

Project
BIKE-06

Ostwalt Amity Road Bikeable Shoulder from US 21 to Pilch Rd

EXISTING CONDITIONS

Route	AADT (2020)	Speed Limit	Roadway Width (ft)	ROW (ft)	System
Ostwalt Amity Road	5,700	55 mph	20'	65'	NCDOT



Person-level view of existing two-lane roadway Credit: Town of Troutman



CONSIDERATIONS

- Coordination with MUP-15, MUP-18, MUP-16, and Ped-18
- Evaluate for a lower speed limit

CONSTRAINTS

- Limited roadway width
- High posted speed limit (55 mph)

COST

High Level Planning Cost adjusted from 2019 to 2021 values: \$1,170,000

Design: \$200,000
ROW: \$80,000
Utilities: \$125,000
Construction: \$765,000



Aerial conceptual rendering of Project Bike-06, showing the proposed bikeable shoulder along Oswalt Amity Rd

RECOMMENDATIONS

Add bikeable shoulder on Oswalt Amity Road from US 21/ NC 115 to Pilch Road. Evaluate for a lower speed limit. Create a connection to the bikeable shoulder (Bike-05 Project).



Conceptual rendering of Project Bike-06 from person-level perspective showing the proposed shoulder upgrade along Oswalt Amity Rd

4. Recommended Programs and Policies

In addition to infrastructure improvements recommended in the previous section, strong programs and policies can help encourage and support pedestrians and bicyclists within the Town.

4.1 Overview

While development of facilities relates directly to engineering, pedestrian and bicycle programs are concerned with the other five of the six E's: encouragement, education, enforcement, equity, and evaluation of the Safe Routes to School 6 E's Framework¹³. Active transportation policies can improve pedestrian and bicycle-friendly design and development of both public and private sector projects. The project team encourages the Town to explore a comprehensive approach to the six E's, so that those initiatives can have a mutually-reinforcing and strengthening effect to create a walk and bicycle-friendly place. This requires ongoing communication and collaboration with a wide range of government agencies, organizations, the community, and individual stakeholders.

Many of the following activities represent continuations and/or enhancements of programs and policies that the Town is already administering. Recommendations in this section support ongoing activities to enhance overall livability and walkability for the Town's growing population. Many programs and resources listed in this section are subject to the availability of grant funding. The Town should follow up directly with the organizations listed for more information on the status of these programs or newer funding resources.

¹³ <https://www.saferoutespartnership.org/safe-routes-school/101/6-Es>

4.2 Existing Programs

The Town has been working to implement a walking club for its senior residents and a running club for more active members of the communities at all ages. The Town has also been working to partner with local schools through its parks department.

Recreational cycling is present on rural roadways around Troutman, and many mountain bicyclists enjoy the trails at Lake Norman State Park. A formal bicycle advocacy group does not currently exist.

4.3 Program Recommendations and Resources

4.3.1 Encouragement Programs

The Town can use encouragement programs to strengthen the walking and bicycling culture within the community. Local businesses and Town departments can all play a role in encouraging pedestrian and bicycle activities through a variety of local opportunities and incentives. Increasing the amount and coverage of encouragement programs were highly recommended from the community outreach.

Lead agencies and stakeholders:

- Town staff
- County health department
- Community leaders/stakeholders

Elements of a good encouragement program:

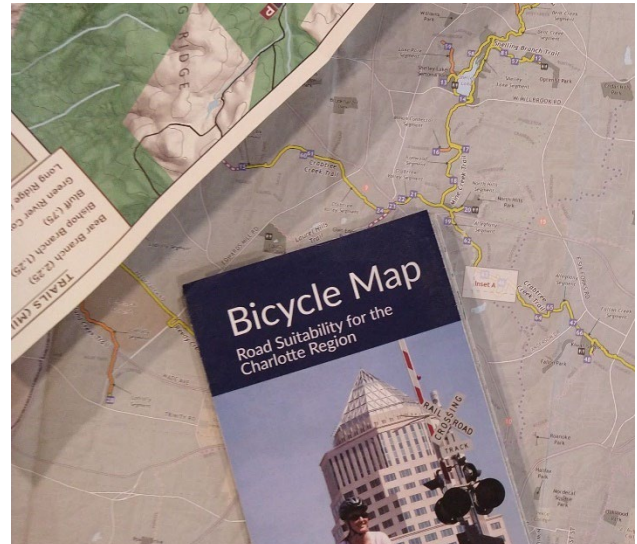
- Provides residents casual introductions to walking in a non-competitive setting.
- Uses a variety of print and electronic strategies to disseminate pedestrian information.
- Celebrates and promotes community wins through print or online media, and word of mouth.

Non-Infrastructure Transportation Alternatives Program

NCDOT has transitioned the Active Routes to School program, a project under NC Safe Routes to School, to a grant-based program funded through the Non-Infrastructure Transportation Alternatives Program. Agencies may request up to three years of funding for projects that encourage children to walk and bike to school, make walking more appealing, and facilitate the development of projects and activities to improve transportation safety near schools. Funding may be requested to support activities for community-wide, regional, or statewide programs. The Town may choose to coordinate with schools, the school district, or the county to pursue funding and recommend projects.

Walking and Biking Maps

User maps are important tools for encouraging walking and bicycling. The Town can create its print and electronic maps and smart phone applications that identify common walking and/or bicycling routes, identify key destinations, and other available or planned features. The Town should refine and update the maps as they develop new facilities and should seek opportunities to distribute to residents and visitors. Colorful, graphic maps should appeal to all ages and abilities and can also include educational information about the rules of the road for drivers, cyclists, and pedestrians; safety; and etiquette.



Bicycling and walking maps could help residents and visitors navigate Troutman on foot and by bike.

Walking Tours and Walking and Running Clubs

Walking tours encourage walking and present an opportunity for residents to socialize. By developing and advertising one or more formal tour routes in association with the walking and bicycling maps previously described, the Town could identify routes to connect pedestrians to recreational, shopping, dining, and scenic destinations. Tour routes could begin with existing facilities and expand as the pedestrian network develops. Walking tours could include organized groups with Town-sponsored tour guides. Alternatively, neighborhoods and local non-profits could start walking clubs for residents of a specific neighborhood, seniors, or other groups to encourage active recreation in a friendly, social format.

A running club could be another way for residents to come together in small groups and experience the Town on foot while enjoying active recreation and socialization.

Story Walks

Story walks, strolls, or trails are an interactive way to get people of all ages out walking while reading children's picture books. The StoryWalk® Project originally was created by Anne Ferguson of Montpelier, Vermont in 2007 and was developed in collaboration with the Kellogg-Hubbard Library (<https://www.kellogghubbard.org/storywalk>). These walks are simple and low cost to set up, requiring at minimum only a physical copy of a children's book. Pages from the book are separated and attached to a mount or stand

for people to read as they walk. Many libraries in NC have partnered with communities, colleges and municipalities to install these the book pages along local walking paths.

Wayfinding Signs

As the pedestrian system develops, and especially as sidewalks are installed and neighborhoods are connected, wayfinding will help contribute to the overall pedestrian environment. Items such as mile markers, consistent themes and logos, and regular wayfinding kiosks will become important elements to encourage walking. The Town can use services such as Walk [Your City] (<https://walkyourcity.org>) to purchase inexpensive, weather resistant signs to educate residents about the distance and direction between destinations.

Awareness Days and Events

The Town can devote specific days of the year to raise awareness related to pedestrian promotion and encourage socializing, especially in the Downtown. Current events include Events can be held in parks, schools, Town facilities, or similar venues.

The Town can use national events to increase use of pedestrian facilities, create new versions specific to local events, and add pedestrian topics to existing Town events. Examples of national events include National Walk to Work Day (April), Earth Day (April 22), National Trails Day (First Saturday in June), PARK(ing) Day (September), National Open Streets Day (September), and National Walk to School Day (October).

Temporary Installations and Open Streets

The Town can use temporary installations to get the public invested and excited about Troutman's multimodal future. There are several types of temporary projects the Town can conduct:

- Open Streets: an event where a section of a street or multiple connecting streets are closed to cars and activities occur in the public right-of-way, often including bicycle rides, outdoor seating, and other potential uses for the public space. These events often occur on a weekend and engage the community in imagining community-focused public spaces. This type of activity could be sponsored by the Town, arts groups, or the county. <https://openstreetsproject.org/>
- Demonstration Projects: short-term installations of bicycle or pedestrian infrastructure using low-cost and temporary materials. These projects can evaluate the effectiveness of different facilities or recommendations without investing in the development of them. Potential examples include application of continental crosswalk marking patterns and curb extensions with flex posts and pavement markings.
- Pop-up bicycle parks: short term bike installations can be a quick solution to implement a safe space for recreational biking. A pop up bicycle park installation can be created to help participants of all ages learn and develop safe bicycling skills and gain experience with navigating a more difficult terrain. Troutman ESD Park could be a potential location for short term pop-up bicycle park implementation.



Asheville Coxe Avenue Demonstration Project Included Temporary Installation of a Separated Bicycle Lane and a Street Mural

National Programs in Support of Walk Friendly Community Designations

Several national recognition programs encourage towns and cities to promote pedestrian activity. The Town can pursue or strive for progress towards one of the programs that recognize communities that are working to improve access, safety, mobility, and transportation options. Recognition programs include the following examples:

- Walk Friendly Community <http://www.walkfriendly.org/>
- Active Towns <https://www.activetowns.org/>
- AARP Age Friendly Communities <https://www.aarp.org/livable-communities/network-age-friendly-communities/>
- CDC Healthy Communities Program <https://www.cdc.gov/nccdphp/dch/programs/healthycommunitiesprogram/index.htm>

Encouragement Program Resources

- Healthy Places By Design <https://healthyplacesbydesign.org/resources/>
- Non-Infrastructure Transportation Alternatives Program <https://connect.ncdot.gov/projects/BikePed/Pages/Non-Infrastructure-Alternatives-Program.aspx>
- *Healthy Aging Research Network Archives*. <http://depts.washington.edu/hprc/resources/products-tools/healthy-aging-research-network-archives/>
- *Livable Communities: Livable in Action*. <http://www.aarp.org/livable-communities/livable-in-action/>
- Story Walk <https://letsmovelibraries.org/storywalk/>

- Move More Walking Map Guide. <https://www.eatsmartmovemorenc.com/resource/walking-map-guide/>
- National Center for Safe Routes to School. <http://saferoutesinfo.org/>
- *Walk Wise, Drive Smart: A Senior Pedestrian Safety Program in Hendersonville, North Carolina.* http://www.pedbikeinfo.org/cms/downloads/WalkWise_Hunter.pdf

4.3.2 Education Programs

The Town can take advantage of existing educational materials from state and federal programs and tailor these to the specific needs of the community. The educational materials should promote safe behaviors, rules, and responsibilities for all roadway users including bicyclists, pedestrians, and motorists, and overcome barriers to bicycling on shared facilities. Local businesses, Town departments, and local advocates can all play a role in developing and distributing education materials. Bicycle education events (bicycle rodeos) could be held to target children and usually require support from non-profit agency partners to organize volunteers, and the use of a large parking lot for skills practice area.

Lead agencies and stakeholders:

- Town staff
- Iredell County health department
- Dedicated and committed community leaders/stakeholders

Elements of a good education program:

- Provides the community with information on bicycle and pedestrian laws, safe behaviors, and skills.
- Reaches people of all skill levels, physical abilities, and ages.
- Delivers information through a variety of print and electronic messages and hands-on training.
- Includes all roadway users: motorists, bicyclists, and pedestrians.

Project-Related Efforts

The Town should coordinate closely with NCDOT and other local stakeholders when elements of the Plan and other pedestrian roadway improvements are planned or implemented. Public involvement and education are essential throughout the project process. Communication with the public during the planning phase ensures the community is aware of upcoming events or potential impacts to their roadway, construction schedules, improvements, and proposed completion dates. This also provides an opportunity for community feedback, which can help inform future educational efforts on the project. Once a project is completed, education efforts should provide information on how to use the facility. Project-related coordination efforts can be distributed through local media outlets, on-site, at special events/community events, project-related meeting, local and Town websites, and in coordination with NCDOT outreach.

Driver Education

Stakeholders from the community expressed the need for driver education in the community. Town staff, Steering Committee members, and community leaders can work together to identify priority educational topics, key

audiences, and outreach methods (e.g., signage, workshops, print media). Potential educational campaigns, as discussed by both community stakeholders and Steering Committee members, include the following:

- General rules of the road conducted at day cares and churches (for young residents).
- Friendly Driver Certification Program <https://www.littlerock.gov/for-residents/bikeped-little-rock/education/friendly-driver-program/>
- Street Smart NJ – Drive Smart/Walk Smart Campaign <https://bestreetsmartnj.org/>

Internal Education

Education is not limited to the community, but should also include all key staff involved in Plan implementation. This includes Town staff, Board members, and Steering Committee members as well as NCDOT Division staff and regional or county staff, when relevant. Opportunities for education include, but are not limited to, the following:

- Staff presentations on sessions or conference events.
- Meetings or retreats on the Plan to discuss the status of the Plan, potential funding opportunities, roadblocks to implementation, or other similar pertinent information.
- Coordination between agencies and departments, such as information or resource sharing between transportation, planning, health, facilities, parks and recreation, and other such City or county departments.
- Training opportunities—webinars, brown bag lunch presentations—to educate staff on pedestrian guidelines and designs and best practices from across the state and nation.

Let's Go NC – Pedestrian and Bicycle Curriculum

NCDOT sponsors this free educational program and provides instructional lesson plans, videos, and other downloadable programming to teach elementary age children how to walk and bicycle safely. Instructors do not need to receive training. The Town should work with local agencies, schools, or community organizations to identify one or more individuals willing to take responsibility for conducting the training.

Eat Smart, Move More NC

Eat Smart, Move More NC is a North Carolina program that promotes physical activity and healthy eating. They provide free, downloadable resources to encourage communities, schools, grocery stores, and similar businesses to make the healthy choice the easier choice. Community-based tools support creating active outdoor play spaces, information on coalitions to support the movement, and handouts for distribution, among others.



Learn to Ride event for children held at a Mecklenburg County location in 2019

Education Program Resources

- Eat Smart, Move More NC. <https://www.eatsmartmovemorenc.com/>
- *Guide to Creating Active Outdoor Play Spaces*. <https://www.eatsmartmovemorenc.com/wp-content/uploads/2019/08/PlaySpacesGuide-HiRez.pdf>
- *Eat Smart, Move More Coalitions*. <https://www.eatsmartmovemorenc.com/resource/eat-smart-move-more-coalitions/>
- *Eat Smart, Move More Manual*. https://www.eatsmartmovemorenc.com/wp-content/uploads/2019/08/070317_lpan_manual.pdf
- Federal Highway Administration Pedestrian and Bicycle Safety. http://safety.fhwa.dot.gov/ped_bike/.
- Institute for Transportation Research and Education: Education and Training – Bicycle and Pedestrian. <https://itre.ncsu.edu/training/bike-ped/>
- Let's Go, NC! <https://www.ncdot.gov/initiatives-policies/safety/lets-go-nc/Pages/default.aspx>
- National Highway Traffic Safety Administration Pedestrian Safety. <https://www.nhtsa.gov/road-safety/pedestrian-safety>
- NCDOT Integrated Mobility Division. <https://connect.ncdot.gov/projects/BikePed/Pages/default.aspx>
- Pedestrian and Bicycle Information Center. <http://www.pedbikeinfo.org/>
- WalkBikeNC. <https://www.ncdot.gov/bikeped/walkbikenc/>

4.3.3 Enforcement Programs

Much like education programs, the purpose of enforcement programs can be used to educate all roadway users about traffic laws and encourage safer behaviors. Programs include periodic reminders or events to obey traffic rules and ongoing monitoring of public spaces. Enforcement programs also reinforce and support the other E's.

Lead agencies and stakeholders:

- Law enforcement agencies
- Town staff

Elements of a good enforcement program:

- Reviews and updates North Carolina laws that impact safety.
- Ongoing enforcement of relevant laws.
- Reduces the number of pedestrian crashes.

Watch for Me NC

This statewide pedestrian and bicycle safety campaign is designed to reduce pedestrian and bicycle injuries and deaths through education and enforcement. Watch for Me NC targets all roadway users and provides useful resources and tools for municipalities and residents. The program provides free training to law enforcement on state traffic laws supporting pedestrian safety, in exchange for commitments to conduct an operation campaign

locally. The program also provides free safety materials for distribution during local operations or special community events. The Town can use the program to improve relationships between residents and law enforcement through educational events and safety materials giveaways (such as reflective gear and bike lights). It can also deploy the vehicle enforcement operations to those locations with higher failure to yield to pedestrians incidents along its higher speed and higher volume arterials such as those identified in for RSAs in the evaluations efforts section below.

SeeClickFix

Community members can use this website to report neighborhood concerns related to infrastructure, such as potholes, streetlight issues, or graffiti. The comments are routed to the local officials who can respond to the comment with information. The Town can use this resource to better track community concerns and identify areas in need of attention.

Speed Feedback Signs

The Town can use temporary traffic calming devices at key locations. These devices are mobile and can be placed along US-21 (Main Street), Wagner Street, Eastway Drive, Old Mountain Road, East Monbo Road, and other locations where motorists may be traveling at higher speeds and pedestrian may be walking or using mobility devices in the roadway due to lack of sidewalks.

Motorist Enforcement

Local police should work together with Town officials to use any of the programs and resources to coordinate one-time or ongoing motorist enforcement campaigns. Enforcement may include monitoring vehicle speeds and traffic signal compliance.

Another approach to motorist enforcement is to incentivize or offer rewards for appropriate behavior. Local law enforcement can conduct a pedestrian enforcement campaign that commends pedestrians for using crosswalks. The Town can work with local business owners to provide gift certificates, coupons, or other small tokens as rewards. The Town should conduct these enforcement efforts at highly visible locations and publicize them in the community and via social media.

Enforcement Program Resources

- FHWA *Partnering with Law Enforcement*. https://www.fhwa.dot.gov/environment/bicycle_pedestrian/ntp/partner_law.cfm
- NCDOT Watch for Me NC. <http://www.watchformenc.org/>
- NHTSA *Resource Guide on Laws Related to Pedestrian and Bicycle Safety*. <https://one.nhtsa.gov/people/injury/pedbimot/bike/resourceguide/index.html>
- SeeClickFix. <https://seeclickfix.com/>
- Pedestrian and Bicycle Information Center Training and Events. <http://www.pedbikeinfo.org/training/index.cfm>
- Pedestrian and Safety Guide and Countermeasure Selection System. <http://www.pedbikesafe.org/pedsafe/>

4.3.4 Evaluation Efforts

The Town can use evaluation efforts to understand how well the strategies in the plan are working over time. Evaluation activities include setting goals, collecting baseline data (where possible), setting timetables, and collecting follow up data for all projects. Not all evaluation activities are data-driven; qualitative feedback and partnerships can assist with achieving the goal of evaluating program/strategy effectiveness and identifying improvements.

Lead agencies and stakeholders:

- Pedestrian Committee
- Steering Committee
- Town staff
- Public Works maintenance staff

Elements of a good evaluation effort:

- Dedicated staff or volunteer who will take responsibility of monitoring all elements of the Plan.
- Established metrics that are measurable and have associated timelines.

Town of Troutman Bicycle and Pedestrian Advisory Committee

The Town should establish a Bicycle and Pedestrian Advisory Committee (BPAC) and engage with the Steering Committee for its initial membership. The Bicycle and Pedestrian Advisory Committee should be responsible for moving the plan towards implementation and tracking success. Steering Committee members can help champion the Plan by working closely with the BPAC to help measure success, work as liaisons with the greater community, and help identify solutions to barriers during implementation. The BPAC can provide guidance for policies, projects, and programs managed by the Town to promote more active lifestyles and safety for walking and cycling.

Annual Bicycle and Pedestrian Count Program

The Town and the Bicycle and Pedestrian Advisory Committee can work together to conduct annual bicycle and pedestrian counts to identify high-traffic locations. Volunteers from schools or community organizations can conduct manual observational counts at different times of the day and days of the week. Counts for specific locations should be done prior to implementation of a project to establish a baseline and then continue annually or on a two-year cycle. Observational qualitative data can also be used to identify locations for specific safety, enforcement, and educational efforts.

Conduct Road Safety Audits

Town staff and representatives can conduct Road Safety Audits on priority corridors to identify more specific engineering-related improvements. This is a formal and detailed process that involves a multidisciplinary team to identify roadway elements that present the most safety concerns and formulate solutions to eliminate or mitigate the safety issues. The Town may request support from NCDOT Division 12, the NCDOT Traffic Safety Unit, and even request technical assistance from the Federal Highway Administration (alternatively, the Town can consider hiring an outside consultant to organize and conduct RSAs).

Corridors that may be suitable candidates based on their traffic volumes, speeds, numbers of lanes, pedestrian crashes, pedestrian-focused land uses, and recommended facilities include:

- US 21 (Main Street) corridor
- Wagner Street / Perth Road
- Old Mountain Road
- Eastway Drive

Vision Zero /Local Transportation Safety Plan

Going beyond a Road Safety Audit for one specific corridor, the Town could pursue a Local Transportation Safety Plan or a Vision Zero plan for the Town of Troutman to undertake a comprehensive review of transportation safety issues and to improve safety for all users. Vision Zero is a strategy to eliminate all traffic fatalities and severe injuries, while increasing safety, healthy and equitable mobility for all through a safe system approach. Multiple municipalities across North Carolina have undertaken Vision Zero plans in recent years, including the City of Greensboro, the City of Charlotte, the Town of Davidson, and the Town of Mooresville. Additional Vision Zero and Local Transportation Safety Plan resources are available as follows:

- Vision Zero Network <https://visionzeronetwork.org/resources/>
- NC Vision Zero <https://ncvisionzero.org>
- FHWA Local Road Safety Plan Resources https://safety.fhwa.dot.gov/provencountermeasures/local_roads.cfm
- Charlotte Regional Transportation Planning Organization (CRTPO) (<https://crtpo.org/projects-plans-programs/performance-based-planning-programming/>)

Community Surveys

The Town can use surveys and other similar feedback mechanisms as tools to gauge community-wide acceptance and understanding of new projects; needs and interests for other future projects; and other community concerns that may be addressed through Encouragement and Education programming. The Town should work with stakeholder groups who reach broad audiences to help disseminate survey tools and collect feedback. This Plan demonstrated the Town's outreach through electronic surveys was capable of reaching hundreds of residents from across the Town.

Facility Inspection and Maintenance

A key piece of evaluation is measuring and identifying maintenance needs, particularly after implementation. Public Works maintenance and facility staff should conduct routine maintenance checks of installed pedestrian projects to identify general wear and tear and immediate fixes—such as potholes and broken asphalt—that may impede use. The Town should establish a plan and timeline for addressing such issues. This encouragement initiative relies upon crowd-sourcing to report maintenance needs.

Evaluation Resources

- National Center for Safe Routes to School – Walkability Checklist. http://walkbiketoschool.org/wp-content/uploads/2017/01/walkability_checklist.pdf

- Pedestrian and Bicycle Information Center – Counts. http://www.pedbikeinfo.org/planning/tools_counts.cfm
- FHWA – Road Safety Audits. <https://safety.fhwa.dot.gov/rsa/>

4.4 Policy Recommendations

The NCDOT Integrated Mobility Division web page includes references and links to state and federal policies to support accommodation of pedestrians as part of the transportation system. See <https://www.ncdot.gov/divisions/bike-ped/Pages/bike-ped-laws.aspx> along with the summaries below.

4.4.1 Complete Streets Policy and Guidelines

Complete Streets Policy and Guidelines

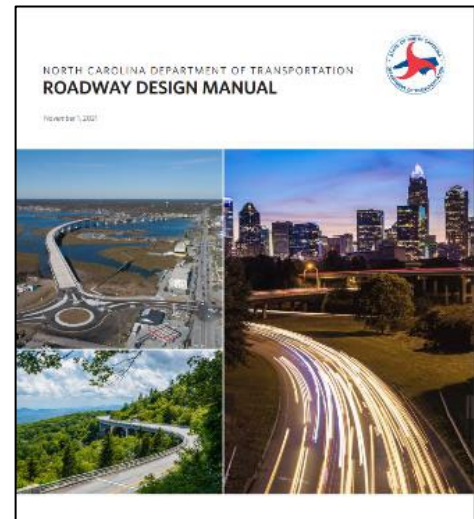
The USDOT defines Complete Streets as “streets designed and operated to enable safe use and support mobility for all users...[including] people of all ages and abilities, regardless of whether they are travelling as drivers, pedestrians, bicyclists, or public transportation riders.”¹⁴ The Town of Troutman does not have a Complete Streets policy or design guidelines as of 2022.

NCDOT adopted its first Complete Streets Policy in 2009, revised it in 2019, and updated implementation guidance in 2022.¹⁵ The updated policy and guidance documents reinforced that NCDOT is committed to partnering with local agencies to deliver Complete Streets. NCDOT highway projects (as defined by the STIP with a primary purpose of improving mobility for motor vehicles) that do not yet have an environmental document (as of August 30, 2019) are subject to the new policy. Revisions or clarification to the policy and guidance will be considered by a NCDOT Complete Streets Technical Team on an ongoing basis.

The 2019 policy and updated guidelines require NCDOT staff to incorporate multimodal facilities into the design of all transportation projects led by NCDOT, with few exceptions. Those exceptions may include facilities where non-motorized travel is prohibited by law (i.e. interstates and controlled access highways); areas with low densities of population and employment; areas with low demand for transit service; emergency repair or some routine maintenance projects.

The NCDOT Roadway Design Manual is the authoritative reference for Complete Streets design for NCDOT projects. NCDOT has recently moved to use the roadway cross sections developed for the SPOT process as illustrative examples for Complete Streets. There are additional resources to the standard roadway drawings, including curb ramp details.

The Town of Troutman should adopt a local Complete Streets Policy. The Town may reference the 2019 NCDOT policy or develop language customized to meet the objectives of this plan and local stakeholders. A Troutman



¹⁴ USDOT <https://www.transportation.gov/mission/health/complete-streets>

¹⁵ <https://connect.ncdot.gov/projects/Project-Management/Documents/CS%20Policy%20Update%20Memo%20Secretary%208.28.19.pdf>

Complete Streets Policy should include the following elements as recommended from Smart Growth America and the National Complete Streets Coalition¹⁶:

1. **Vision and intent:** Includes an equitable vision for how and why the community wants to complete its streets. Specifies need to create complete, connected, network and specifies at least four modes, two of which must be biking or walking.
2. **Diverse users:** Benefits all users equitably, particularly vulnerable users and the most underinvested and underserved communities.
3. **Commitment in all projects and phases:** Applies to new, retrofit/reconstruction, maintenance, and ongoing projects.
4. **Clear, accountable exceptions:** Makes any exceptions specific and sets a clear procedure that requires high-level approval and public notice prior to exceptions being granted.
5. **Jurisdiction:** Requires interagency coordination between government departments and partner agencies on Complete Streets.
6. **Design:** Directs the use of the latest and best design criteria and guidelines and sets a time frame for their implementation.
7. **Land use and context sensitivity:** Considers the surrounding community's current and expected land use and transportation needs.
8. **Performance measures:** Establishes performance standards that are specific, equitable, and available to the public.
9. **Project selection criteria:** Provides specific criteria to encourage funding prioritization for Complete Streets implementation.
10. **Implementation steps:** Includes specific next steps for implementation of the policy.

Recommendation: The Town of Troutman should adopt a local Complete Streets Policy that summarizes principles and goals, references design best practices, identifies responsible parties and activities for implementation, and defines exceptions to application of the policy.

¹⁶ Smart Growth America, "The Elements of a Complete Streets Policy," 2018, <https://smartgrowthamerica.org/resources/elements-complete-streets-policy/>

4.5 Six E's Recommendation Overview

Table 11 - Six E's Recommendation Overview

Strategy	Target Audience	Lead Agency/ Stakeholder	Partnerships for Success	Time Frame	Duration	Costs
Encouragement						
Non-Infrastructure Transportation Alternatives Program	Schoolchildren, Parents	Town of Troutman	County Department of Public Health, School District	Immediate	Ongoing	\$
Walking Maps	General Public	Bicycle and Pedestrian Advisory Committee	Town Staff, Volunteers	Near Future – Long-Range	Ongoing	\$ - \$\$
Self-Guided / Group Walking Tours	General Public	Bicycle and Pedestrian Advisory Committee	Town Staff, Volunteers	Near Future – Long-Range	Periodic	\$
Story Walks	Schoolchildren, Parents	Parks and Recreation	Town Staff, Iredell County Schools, Volunteers, BPAC	Near Future – Long-Range	Periodic	\$
Wayfinding Signs	General Public	Bicycle and Pedestrian Advisory Committee	Town Staff, Tourism Bureau, Volunteers	Immediate	Ongoing	\$ - \$\$
Awareness Days/Events	General Public	Town of Troutman	BPAC, Volunteers, Union County DSS, Union County Schools	Immediate – Long-Range	Ongoing	\$
Temporary Installations	General Public	Town, Bicycle and Pedestrian Advisory Committee	Volunteers, NCDOT	Near Future – Intermediate	Ongoing	\$-\$\$
Town Designations	General Public	Town of Troutman	Bicycle and Pedestrian Advisory Committee	Long-Range	Ongoing	\$
Education						
Project-Related Efforts	General Public	Town of Troutman	NCDOT	Immediate – Long-Range	Ongoing	\$
Driver Education	General Public	Town of Troutman	NCDOT	Near Future – Long-Range	Ongoing	\$ - \$\$\$

Internal Education	Town staff/ representatives	Town of Troutman	NCDOT, Regional, County staff	Immediate – Long-Range	Periodic	\$
Let's Go NC	General Public, schoolchildren	Town of Troutman	NCDOT, Active Route to School Coordinator	Immediate	Periodic	\$
Eat Smart, Move More NC Enforcement	General Public	Town of Troutman	NCDPH, ESMM	Immediate	Ongoing	\$
Watch for Me NC	Motorists	Town of Troutman	Law Enforcement, NCDOT	Immediate – Long-Range	Periodic	\$
SeeClickFix	General Public	Town of Troutman		Immediate – Long-Range	Ongoing	\$
Speed Feedback Signs	Motorists	Town of Troutman	Law Enforcement, NCDOT	Long-Range	Ongoing	\$\$ - \$\$\$
Motorist Enforcement	Motorists	Town of Troutman	Law Enforcement	Immediate	Periodic	\$\$ - \$\$\$
Evaluation						
Bicycle and Pedestrian Advisory Committee	Town Staff / General Public	Bicycle and Pedestrian Advisory Committee	Town Staff, Steering Committee	Near Future – Long-Term	Ongoing	\$
Annual Pedestrian Count Program	General Public	Bicycle and Pedestrian Advisory Committee	Town Staff, Steering Committee	Near-Future – Long-Range	Periodic	\$ - \$\$\$
Road Safety Audits	Town Staff	Town of Troutman	Bicycle and Pedestrian Advisory Committee, NCDOT	Near-Future – Long-Range	Periodic	\$\$ - \$\$\$
Community Surveys	General Public	Bicycle and Pedestrian Advisory Committee	Town Staff, Steering Committee	Near Future – Long-Range	Periodic	\$\$ - \$\$\$
Facility Inspection/Maintenance	Town Staff	Town of Troutman	Facilities	Near Future – Long-Range	Periodic	\$\$\$
Equity – Foundation of the Plan Elements, Included in All Activities						

Time Frame: Immediate = initial steps in Plan, short-term; Near Future = implementation phases; Long-Range = post-implementation, evaluation, and maintenance phases

Duration: Ongoing = continual updates needed, no clear end; Periodic = occasional, non-specified milestones

Costs: \$ = Minimal costs/free; \$\$ = Moderate costs, may be available through local funds/investments; \$\$\$ = Requires investment, grants, additional funding resources

4.6 Town of Troutman Unified Development Ordinance and Other Ordinances

The Unified Development Ordinance (UDO) is the current legislation adopted by the Town in 2019 and updated in June of 2022 and is available on the Town’s website at https://www.troutmannnc.gov/vertical/sites/%7B212D0B0F-A03E-4846-A212-4AB2C3F1B2C5%7D/uploads/Troutman_UDO_Amended_As_of_6-9-2022.pdf. Troutman has achieved several policies for promoting bicycle and pedestrian activity from the 2008 Pedestrian Plan, including promoting street connectivity, extending the active transportation network, and adopting a form-based code. Table 12 outlines Troutman’s existing standards and guidelines and recommended improvements to the standards.

Table 12 - Recommended Unified Development Ordinance and Other Ordinance Updates

Development Standard or Guideline	Improvement Needed	Reference
Increase required pedestrian/vehicle points of entry/egress for subdivisions	Increase required points of entry/egress for subdivisions to at least three when the exterior frontage of the subdivision on a particular public road is more than 750 ft (see Block Length). State that additional points of ingress/egress may be required when the Planning Board determines that physical characteristics (such as the location of opposing driveways) would render the additional entrance practical for vehicles and pedestrian use.	UDO section 7.7.4 (p. 131)
Required block length and exceptions	Update the UDO section 7.7.4 to reduce maximum block length to no more than 600 feet for all zoning districts where it’s currently greater (Rural & Suburban Districts: RP, RS, RMH, OI).	UDO section 7.7.5 p. 133 (table)
Sidewalk Installation Requirements: Include a condition on schools for the installation of an internal sidewalk system connecting to sidewalks along major streets	<p>In order to provide safe pedestrian connections to schools, amend the UDO to include a clear requirement for schools for the installation of an internal sidewalk system connecting to sidewalks along major streets that abut or join school facilities.</p> <p>This would apply to schools and limited other uses for internal sidewalk networks to encourage pedestrian connectivity to school. Coordinate with walk to school programs. Current UDO Section 7.1.2 requires sidewalks on both sides of the street for all new streets in RM, NC, OI, CB, and HB zones. Section 7.7.3 requires a minimum sidewalk width of 5 feet in residential areas and 8 feet serving both mixed-use and commercial areas.</p>	UDO section 7.5.1, 7.7.3
Crosswalk/Pedestrian Traffic Controls: Conditional rezoning for potential generators of pedestrian use	Update policy/LDC to require that all uses that might typically generate a significant amount (i.e. consistent and recurring) of pedestrian traffic (e.g. schools, parks) be subject to a conditional use; a condition could be placed on such facilities require the installation of crosswalks on major streets that abut such facilities requiring review for crosswalks and pedestrian signals at all signalized intersections adjacent to developed areas.	UDO; Consult NCDOT Pedestrian Crossing Guidelines

Crosswalk/Pedestrian Traffic Controls: Crosswalks and Midblock Connections	Update policy/UDO to require crosswalks at any residential street intersection and at midblock locations for long blocks. Require review for additional crossing treatments at all midblock connections. Amend UDO to require midblock crosswalks along collector streets within subdivisions for block lengths of greater than 500 feet.	UDO; Consult NCDOT Pedestrian Crossing Guidelines
Greenway Installation and Connectivity	Update the UDO to include objective guidelines by which the Zoning Administrator can base a determination of conditions being "impractical" for sidewalk or multi-use trail connections. These guidelines should include maximum degree of slope, maximum distance, or presence of wetlands. Recommended standards: slopes exceeding 15% for a sustained length (fifty feet), or distance of paved road separation exceeding 500 feet. Include a reference the Town's new Bicycle and Pedestrian Plan and other future related planning documents for location of proposed greenways and multi-use trails.	UDO Section 7.5.1 Sidewalk Standards; 7.5.2 Greenways
Access Management and Street Entrances: Driveway consolidation	Recommend modifying UDO to promote the consolidation of new driveways to minimize conflict points along mixed-use corridors with higher levels of pedestrian activity. Standards for minimum distances between curb cuts to be based upon the permitted travel speed of the road. For example, see below: 30 mph - 100' 35 mph - 150' 40 mph - 200' 45 mph - 250' 50 mph - 300' 55 mph - 350' Continue to coordinate with NCDOT on driveway access permits to reduce conflict points and promote access points for pedestrians.	UDO Section 7.7.4 Connectivity and Cul-De-Sacs
Implementation		
Set aside a dedicated funding stream for sidewalk implementation	Set aside a dedicated funding stream for sidewalk implementation through a General Fund allocation, bonds referendum, vehicle registration fee or other sources. Potential eligible projects for a pedestrian/greenway focused bond could be derived from this Plan. Consider a 10-year funding level to achieve selected projects (total to be determined).	N/A
Set aside a dedicated funding stream for public art and placemaking to enhance the public realm and walkways	Set aside a dedicated funding stream to allocate funding to public art projects and placemaking to enhance the public realm and walkways on a regular basis.	N/A

<p>(murals, sculptures). Target key locations that could benefit from additional activation of the pedestrian walkways (vacant storefronts, underutilized lots).</p>		
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5. Implementation Plan

Following through on the Plan recommendations will require a coordinated effort, persistence, and leadership from the local community and key stakeholders. Although local sources of funding can go a long way in achieving community aims, there are a variety of ways for the residents of Troutman to encourage walking and biking in their community.

5.1 Implementation Overview

This section outlines the organizational structure and steps necessary to successfully achieve the goals set forth by this Plan. The recommendations within this section include:

- Organizational structure for administering programs.
- Action items for building a culture of active living.
- Methods for monitoring progress and continuing encouragement.
- Potential funding sources.

5.2 Organizational Framework for Implementation

Successful implementation of the Plan will require the cooperation of several agencies and organizations. Many of these partnerships already exist, and this Plan will build on those partnerships. Examples of these partnerships include the relationships between NCDOT, the Town, and the Charlotte Regional Transportation Planning Organization (CRTPO). Still other connections will be formed through the implementation of this Plan. These coalitions will likely be formed within the community itself, as the Town coordinates its efforts with local schools, athletic associations, and other community groups.

Role of NCDOT

As the administrator of the Multimodal Planning Grant Initiative and the primary agency concerned with transportation planning, engineering, and construction in the State of North Carolina, NCDOT will be an important partner in the implementation of this Plan. After the adoption of this Plan, NCDOT should continue to provide

technical assistance and consulting regarding pedestrian and bicycle transportation planning in Troutman. NCDOT Division 12 is responsible for construction and maintenance of pedestrian facilities in the Town. It will be the primary partner for the design and construction of recommended projects made in Section 3 of this Plan.

The Strategic Prioritization Office of Transportation (SPOT) process prioritizes most NCDOT division projects, per the state's Strategic Transportation Investment (STI) law. SPOT is a data-driven approach to project prioritization for all transportation mode projects, including bicycle and pedestrian project improvements. STI provides three funding tiers for transportation projects: Statewide Mobility, Regional impact, or Division needs. Standalone pedestrian projects are eligible for funding as part of the Division Needs category. Bicycle and pedestrian projects compete against highway and other transportation projects in this category. Half of the score is based on data-centric methodology determined by NCDOT and the other half of the score is dependent on local input from the NCDOT Division 12 office and the CRTPO.

The NCDOT Division of Integrated Mobility is the primary resource for guidance on bicycle and pedestrian policies, laws, and safety education (Section 4). It is also the administrator for a wide variety of statewide initiatives aimed at promoting safety and participation in active transportation. As the Town progresses with the implementation of this Plan, it should consult the online resources available through the Division of Integrated Mobility for guidance on specific pedestrian treatment issues.

Role of the Charlotte Regional Transportation Planning Organization (CRTPO)

As the Metropolitan Planning Organization (MPO) responsible for transportation planning within Mecklenburg County, Iredell County and portions of Union County, the CRTPO should consider implementing the projects recommended in this Plan. For the infrastructure needs of Troutman to be met, CRTPO should continue to consider the multimodal transportation needs of the Town in the region's comprehensive transportation plan (CTP). Opportunities to improve the bicycle and pedestrian environment should be taken when roadways are scheduled for maintenance or construction. Some of the projects outlined in this report can be good candidates for funding through the STI Prioritization process to include a project in the State Transportation Improvement Program (STIP). Other improvements can be achieved as part of roadway improvements in Town funded in the STIP.

The CRTPO holds regular calls for transportation funding through its discretionary funding program (funded through a combination of STBG-DA, CMAQ and other funds). The Town of Troutman has been a recipient of several discretionary funding awards through the CRTPO in the past in support of sidewalk and greenway improvements. A local match (a contribution of funds from the Town towards the cost of the project; typically, 20% but can vary) is required from the Town of Troutman to pursue those funds.

Role of Iredell County

While Counties in North Carolina typically do not own or maintain roadways, planning by the Iredell County government has a direct effect on the Town of Troutman. Especially when it comes to implementation and maintenance of sidewalk and multi-use path links outside of Troutman town limits or on sections connecting two incorporated areas through an unincorporated area, the County would have to be a partner to support long term maintenance of implemented facilities under an agreement with the Town of Troutman and NCDOT.

The County is the primary organization governing land use planning, transportation planning, and public health initiatives outside of municipal limits. It is vital that these plans align with common goals that span municipal boundaries. There are several crucial ways for the County to support this Plan:

- Support active transportation through regional trails and networks.
- Promote active transportation and public health through county-wide programming.
- Prioritize pedestrian and bicyclist safety when updating the Transportation Master Plan (or County CTP).
- Include the Plan's facility recommendations as an amendment to the existing Iredell County Transportation Master Plan, where they do not already overlap.

Role of the Town of Troutman

Troutman is responsible for implementing this Plan. Through its adoption, the Town will be empowered to act as a champion for bicycle and pedestrian needs. The Town should form a pedestrian and bicycle advisory committee that will serve as leaders for bicycle and pedestrian planning in Troutman. As champions of active transportation, committee members should encourage the full implementation of this Plan. This includes advocating for the project and programmatic recommendations in this Plan, as well as developing other events and programs as they work in the community. A great example of this in practice is a wayfinding signage program. This would be functional for pedestrians and would enhance the sense of community and aesthetics in Troutman.

5.3 Implementation Action Steps

This section outlines general steps to fully implement this Plan. Steps are assigned to three categories: policy, programming, and infrastructure. A timeline of these actions is provided in Table 12.

5.3.1 Policy Action Steps

Adopt This Plan and Integrate into Comprehensive Transportation Plans

The first step for the Town of Troutman to build upon the existing regional plans and policies is adopting this plan. Adoption will improve the Town's eligibility to receive priority funding for projects.

In addition to local adoption, the Town should work with NCDOT and other agencies in Iredell County to amend the Iredell County CTP to incorporate the plan's recommendations and seek the CRTPO endorsement. This inclusion in the County's CTP would solidify the plan's recommendation for both Troutman and throughout the County and other localities.

Establish the Bicycle and Pedestrian Advisory Committee (BPAC)

The Town should take its existing Steering Committee – which was established for the development of this Plan – and transform it into a Bicycle and Pedestrian Advisory Committee (BPAC). This committee would be the primary advocate for promoting bicycle and pedestrian planning and events in Troutman and event programming and encouragement within the community. Local champions should represent many different interests within the Town, such as the schools, Town staff, police, and many others, which share the common goal of making Troutman a safer place to walk and bike. Other North Carolina communities, such as Mebane and Greenville, have established BPACs that can serve as a model for Troutman.

Adopt a Complete Streets Policy

The Town of Troutman should adopt a local Complete Streets Policy. The Town may reference the 2019 NCDOT policy or develop language customized to meet the objectives of this plan and local stakeholders. This will support future pedestrian *and* bicycle improvements in both Town and NCDOT projects.

Modify the UDO to Support Plan Implementation

The Town should review the recommended policy changes identified in Table 11 and adopt those that support the implementation of bicycle and pedestrian projects, and the overall walkability and bikeability of Troutman's streets.

Continue to Enforce State and Local Regulations

Ensuring that motor vehicles obey the speed limit, pedestrian signals, and other traffic regulations can improve the perception and desirability of walking Troutman. Additionally, ensuring that pedestrians and other non-motorized road users are familiar with the operation of pedestrian signals and beacons and obey traffic laws themselves can ensure that these travelers stay out of harm's way. This creates an environment that is safe for all roadway users. The NCDOT Division of Integrated Mobility offers helpful links to many of these regulations through its website: <https://www.ncdot.gov/bikeped/lawspolicies>.

5.3.2 Program Action Steps

Create Educational Outreach Programs

Education provides people of all ages the confidence to walk and bike along Troutman's sidewalk, SUP, and local road network. Educational outreach should also extend to drivers of motor vehicles as well. Awareness of pedestrians and bicyclists is a skill that is learned and can be improved upon with active engagement.

Create Encouragement Outreach Programs

Many of these encouragement programs serve to remind individuals how convenient and attainable an active lifestyle can be. Walk or bike to work and school events can illustrate how easy it is to complete daily activities through active transportation. Open streets bring people together, build a sense of community, and allow them to engage with the community without needing to drive and find a parking space.

Establish a Monitoring and Benchmarking Program

The BPAC should devise ways of monitoring pedestrian and bicycling activity, as well as preferred routes and destinations. The needs and preferences of the community will evolve over time. To ensure that Town officials and planners can respond effectively, there should be an established methodology for tracking these changes, evaluating current programs, and generating new priorities.

Become Registered as a Walk Friendly and/or Bicycle Friendly Community

The Town could choose to apply for a designation as a Walk or Bicycle Friendly Community through the University of North Carolina's Highway Safety Research Center (Walk Friendly, <https://www.walkfriendly.org/>) or the League of American Bicyclists (Bicycle Friendly, <https://bikeleague.org/bfa/>). This designation offers the opportunity for Troutman to assess its current conditions and receive feedback from third party perspectives. By undergoing this

process, the Town may be more equipped to apply for future grant funding through organizing its existing conditions and refining its vision as a leading pedestrian and bicycle friendly community. Other Walk Friendly and Bicycle Friendly recognized communities in North Carolina include Charlotte, Davidson, Asheville, Cary, and Boone.

5.3.3 Infrastructure Action Steps

While there are several phases involved in infrastructure project implementation, the steps outlined in this section are fundamental for the Town to take as it implements the new infrastructure projects. The process for implementation depends on the funding source the Town is seeking for execution.

Identify Implementation Opportunities

Federal, state, and local funding sources will be necessary to implement this Plan. No one source should be relied upon to complete all of the proposed recommendations. The implementation strategy for each project depends on the cost, facility recommendation, roadway type, and other elements. The following are possible implementation opportunities the Town can seek:

- NCDOT Pedestrian Projects selected for funding in the STIP (State Transportation Improvement Program) through STI (Strategic Transportation Improvements) Prioritization process (10 to 15 years).
- NCDOT Highway Projects with bicycle and pedestrian improvements included under the NCDOT Complete Streets Policy, selected for funding in the STIP through STI Prioritization process (5 to 15 years).
- NCDOT Pedestrian Safety Improvements (1 to 5 years).
- NCDOT Resurfacing Projects (1 to 5 years).
- CRTPO Discretionary Funding (3 to 7 years).

Refer to Section 5 for more detail on each NCDOT funding source and the process the Town should follow for each source.

Perform Road Safety Audits

US-21 (Main St.), Wagner St./Perth Rd., Old Mountain Rd., and Eastway Dr. were identified during the study as ideal candidates for a Road Safety Audit (RSA). An RSA is a formal examination of mobility safety performance to identify potential road safety issues and identifies opportunities for improvements in safety for all road users. The FHWA works with State DOTs and local jurisdictions to encourage RSAs along existing roads and intersections. The goal of an RSA is to identify elements of the road that may present a safety concern and recommend a standard approach to elimination or mitigation.

Prioritize Projects

The most highly scored projects in Section 3 should be considered for implementation in the near to mid-term. However, should opportunities arise to implement this Plan's projects concurrent with related capital, NCDOT, or private improvements, the Town should pursue those options to support the completion of its bicycle and pedestrian network. As the Town progresses on project implementation, it should re-prioritize the list of projects on a semi-annual basis (e.g. two or three year cycle) with updated costs, facility specifications (as needed), and meeting the community's need, especially those with persistent transportation barriers.

Review the Applicability of Future Projects

Many of the projects in this Plan, as well as others concerning transportation in Troutman, will need to undergo more detailed site-specific evaluation as future revisions are made. Troutman’s priorities will change over time, and projects should be constantly re-evaluated for future needs. Town staff and the BPAC should work jointly to this end. These priority projects should be the Town’s focus as it works with the County and the MPO for funding and implementation through local and regional plans.

5.3.4 Action Item Timeline

Table 13 - Action Item Timeline

Strategy	Contributing Stakeholders	Lead Agency/ Stakeholder	Time Frame	Duration
Policy				
Adopt this Plan	Town Council	Town Staff	Immediate	Initial
Amend the CTP	Town Council, Iredell County Commissioners, CRTPO	Iredell County Commissioners	Near Future	Once
Finalize the Bicycle and Pedestrian Advisory Committee (BPAC)	Town Staff, BPAC	Town Staff	Immediate	Periodic
Adopt a Complete Streets Policy	Town Council, Town Staff, Pedestrian Advisory Committee	Town Council	Near Future	Once
Update UDO	Town Staff, Town Council	Town Council	Near Future	Periodic
Continue to Enforce State and Local Regulations	Town Staff, Law Enforcement, BPAC	Police	Near Future – Long-Range	Ongoing
Update the Bicycle and Pedestrian Plan every 7-10 years	Town Council, Town Staff	Town Staff	Intermediate-Long Range	Periodic
Program				
Create Educational Outreach Programs	BPAC	Town Staff	Near Future – Long-Range	Ongoing
Create Encouragement Outreach Programs	BPAC	Town Staff	Near Future – Long-Range	Ongoing
Establish a Monitoring and Benchmarking Program	Town Staff, BPAC	Town Staff	Immediate – Long-Range	Ongoing
Become Registered as a Walk Friendly and Bicycle Friendly Community	Town Staff, BPAC	Town Staff	Near Future – Long Range	Periodic
Infrastructure				
Identify Funding Sources	Town Staff, BPAC	NCDOT & Town Staff	Immediate – Long-Range	Periodic

Perform a Road Safety Audit	NCDOT Transportation Safety & Mobility Unit, FHWA Division Office, Town Staff	NCDOT & Town Staff	Near Future – Intermediate	Once
Build the Priority Projects Outlined in this Plan	NCDOT, Iredell County, Town Staff, CRTPO	NCDOT	Near Future – Intermediate	Ongoing
Review the Applicability of Future Projects	NCDOT, CRTPO, Iredell County, Town Staff, BPAC	NCDOT	Long Range	Periodic

5.4 Performance Measures

Performance measures should be developed to evaluate this Plan’s action items and programs. Baseline conditions, such as pedestrian/cyclist counts and event attendance, should be gathered before any of the action items are implemented. This allows the Town and the BPAC to track the progress of successful programs as they grow and mature. Determining which programs are effective and which ones are less effective within the context of Troutman will be critical in making future decisions regarding the full implementation of this Plan. The following goals and their multiple performance measures were identified by the Steering Committee to ensure the continual improvement of pedestrian and bicycle facilities in Troutman.

Safety

Reduce Bicycle and Pedestrian Crashes	Decrease the average number of pedestrian and bicycle crashes resulting in injuries.
Crossing Locations	Increase the number of crossing locations with high visibility crosswalks and additional treatments.

Mobility and Accessibility

Increase the Network	Increase the number of miles of sidewalks, bike lanes, and greenways.
Access for All	Prioritize upgrading sidewalks and curb ramps to ADA standards near key community destinations.

Outdoor Recreation and Health

Connection to Recreation	Support bicycle and pedestrian improvements that connect to gyms, parks, and Lake Norman State Park.
Implement Greenways	Increase the number of miles of greenways to promote healthy, outdoor recreational opportunities.

Connectivity

Improve walkability / bikeability	Prioritize bicycle and pedestrian improvements in downtown and near schools and work destinations, as well as short greenway links between neighborhoods.
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Regional Movement	Increase the number of connections to existing and future Carolina Thread Trail and state and regional bicycle routes.
Carless Commutes	Increase the share of the population who commutes to work or school by active transportation modes.

Economic Development

Commercial Connections	Support sidewalk and greenway improvements in proximity to commercial activity centers.
Wayfinding	Enhance wayfinding and signage for pedestrian and bicycle routes.

Equity

Equitable Access	Increase the percentage of transportation disadvantage population who have access to pedestrian and bicycle facilities.
Equitable Implementation	Ensure equitable distribution of bicycle and pedestrian facilities to all Troutman residents.

5.5 Funding Sources

The list below provides a description of some of the key funding sources available to support implementation of active transportation improvements. This is not meant to be an exhaustive list.

5.5.1 Federal

Highway Safety Improvement Program (HSIP)

The Highway Safety Improvement Program (HSIP) is a core federal-aid program that provides funding for safety projects and programs on any publicly owned roadway to reduce fatal and serious injury crashes. The FHWA has developed a variety of resources to help states plan, implement, and evaluate the effectiveness of the efforts. HSIP funding can be used for either location-based or systemic projects or programs, but obtaining funding requires detailed data evaluation to ensure the best use of funds. In North Carolina, NCDOT oversees the project selection for HSIP funding. The North Carolina Strategic Highway Safety Plan guides the priorities for HSIP project selection in North Carolina.

National Priority Incentive Programs (Section 405) and State and Community Highway Safety Program (Section 402)

National Highway Traffic Safety Administration (NHTSA) administers the highway safety grants included in the Bipartisan Infrastructure Law and distributed to Highway Safety Offices in all 50 states, the District of Columbia, United States territories, and the U.S. Department of the Interior’s Bureau of Indian Affairs. Those highway safety grants generally fall under two categories:

- State and Community Highway Safety Program (Section 402): this program covers initiatives such as high-visibility enforcement campaigns and other safe driving campaigns, as well as enforcement of and education about state laws on seat belt use and risky driving; in addition, this program supports improving traffic records and support programs on the proper use of child safety seats, including inspection stations where caregivers can confirm the proper installation of their child safety seats.
- National Priority Incentive Program (Section 405): this program includes categories of projects such as impaired driving countermeasures; state traffic safety information systems to help states build databases related to crashes; occupant protection including seat belt education and enforcement; distracted driving prevention; pedestrian and bicyclist safety programs; and motorcyclist safety

In North Carolina, NCDOT Governor’s Highway Safety Office is the agency the collects grant applications on an annual basis for projects to be funded with Section 402 and Section 405 funds.

Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Discretionary Grant Program

RAISE discretionary grant funding program, previously known as TIGER grants and then later as BUILD grants, includes eligibility for a wide variety of transportation projects planning and implementation. RAISE grants are expected to help communities carry out projects with significant local or regional impact. A competitive grant application process is required. The minimum award amount for planning projects is \$5 million (\$1 million in rural areas), and the maximum amount differs between two funding streams (\$25 million if funded through Bipartisan Infrastructure Bill (BIL) funding and \$45 million if funded through the FY 2022 Appropriations Act funding). A 20% local match is generally required, with a few exceptions in the following cases:

- Rural communities,
- Areas of Persistent Poverty, and
- Historically Disadvantaged Communities are eligible to apply for 100% federal funding.

Active Transportation Infrastructure Investment Program

This is a new funding program in the Infrastructure Investment and Jobs Act (IIJA, also known as the Bipartisan Infrastructure Bill (BIL)). Under the Active Transportation Infrastructure Investment Program, local, regional, state, and tribal governments can apply to receive funding for active transportation projects and planning grants that build upon a local, regional or state network or key network corridors. The infrastructure projects and planning studies funded under this program have to account for safety and facilitate more people walking and biking.

Safe Streets and Roads for All (SS4A) Grants

The Safe Streets and Roads for All (SS4A) discretionary program was a new program established under the Bipartisan Infrastructure Law (BIL). SS4A grant program is available for both safety action plans and implementation. A 20% local match is required. Funding amounts range as follows:

- For action plans, the range is between \$200,000-1 million (for municipalities) or up to \$5 million (for MPOs).
- For implementation applications, the range is \$5 million-30 million for municipalities, \$3 million-30 million for rural areas and \$5 million-50 million (for MPOs).

- Any jurisdiction outside of an Urbanized Area or any Urbanized Area < 200,000 in population is considered “rural” for the purpose of this grant application.

Surface Transportation Block Grant (STBG)

The Surface Transportation Block Grant Program (STBG) provides a flexible funding source to best address State and local transportation needs and covers a wide variety of potential projects including highway, bridge, transit capital and bicycle and pedestrian projects. A minimum 20% local match is required. The State of North Carolina receives an apportionment on an annual basis based on an established allocation formula. MPOs with over 200,000 in population including the CRTPO also receive pass-through funds as STBG-DA (Surface Transportation Block Grant-Directly Attributable funds). NCDOT allocates STBG funding that is not designated for larger MPOs through the STI Prioritization process that informs the STIP development every two years.

Congestion Mitigation and Air Quality funding (CMAQ)

CMAQ funding supports surface transportation projects and other related efforts that contribute air quality improvements and provide congestion relief. Funds may be used for a transportation project or program that is likely to contribute to the attainment or maintenance of a national ambient air quality standard and is included in an MPO’s current transportation plan and TIP or the current STIP in areas without an MPO. A minimum 20% local match is required.

5.5.2 State

STI Prioritization and STIP

NCDOT manages the STI Prioritization process which results in an update to the State Transportation Improvement Program every two years. STIP identifies construction funding for transportation projects, funded through a combination of federal and state funding sources. The Town of Troutman could submit a project through the CRTPO process to be considered for STI Prioritization and scoring and inclusion in the STIP. Both stand-alone bicycle and pedestrian improvements and roadway projects with inclusion of complete streets elements may be submitted.

NCDOT HSIP Hazard Elimination Program

Safety grant program utilizing federal and state funding to address safety and potential safety issues. Projects are selected based on a cost-benefit ratio with safety benefits being classified in terms of crashes reduced.

Governor’s Highway Safety Program Grant

Safety grant program specifically related to preventing crashes on North Carolina roads.
(<https://www.ncdot.gov/initiatives-policies/safety/ghsp/Pages/Grants.aspx>)

Eat Smart, Move More NC

This program provides a variety of links and resources, including potential funding sources for public health initiatives. (<https://www.eatsmartmovemorenc.com/>)

Bicycle Amenities Program

The NC Division of Public Health (DPH) conducts a competitive grant program for funding of bicycle racks and repair stations. Once awarded, communities must pick up the racks and fixit stations from the state’s distribution facility and transport and install in their community. Contact the DPH Built Environment & Physical Activity Coordinator for more information and funding cycles. (

Bicycle Helmet Program

The NCDOT Integrated Mobility Division provides helmets to communities through the annual Bicycle Helmet Initiative. Communities submit an application to IMD that describes how they plan to distribute helmets to low-income children. More information is available at <https://www.ncdot.gov/initiatives-policies/safety/bicycle-helmets/Pages/default.aspx>

Non-Infrastructure Transportation Alternatives Program

Provides funding for programs and activities that aims to shift community behavior, attitudes, and social norms through education, encouragement, and enforcement strategies to increase the safety and convenience for children to walk and bicycle to school (<https://connect.ncdot.gov/projects/BikePed/Documents/SRTS%20Non-Infrastructure%20Grant%20Guidelines.pdf>)

NC Parks and Recreation Recreational Trails Grants

The North Carolina Division of Parks and Recreation manages grant funding under the Recreational Trails Program (RTP). The Recreational Trails Program (RTP) is a \$1.5-million federal grant program designated to help states provide and maintain trails for motorized and non-motorized recreational trail use; RTP funding is provided on a reimbursement basis where the funds must be spent and reimbursement requested upon completion of the project; a state, federal or local government or qualified nonprofit organization is an eligible entity. Additional information available is at <https://trails.nc.gov/trail-grants>

Trust Fund PARTF Program

Since 1994, the North Carolina Parks and Recreation Trust Fund (PARTF) has been awarding matching grants to local governments for parks and recreational facilities. Counties, incorporated municipalities, and public authorities, as defined by G.S. 159-7, are eligible applicants. A local government can request a maximum of \$500,000 with each application. The appraised value of land to be donated to the applicant can be used as part of the match. Grant applications are typically due in February. Additional information available at <https://www.ncparks.gov/more-about-us/parks-recreation-trust-fund/applicants>

Community Development Block Grant Program

State Community Development Block Grant (CDBG) funds are provided by the U.S. Department of Housing and Urban Development (HUD) to the state of North Carolina; smaller communities may apply for assistance for community projects that benefit low to middle income households. Projects are intended to support decent housing and suitable living environments and expanding economic opportunities. All North Carolina small cities are eligible to apply for funds except for 23 entitlement cities that receive funds directly from the U.S. Department of Housing and Urban Development (HUD) (Troutman does not receive direct funds). Each year, CDBG provides funding to local governments for hundreds of critically-needed community improvement projects throughout the

state. Priority is given to the counties in the top 80 ranking based on economic distress; Iredell County currently falls outside of the list of the 80 priority counties. Additional information is available <https://www.nccommerce.com/grants-incentives/public-infrastructure-funds/infrastructure-state-rural-grants>

Economic Development Grants

There are a variety of state grant funding categories that are geared towards economic development or other purposes not specific to transportation, that could have a positive impact on transportation mobility and safety.

For example, the Rural Transformation Grant program (first call for projects held in the spring 2022 with several future calls expected)¹⁷ can fund a variety of projects including but not limited to “Main street and downtown investment and revitalization efforts” and “Initiatives that help create resilient neighborhoods”; sidewalk improvements are eligible as part of this grant. Additional information about the Rural Transformation Grants available at <https://www.nccommerce.com/grants-incentives/rural-transformation-grants>

Implementation as Part of Roadway Projects Implementation and Complete Streets Improvements

As part of roadway projects planning and implementation, NCDOT reviews roadway projects for multimodal elements based on the Complete Streets Policy. Pedestrian, bicycling, and transit stop improvements can be included as part of a roadway project, if recommendations for those improvements are reflected in a local or regionally adopted plan. (<https://connect.ncdot.gov/projects/BikePed/Pages/Complete-Streets.aspx>)

Bridge replacement is a special case when it would be particularly important to consider bicycle and pedestrian improvements that can be included. Similarly, underpasses and overpasses under and over I-77 in and near Troutman warrant a specific consideration for bicycle and pedestrian facilities that can be improved, to address the issue of I-77 serving as a barrier to multimodal transportation in and around Troutman.

Implementation as Part of Maintenance Activities

Municipalities and NCDOT can implement some safety treatments as part of typical maintenance activities. For example, when repaving a secondary road, where sufficient width exists, NCDOT can add reflective shoulder striping as a low cost, high impact safety measure. NCDOT provides five-year plans that include resurfacing schedules. The following website includes a link to an interactive map of corridors scheduled for maintenance in over the current five-year cycle: <https://connect.ncdot.gov/resources/Asset-Management/HMIP/Pages/default.aspx>

Clean Water Management Trust Fund

The Clean Water Management Trust Fund is available to any state agency, local government, or non-profit whose primary purpose is the conservation, preservation, and restoration of North Carolina’s environmental and natural resources. Conservation projects have to address one or multiple of the following target areas:

- enhance or restore degraded waters;
- protect unpolluted waters, and/or

¹⁷ North Carolina Department of Commerce. Rural Transformation Grants. <https://www.nccommerce.com/grants-incentives/rural-transformation-grants#resilient-neighborhoods>

- contribute toward a network of riparian buffers and greenways for environmental, educational, and recreational benefits;
- provide buffers around military bases to protect the military mission;
- acquire land that represents the ecological diversity of North Carolina; and
- acquire land that contributes to the development of a balanced State program of historic properties.

Additional information is available at nclwf.nc.gov/grants

5.5.3 Regional

CRTPO Discretionary Call for Projects

The CRTPO holds a competitive call for discretionary transportation projects funding on a regular basis-this includes STBG-DA funds allocated to the Charlotte region, Transportation Alternatives Program (TAP-DA) funds as well as Congestion Mitigation and Air Quality Improvement Program (CMAQ) funds and a portion of toll proceeds. A local match of at least 20 percent is required.

Complete Streets Implementation

Under the NCDOT Complete Streets Policy, as part of roadway projects planning and implementation, complete streets elements including bicycle, pedestrian and transit improvements recommended in local and regional plans are included. A local match is generally not required.

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

5.5.4 Municipal/Local

Implementation as Part of Residential and Commercial Development

As required in the Unified Development Ordinance, the Town should continue to monitor new developments to ensure that required sidewalk, greenway connections (or greenway easements for subdivisions with less than 10 lots), on-road bicycle improvements and bicycle parking facilities are included and constructed up to required standards where applicable. Periodic updates to the Unified Development Ordinance might be needed to address the elements currently missing or not specific enough to address a variety of situations.

Municipal Property Tax

Municipal property tax proceeds are broadly eligible for transportation projects. Additional funds would require either raising the tax rate or re-allocating funding from other purposes.

Municipal Vehicle Tax for Transportation Improvements

NC statutes authorize the levy of an annual municipal vehicle tax upon vehicles registered in the town/municipality to be used to fund projects on public streets. Municipalities can designate a dedicated line item in the annual budget and Capital Improvement Program for neighborhood traffic calming, intersection and safety improvements. As an example, the Town of Waxhaw, North Carolina sets aside funding for "Small

Transportation Project Fund” partially funded with municipal vehicle tax.
(https://www.ncleg.gov/EnactedLegislation/Statutes/PDF/BySection/Chapter_20/GS_20-97.pdf)

Powell Bill Funds

North Carolina municipalities receive financial assistance from the State to help pay for the construction, maintenance, and repair of municipal streets, bikeways, and sidewalks. North Carolina levies motor fuel taxes under a formula that increases taxes when the wholesale price of motor fuels increases. The State appropriates a certain percentage of this revenue, plus an additional percentage of the North Carolina Highway Trust Fund's net proceeds, to eligible municipalities across the State. The legislation that first established this distribution is known as the Powell Bill. The available funds are distributed among eligible municipalities. Powell Bill funds can be used for street, sidewalk, and bikeway maintenance, improvements, and design, among other transportation uses.
(<https://connect.ncdot.gov/municipalities/State-Street-Aid/Pages/default.aspx>)

General Obligation Bonds

Long-term bonds may be approved through voter referendum, to be repaid by property taxes. The purpose is established prior to the referendum vote. Transportation projects can be a specified purpose of a bond referendum package.

Municipal Service Districts (MSDs)

Municipalities can designate Municipal Service Districts, where additional property taxes may be assessed to fund projects and services within the districts. Downtown Municipal Service Districts are most common.

5.5.5 Private Foundation Grants

AARP Community Challenge Grants

The AARP Community Challenge grant funding cycle in 2021 awarded \$3.2 million to support 244 quick-action projects across the U.S., funding a variety of improvements in urban, rural and suburban communities to support residents of all ages. Community Challenge grants help improve public spaces, transportation, housing, and civic engagement with an emphasis on the needs of people 50 or older. Some of the transportation improvements funded recently included bikeway and pedestrian improvements. Typically those grants are under \$20,000 each.¹⁸

American Hiking Society's National Trails Fund Grant

This organization offers micro-grants (\$500-\$3,000) to active members of the alliance of hiking organizations to improve hiker access or hiker safety. Recipient organization must be a 501(c)(3) non-profit.
(<https://www.aarp.org/livable-communities/community-challenge/info-2023/2023-challenge.html>)

Better Block Foundation Grants

The Better Block Foundation is a 501(c)3 nonprofit that educates, equips, and empowers communities and their leaders to reshape and reactivate built environments to promote the growth of healthy and vibrant

¹⁸ AARP (July 28, 2021). AARP Community Challenge 2021 Grantees. <https://www.aarp.org/livable-communities/community-challenge/info-2021/2021-grantees.html>

neighborhoods. Its services support the reimagining of public spaces to include active transportation like walking and bicycling. (<https://www.betterblock.org/>)

Carolina Thread Trail Regional Trail Implementation Grant Program

The Carolina Thread Trail is an umbrella effort supporting a regional network of trails that would connect 2.9 million people in 15 counties in North and South Carolina, and Iredell County is part of the Carolina Thread Trail network. The Carolina Lands Conservancy is a local non-profit conservation group leading the Carolina Thread Trail implementation efforts. Local communities in the 15-county area can apply for a Regional Trail Implementation grant in support of planning for and building sections of the Thread Trail. The following project types with expected funding amounts were designated in recent calls for projects:

- Trail Construction (to complete construction of segments of the Carolina Thread Trail that may include varying trail types, such as natural surface, unpaved aggregate or stone material, and asphalt or concrete pavement); maximum grant request: \$50,000;
- Trail Project Design (to conduct site due diligence, permitting, construction budgeting, and drawing for segments of the Carolina Thread Trail); maximum grant request: \$30,000;
- Land Acquisition (to acquire land or purchase easements or development rights for segments of trail that align with the Carolina Thread Trail Master Plan. Land acquired may include open space for viewsheds, riparian buffers, wildlife habitat, or recreation along the trail); maximum grant request: \$30,000;
- Detailed Corridor Planning (to identify trail alignment on parcel by parcel basis by working with landowners on a specific segment of the Carolina Thread Trail Master Plan and develop the scope of work necessary to successfully implement the plan and construct the trail); maximum grant request: \$15,000;
- Canoe/Kayak Launch Construction (to complete construction of canoe or kayak launches into designated Carolina Thread Trail Blueways (Rocky River, South Fork River, Catawba River, Pee Dee River)); maximum grant request: \$5,000.

Additional information about the Carolina Thread Trail grant funding is available at <https://www.carolinathreadtrail.org/resources/grant-program-funding-sources/>

National Association of Realtors Placemaking Grants

The Placemaking Grant funds the creation of new, outdoor public spaces and destinations in a community, and it is accessible through state and local REALTOR® Associations. Potential funded projects include demonstration projects like parklets, pop-up parks, pedestrian plazas, bike lanes, and amenities like street furniture, paint, signage, materials, landscaping, and murals. (<https://www.nar.realtor/grants/placemaking-grant>)

A

Appendix A: Glossary

AADT	Average Annual Daily Traffic
ACS	US Census Bureau American Community Survey
Active Transportation	Transportation Methods that do not involve the use of a personal vehicle such as walking, running, bicycling, transit, etc.
ADA	Americans with Disability Act
Advisory Shoulder / Advisory Bike Lane	A roadway consisting of a single center lane which supports two-way vehicle traffic and an edge lane on either side reserved for bicyclists and pedestrians except when oncoming traffic necessitates the need for the vehicle to use the edge lane
Bicycle Lane	A portion of roadway that has been designated by striping, signage, and pavement markings for the exclusive use of bicyclists
CIP	Capital Improvement Plan
CMAQ	Congestion Mitigation and Air Quality Funding
Couplet	A pair of parallel one-way roads that carry traffic in opposing directions
CRTPO	Charlotte Regional Transportation Planning Organization
CTP	Comprehensive Transportation Plan
CTT	Carolina Thread Trail
FHWA	Federal Highway Administration
Greenway	A pathway (typically 10 feet wide) that can be used for both pedestrian and bicycle activity that parallels a natural or manmade feature

High Visibility Crossing	A crosswalk that uses patterns that are visible to both the driver and pedestrian from farther away compared to traditional crosswalks
Local Match	A local government's financial contribution to an infrastructure project
Median Refuge Island	A small section of pavement or sidewalk surrounded by asphalt or other road materials where pedestrians can stop before finishing crossing a road
Mid-Block Crossing	A bicycle and pedestrian crossing opportunity that is not at a roadway intersection
MPO	Metropolitan Planning Organization
Multi-Use Path (MUP)	A pathway larger than a sidewalk (typically 10 feet wide) that can be used for both pedestrian and bicycle activity that parallels a roadway
NCDOT	North Carolina Department of Transportation
NHTSA	National Highway Traffic Safety Administration
Ped Signal Head	A lighted signal at a signalized intersection used to let pedestrian know when it is safe to cross the roadway
Pedestrian Scale Lighting	Luminaries that are directed toward the sidewalk, positioned lower than and spaced closer than roadway luminaries, that are designed to improve pedestrian safety and enhance placemaking
PHB	Pedestrian Hybrid Beacon
Placemaking	A process of transforming and defining a public space to strengthen the connection between those who use the space and the physical environment
Planning-level cost estimate	A preliminary cost estimate due to the limited availability of project details
Rail Trail	A multi-use path created from former railroad corridors
RAISE	Rebuilding American Infrastructure with Sustainability and Equity Discretionary Grant Program

ROW	Right-of-way – real property and rights therein used for the construction, operation, or maintenance of a transportation or related facility
RPO	Rural Planning Organization
RRFB	Rectangular Rapidly Flashing Beacon
Sharrow	A pavement marking indicating that roadway users are to share the road with bicyclists; Sharrows also indicate suggested position for bicyclists in the roadway
Sidewalk	A paved surface designated for pedestrian use parallel to the roadway, generally separated from the traffic lanes by a curb
SS4A	Safe Streets and Roads for All Grant
Stakeholder	A person or entity with an interest or concern in the project
STBG	Surface Transportation Block Grant
Steering Committee	A group of people who decide on the priorities, direction, and guidance of a project
STI	Strategic Transportation Investments
STIP	State Transportation Improvement Program
TIP	Transportation Improvement Program
Truncated Domes	A tactile warning strip of raised bumps designed to let pedestrians with vision impairments know that they are approaching an intersection
UDO	Unified Development Ordinance – a set of regulations designed to guide future development in a municipality
Vision Zero	A strategy to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all
Wayfinding	The use of signage and design elements to help residents and tourists to navigate a space

Appendix B. Pedestrian and Bicycle Design Guidance

This Design Guidance section documents current design guidance and standards resources in support of implementing bicycle and pedestrian improvements. This list of resources has been developed to complement the Town's Bicycle and Pedestrian Acceleration Plan and reflects best practices at the state and national level to support bicycle and pedestrian safety and comfort.

Most of the projects identified in the plan will require a more detailed evaluation by a professional engineer prior to implementation, with considerations for physical constraints, rights-of-way, traffic counts and speed and other data to be reviewed at the time of the engineering study.

National Guidance

American Association of State Highway and Transportation Officials' (AASHTO) *Guide for the Planning, Design, and Operation of Pedestrian Facilities.*

The American Association of State Highway and Transportation Officials (AASHTO) is a non-profit organization with the goal of supportive multimodal transportation for the entire United States. The AASHTO *Guide for the Planning, Design, and Operation of Pedestrian Facilities* (2nd Edition, 2021) provides guidance on the planning, design, and application of various types of pedestrian facilities. The project team used this guide to help develop the recommendations in this Plan, and future updates to this Plan should involve consulting the guide. It will also provide specific guidance for design criteria of individual projects during the implementation phase.

American Association of State Highway and Transportation Officials' (AASHTO) *Guide for the Development of Bicycle Facilities*

The AASHTO *Guide for the Development of Bicycle Facilities* (4th Edition, 2012) provides similar types of guidance as the AASHTO Pedestrian Guide, and should be consulted in a similar manner as priority projects are advanced into design and construction. A new guide is anticipated in 2022.

American Association of State Highway and Transportation Officials' (AASHTO) *A Policy on Geometric Design of Highways and Streets.*

A Policy on Geometric Design of Highways and Streets (2018) provides national guidance on the design of highways and streets. The 7th edition of the "The Green Book" offers an updated framework for geometric design that is more flexible, multimodal, and performance based than in previous editions.

Federal Highway Administration (FHWA) Guidance

FHWA provides guidance for accessibility, design, and facility operations for pedestrians and bicyclists, among other modes. Often, these are in the form of standalone publications that target a specific issue in transportation, such as planning in small towns, crossing guidance, and bikeway facility design. Their resources are especially helpful for state and local governments who wish to implement the best practices. Several publications of note are included below:

- ***Bikeway Selection Guide.*** The *Bikeway Selection Guide* (2019) is designed to assist transportation planners and engineers in the selection of roadway design treatments to accommodate bicycles and motor vehicles. This document is a resource to help transportation practitioners consider and make informed decisions about tradeoffs relating to the selection of bikeway types based on the local context, roadway characteristics and planned bicycle network.
- ***Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations.*** The *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations* (2018) is developed to assist State or local transportation or traffic safety departments that are considering developing a policy or guide to support the installation of countermeasures at uncontrolled pedestrian crossing locations. This document provides guidance to agencies, including best practices for each step involved in selecting countermeasures. By focusing on uncontrolled crossing locations, agencies can address a significant national safety problem and improve quality of life for pedestrians of all ages and abilities.
- ***Pedestrian Lighting Primer.*** The *Pedestrian Lighting Primer* (2022) was developed as a resource for transportation practitioners interested in the safety and security benefits of pedestrian lighting as well as lighting design considerations at locations with existing or future pedestrian activity.
- ***Separated Bike Lane Planning and Design Guide.*** The *Separated Bike Lane Planning and Design Guide* (2015) is the latest national guidance on the planning and design of separated bike lane facilities released by the Federal Highway Administration (FHWA). The resource documents best practices as demonstrated around the U.S.
- ***Small Town and Rural Multimodal Networks Guide.*** The *Small Town and Rural Multimodal Networks Guide* (2016) adopts existing street design guidance and facility types for bicycle and pedestrian safety and comfort for the context of smaller towns and rural places not addressed in guides such as the NACTO Street Design Guide and ITE Walkable Urban Thoroughfares report. The guide provides examples of how to interpret and apply design flexibility to improve bicycling and walking conditions.
- ***STEP: Improving Visibility at Trail Crossings.*** *STEP: Improving Visibility at Trail Crossings* is a resource focused on improving the driver's visibility of trail users at roadway crossings. The document presents a systemic approach to reviewing existing crossings or planning for improved at-grade trail crossings with engineering countermeasures, such as enhanced signs and traffic controls. This resource discusses ways to make crossings more visible to drivers. The document describes safety issues and countermeasures for several most frequent types of trail crossings and introduces a process for reviewing trail crossing locations for issues and opportunities to reduce the chances of fatal or severe injury crashes.

ITE Designing Walkable Urban Thoroughfares: A Context Sensitive Approach

The Institute of Transportation Engineers' (ITE) *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach* (2010) was developed as a guide to support the understanding of the flexibility that is inherent in the AASHTO *A Policy on Geometric Design of Highways and Streets*. The chapters emphasize thoroughfares in "walkable communities" - compact, pedestrian-scaled villages, neighborhoods, town centers, urban centers, urban cores and other areas where walking, bicycling and transit are encouraged. It describes the relationship, compatibility and trade-offs that may be appropriate when balancing the needs of all users, adjoining land uses, environment and community interests when making decisions in the project development process.

Manual on Uniform Traffic Control Devices (MUTCD)

The MUTCD provides guidance on the use, design, and application of control devices such as signs, pavement markings, and signals. This manual defines the design criteria for specific implementation projects. The project team consulted the MUTCD during preparation of this Plan.

National Association of City Transportation Officials' (NACTO) *Urban Bikeway Design Guide*

The NACTO *Urban Bikeway Design Guide* (2011) is based on the experience of cycling cities around the world and in the U.S. and is meant provide cities with state-of-the-practice solutions that can help create complete streets that are safe and enjoyable for bicyclists.. The designs in this document were developed by cities for cities, since unique urban streets require innovative solutions. Most of these treatments are not directly referenced in the current version of the AASHTO Guide to Bikeway Facilities, although most of them are permitted under the Manual on Uniform Traffic Control Devices (MUTCD). Non-compliant traffic control devices may be piloted through the MUTCD experimentation process. That process is described in Section 1A.10 of the MUTCD. The Federal Highway Administration has posted information regarding MUTCD approval status of all the bicycle related treatments (last updated in 2017)¹ and has issued a memorandum² in August 2013 officially supporting use of the document.

National Association of City Transportation Officials' (NACTO) *Urban Street Design Guide*

The National Association of City Transportation Officials' (NACTO) *Urban Street Design Guide* (2013) is a collection of nationally recognized street design standards, and offers guidance on the current state of the practice designs. Written by and for cities, NACTO's design guide centers around building streets that safely accommodate all road users, including people traveling on foot, bike, and on transit. This guide includes a toolkit of street design elements with key dimensions and applications.

United States Access Board

The US Access Board provides standards and guidelines for accessibility consistent with ADA. For more information about ADA accessibility requirements, the Town should consult the US Access Board's 1991 *ADA Accessibility Guidelines (ADAAG)* and the 2010 *Standards for Accessible Design* as minimum requirements for new construction or alterations.

The Town should also consult the 2011 *Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way* (proposed PROWAG) for additional best practices for accessibility. PROWAG has been published as a Notice of Proposed Rulemaking but is not standard as of 2022.

¹ FHWA (2017). Bicycle Facilities and the Manual on Uniform Traffic Control Devices (table). Retrieved from https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/mutcd/

² FHWA (2013). Memorandum: Bicycle and Pedestrian Facility Design Flexibility. Retrieved from https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/design_flexibility.cfm

North Carolina Guidelines

MUTCD

North Carolina has its own supplement to the MUTCD to provide additional guidance on very specific issues, such as the implementation of speed limit signage. For more general instruction on signage and traffic markings, consult the national MUTCD provided by FHWA.

Roadway Design Manual

This document includes design specific elements and information required to prepare a detailed roadway design. The RDM is also intended to provide the designer with flexibility in the design process while still maintaining reasonable conformity to common NCDOT design practices. Part I, Chapter 4 – Cross Section Elements, describes the desirable and minimum widths for pedestrian and bicycle facilities and related projects.

Pedestrian Crossing Guidelines

This guide is designed to help local communities evaluate the existing conditions at pedestrian crossings in North Carolina. With this evaluation, it may be used to assess potential improvements based on these conditions. This guide is not designed to prioritize improvements, or assess the connectivity of a local pedestrian network. Additionally, this guide may not apply in special circumstances such as school crossings.

Complete Streets Implementation Guide and Evaluation Methodology

NCDOT describes the process for evaluating and incorporating pedestrian, bicyclist, and transit elements facilities in the Complete Streets Implementation Guide and the Complete Streets Project Evaluation Methodology. These resources are designed to help communities and NCDOT Divisions plan for a variety of transportation modes, including determining cost-share obligations. Through this multimodal approach, communities can become more active, sustainable, and connected.

Traffic Engineering Policies, Practices and Legal Authority (TEPPL)

This comprehensive resource provides a complete authority on federal and state policies and regulations regarding all transportation issues. This resource should be used a library for very intricate details regarding policy issues affecting active transportation.

Useful Web Links By Source

AASHTO

- AASHTO Publications. <https://store.transportation.org/>

FHWA

- Manual on Uniform Traffic Control Devices (2009): <https://mutcd.fhwa.dot.gov/>
- Bicycle and Pedestrian Program Publications:
https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/

- Safe Transportation for Every Pedestrian (STEP) Resources:
https://safety.fhwa.dot.gov/ped_bike/step/resources/

ITE

- ITE Transportation Planning Resources <https://www.ite.org/technical-resources/topics/transportation-planning/>

NACTO

- NACTO Guides <https://nacto.org/publications/>

NCDOT

- Active Travel Terminology (2015)
<https://connect.ncdot.gov/projects/BikePed/Documents/NC%20Terminology%20for%20Active%20Travel.pdf>
- Bicycle and Pedestrian Project Development and Design Guidance Resources (including Bicycle and Pedestrian Facility Cost Tool; Greenway Construction Standards):
<https://connect.ncdot.gov/projects/BikePed/Pages/Guidance.aspx>
- Complete Streets Planning and Design Guidelines:
<https://connect.ncdot.gov/projects/BikePed/Pages/Complete-Streets.aspx>
- Local Programs Management Handbook:
<https://connect.ncdot.gov/municipalities/Funding/Pages/LPM%20Handbook.aspx>
- Manual of Uniform Traffic Control Devices-North Carolina Supplement (2009):
<https://connect.ncdot.gov/resources/safety/Documents/>
- Roadway Design Manual: <https://connect.ncdot.gov/projects/Roadway/Pages/RDM.aspx>
- Pedestrian Crossing Guidance: [https://connect.ncdot.gov/resources/safety/Tepp/TEPPL All Documents Library/Pedestrian Crossing Guidance.pdf](https://connect.ncdot.gov/resources/safety/Tepp/TEPPL%20All%20Documents%20Library/Pedestrian%20Crossing%20Guidance.pdf)
- Traffic Engineering Policies, Practices, and Legal Authority (TEPPL):
<https://connect.ncdot.gov/resources/safety/Tepp/Pages/tepl.aspx>
- WalkBikeNC: <https://www.ncdot.gov/bikeped/walkbikenc/>

