

## Introduction

The continued growth of the Greenville region provides the opportunity and need for improved choice in transportation. Creating an environment in which pedestrians and bicyclists can move with ease and confidence between desirable activity sites provides benefits to individuals (improved fitness and reduced transportation costs) and the larger community (fewer vehicle miles traveled and cleaner environment). Alternatives to private automobiles create recreational opportunities and enhance the quality of life and livability of a neighborhood, city, and region.

But for many residents, the need for improved pedestrian and bicycle facilities is not a matter of choice — it is a matter of necessity. For persons with disabilities or those without access to private automobiles, the network of sidewalks, bike lanes, and paths connect them to their homes and livelihoods.

At the public workshops held during the planning process, citizens supported improvements to the pedestrian and bicycle network throughout the region. These citizens want to walk to schools and parks from their homes. They want improved trails and paths that connect to regional systems. Additionally, they want sidewalks and bike lanes to be built in existing neighborhoods and as new neighborhoods and roadways are constructed. These desires and needs are being recognized by officials at all levels of government who understand that while the benefits to bicyclists and pedestrians alone justify many of these improvements, other users of the transportation system will find advantages in these changes. For example, a paved shoulder not only gives extra space to bicyclists, but it also provides a refuge for motorists with disabled vehicles and helps to slow pavement deterioration of the travel lane.

Building sidewalks and re-striping pavement is only part of the solution to making the region more pedestrian- and bicycle-friendly. For uses other than recreational, pedestrian and bicycle planning is a land use consideration because users must have complementary land uses within a reasonable distance. Properly executed, pedestrian and bicycle planning produces an interconnected system that serves both recreational and transportation needs.

## Existing Conditions and Plans

### Pedestrian Environment

Pedestrian is described as both “undistinguished, ordinary” and “travel by foot,” so ideally, travel by foot should be ordinary and commonplace. Within the downtown areas, an existing interconnected network of sidewalks encourages pedestrian travel. Moving from the urban core, however, pedestrian facilities become less consistent, mainly serving major corridors and a few neighborhoods. Few sidewalks exist along the rural fringe and in the countryside, forcing pedestrians into travel lanes.

The South Carolina Department of Transportation acknowledged this trend when it addressed the need for sidewalks in the *2003 Highway Design Manual*:

Generally, sidewalks are an integral part of city streets. For suburban residential areas, the construction of sidewalks is often deferred. However, sidewalks in rural and suburban areas are still often justified at points of community development such as schools, local businesses, shopping centers and industrial plants that result in pedestrian concentrations along the highway. If pedestrian activity is anticipated, include sidewalks as part of the construction.

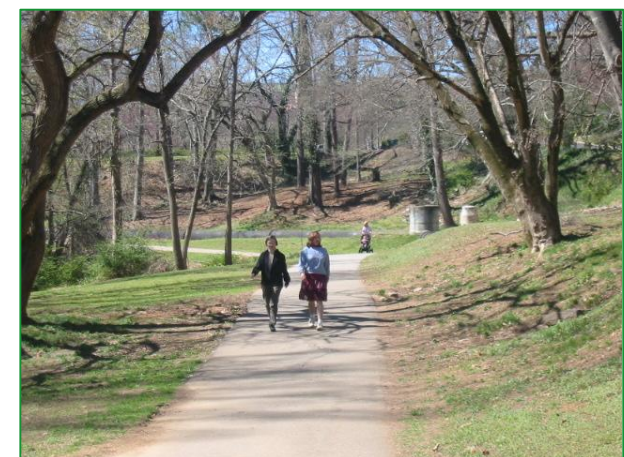
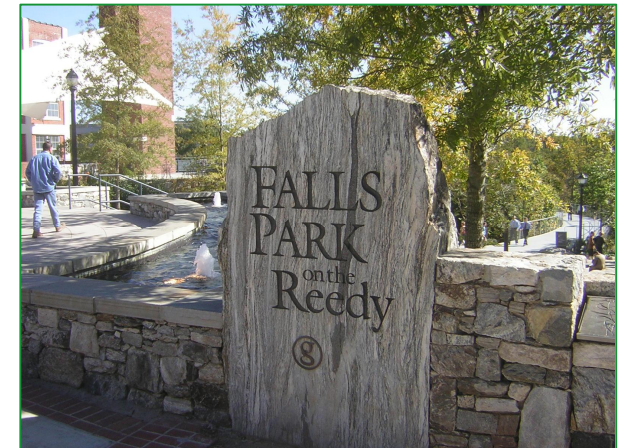
Walkers in the GPATS region have access to some greenways and trails, particularly shorter trails located within public parks. The Greenville County parks of Poinsett, Gary L. Pittman, Herdklotz, Lincoln, and Piney Mountain include walking trails. The City of Greenville maintains the Reedy River Corridor Trail, a continuous paved trail along the banks of the Reedy River that connects several city parks. Veteran’s Park in Greer and the Mauldin City Park offer walking paths. In Easley, a 1-mile nature trail is provided at the J.B. “Red” Owens Recreation Complex. Many of the greenways and trails used by pedestrians are shared with bicyclists.

**Figures 6.1A to 6.1D** illustrate the existing network of sidewalks in the GPATS region.

### Bicycle Environment

The dual, and in some cases competing, roles of practical versus recreational bicycling create other factors that foretell the bicycle network’s attractiveness to a given user. For the practical user, the proximity of activity sites and the creation of human-scaled environments support bicycle use. The average citizen can access destinations within a 5-mile (30-minute) radius. With interconnected streets and a mix of land uses, the downtown areas of Greenville and the area’s smaller cities provide such an environment. The recreational cyclist benefits from several loops and trails north and south of Greenville and a few within the city limits. Cyclists comfortable riding with traffic can take advantage of the existing rural roads with relatively lower traffic volumes.








The existing network of bicycle facilities is poised for improvement in part due to renewed commitment by SCDOT and emerging momentum following a national cycling event. Like pedestrian facilities, the state DOT emphasized the importance of considering the needs of bicyclists in new roadway construction. An Engineering Directive Memorandum in 2003 stated that bicycle accommodations “should be a *routine* part of the Department’s planning, design, construction, and operating activities.” The Memorandum describes different facilities and provides guidance on their design requirements for new projects.

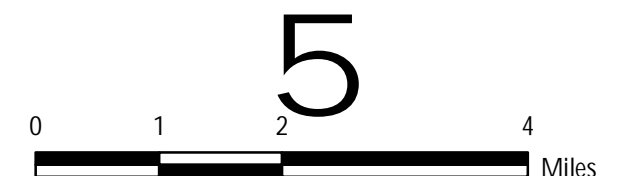
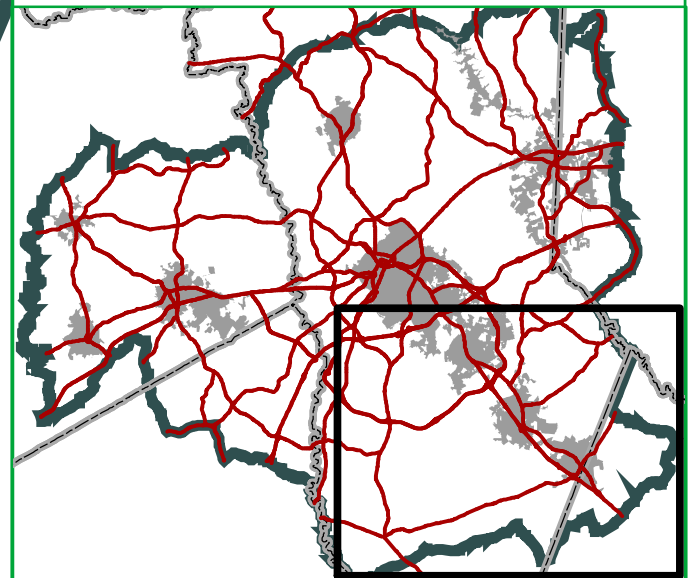
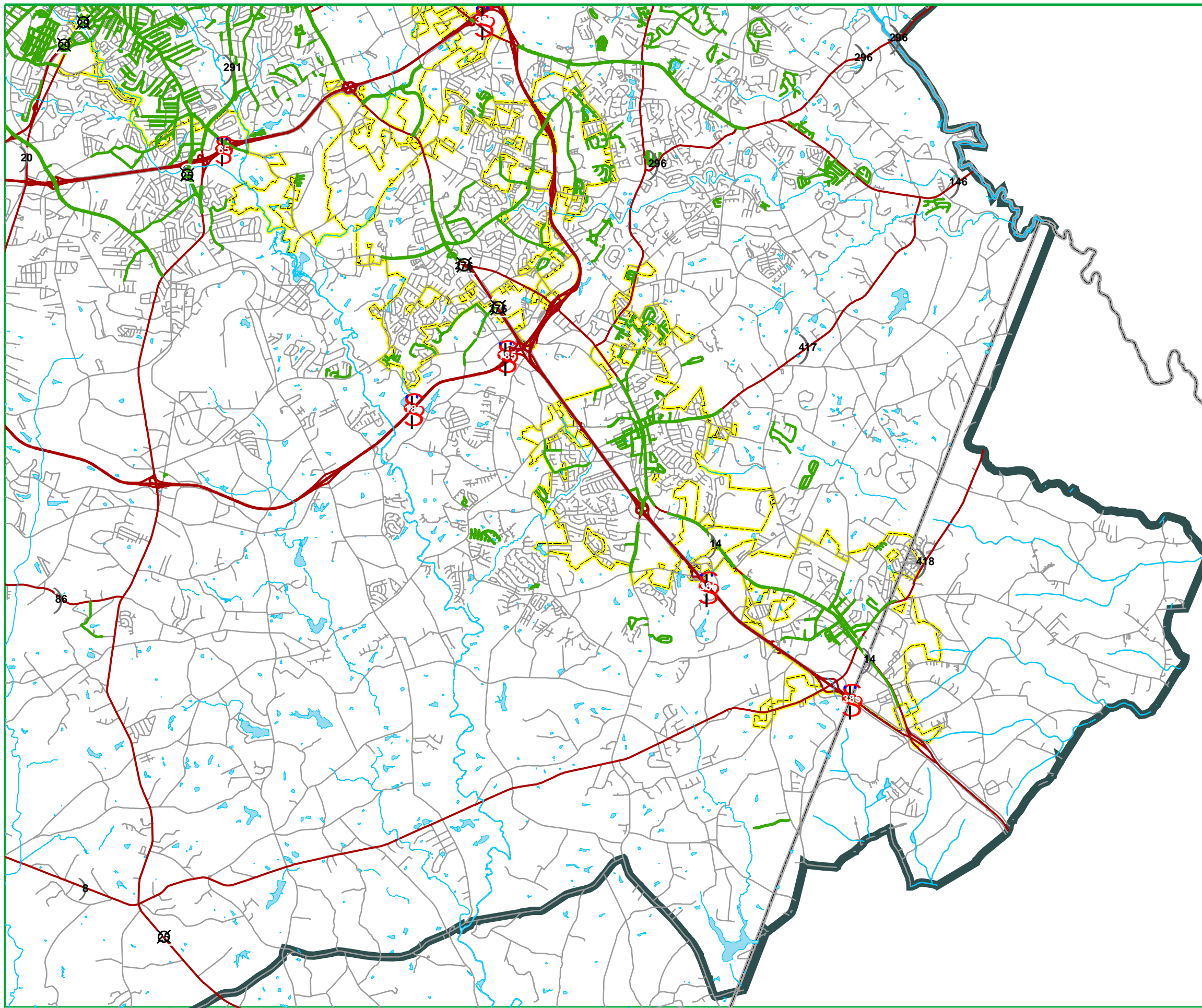




## Figure 6.1A

### Existing Sidewalk Facilities

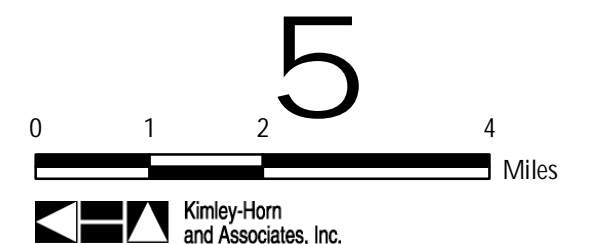
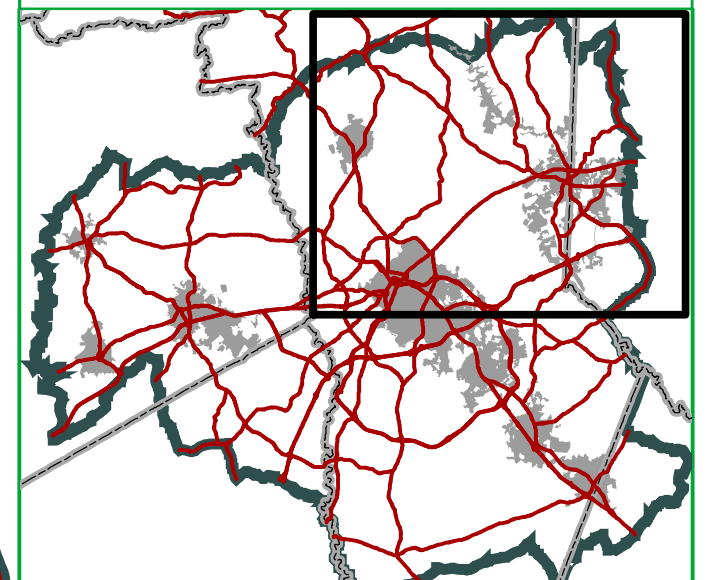
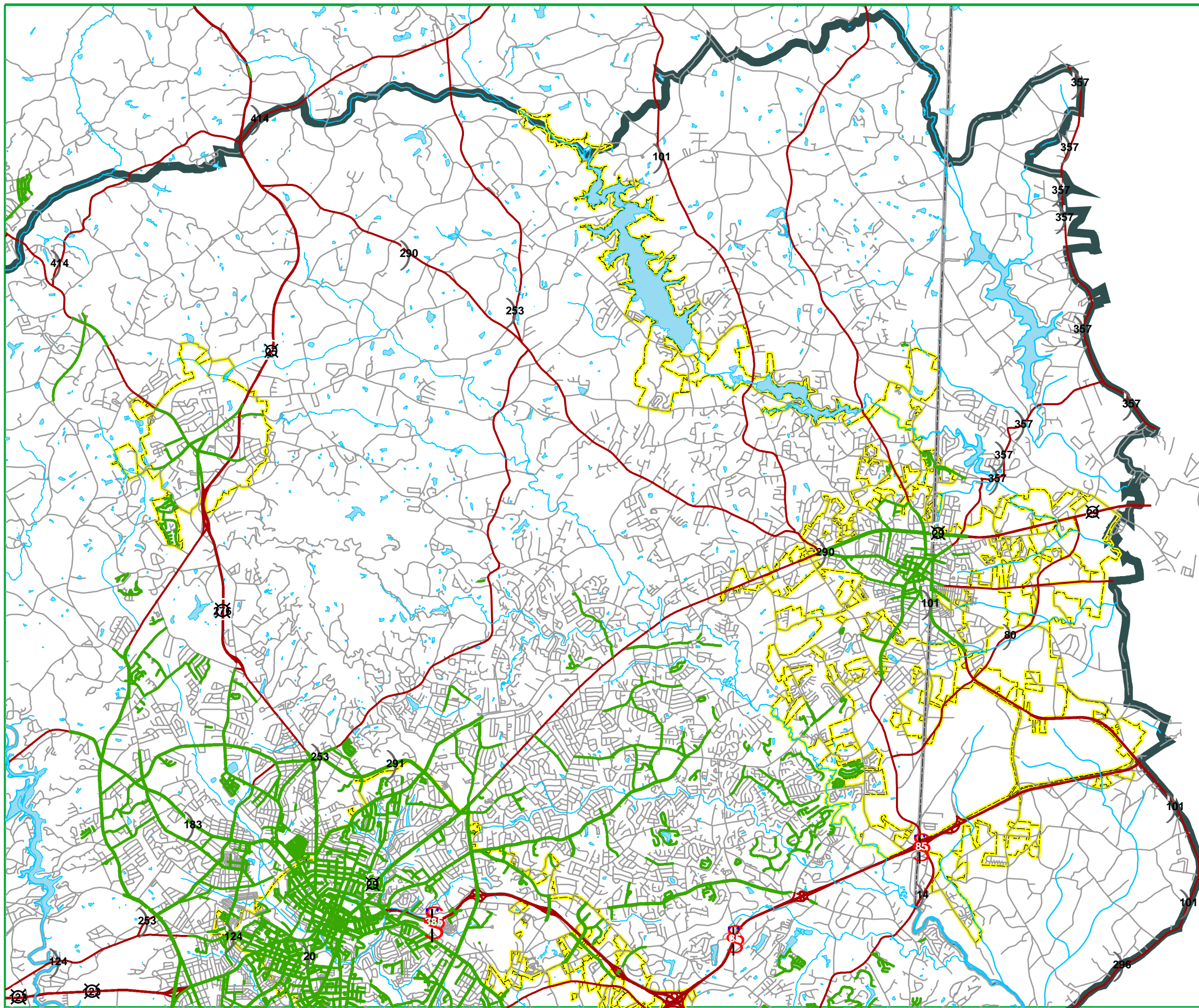
-  GPATS Boundary
-  County Boundaries
-  Municipal Boundary
-  Lake / River
-  Primary Highways
-  Street Center Line
-  Existing Sidewalks





## Figure 6.1 B Existing Sidewalk Facilities

- GPATS Boundary
- County Boundaries
- Municipal Boundary
- Lake / River
- Primary Highways
- Street Center Line
- Existing Sidewalks

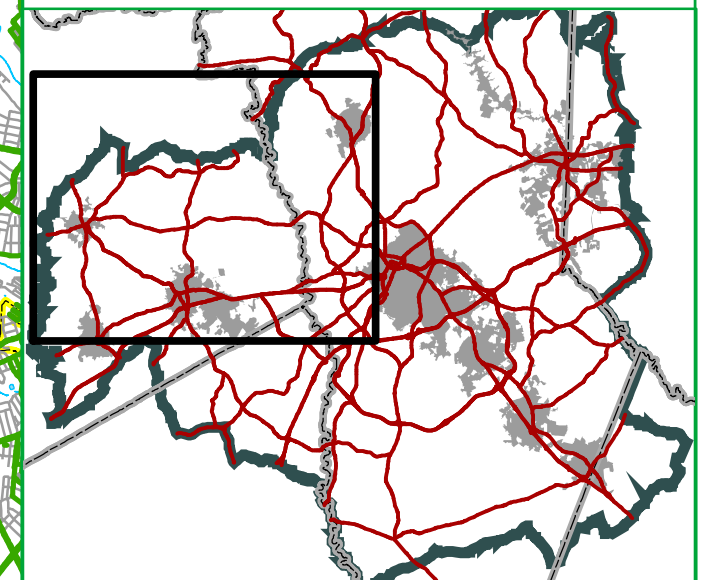
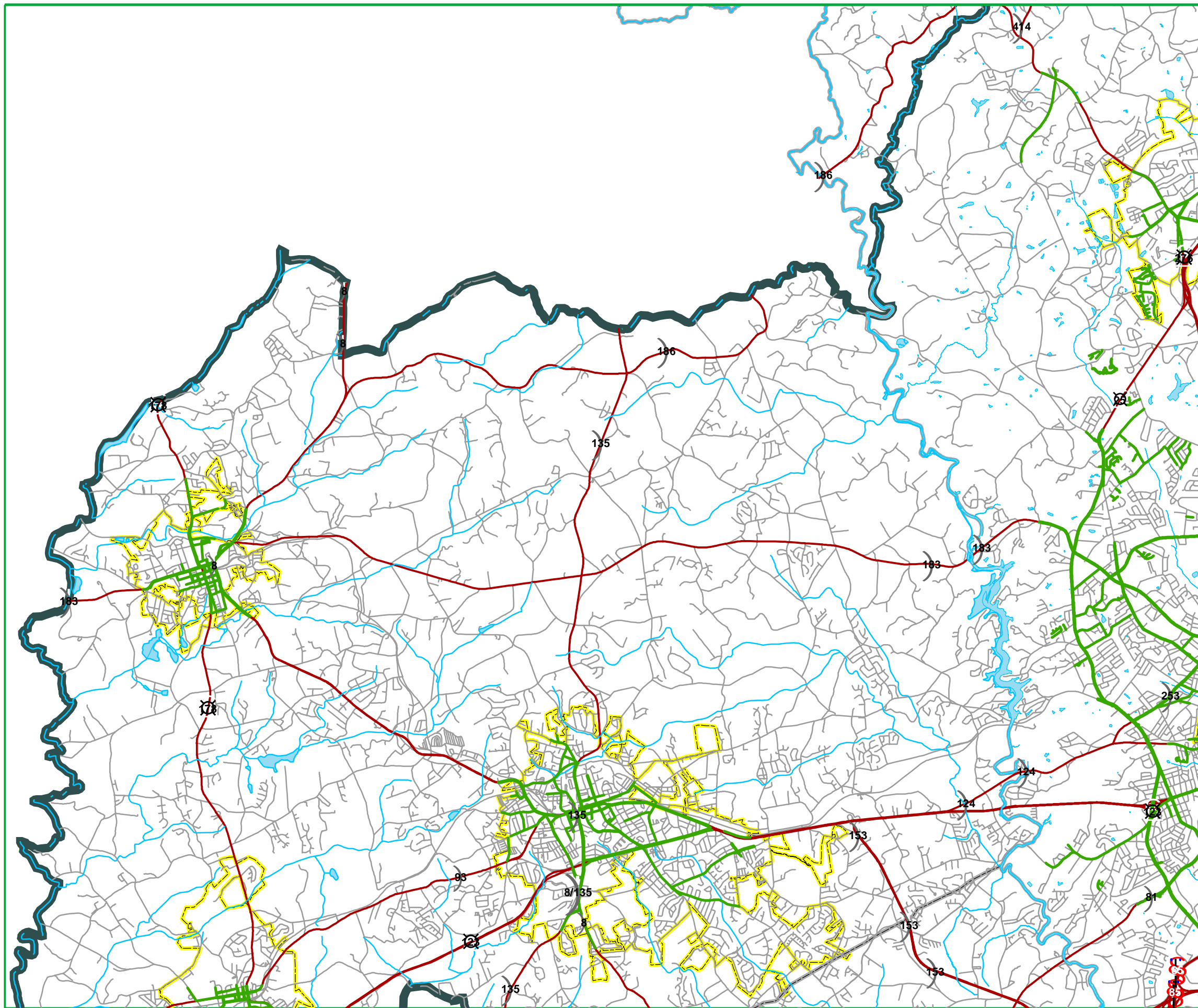




# Figure 6.1C








## Existing Sidewalk Facilities

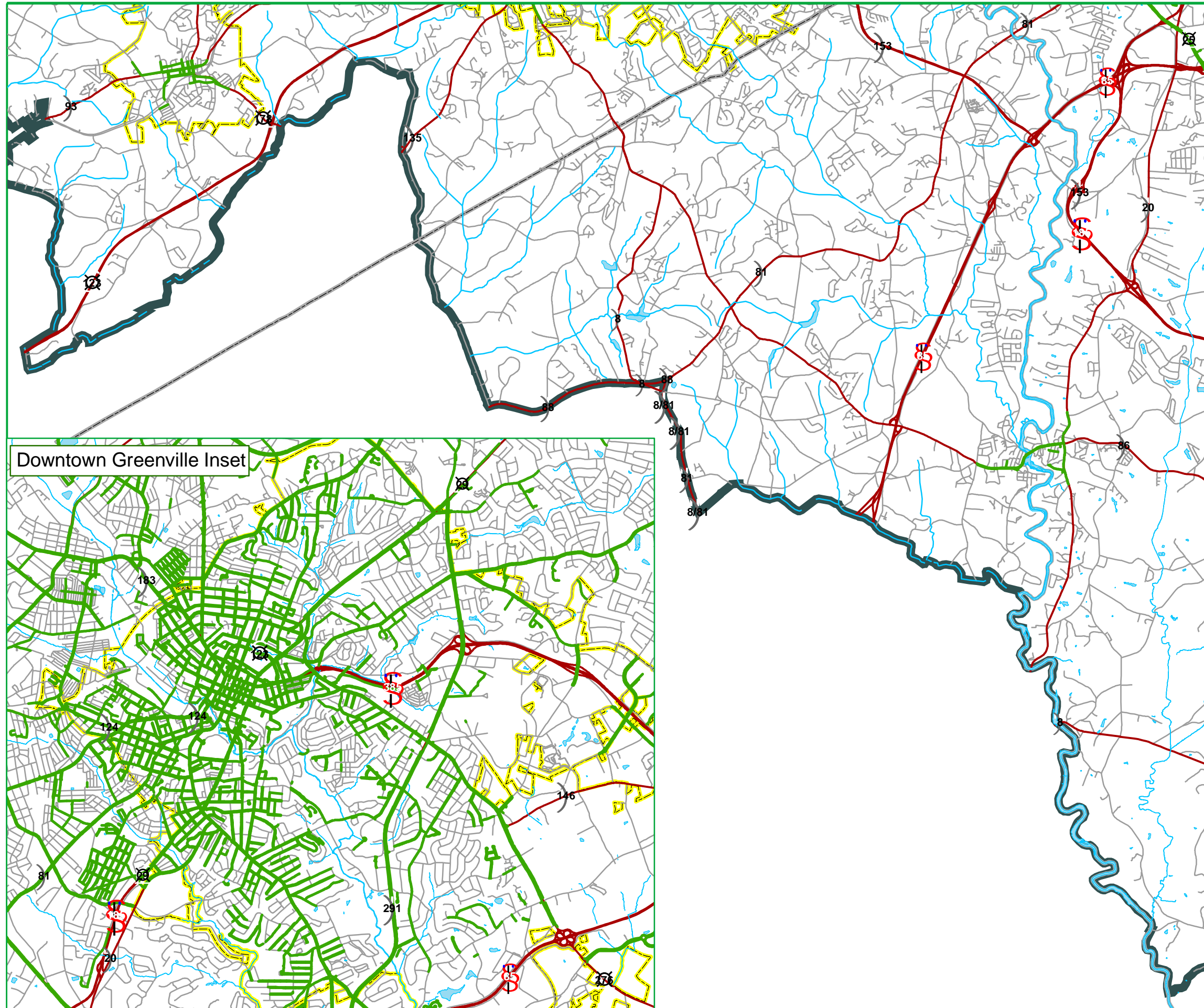
- GPATS Boundary
- County Boundaries
- Municipal Boundary
- Lake / River
- Primary Highways
- Street Center Line
- Existing Sidewalks



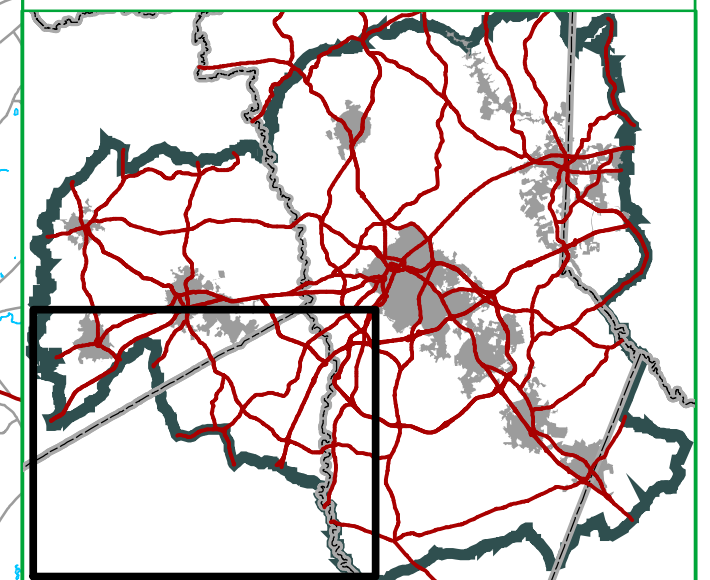


**Figure 6.1D**  
**Existing Sidewalk Facilities**

-  GPATS Boundary
-  County Boundaries
-  Municipal Boundary
-  Lake / River
-  Primary Highways
-  Street Center Line
-  Existing Sidewalks



Downtown Greenville Inset





In September 2006, Greenville hosted the USA Cycling Professional National Championships for the first time. Bicyclists from across the United States competed in the one-day event. An initial three-year agreement brings the event back to Greenville in 2007 and 2008, and it provides an opportunity for the region to reaffirm its interest in bicycling as a viable mode of transportation. **Figure 6.2** shows the existing greenways/trails and bikeways.

## Planning Context

Improvements for pedestrians and bicyclists require three general steps:

- **Integrate** land use and transportation to create neighborhoods and communities designed for walking and cycling
- **Adopt** pedestrian- and bicycle-friendly development standards, policies, and guidelines
- **Accept** change with a proactive attitude

The three steps can be daunting in practice. For GPATS, the reality of existing conditions and future needs for its pedestrian and bicycle network is that significant obstacles prevent neighborhood- and regional-level transport by these modes. Walking and bicycling are not viable options in some areas due to the separation of compatible land uses and inconsistency in the pedestrian and bicycle network. It is a reality that lends itself to improved planning and design of such facilities.

### The Four Es of Pedestrian and Bicycle Planning

Success of the pedestrian and bicycle system hinges on four interdependent components.

**Engineering** – Before there can be facilities for walking and riding bicycles, a network of pathways must be planned and designed. Good design and route choices are essential parts of a successful pathway network.

**Education** – Once pathway systems are developed and in-place, new and experienced cyclists need to be made aware of where these systems are and what destinations can be accessed. Motorists, pedestrians, and cyclists need to understand the “rules of the road” to keep themselves safe while operating not only on, but also adjacent to these facilities.

**Encouragement** – The most nebulous of the four components, people need to be encouraged to walk and bicycle. The more desirable the GPATS area becomes for pedestrians and cyclists (by providing more destinations oriented for them), the more successful these modes will become. Setting a goal to be widely recognized as bicycle-friendly is a worthy idea.

**Enforcement** – It is critical to make sure that laws pertaining to the interaction between motorists and pedestrians/cyclists are heeded by all to ensure safety.

## Pedestrian Facilities

The South Carolina Department of Transportation has established standards for pedestrian and bicycle facilities that are presented in the 2003 *Highway Design Manual* as well as the 2003 Engineering Directive. As appropriate, consideration should be given to enhancements of the standards, as described in the “Complete Streets” section of **Chapter 4**. In general, pedestrians need a variety of facilities to make walking accessible, equitable, safe, and efficient. Some of these facilities are described below.

### Sidewalks and Walkways

The Federal Highway Administration (FHWA) defines walkways as generally being “pedestrian paths, including plazas and courtyards” and sidewalks as “walkways that are parallel to a street or highway.” It recommends that sidewalks and walkways be designed with wide pathways, minimal obstacles, moderate grades and cross slopes, minimal changes in level, and ample rest areas outside of the pedestrian zone. Good lighting and firm, stable, and slip resistant surfaces provide a safer environment.

The Institute of Traffic Engineers (ITE), the American Association of State Highway and Transportation Officials (AASHTO), and FHWA all recommend a minimum width of 5 feet for a sidewalk or walkway to allow two people to pass comfortably or to walk side-by-side. It is also preferred that a 4- to 6-foot buffer zone be provided to separate pedestrians from the street.

Sidewalks and walkways should be designed such that grades and cross slopes are minimized to allow those with mobility impairments to negotiate with greater ease. FHWA recommends that the grade and cross slope not exceed 5 and 2 percent, respectively, wherever possible.

### Curb Ramps

Curb ramps provide access between the sidewalk and street for people with mobility limitations and vision impairments. While different designs for curb ramps exist, FHWA suggests the ramp provide a level land area, be within the marked crosswalk area, avoid large changes of grade, and be distinguishable from surrounding terrain.

Curb ramps must be installed at all intersections and mid-block locations where pedestrian crossings exist, as mandated by federal ADA legislation. Curb ramps provide critical access for those with mobility impairments and are crucial for communities to comply with federal ADA requirements.



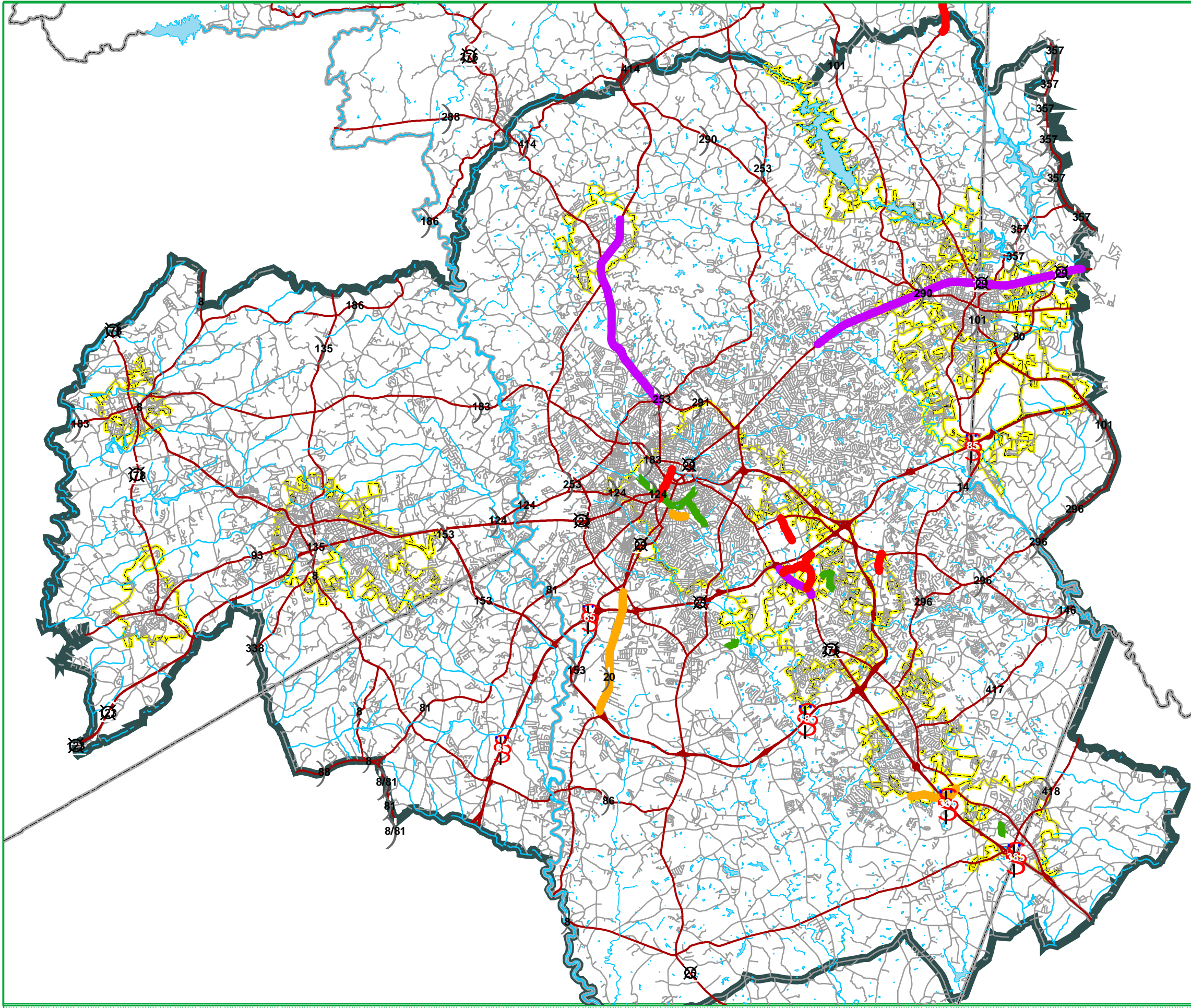
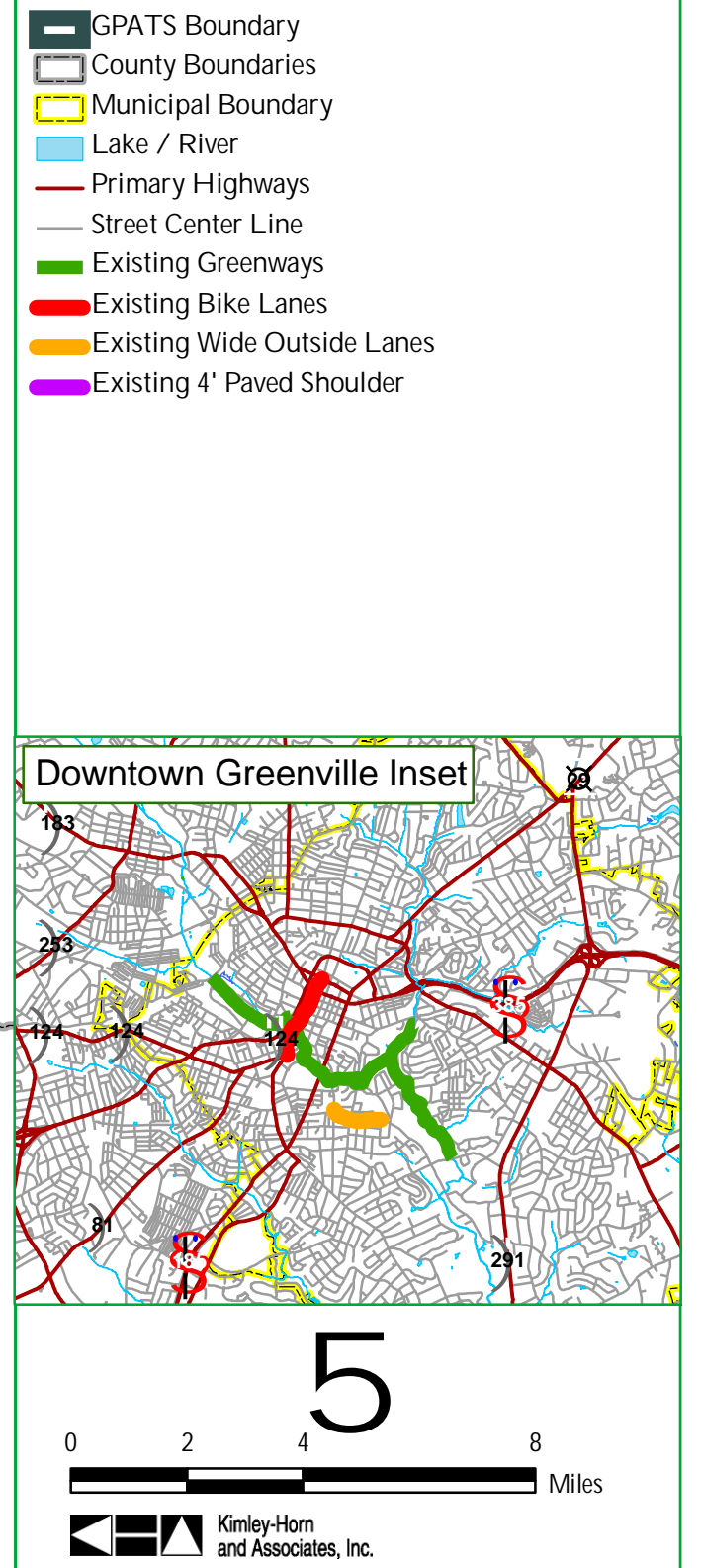
Source: City of Hendersonville, NC





Figure 6.2

Existing Greenway/Trails and Bicycle Facilities





### Marked Crosswalks and Enhancements

**Marked crosswalks** indicate the optimal location for pedestrians to cross a street. In South Carolina, pedestrians within a crosswalk have the right-of-way and motorists must yield. Crosswalks are usually installed at signalized intersections, though more localities are installing crosswalks at mid-block locations. In locations that require increased levels of pedestrian visibility, enhancements such as raised crosswalks and pedestrian refuge islands can be incorporated into the crosswalk and street design.

A **raised crosswalk** elevates the roadway by 3 to 6 inches. The effect reduces the speed of automobiles and provides increased visibility for areas with high levels of pedestrian travel. Raised crosswalks should be well-lit and well-marked so motorists can detect them at night and during inclement weather.

A **pedestrian refuge island** is a raised surface placed within a street to protect pedestrians from vehicles. At such a crossing, pedestrians can concentrate on crossing one direction of traffic at a time by crossing to the center island and waiting for a gap in traffic to complete the trip across the street.

**Curb extensions** extend the sidewalk into the street to improve pedestrian safety by calming traffic, increasing driver awareness of pedestrian activity, and shortening the crossing distance for pedestrians. Curb extensions can be placed at intersection or mid-block crossings, and when combined with landscaping can compensate for overly wide streets and improve the street's character.

### Transit Stop Treatments

To accommodate as many users as possible, a transit system must include well-planned routes and safe, accessible stops. Bus stops should be designed to accommodate the appropriate number of users and should be highly visible to pedestrians and motorists.

The location of the bus stop on a block is critical to pedestrian safety. For example, a stop just beyond an intersection encourages riders to cross the intersection behind the bus and in full view of approaching motorists. The location also should be set back enough from the roadway to buffer users from traffic without impeding pedestrian activity.

Safety and comfort at a bus stop is determined by the amenities offered to users. Shelter with seating, bus stop signage with route information, trash cans, and bicycle parking can encourage transit use. Pedestrian-level lighting improves the visibility of pedestrians to motorists and increases the level of safety for users.

### Multi-Use Paths on Independent Alignments

Multi-use paths — also known as shared use trails — are becoming popular, not only with pedestrians, but also with many non-motorized transportation device users across the country. They can provide a high-quality pedestrian experience in an environment that is protected from motor traffic because they are constructed in their own corridor, often within an open-space area. Multi-use paths can be paved and should be a minimum of 10 feet wide. Their width may be reduced to 8 feet, depending upon physical or right-of-way constraints. Additional width should be considered for areas with difficult terrain or heavy traffic.

Multi-use paths are, in effect, little roads and should be designed with clearance requirements, minimum radii, stopping sight distance requirements, and other criteria similar to those standards for roadways. High standards should be observed when designing these paths, especially when considering that limited federal and state money is available for their maintenance. Designers must comply with the MUTCD and AASHTO Bicycle Guide when designing these facilities, making them more likely to receive part of the limited funding available.

Though paths should be thought of as roadways for geometric and operational design purposes, they require much more consideration for amenities than do roadways. Shade and rest areas with benches and water sources should be designed along multi-use paths. Where possible, vistas should be preserved. Way finding signs (e.g., how far to the library or the next rest area or directions to restrooms) are important for non-motorized users. These types of design considerations can help make a multi-use path more attractive to potential users.

### Bicycle Users and Facilities

Bicyclists have distinct categories of users and facilities that must be addressed in each component of bicycle planning.

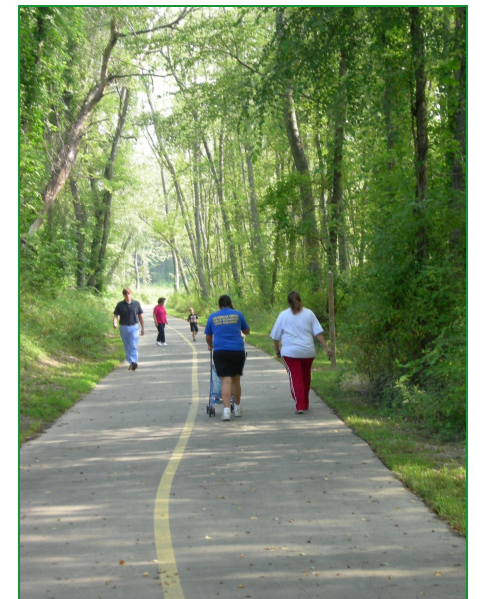
#### Types of Cyclists

Current and future bicycle facilities should serve bicyclists with a range of experience and skill. The needs and expectations of the following “ABCs” of cyclists needs to be addressed.

- **Advanced** – These experienced cyclists have the ability to safely ride under more typical thoroughfare conditions of higher traffic volume and speed. This group generally prefers shared roadways as opposed to striped bike lanes and paths. Although surveys show they represent only about 20 percent of all cyclists, surveys also show that these cyclists ride about 80 percent of the bicycle miles traveled yearly. With monthly street sweeping of gutter debris, advanced cyclists typically accept striped bike lanes.



Source: City of Hendersonville, NC



Source: City of Hendersonville, NC



- **Basic** – These cyclists are casual or new adult and teenage riders less secure in their ability to ride in traffic without special accommodations. They typically prefer multi-use paths or bike lanes on collector or arterial streets with less exposure to fast-moving and heavy traffic. Surveys of the cycling public indicate that 80 percent of cyclists can be categorized as basic cyclists.
- **Child** – This group includes children (aged 12 and under) on bicycles who have a more limited field of vision as they ride. This group generally keeps to neighborhood streets, sidewalks, and greenways. When children venture out onto busier roadways, they typically stay on sidewalks or bicycle facilities that keep them safely away from traffic. Given the comfort level of these cyclists, it is recommended that areas in the GPATS region lacking bike lanes allow children and other cyclists who are uncomfortable riding in traffic to ride on sidewalks with the requirement that they yield to pedestrians.

Like drivers, cyclists gain experience over time by riding. As a cyclist rides and gains more experience operating in traffic, they graduate from basic to advanced cyclists. This transition means that the needs of all three types must be constantly evaluated and accommodated.

### Types of Facilities

A cyclist with a particular skill level often prefers specific types of facilities. The following types of facilities must be understood to effectively evaluate existing conditions and to accommodate future demand in bicycle travel.

- **Shared Lane** – This type of facility is often referred to as a “wide outside lane,” a “shared lane,” or a “wide curb lane.” These facilities provide extra width in the outermost travel lane on either single- or multi-lane roadways to accommodate cyclists. Typically, shared lane facilities have an outer lane width of 14 feet on multi-lane roadways and 15 feet on two-lane roadways. It is important to note that the lane width that is measured on this facility type does not include the width of the gutter adjacent to the travel lane. This facility is most appropriate on travel routes with moderate traffic volumes and is suitable for cyclists who are comfortable riding with the flow of regular traffic. These routes can be ridden by basic cyclists, but are most often preferred by advanced cyclists.
- **Striped Lane** – This type of facility consists of an exclusive-use area adjacent to the outermost travel lane. The area delineated for cyclists is a minimum of 4 feet wide and is marked by a solid white line on the left side and frequent signs and stenciled pavement markings indicating either “Bike Only” or another such message so as to deter vehicles other than bicycles from using the lane for travel. In situations where a striped lane encounters on-street parking, extra width is required, most often a minimum of 1 additional foot (5-foot total lane width). As with the

shared lane facility, delineated bike lane minimum widths do not include any curb-and-gutter that may exist, as these areas are unsuitable for bicycle travel. Striped bike lanes are one of the facilities of choice for basic and child cyclists because they offer a measure of security (separation from vehicles) not found in all other facilities.

- **Sidepath** (one side of street) – A sidepath is simply a multi-use path that runs alongside a roadway. As described, sidepaths should not be constructed where frequent curb cuts and intersections increase the potential conflict between cyclists and vehicles. This facility type is generally suitable for all levels of cyclists, but is most often preferred by basic and child cyclists. Off-road multi-use paths can increase the value of neighboring real estate and protect existing corridors from development. Trails and other greenway corridors promote parkland development, wetland preservation, and environmental protection.
- **Signed Route** – This type of route is created in cases where no room or need exists to create additional space for cyclists. Often, signed routes lead cyclists through the “quieter” streets of a city, using neighborhood streets where traffic speeds and volumes are low. This type of route is good for cyclists of any level, provided it is planned on streets that have low traffic volumes and speed. Signed routes are helpful in wayfinding to link neighborhoods with networks of greenways and other bike facilities. Several bike touring routes use local roads, including SC Highway 14, SC Highway 11, and US Highway 25.

According to a United States Department of Transportation (USDOT) and Bureau of Transportation Statistics report<sup>1</sup>, approximately one-half of all bicycle trips surveyed were on paved roads (not on shoulders). Other facilities used by bicyclists included:

- |                           |                        |
|---------------------------|------------------------|
| ▪ Sidewalks (13.6%)       | ▪ Striped Lane (5.2%)  |
| ▪ Multi-Use Paths (13.1%) | ▪ Unpaved Roads (5.2%) |
| ▪ Shared Lane (12.8%)     | ▪ Other (2.1%)         |

The low percentage of bicycling trips using striped lanes reflects the lack of this facility available to the bicycling public. Participants in this national study recommended providing facilities for bicyclists and pedestrians (e.g., sidewalks, trails, paths, lanes, signals, lighting, or crosswalks) as a way to improve the prevalence and safety of walking and bicycling.

<sup>1</sup> 2002 National Survey of Pedestrian and Bicyclists Attitudes and Behaviors



Previous Planning Efforts

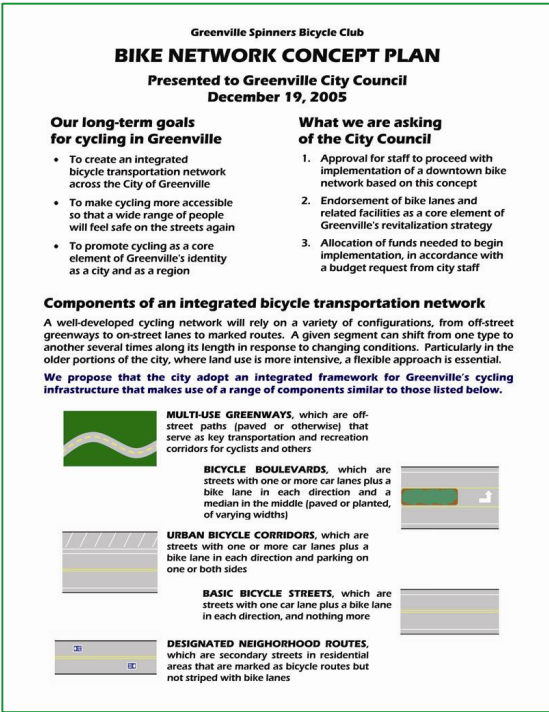
Like SCDOT, the Federal government recognizes the role pedestrian and bicycle facilities play in creating a multimodal transportation network. The reauthorization bill SAFETEA-LU (Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users) built on earlier legislation that encouraged the incorporation of pedestrian and bicycle facilities into the transportation network. SAFETEA-LU extends the mission to make walking and bicycle an attractive, safe, and efficient means of transportation.

Planning also has occurred at a grassroots level. Bicycle clubs, such as the Greenville Spinners Bicycle Club (GSBC), organize recreational rides throughout the year and offer a unified voice for bicyclists. In December 2005, the GSBC presented to the Greenville City Council a framework plan to improve the popularity and safety of bicycling in the city. The *Bike Network Concept Plan*’s vision for Greenville included the following goals:

- To create an integrated bicycle transportation network across the City of Greenville
- To make cycling more accessible so that a wide range of people will feel safe on the streets again
- To promote cycling as a core element of Greenville’s identity as a city and as a region

The purpose of the GSBC plan is to encourage the city to adapt the bicycle network as necessary during implementation, using different types of facilities to create a well-developed cycling network. More importantly, the plan acknowledges the fiscal and physical constraints to constructing the network and proposes to limit required resources by re-stripping lanes during routing resurfacing. The plan notes that completing the citywide network will require a committed budget.

These earlier planning efforts, in addition to ongoing public involvement and new analysis, influenced the recommendations that follow.



Recommendations

As a part of the plan development, a set of goals were developed for enhancing bicycle and pedestrian mobility in the GPATS region. These goals include:

- Creating better street, sidewalk, and trail connectivity wherever and whenever it is politically and financially possible
- Increasing mobility for all residents regardless of age, ability, or income
- Improving bicycling and walking conditions on the existing roadway, sidewalk, and greenway network through:
  - Educating bicyclists, pedestrians, and drivers and enforcing existing traffic laws
  - Engineering newly-constructed roads to provide space for bicyclists and pedestrians and to create bicycle and pedestrian accommodation opportunities when road maintenance projects are planned

As mentioned previously, during this planning process, citizens expressed support for improvements to the pedestrian and bicycle network. They discussed the advantages of being able to walk to schools and parks from their homes, and talked about wanting sidewalks and bike lanes to be built in existing and developing neighborhoods.

A comprehensive pedestrian and bicycle system, however, provides more than a network of physical facilities. It also provides programs to educate current and potential users, enforce rules and regulations, and encourage the active use of the network. In addition, a comprehensive bicycle and pedestrian network provides increased regional security by providing residents with enhanced multimodal mobility. After evaluating existing conditions, previous plans, and current standards in place in the GPATS area, the next step in the pedestrian and bicycle planning process was to develop a set of recommendations that addresses the Four Es of pedestrian and bicycle planning.

Engineering

The following recommendations address the physical needs of pedestrians and bicyclists.

Ancillary Facilities

Through surveys, workshops, and discussion with the Advisory Committee, a demand surfaced for many different types of ancillary facilities in the GPATS area. Bicycle route signage, clean road surfaces, maps of bicycle routes, drainage grates flush with pavement surface, and bicycle racks at destination points all were considered to be important to survey respondents. This section outlines several different types of ancillary facilities and their potential benefits to the community. Several of these facilities are physical components of education, encourage, and enforcement programs to be described later in this chapter.



## Mapping and Signing Projects

### Comprehensive Route Systems

The pedestrian and bicycle recommendations from this chapter have been established to help create a comprehensive route system for the area that links commercial, recreational, and residential areas. Over the next several years, the implementation of these routes will ultimately result in an interconnected set of facilities. To accommodate these facilities, the proposed area-wide Bike Route System should be mapped and signed with bicycle route signs. The recommendations encompass issues from maintenance to design and include but are not limited to:

- Provision of bike lanes on local streets where space is available and on-street parking is not an issue
- Exploration of the use of the shared lane symbol under restricted conditions
- Marking and signing signal loops (and possibly repairing them) for bicyclists
- Repairing utility lids within the bicyclists' line of travel
- Marking railroad crossings to improve safety
- Route signage



While the first five items listed above are important for the cyclist who has decided to use a specific route, the last — route signage — is critical to helping cyclists determine which route to use. Route signage should provide useful information to bicyclists. When creating a route system signing plan, the destinations being served and the best roadways (or facilities) to access those destinations must be considered. Signing should include information on the direction and distance to destination points, as well as intermittent confirmation that the bicyclist is still on the correct route. Facilities that can be used to create a comprehensive route system include multi-use paths, bike lanes, shoulders, and wide outside curb lanes.

### Share the Road Signing Initiative

“Share the Road” signs serve to make motorists more aware of the possibility of bicyclists on high-use roads with potentially hazardous conditions. When this sign is placed along a bicycle route, it typically denotes a major roadway connecting with less frequently traveled roads. These signs serve as important and cost-effective safety and education tools. In fact, the state acknowledged the visibility and impact of these signs by issuing a “Share the Road” license plate. The additional funds received through the sale of this license plate go to the Palmetto Cycling Coalition, Inc. to promote bicycle safety and education programs.



### Suitability Rating System

The bicycle level of service (LOS) methodology allows planners and designers to select a level of accommodation rather than a required specific design treatment to provide for bicyclists along a bike route. What the bicycle LOS methodology does not do is dictate what level of service is appropriate for a given community or user. This means that a community can decide that for one type of bike route system, such as a neighborhood route system, a LOS A or B may be required. Conversely, LOS C may be acceptable for the routes serving cross-town commuter cyclists. In addition to being widely accepted by state DOTs and local jurisdictions, the bicycle LOS method is also being considered as the basis for a national LOS model to be included the Highway Capacity Manual (HCM). Chapter 19 of the current version of the HCM outlines LOS criteria for exclusive off-street bicycle paths, multi-use off-street paths, on-street bicycle lanes on urban streets, and for bike lanes at signalized and unsignalized intersections.

Similar concepts can be applied to create and implement pedestrian levels of service. Neither pedestrian nor bicycle level of service analysis was conducted as part of this study. However, GPATS should work with local jurisdictions to perform level of service analysis with a corresponding map component. This exercise ultimately could serve as a benchmark for the road system in the GPATS area during re-evaluations of the system.

## Spot Improvement/Maintenance Programs

### General Considerations

All non-controlled access roadways should be maintained to be safe for bicyclists use. The surface should be free of debris. Longitudinal cracks should be patched and drainage grates with longitudinal slots should be replaced. Utility covers should be flush with the roadway surface. Paved shoulders should be installed where rutting is occurring on the side of non-curb and gutter roadways. These items should be addressed through the normal roadway maintenance.

The alignment of drainage grates and gutter pans with existing pavement is also an area of concern in the GPATS region. Over repeated repavings, the pavement level on streets with curb and gutter can become significantly higher than the gutter pan. This poses a safety hazard for bicyclists and cars by creating a dangerous edge of pavement. This situation can be avoided by milling the pavement so that a repaving will be flush with the gutter pan or by raising the drainage grates and paving all the way to the curb.

Bicycle facilities, including trails, require an additional level of effort to provide acceptable maintenance. These maintenance issues occur most frequently on the right side of the pavement, where cyclists are likely to be riding. Consequently, a more frequent maintenance cycle to address these defects should be provided for bicycle routes. Areas such as bridges where excessive debris tends to build up and bicyclists have limited refuge options should be maintained even more frequently.



### Signal Clearance

Traffic signal timing and loops along bicycle facilities require extra attention. According to the *Manual on Uniform Traffic Control Devices*,

At installations where visibility-limited signal faces are used, signal faces shall be adjusted so bicyclists for whom the indications are intended can see the signal indications. If the visibility-limited signal faces cannot be aimed to serve the bicyclist, then separate signal faces shall be provided for the bicyclist.

On bikeways, signal timing and actuation shall be reviewed and adjusted to consider the needs of bicyclists.

While compliance with the former guideline can be easily evaluated, the latter concern — that of signal timing — is a little harder to address. The AASHTO Bike Guide provides information of clearance intervals and minimum green times for bicyclists. At wide intersections, the clearance interval equation can result in excessively long yellow-plus-all red periods for signals. If the facility consists of a shared use path or a bike lane, a signal loop can be placed in the bike lane or on the path in advance of the intersection. When a cyclist passes over the loop, the signal extends the green time for the intersection approach to accommodate the crossing cyclists. This treatment is in common use for motorists and has been applied in various locations for bikes. The design of the loop is critical; the wrong loop in a bike lane will detect cars in the adjacent lane. An effective loop design for detecting bikes in bike lanes is a quadrupole 2 feet wide and 20 feet long (approximately half the size of a normal 40-foot roadway loop). Such a loop readily detects cyclists, but will not detect a car 6 inches to the side.

### Roadway Symbol Buildup

Thermoplastic buildup is another concern of bicyclists. Bike lane symbols, lane use (directional) symbols, and even crosswalks can all build up with repeated application and cause handling problems for bicyclists. More than two layers of thermoplastic (one marking) should not be allowed on bicycle facilities. The slipperiness of thermoplastic and paints is another concern of bicyclists. One way to mitigate this concern is to add sharp silica sand to the glass spheres when it is being applied to the wet thermoplastic or paint. This increases the roughness of the markings' surfaces, reducing the potential for bicyclists to slip on the thermoplastic.

### Safety Railings along Bicycle Facilities

Bridge railing heights have been the subject of recent revisions to the AASHTO Bike Guide and ongoing debates among bicycle facility design professionals. The current guide states railing heights should be at least 42 inches to prevent bicyclists who hit the railing from tipping over the top. However, current AASHTO Bridge Specifications require a 54-inch railing. In practice, designers have been using the 54-inch railing when a structure is built to AASHTO specifications and a 42-inch railing along non-structural locations, such as when protecting bicyclists from embankments.

### **Bicycle Parking Facilities**

Just as motorists need a place to park their cars when they arrive at destinations, bicyclists also need a place to park their bicycles. Consequently, when creating a transportation system to accommodate bicycling, parking must be included in that system. Bicycle parking is critical in areas where there are frequent bicycle riders such as shopping areas, schools, and other recreational areas. Bicycle parking should also be considered in downtown areas and near businesses where bicyclists may frequent.

Typically, when parking is installed for bicyclists, the primary consideration is simply the **accessibility** or the convenience of the parking. While these are significant concerns for bicyclists, they are not the only issues. Bicyclists also must consider the security of the parking and the protection afforded to the bicycle.

The **security concerns** of bicycle parking can be addressed in several ways. High visibility of the parking rack can improve security. By locating parking near storefronts, or in high pedestrian use zones, the potential for theft or vandalism is reduced. Well-lit areas can improve the security in locations where bicycles are parked after dark. Providing racks that support the frame instead of the wheel make it easier to lock a bike without damaging it. Locking bike lockers also provide good security for bicycles.

The **protection** required for a bicycle varies with respect to the purpose of the bicycle trip. For short duration trips, such as to the grocery store or the library, U-shaped bicycle racks on a concrete pad in front of the building may be acceptable. At a park and ride lot, or in front of an office building where the parking is for commuters, bike lockers or covered parking is more appropriate.

There are **four basic elements** to bicycle rack design. First, the bicycle should be supported upright by its frame in at least two places. Second, the rack should enable the frame and one wheel to be locked. Third, the rack should be anchored so that it cannot be stolen with bikes on it. Fourth, the rack should be placed as close to the building it serves as possible.

Bicycle racks can be tailored to reflect the culture or character of an area, or as a form of public art. Bike racks such as the one shown to the right make a statement about the area in which they serve as well as providing parking facilities for bicyclists.

For additional information on bike rack designs, the Association of Pedestrian and Bicycle Professionals (APBP) has produced a guidance document on good bicycle parking design. The guidelines outlined in the reference covers rack design, rack placement, and specifics for appropriate layout of the rack area in dimensions and relation to the surrounding land uses.



Source: [www.pedbikeimages.org](http://www.pedbikeimages.org)



## Engineering/Traffic Calming Countermeasures

### Intersection Signage

Static signs such as NO TURN ON RED when Pedestrians Present or the Left Turning Vehicles Yield to Pedestrians have been found to reduce the incidence of pedestrian conflicts at intersections. Consequently, it is reasonable to expect that these signs also would reduce the conflicts between motorists and bicyclists riding on the sidewalk or on a sidepath. However, they should be used sparingly and only where a problem has been documented and relatively constant pedestrian/bicycle use of the intersection exists. The overuse of signs or the use of the signs where pedestrians or bicyclists are not using the crosswalks dilute the ability of the signs to command the attention of motorists. Eventually this results in the signs being just background visual clutter.



Because they are real time traffic control devices, blank out signs like the one pictured to the right can continue to be effective at intersections because they are only activated when there is a potential conflict. If motorists see a YIELD TO PEDS sign next to a permissive left turn signal, the motorists will know a pedestrian is crossing the conflicting crosswalk at that time. This “real-time” aspect of blank out signs allows for them to be placed at locations where conflicts are not frequent or constant enough to make a static sign appropriate.



Bland out sign

### Traffic Calming

Even with the best planned street networks, certain streets will experience unwanted cut-through traffic and vehicles traveling at speeds in excess of posted speed limits. Motorists that frequently travel in an area will find “short cuts” and “back ways” around problem intersections and congested road segments. High speeds and changing travel habits impact pedestrians and bicyclists. The practice of traffic calming provides opportunities to address a wide range of citizen concerns with traffic including slowing speeds, reducing cut-through trips, improving the aesthetics of a street, and increasing safety for pedestrians, bicyclists, and vehicles.

The Institute of Transportation Engineers and other professional organizations publish “best practices” for traffic calming; however, individual communities throughout the United States typically develop policies and protocols specific to their local traffic conditions and citizen expectations. Specific policies and protocols generally include definitive “warrants” and a “toolbox” of preferred traffic calming solutions to assist local officials with the design and implementation flexibility to best represent the values and vision of the community. GPATS and local jurisdiction should develop traffic calming plans for streets with severe safety problems.

### Shared Lane Symbol

The Shared Lane Symbol, or “sharrow,” has the potential to reduce several different types of crashes and is being used in jurisdictions across the country. Because cyclists tend to center over the symbol, it may be useful for reducing door crashes (where a parked motorist opens a door into the path of a cyclist). Additionally, a similar treatment has been found to reduce wrong way riding and riding on the sidewalk, in addition to improving bicyclists’ position in the travel lanes.

Consequently, this treatment may actually reduce the incidence of motorist failure to yield to the bicyclist crashes and overtaking crashes. Despite the potential for these collateral improvements, this treatment is recommended only in very selective areas, such as adjacent to on-street parking, or completing a link in a bicycle route. The Federal Highway Administration and the state of South Carolina have not yet approved sharrows for use on federally and state maintained roadways. However, sharrows may be used by municipalities on locally maintained roads. If use of a sharrow is desired on a state or federal road, an exception must be applied for from FHWA.

### Transit Interface

At this time, limited bicycle amenities are provided on Greenville Transit Authority buses. However, GTA recently has ordered bicycle racks for all buses in its fleet. Bike racks on buses help eliminate barriers presented to those individuals who need their bicycles for supplemental transportation after they debark. Amenities for bikes on GTA or other future bus services should be marketed as a way to enhance the multimodal riding experience for users by extending the area for the transit service and giving bicyclists more options.



Another amenity that should be considered to more fully integrate bicycle use and the transit system is the installation of bike racks near heavily used bus stops and destination points in town.

### Public Amenities

In addition to bicycle parking and provisions for bikes on buses, other amenities should be considered for implementation in order to create a more user-friendly bicycle system. Benches, water fountains, public restrooms, and changing areas provide riders with valuable services. These amenities are especially helpful in high traffic areas such as downtown and by major destination points such as shopping areas and schools.



### Retrofit Facilities

As the GPATS region continues to grow, a plan to extend and enhance the non-vehicular transportation network should be implemented. Such facilities can be constructed as stand-alone enhancement projects. However, they usually are more cost-effective when incorporated into larger projects such as roadway widening, regular street maintenance, utility line replacement, and new road construction. As existing streets are resurfaced, bicycle lanes or wide outside lanes should be implemented by slightly narrowing the traffic lanes where appropriate.

Spot safety improvements can help improve safety and convenience for pedestrians. These low cost, short-term improvements include provisions such as countdown signals and high visibility crosswalks. Such improvements are especially important around schools and where regional

**Figures 6.3A to 6.3D** illustrate “vision plan” for bicycle facilities in the GPATS region. Most of the bicycle facilities in this plan can be implemented at virtually no cost by re-striping existing roadways.

### Pedestrian Facilities

A full inventory of existing sidewalks and multi-use paths was developed as the baseline for completing the pedestrian facilities network. While this inventory identifies the location of sidewalks, it does not yet provide information on the condition, width, or accessibility of the sidewalks.



The most important shortcoming of the existing sidewalk network is the lack of curb ramps on many streets. On University Ridge Road, for example, the absence of curb ramps on the south side of the street results in some wheelchair users having to move to the street to gain access to the Health Department offices. Insufficient maintenance also can create barriers. On many streets, tree roots have heaved sidewalks and made them impassable to some wheelchairs, and this uneven surface also creates a general pedestrian hazard.

When streets with sidewalks are resurfaced, curb ramps must be installed in compliance with U.S. Supreme Court rulings. This requirement will provide curb ramps on all sidewalks in the area over time as streets are resurfaced. Transportation Enhancement funds also can be used to retrofit curb ramps. Several streetscape projects in the region have made portions of the sidewalk network accessible.

In addition to providing curb ramps, routine maintenance of sidewalks is important. Broken and root damaged sidewalks make walking less safe and less pleasant, and can create significant liability for the unit of government responsible for maintenance.

### Bike Facilities

The current facilities available to bicyclists include a selection of the facilities types listed in this report. However, the general lack of connectivity as a network and the separation of complementary land uses make travel by bicycle for reasons other than recreation difficult.

Virtually all of the standard five-lane roads in the region (four 12-foot travel lanes with a 15-foot wide median) can be re-striping to provide bike lanes where speeds limits are 40 mph or less or re-striping to provide wide outside lanes on roads with posted speeds of 45 mph. GPATS should adopt a policy to require bicycle accommodation on all standard five-lane roads when they are resurfaced.

Re-striping is a low-cost alternative that can modify an existing roadway cross-section to accommodate bicyclists without widening. Striped bike lanes provide bicyclists the comfort of being separated from the motorist travel lane and also visually alert the motorist to the potential presence of bicyclists on the roadway. To be most cost-effective, re-striping should be pursued only in conjunction with resurfacing or other road improvement projects.

In the GPATS area, approximately 30 miles of roadway are recommended to be re-striping with bicycle lanes, while 137 miles are recommended to be re-striping for wide outside lanes. **Figures 6.4A to 6.4D** show the bicycle network that will be constructed as part of the highway projects listed in **Chapter 4** as well as roads identified to be re-striping to include bicycle lanes or wide outside lanes.

### New Construction

As new streets are constructed and some are extended, the “Complete Streets” concept described in **Chapter 4** should be used to incorporate full accommodation of pedestrians and bicyclists. The incremental cost to accommodate bicyclists and pedestrians is much less than the cost to retrofit. Details and specific application of this policy should be negotiated with the South Carolina Department of Transportation. Strong demand exists nationwide for residential and mixed-use communities with sidewalks and bikeways as they are now considered a desirable amenity.

### Pedestrian Facilities

The inventory of pedestrian facilities made possible the identification of gaps in the existing regional sidewalk network. New sidewalk projects are proposed to eliminate the gaps in the network, and to create regional links. Few people will walk between any two of the cities in the GPATS region but creating a complete network ensures connectivity for shorter trips to major destinations. Highest priority should be given to areas with the most intense existing or planned development.





**Figure 6.5** shows the existing inventory of sidewalks and the regional connections that are needed to create a complete network.

While a full, connected network of sidewalks is desirable, funding limitations must be considered as well. For that reason, a ranking system was developed to prioritize sidewalks based on proximity to important community facilities, densely populated areas, and low income areas. **Figures 6.6A to 6.6D** prioritize new sidewalk construction based on the ranking system. Please see **Tables 4.1 and 4.2** for incidental pedestrian projects in the Funded and Vision Plan scenarios

As a general policy, sidewalks should be included in all new non-freeway road construction projects in the GPATS region unless compelling reasons exist not to include sidewalks. In some corridors that may remain rural, adding paved shoulders or bicycle lanes may be a more important facility, and these improvements will provide some accommodation for pedestrians. In areas that are developing in a suburban or urban pattern, sidewalks will be desirable and should be included in all road widening projects. The cost of retrofitting sidewalks to an existing road is much higher than building them in the initial road construction project.

### Bicycle Facilities

In the same manner that the sidewalks were given prioritization to consider the funding limitations, so too was the bicycle network that would require new construction and not simply a re-striping. **Figure 6.7** shows this network. Please see **Tables 4.1 and 4.2** for incidental bicycle projects in the Funded and Vision Plan scenarios.

The proposed bicycle facilities aim to complete the network by coupling local connections within neighborhoods and towns with regional connections between cities. As shown in **Figure 6.8**, most new construction focuses on bicycle lanes and 2-foot paved shoulders.

The total miles of bicycle lanes would increase from 7.4 to more than 120. The bicycle lanes would link the region's cities through the following connections:

- Greenville to Easley via Saluda Dam Road
- Easley to Liberty via Greenville Highway
- Greer to Travelers Rest via Tigerville, Jackson Grove, Lynn, and Locust Hill Roads

Construction of 4-foot paved shoulders would be limited to less than 9 miles, almost all of which would be along US Highway 25 between Greenville and Travelers Rest. Two-foot paved shoulders should be included in resurfacing projects where existing earth shoulders allow, which would improve the safety of the region's rural roads for motorists and cyclists alike.

### Education, Encouragement, and Enforcement Programs

In order to form a complete system in the GPATS area, the routes and facilities recommended in this chapter must be supplemented by a set of education, encouragement, and enforcement programs. It will be important to educate users about how the facilities recommended in this plan should be used in order to create a safe walking and bicycling environment. These programs seek to help pedestrians, bicyclists, and motorists work together to create a comfortable and approachable environment by teaching each the responsibilities they bear as users of these shared facilities.

All users have a responsibility to use roadways in a safe manner. If they behave unsafely, their actions should be discouraged through police enforcement. However, while discouraging inappropriate and unsafe behavior is important, it is equally as important to encourage appropriate behavior. Recommendations follow for ways to promote safe use of the area's existing and proposed network of pedestrian and bicycle facilities. Government agencies, employers, retailers, and advocacy groups must share responsibility for these programs and initiatives. Before travel behavior will change, residents of and visitors to the GPATS area will need to acknowledge the following messages:

- Walking and bicycling are legitimate and realistic means of travel
- Transportation is much more than getting to and from work
- Bicycling and walking can be done safely
- Bicycling and walking are a great value

While the programs that follow are grouped into specific categories, a single program can address any combination of education encouragement, and enforcement.

#### Education

The community itself often provides valuable resources in developing and promoting bicycle programs. Law enforcement officials, local bicycle shops, local bicycle advocacy groups, educators, church organizations, public health professionals, local media, and other community groups can all offer resources to the area as it strives to establish a broad-based pedestrian and bicycle safety education campaign. Incorporating these groups listed above in education programs allow people of all ages and abilities to become more informed about safety. Because these programs can help drivers operate more safely around pedestrians and bicyclists, they should address all users.

A simple way to educate walkers and bicyclists is with a public facilities map. A public pedestrian and bicycle map for the area would provide information regarding pedestrian and bicycle routes and education measures. Identifying safe paths and routes as well as making the public aware of the bicycle amenities available to them is the cornerstone of an effective bicycle education program.



## Rules of the Road

Conveying the proper way to operate on roadways and paths is basic to any pedestrian and bicycle safety education campaign. The following “rules of the road” provide a good foundation.

### For pedestrians

- Always walk on the sidewalk if one is available. If there isn’t a sidewalk, walk facing traffic so that you can see cars coming and drivers can see you.
- Cross streets at intersections or marked mid-block crossings.
- Be sure to look left, then right, and then left again before crossing a street even if you have the right-of-way (a marked crosswalk, walk signal, or green light for traffic in the direction you are going). Continue to look left and right as you cross to be sure cars aren't coming.
- Dress in bright colored clothing if you are walking at night — cars may not be able to see you if you are wearing dark clothes.
- Obey the Walk/Don’t Walk signals at intersections.
- Hold a child’s hand when he or she is crossing the street.
- Obey pedestrian signs at construction zones.

### For cyclists

- Always wear a properly fitting helmet.
- Be visible. If riding at night, use lights, reflectors, and bright clothing.
- Ride predictably and defensively. Use hand signals before turning.
- Follow the same laws that apply to motorists, obeying all traffic signals, signs, and lane markings. Always yield to pedestrians.
- Ride on the right side of the road with the flow of traffic, never against it.
- Avoid riding on sidewalks. If it is necessary to ride on a sidewalk, be aware of risks at driveways and intersections.



### For motorists

- Obey speed limits. Higher speeds result in greater injuries to cyclists and pedestrians.
- Obey signs, signals, and markings. Never run red lights.
- Yield to cyclists. Always look for bicyclists when turning.
- Pass cyclists with care. Slow down and provide enough space when passing.
- Do not honk your horn close to cyclists.
- Look for cyclists when opening car doors.
- Watch for children.
- Watch for bicyclists riding at night.

In addition to the rules of the road, other critical safety issues that should be addressed by the GPATS safety campaign include riding against traffic, riding on sidewalks, and riding at night. These behaviors increase the risk of bicycle crashes with motor vehicles and pedestrians.

## Walkable Community Workshops

At the TPAG meeting, participants expressed interest in Walkable Community Workshops. These workshops have been employed across the country for several years. Typically lasting several hours, the workshops provide an interactive environment for elected officials, local government staff, engineers, planners, business owners, and citizens to learn what makes a community walkable, to analyze the existing walking environment of their neighborhood or town, and to develop ideas and momentum to evoke change. A key component of the workshops is the walking audits in which professionals lead participants on a tour to identify problems and solutions.

## Bike Rodeos

Cities, towns, and neighborhoods should partner with local law enforcement and volunteer bicyclists to offer bicycle rodeos several times during the year to teach basic bicycling skills and rules of the road. These rodeos could be the initial stages in developing a more comprehensive safety education program for local schools. Bike rodeos can be conducted as school education programs, through independent programs at community centers, or as a part of other group bicycle riding activities.



### School-Based Safety Education

Now is the perfect opportunity to work with local elementary schools to develop a pedestrian and bicycle safety education program. Pedestrian and bicycle safety could be incorporated into the regular physical education classes. While children in Kindergarten and Grades 1 and 2 could be taught about pedestrian safety, Grades 3, 4, and 5 could be given hands-on bicycle safety lessons about wearing helmets, following the rules of the road, and turning and signaling. Towns and cities in the GPATS area could enlist the support of local bicyclists and law enforcement officers for bike lessons.

### Crossing Guard Training

As traffic increases around local schools, so does concern for the safety of children as they walk or bike to and from school. A consistent program is needed to train school crossing guards in the area and across South Carolina. In 1998, North Carolina developed a statewide program to train local law enforcement officers responsible for training school crossing guards. Properly trained crossing guards will use standardized procedures that allow motorists to know what to expect while traveling through school zones. Crossing guards also should be able to teach children proper pedestrian skills for when crossing guards are not present.

### Public Service Announcements

One method of informing the public about safe walking and bicycle riding as well as driver courtesy is through public announcements on the television, radio, and newspaper. Developing and broadcasting public service messages about pedestrian and bicycle safety will help the message reach additional community members.

### Other Educational Materials

In addition to hands-on programs and announcements, written materials and images should be developed to distribute throughout the community. Brochures, posters, and web pages all will help increase awareness of potentially dangerous situations. The print materials can be provided at local businesses, schools, and public buildings.



### Encouragement

Several sets of programs can be established to encourage residents to use the new pedestrian and bicycle facilities.

### Safe Routes to School

The implementation of a Safe Routes to School program has helped communities across the nation promote pedestrian and bicyclist safety. Funding is available for this program, and cities and towns should work with local schools and advocacy groups to apply for state funding. The program should be designed to increase the number of students walking and bicycling to school through improved facilities and encouragement. For additional information about this program, please see the website [www.saferoutestoschools.org](http://www.saferoutestoschools.org).

Two pilot schools should be selected to implement the Safe Routes to School program. The program can then be expanded to additional schools in the future. In terms of funding, the Federal Highway Administration allocated nearly \$1.2 million to SCDOT for Fiscal Year 2006. The total should increase each year to a projected \$2.4 million in FY09.

### Walk and Bicycle to School Day

In the past decade, many South Carolina schools have identified “walk and bicycle to school” days. In fact, the state designates the first Wednesday of October as “Walk or Bicycle with Your Child to School Day.” Through these programs, schools are able to increase awareness of bicycling and walking as fun, healthy transportation choices and identify needed improvements such as sidewalks or safer pedestrian routes not open to vehicular traffic. This kind of encouragement also brings the added benefit of reducing automobile congestion and pollution near schools.

### Other School-Based Programs

Other activities that could encourage bicycling include organizing a “pedestrian school bus” or “bicycling school bus” where students meet to walk or bicycle to school as a group. Schools could also establish a “frequent walker/rider” club through which students could earn points and prizes, or schools could give away bicycle helmets to classes that have the highest number of students bicycling to school. Local bicycle groups should be contacted to see if they can sponsor these programs.





### Bike to Work Week

Like “Walk or Bicycle with Your Child to School Day,” another idea for promoting bicycling is identifying and publicizing a “Bike to Work” week. Local employers might compete to see which can have the greatest percentage of employees bicycle at least one day during the week, or employers could give away bicycles or bicycle helmets.

Greenville should consider sponsoring a bicycle rally downtown. May is typically considered Bicycle Month in the United States, so the city could select a week during May to highlight the benefits of bicycling to work.



Source: City of Durham, Durham County, NC

### Bike Mentor Program

One way to encourage bicyclists is by taking advantage of the people in the community who are already bicycling. The GPATS area should consider establishing a bike mentor program to match adults who would like to learn more about commuting by bicycle with an experienced volunteer. This gives bicyclists the opportunity to share optimal commuting routes as well as cover important safety basics, such as how to bicycle in traffic, in the dark, or in the rain. This is an effective way to make new bicyclists more comfortable with the idea of bicycling for transportation purposes.

### Bicycle Rideabout

A bicycle rideabout can be a great way to promote interest in bicycling. A rideabout typically consists of a short (3 to 5 mile) ride on bicycle-friendly roads in the community. Local police departments also should get involved with the ride in order to provide this opportunity to inexperienced riders who may want to participate, as well as to help direct traffic at key intersections along the route. Bicycle groups in the area can use a rideabout as a recruiting opportunity or just a fun exercise. This also allows citizens to speak with town staff and learn about the bicycle planning projects that are ongoing in the community. A bicycle rideabout is suitable as a stand-alone event, as a part of a larger festival or event, or as an event kicking off or opening a new bicycle facility or program.



### Bicycle Friendly Community

Administered by the League of American Bicyclists, the Bicycle Friendly Communities Campaign identifies communities that provide safe accommodations for bicyclists while also encouraging bicycling for transportation and recreation. Currently, no South Carolina municipality has been named a Bicycle Friendly Community.

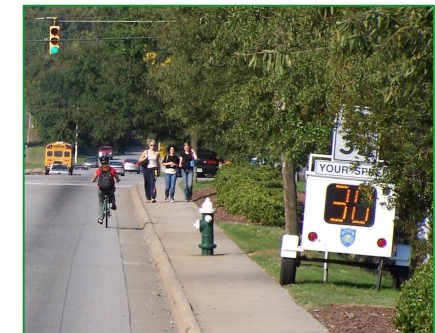


### Enforcement

When it comes to pedestrian and bicycle safety, education and encouragement are important, but so is enforcement. The cities, towns, and counties of the GPATS area should partner with the South Carolina State police to establish a well-publicized area-wide, coordinated pedestrian and bicycle enforcement campaign. Through this enforcement effort, safety will be shown as a shared responsibility between pedestrians, bicyclists, and motorists. To enforce the laws regarding pedestrian and bicycle safety, it is important to understand what they are and what they mean.

Many bicyclists are unaware that legally, bicycles are considered vehicles, and bicyclists are expected to obey traffic laws as they would when driving an automobile. Bicyclists have a reputation for not obeying traffic laws. They are frequently seen running red lights and stop signs. This behavior puts the bicyclists at risk and increases conflicts with pedestrians and motorists. Likewise, pedestrians have a tendency to cross streets at inappropriate locations — for instance, between parked cars or at unmarked mid-block locations. For these reasons, stronger local ordinances, control measures, and enforcement efforts should be implemented. The following bicycle and pedestrian ordinances and enforcement initiatives are recommended for the planning area:

- Work with local police to increase enforcement on the following offenses:
  - Running stoplights and stop signs
  - Riding the wrong way down the street
  - Riding at night without lights
- Increase police patrols, preferably with police on bicycles of the planning area including off-street trail system and parks
- Require safety helmets to be worn by all bicyclists riding on a public facility





## South Carolina Statutes

Some of the South Carolina statute bicycle-related laws include the following:

- In South Carolina, the bicycle has the legal status of a vehicle. Bicyclists have full rights and responsibilities on the roadway and are subject to the regulations governing the operation of a motor vehicle.
- Bicyclists are required to use both a front lamp and rear reflector when riding at night.
- Bicycles traveling under the posted speed limit must ride in the right-hand lane or as close as practicable to the right-hand curb or edge of the highway, except when overtaking and passing another vehicle or when preparing for a left turn.

## Targeted Behaviors

Behaviors that go against South Carolina laws concerning bicycles should be targeted for enforcement, including the following:

### Pedestrian Behaviors

- Violating traffic signals

### Bicycle Behaviors

- Violating traffic signals
- Riding against traffic on the roadway
- Riding at night without lights

### Driver Behaviors

- Not allowing enough space when passing cyclists
- Not yielding to bicyclists when turning
- Speeding

## Bicycle Licensing Program

A bicycle licensing program is one method of enforcing bicycle safety that should be considered. By requiring bicyclists to register and affix a license tag to their bicycles, the program could help identify bicyclists who might be unresponsive after an accident. This could help rescue personnel quickly establish an accident victim's identity, leading to improved decision-making for emergency medical treatment. Another benefit of a bicycle licensing program is deterring bicycle theft and increasing the opportunity for stolen bicycles to be returned to their proper owners.

## Positive Reinforcement

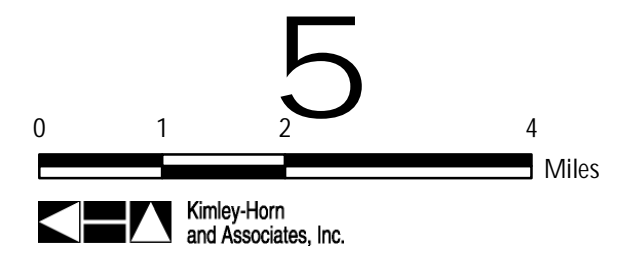
Enforcement does not always have to be a negative experience. Positive reinforcement can also be a great way of promoting safe riding techniques. As is done in other cities, local police departments could recognize and reward kids seen operating their bicycles in a safe manner with coupons for redemption at local merchants (e.g., free ice cream, pizza, movie ticket). When a police officer spots a child bicycling properly as a part of his or her normal rounds, the child is given coupons redeemable at local merchants recruited to participate in the program. This program not only rewards a child following the rules, but encourages other kids to follow their example in order to be rewarded.



Figure 6.3A

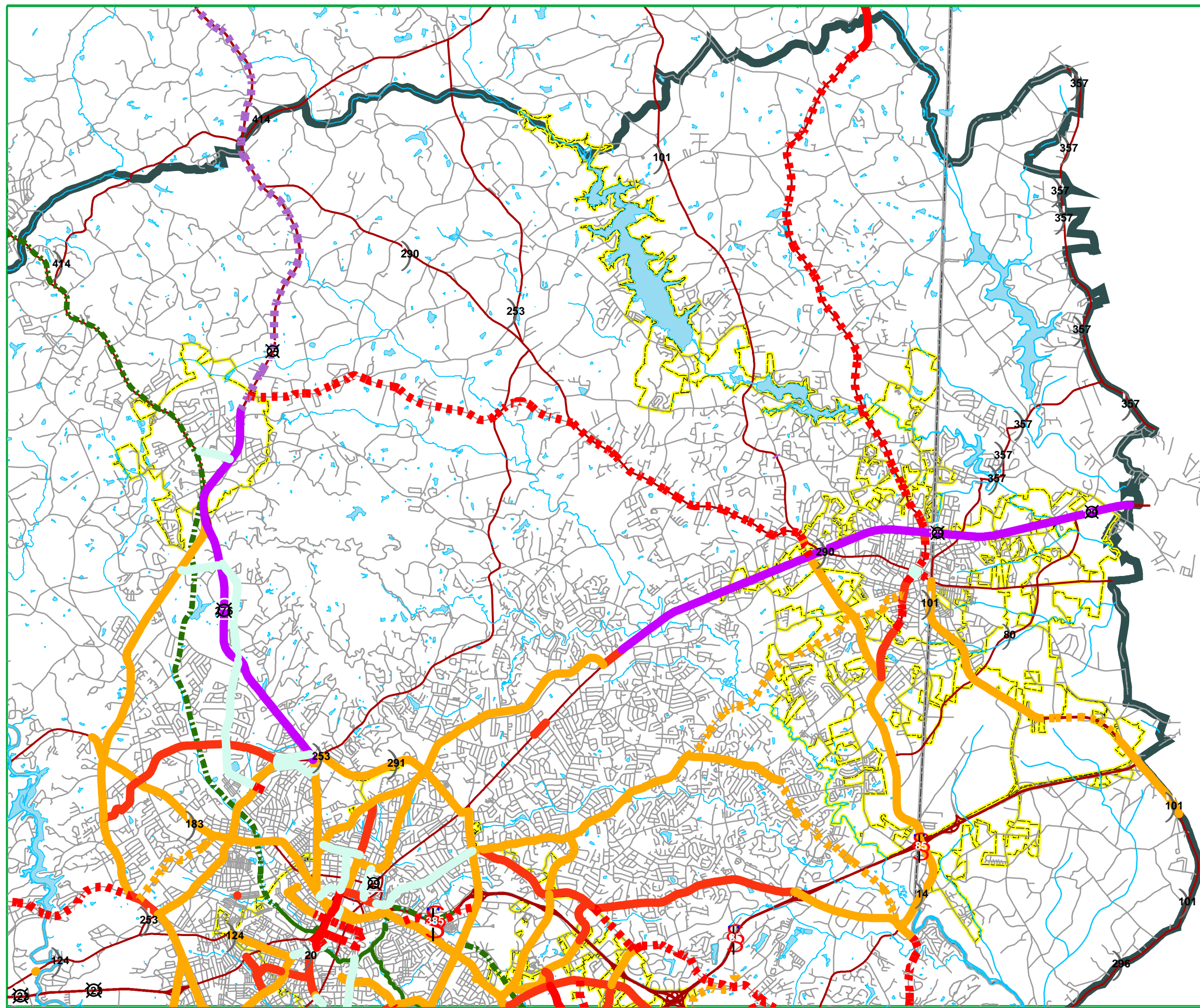
Regional Bicycle Facilities Plan

- GPATS Boundary
- County Boundaries
- Municipal Boundary
- Primary Highways
- Street Center Line
- Lake / River
- Bike Lane, Existing or to be Re-striped
- Wide Outside Lane, Existing or to be Re-striped
- 4' Paved Shoulders, Existing
- Bike Route with "Share the Road" signs
- Bike Lane Proposed
- Wide Outside Lane Proposed
- 4' Paved Shoulder Proposed
- Existing Greenways
- Proposed Paved Greenways
- Proposed Unpaved Greenways

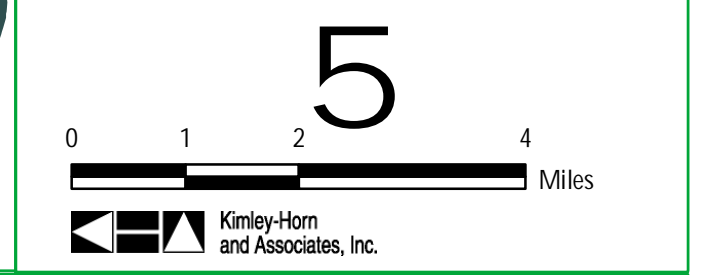
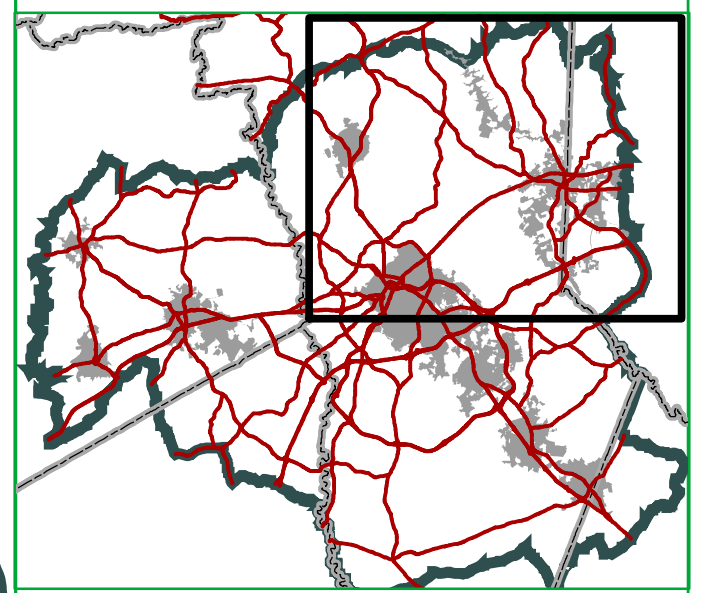




**Figure 6.3 B**  
**Regional Bicycle Facilities Plan**



- GPATS Boundary
- County Boundaries
- Municipal Boundary
- Primary Highways
- Street Center Line
- Lake / River
- Bike Lane, Existing or to be Re-striped
- Wide Outside Lane, Existing or to be Re-striped
- 4' Paved Shoulders, Existing
- Bike Route with "Share the Road" signs
- Bike Lane Proposed
- Wide Outside Lane Proposed
- 4' Paved Shoulder Proposed
- Existing Greenways
- Proposed Paved Greenways
- Proposed Unpaved Greenways





### Figure 6.3 C Regional Bicycle Facilities Plan

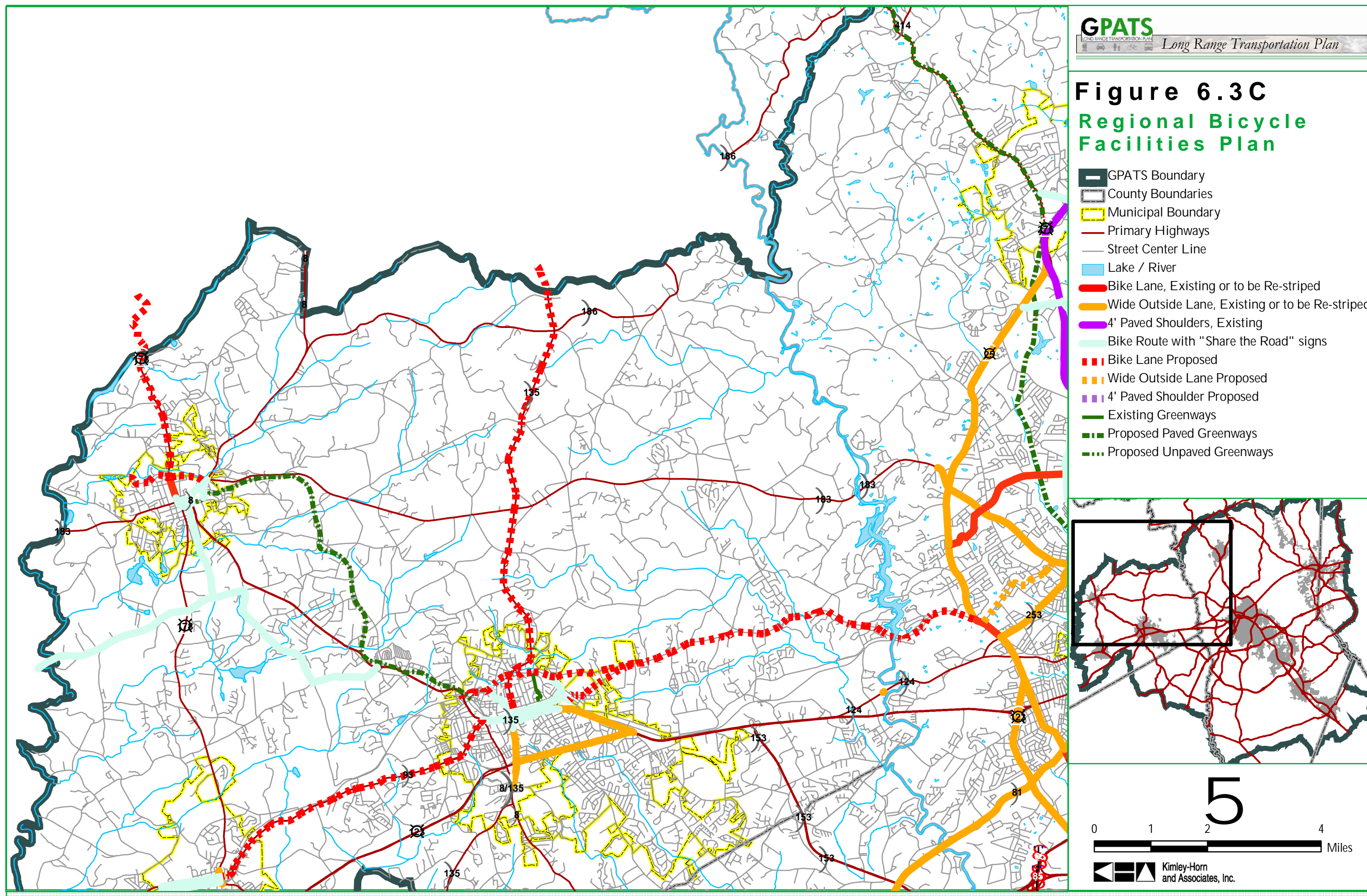




Figure 6.3D

Regional Bicycle Facilities Plan

GPATS Boundary

County Boundaries

Municipal Boundary

Primary Highways

Street Center Line

Lake / River

Bike Lane Proposed

Wide Outside Lane Proposed

Paved Shoulder 4' Proposed

Bike Lane, Existing or to be Re-striped

Wide Outside Lane, Existing or to be Re-striped

4' Paved Shoulders, Existing

Bike Route with "Share the Road" signs

Existing Greenways

Proposed Paved Greenways

Proposed Unpaved Greenways

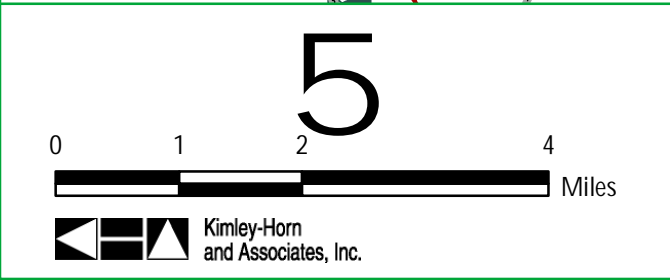
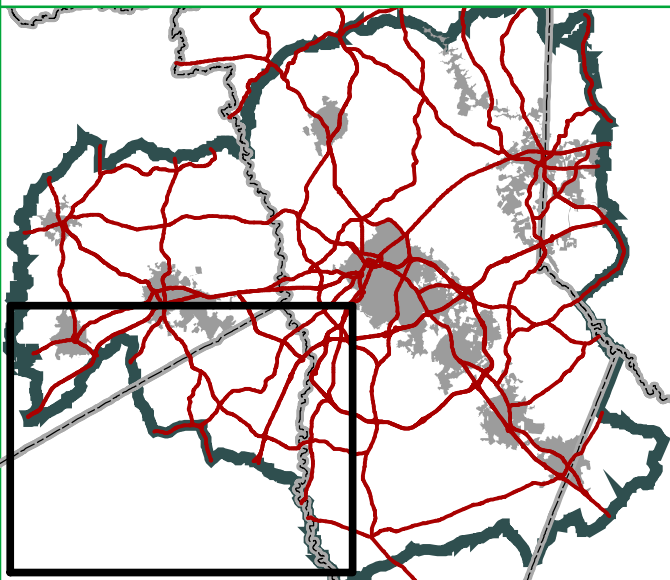
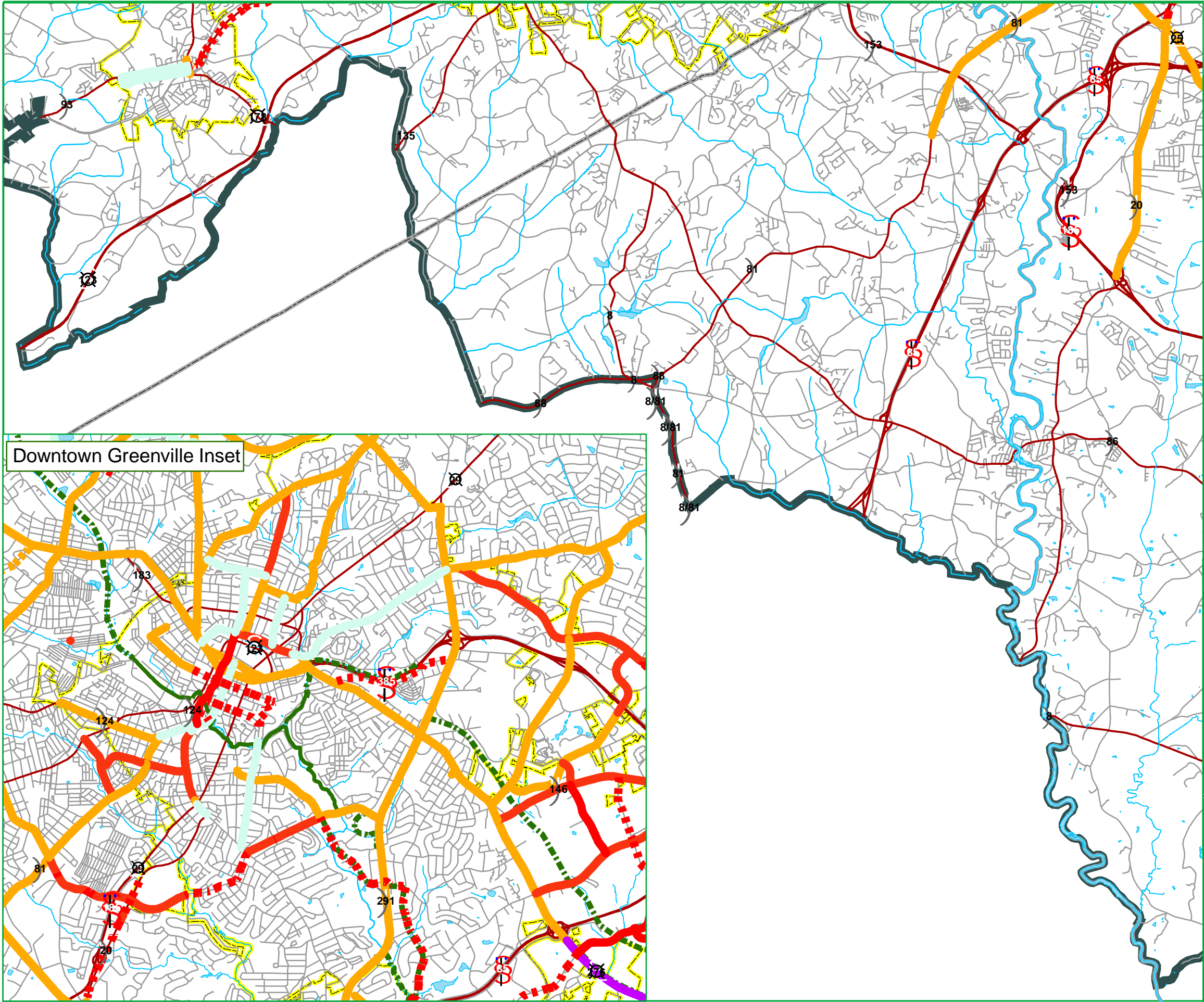
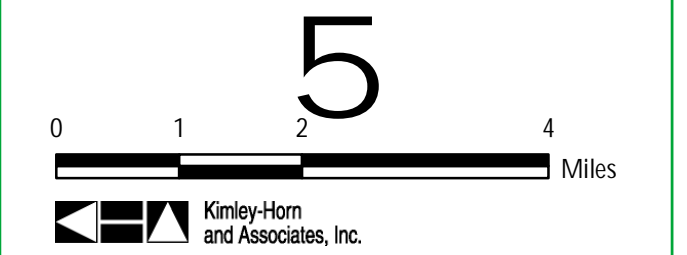
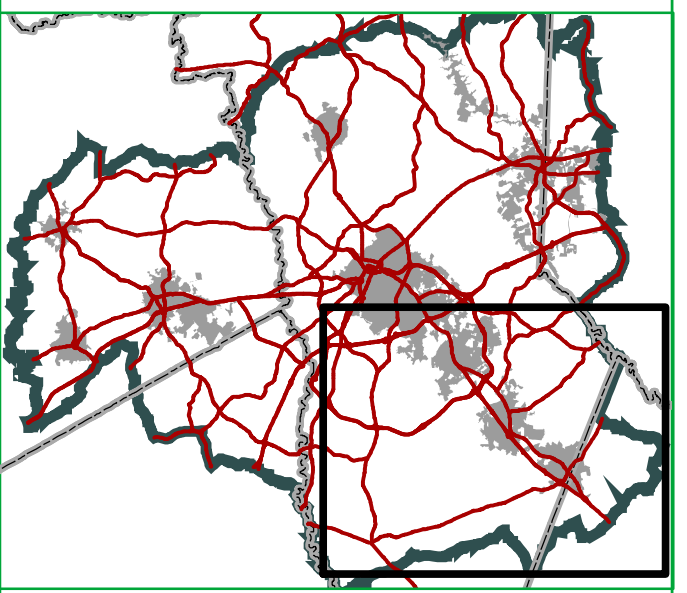




Figure 6.4A

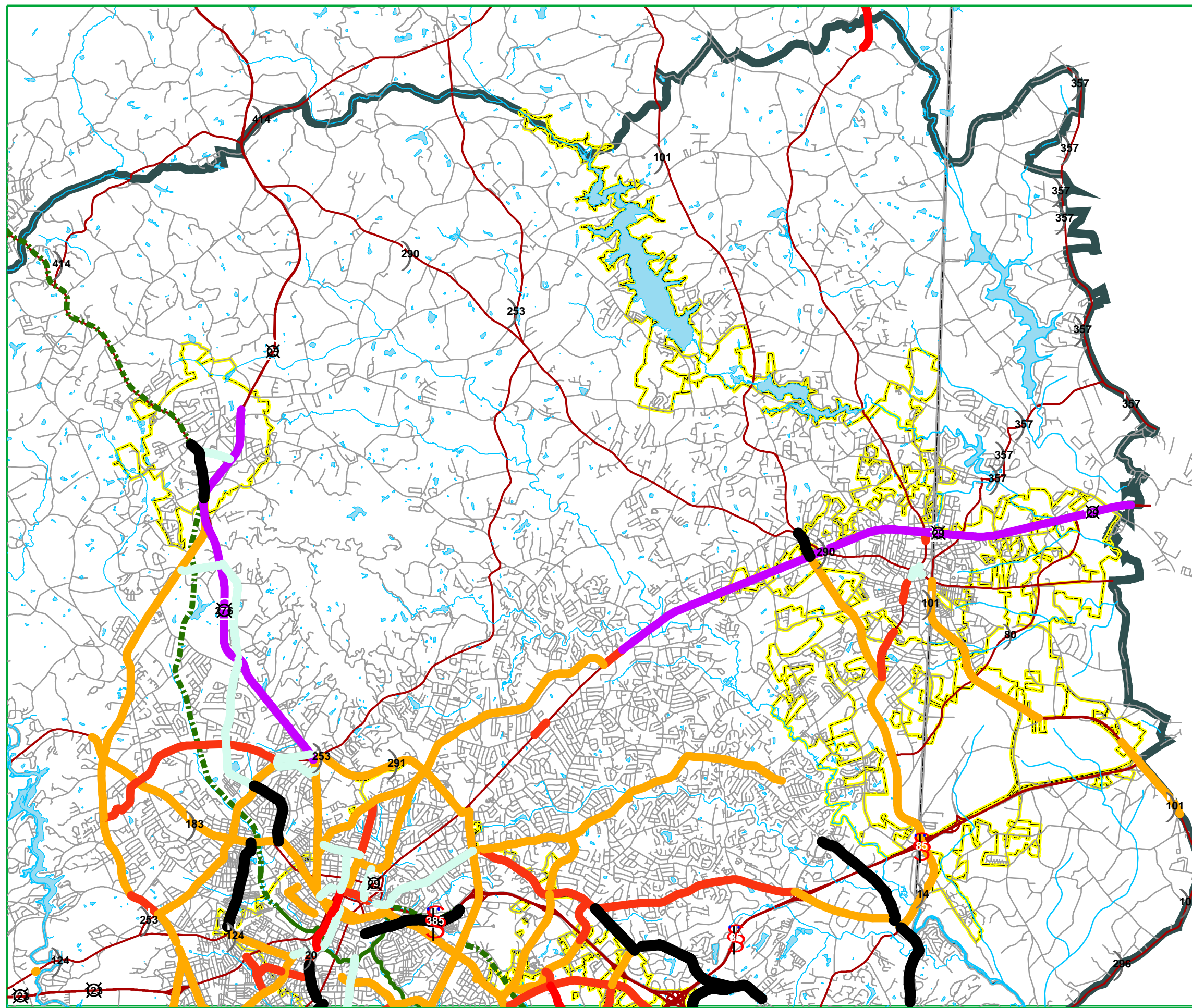
Financially Feasible Bicycle Network

- GPATS Boundary
- County Boundaries
- Municipal Boundary
- Primary Highways
- Street Center Line
- Lake / River
- Bicycle Facilities in the L RTP
- Bike Lane, Existing or to be Re-striped
- Wide Outside Lane, Existing or to be Re-striped
- 4' Paved Shoulders, Existing
- Bike Route with "Share the Road" signs
- Existing Greenways
- Proposed Paved Greenways
- Proposed Unpaved Greenways

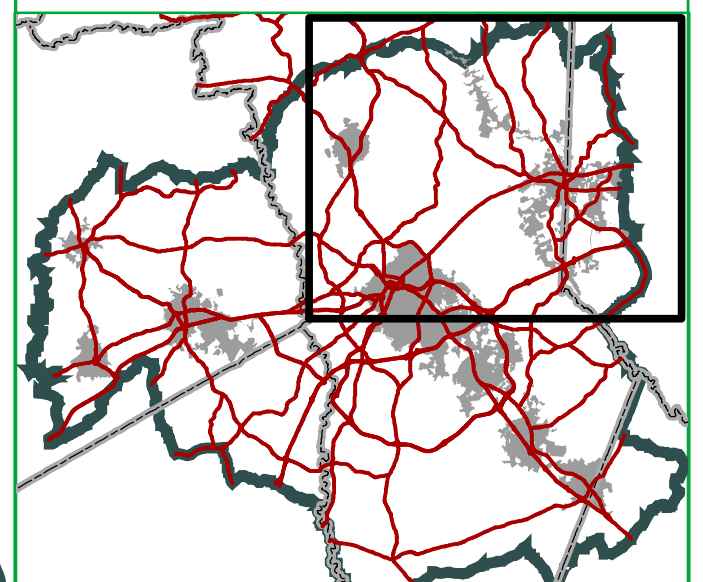




**Figure 6.4 B**  
**Financially Feasible**  
**Bicycle Network**

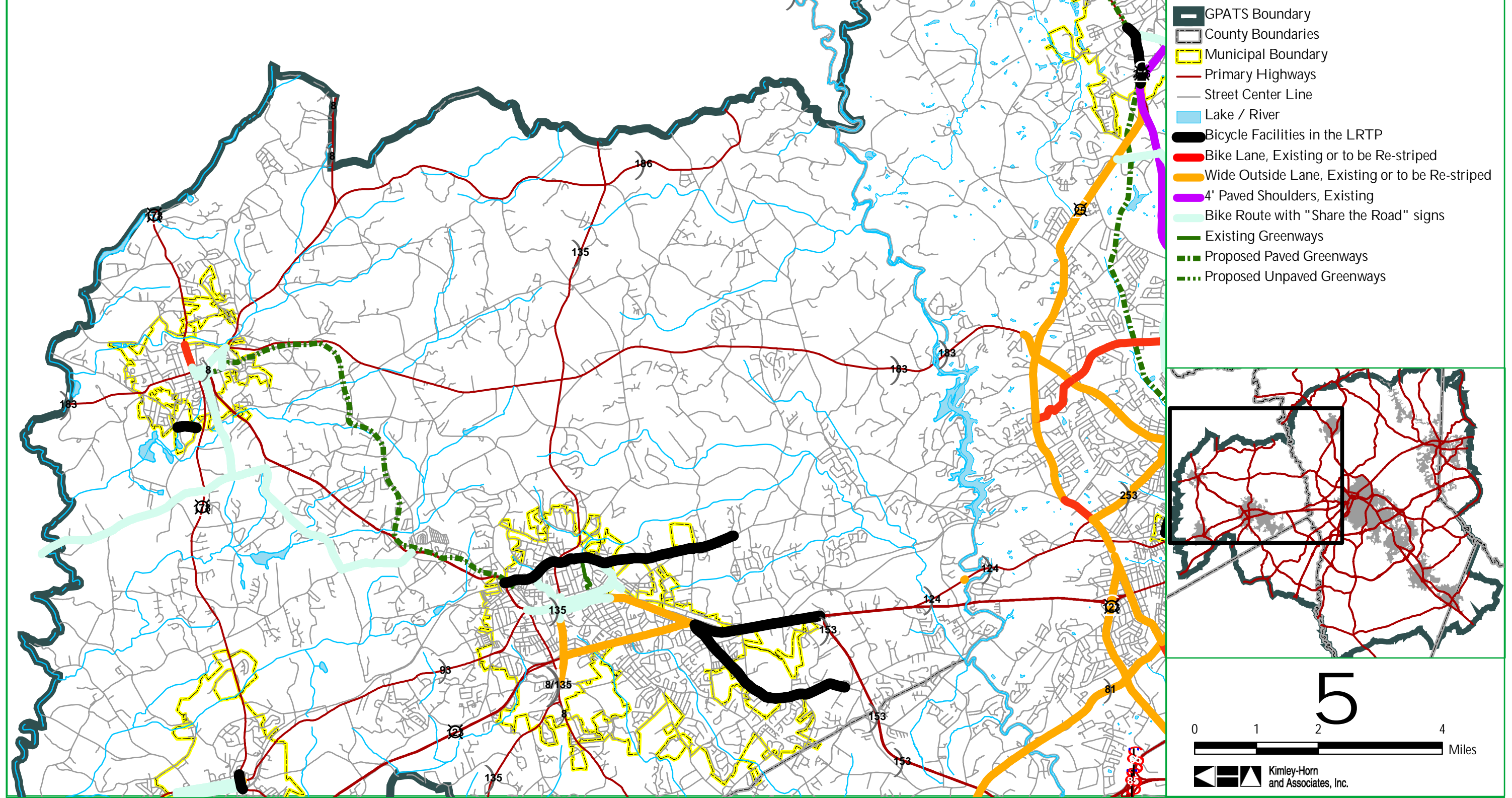


- GPATS Boundary
- County Boundaries
- Municipal Boundary
- Primary Highways
- Street Center Line
- Lake / River
- Bicycle Facilities in the LRTP
- Bike Lane, Existing or to be Re-striped
- Wide Outside Lane, Existing or to be Re-striped
- 4' Paved Shoulders, Existing
- Bike Route with "Share the Road" signs
- Existing Greenways
- Proposed Paved Greenways
- Proposed Unpaved Greenways



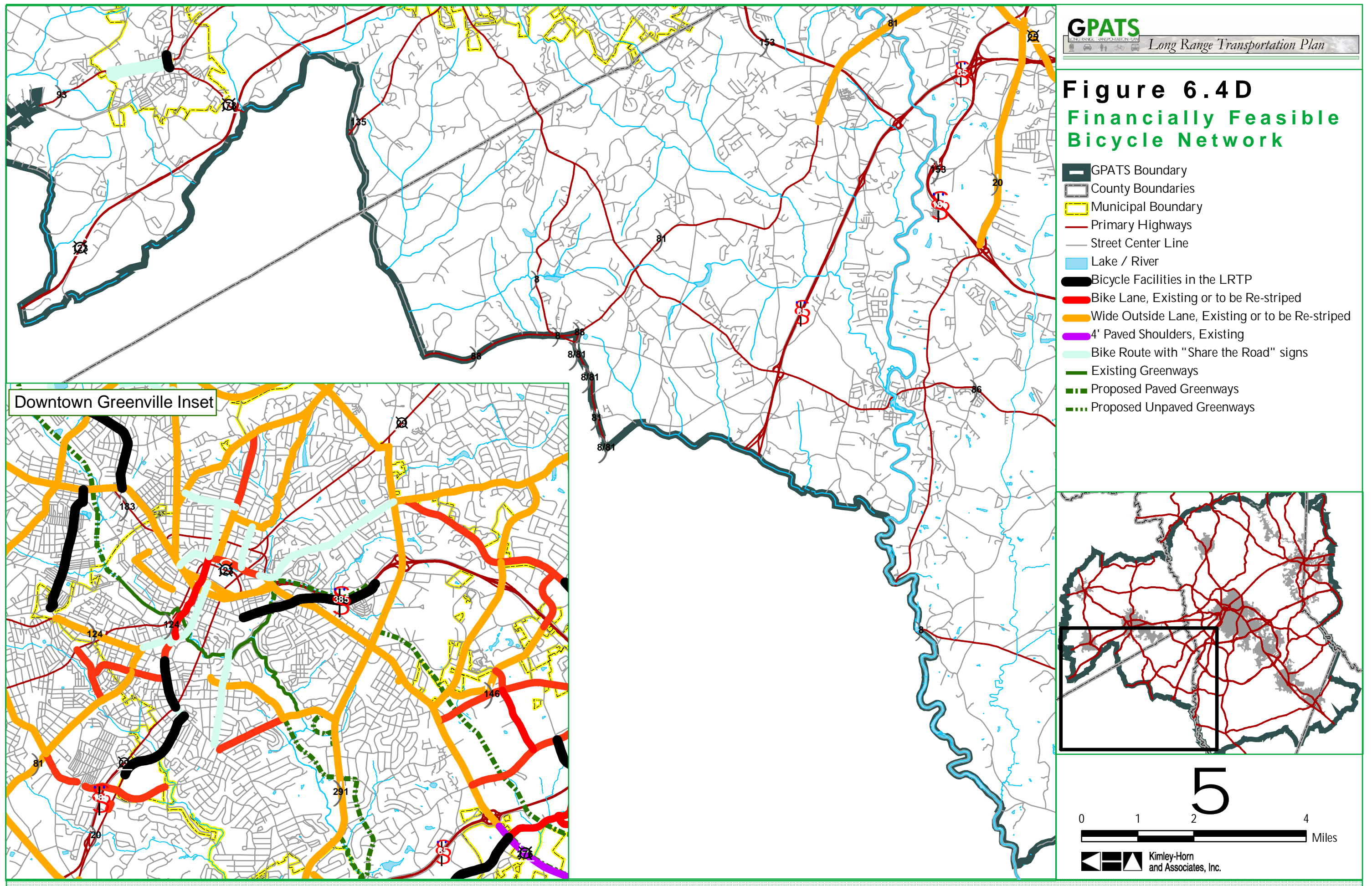


**Figure 6.4C**  
**Financially Feasible**  
**Bicycle Network**













**Figure 6.4D**  
**Financially Feasible**  
**Bicycle Network**

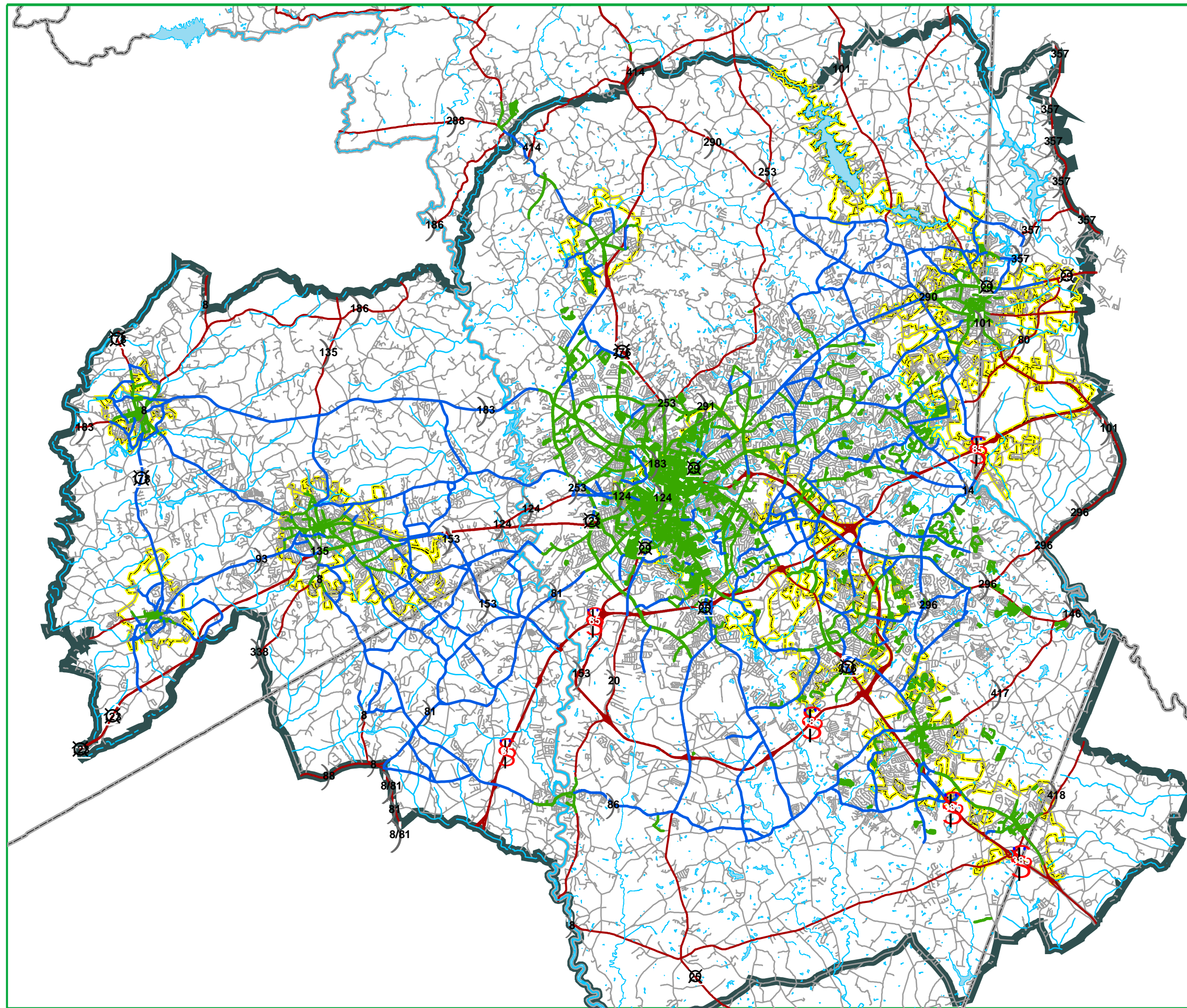




## Figure 6.5

### Existing and Regional Proposed Sidewalks

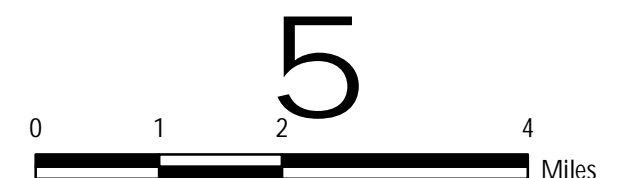
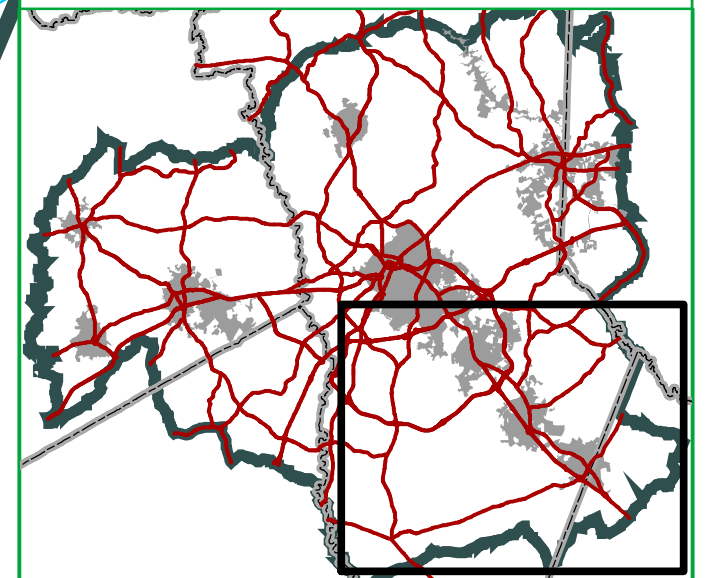
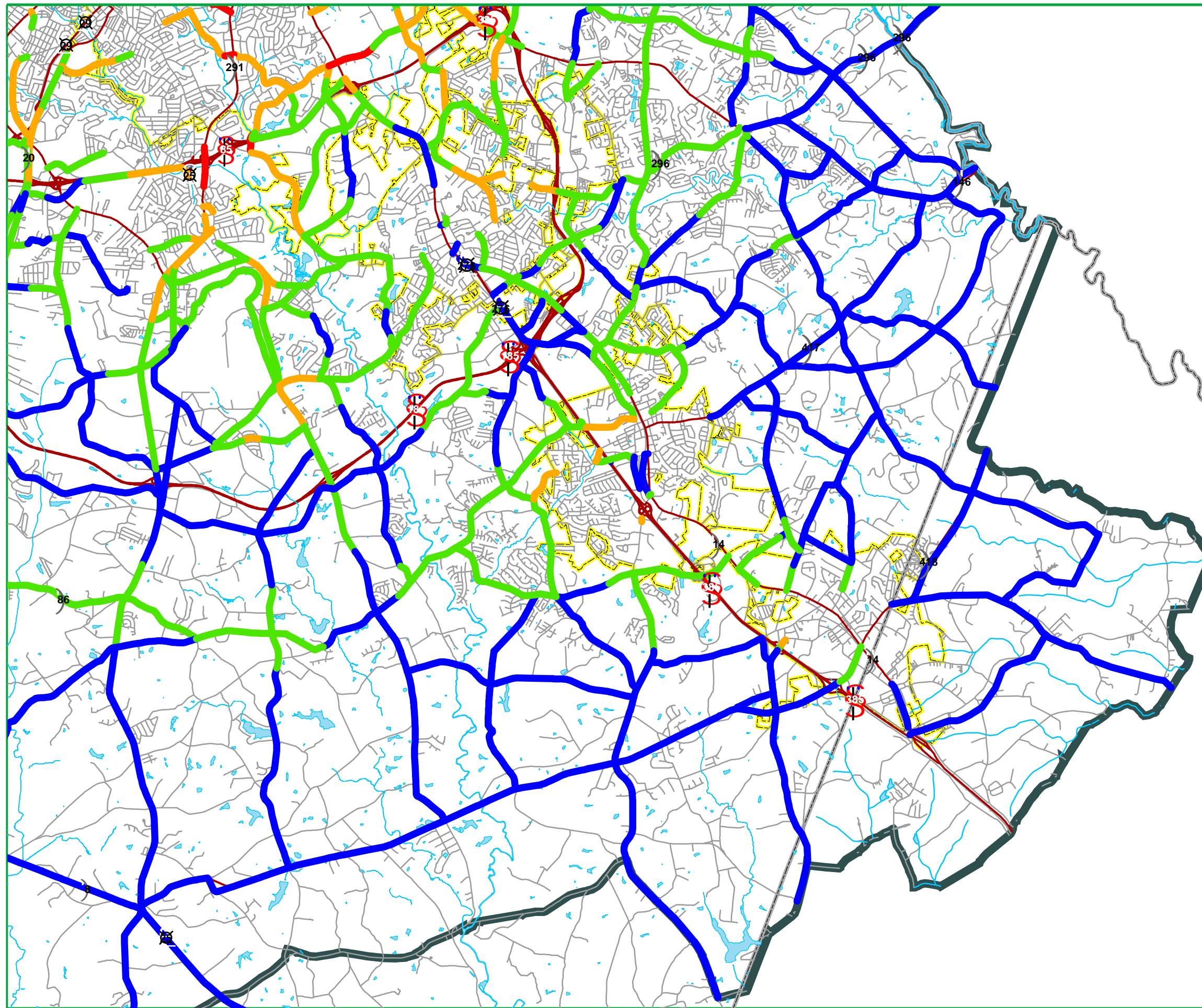
-  GPATS Boundary
-  County Boundaries
-  Municipal Boundary
-  Lake / River
-  Primary Highways
-  Street Center Line
-  Existing Sidewalks
-  Proposed Regional Sidewalks





# Figure 6.6A New Sidewalk Construction Priority Ranking

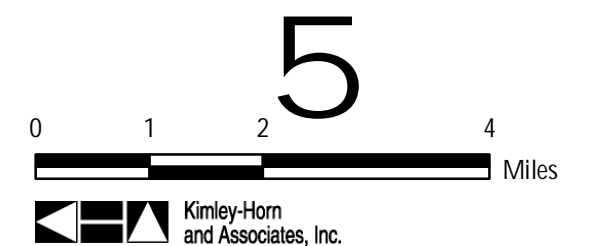
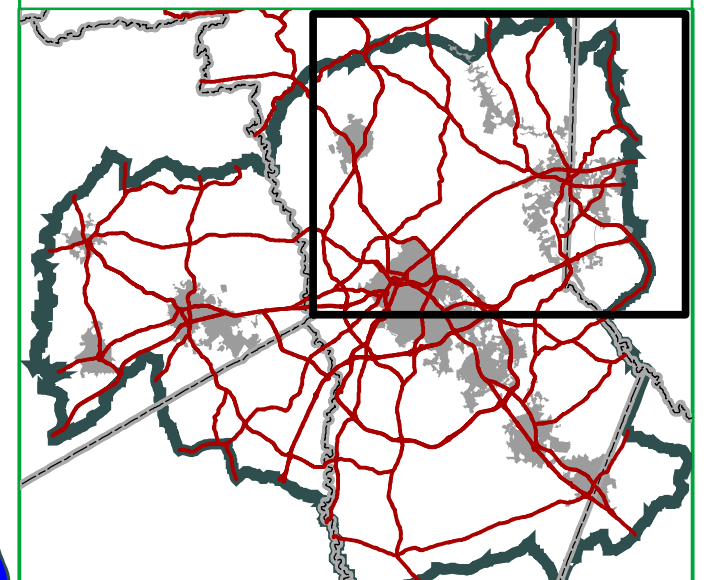
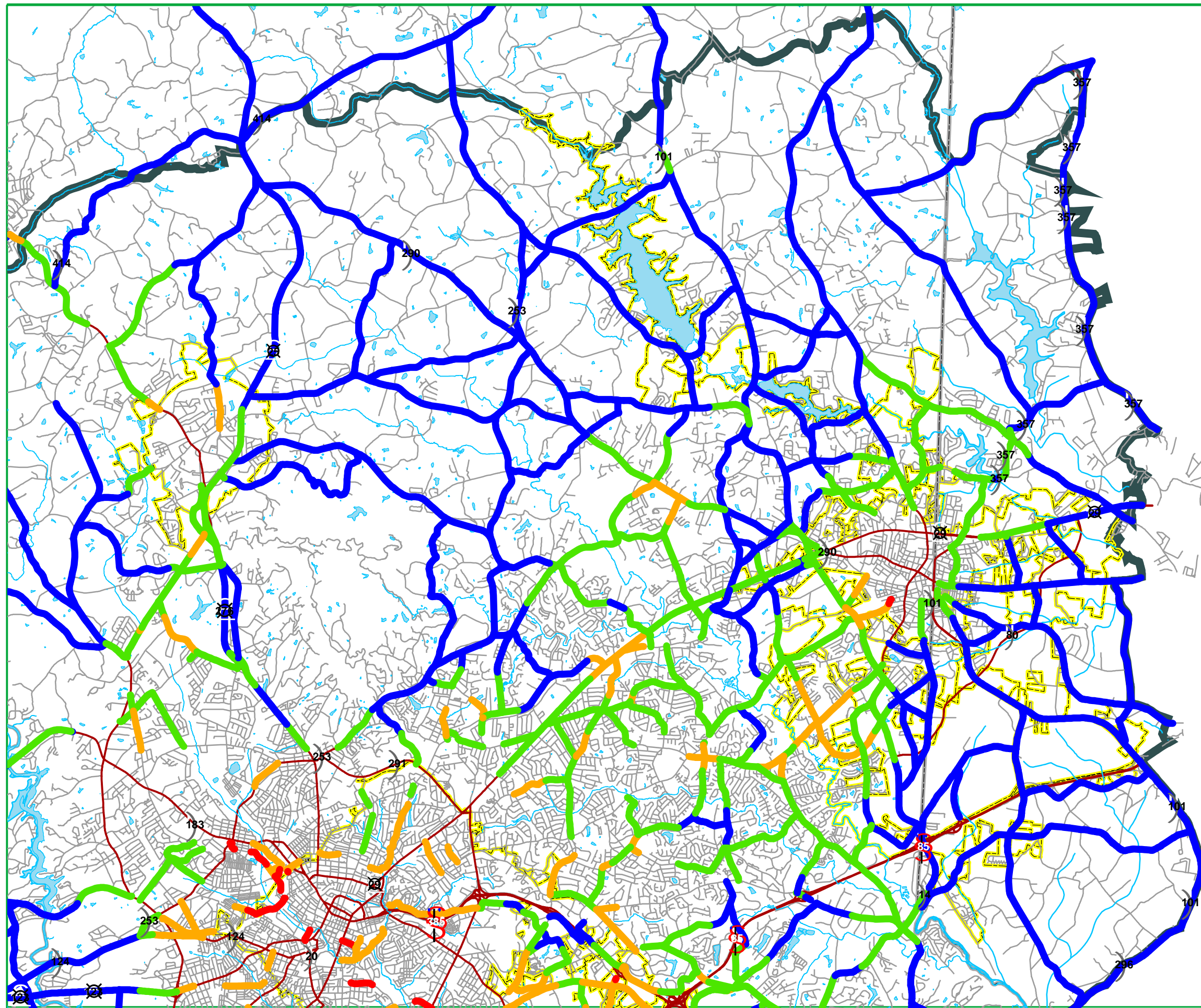
- GPATS Boundary
- County Boundaries
- Municipal Boundary
- Lake / River
- Primary Highways
- Street Center Line
- Sidewalk Ranking
  - Very High Priority
  - High Priority
  - Medium Priority
  - Low Priority





# Figure 6.6 B New Sidewalk Construction Priority Ranking

- GPATS Boundary
- County Boundaries
- Municipal Boundary
- Lake / River
- Primary Highways
- Street Center Line
- Sidewalk Ranking
  - Very High Priority
  - High Priority
  - Medium Priority
  - Low Priority

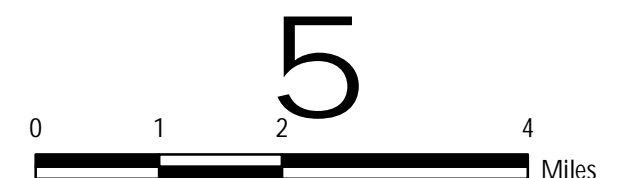
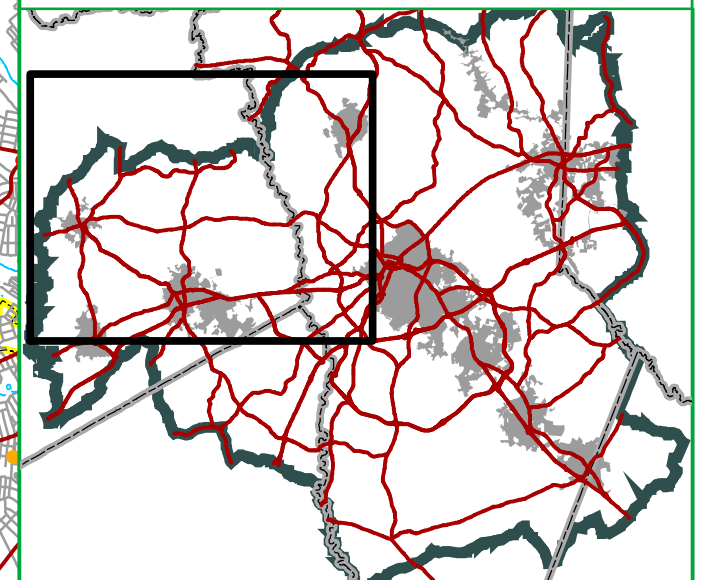
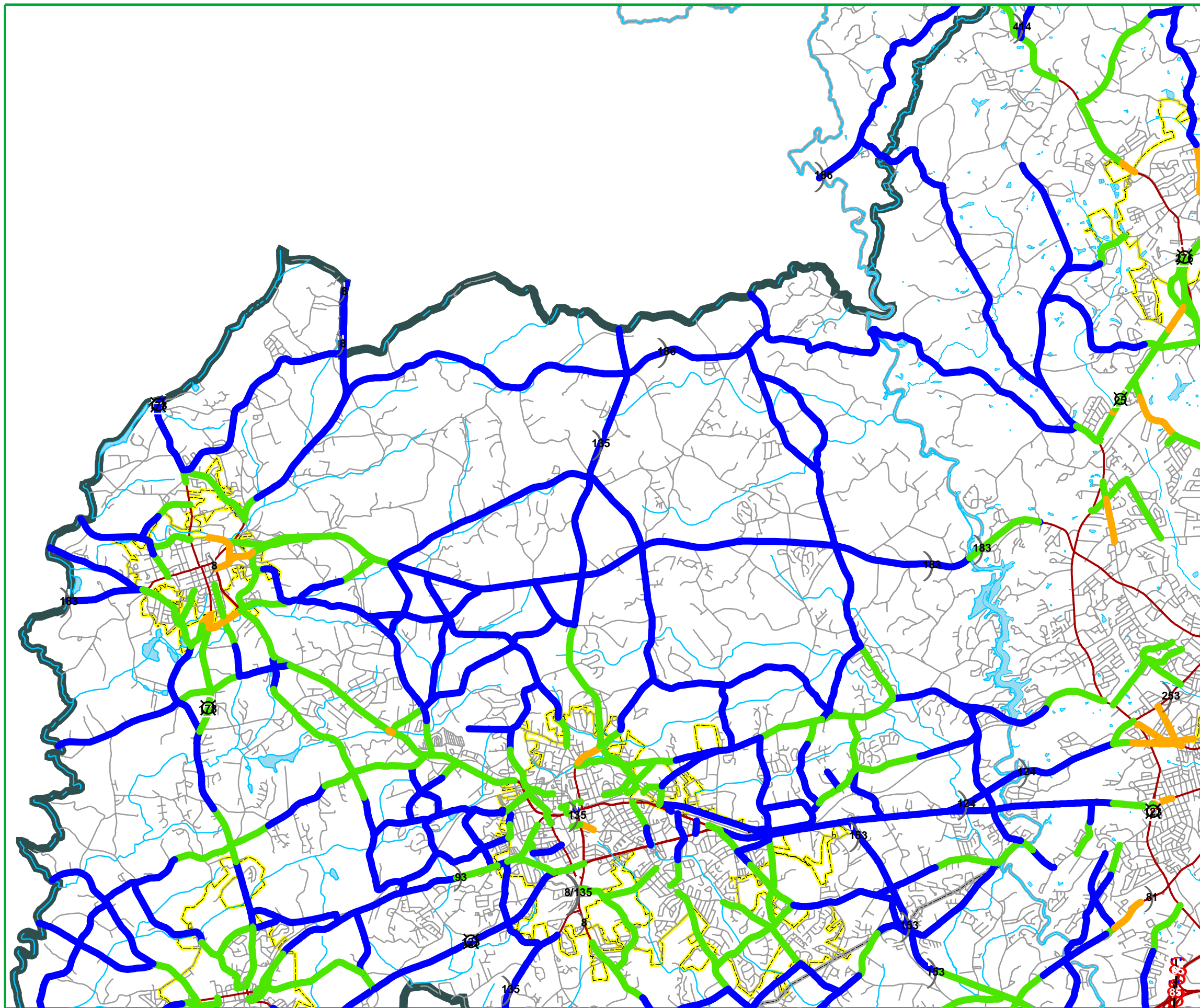




## Figure 6.6C


### New Sidewalk Construction Priority Ranking

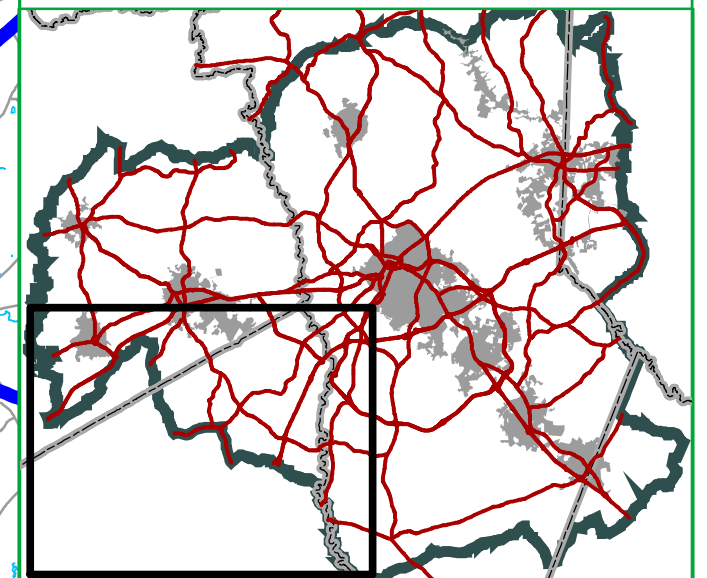
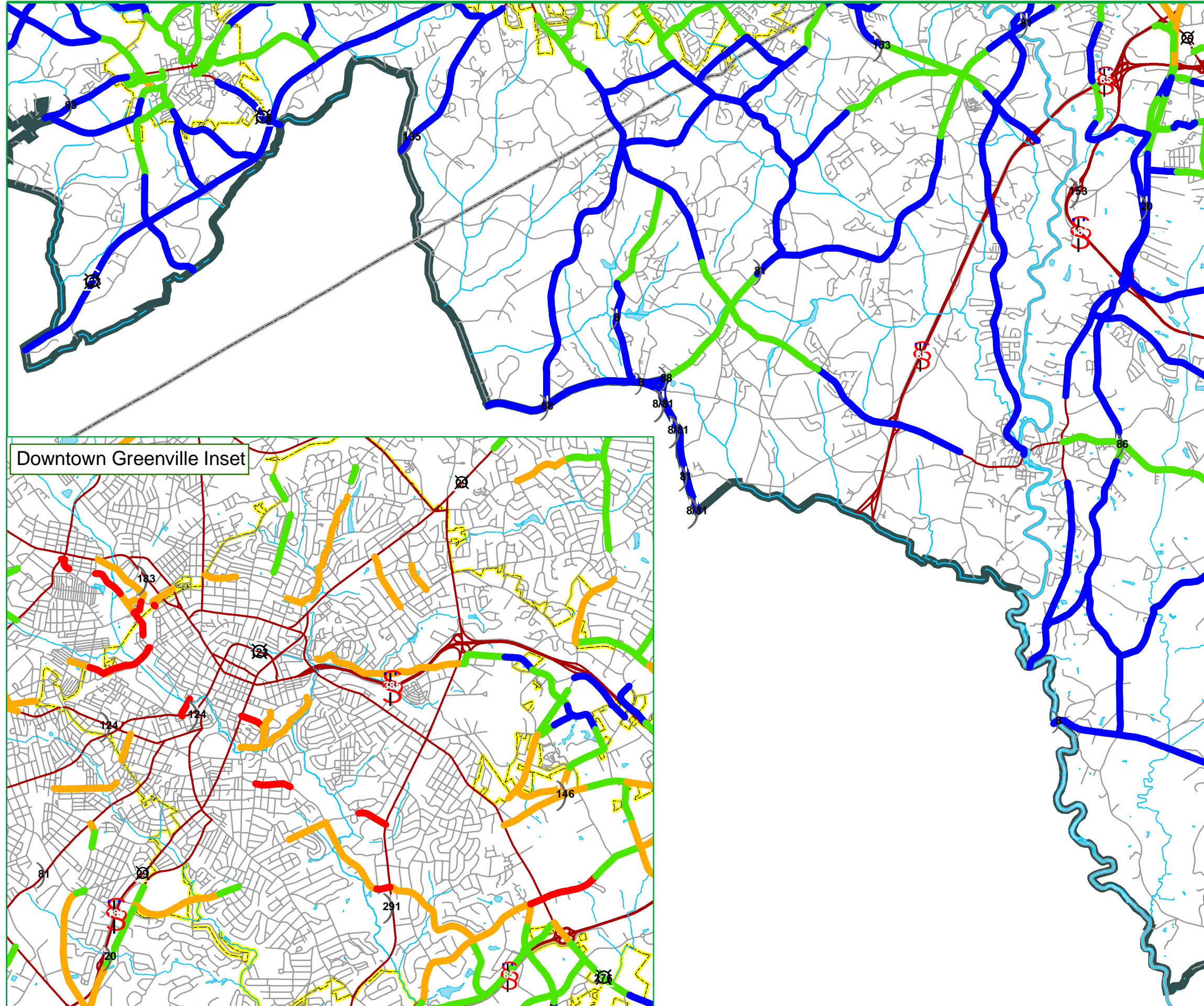
- GPATS Boundary
- County Boundaries
- Municipal Boundary
- Lake / River
- Primary Highways
- Street Center Line
- Sidewalk Ranking
  - Very High Priority
  - High Priority
  - Medium Priority
  - Low Priority





**Figure 6.6D**  
**New Sidewalk Construction Priority Ranking**











-  GPATS Boundary
-  County Boundaries
-  Municipal Boundary
-  Lake / River
-  Primary Highways
-  Street Center Line
- Sidewalk Ranking**
  -  Very High Priority
  -  High Priority
  -  Medium Priority
  -  Low Priority





## Figure 6.7

### New Bike Lane Construction Priority Ranking

-  GPATS Boundary
-  County Boundaries
-  Municipal Boundary
-  Lake / River
-  Primary Highways
-  Street Center Line
- Bicycle Lane Ranking**
  -  Very High Priority
  -  High Priority
  -  Medium Priority
  -  Low Priority

