

# GREENVILLE WEST SIDE

## COMPREHENSIVE PLAN



February 19, 2014

**City of Greenville, South Carolina**



## Chapter 7: Transportation Improvements



NAME Jack

AGE: 17

MY FAVORITE PLACES:

West End of Downtown



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# Transportation Improvements

# 7

## 7.1: Overview

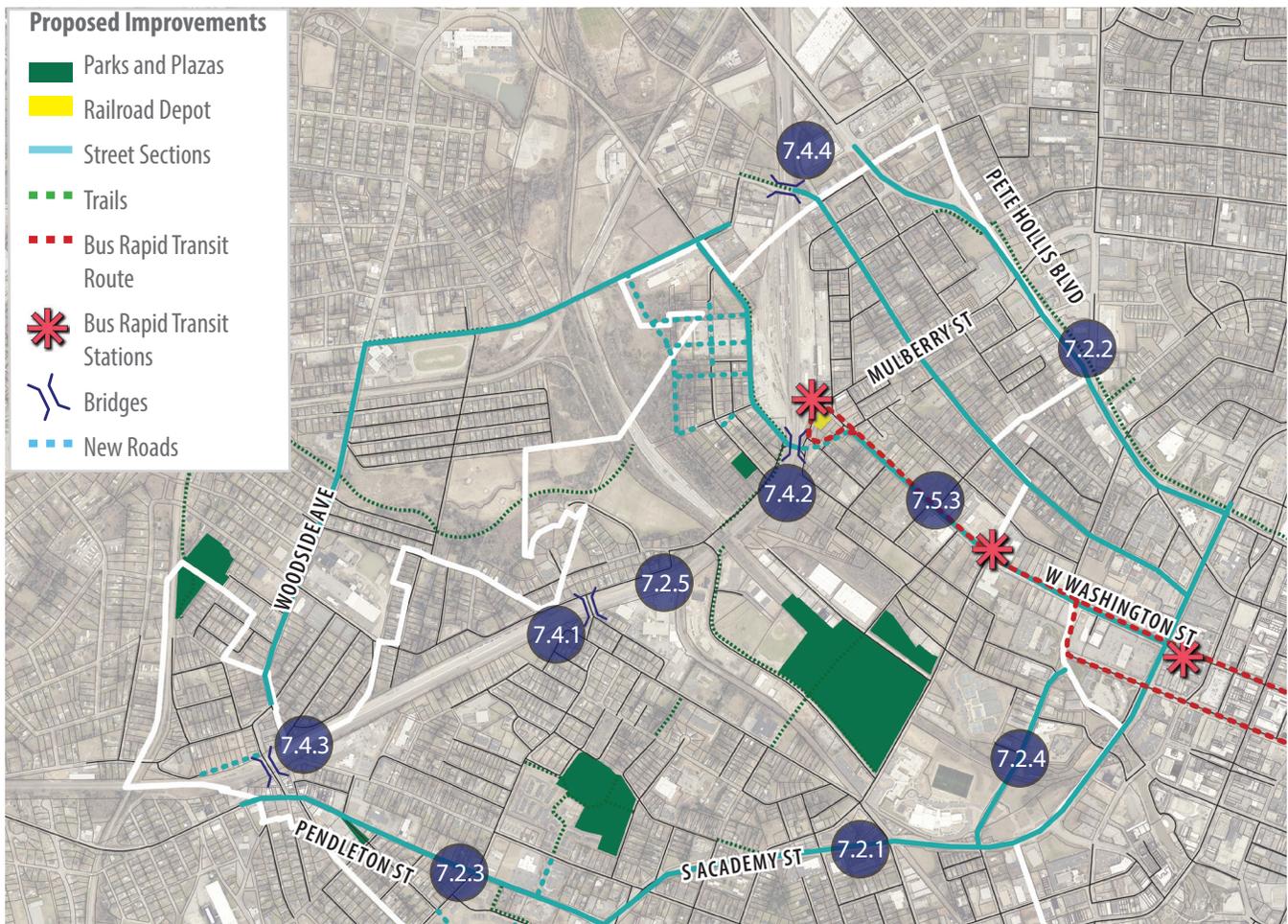
A child-friendly community provides options for all residents to navigate their neighborhoods safely, independently, and affordably. In the West Side, this means:

- Regional and neighborhood corridors, including Academy Street, Pendleton Street, West Washington Street, and Pete Hollis Boulevard need to be retrofitted with wider sidewalks, bike lanes, and protected crossings with pedestrian refuge areas (§7.2.1-7.2.5)
- The development of a neighborhood street network that provides low-traffic alternatives for pedestrians and cyclists and programs that build a local cycling culture (§7.2.6)
- Improved crossings over and under the railroad tracks that divide and isolate neighborhoods (§7.4)

- Increased availability and coverage of local transit routes to provide a low-cost alternative to car ownership for longer trips. (§7.3, 7.5)

These improvements also enhance economic development opportunities, as infrastructure improvements spur private investments on nearby properties. Additionally, more “feet on the street” increases activity and economic vitality within and adjacent to the West Side neighborhoods.

The City of Greenville has the regulatory framework and tools in place to make these changes; in 2007, Greenville’s City Council passed a Complete Streets resolution officially establishing the City’s support for accommodating alternative transportation. The City also amended its Engineering and Design Specifications Manual to follow the mandate of the Complete Streets Resolution and committed to annual funding for bicycle



Map of Key Infrastructure Projects

and pedestrian infrastructure. More recently, Council has shown support for bicycling through adoption of the City of Greenville Bicycle Master Plan (2011), which includes new design guidelines for bikeways and bicycle infrastructure.

The City’s recent investment in the Bus Rapid Transit and Transit-Oriented Economic Development Feasibility Analysis demonstrates a commitment to improving mass transit in the city. Transit not only enhances economic vitality, but helps reduce congestion, improves air quality by reducing carbon emissions, provides connections to jobs and entertainment destinations, and reduces the need for automobiles.

## 7.2: Complete Street Design Recommendations

Many of the streets in the West Side area are designed to move as many cars as quickly as possible, without consideration of other modes of travel. This section details strategies for creating complete streets that serve cars, transit, bicyclists, and pedestrians. The strategies address three main street types:

- Regional Corridors: Academy Street (§7.2.1) and Pete Hollis Boulevard (§7.2.2)
- Neighborhood Corridors: Pendleton Street (§7.2.3); Woodside Avenue, East Bramlett Road, Hudson Street, and Westfield Street (§7.2.4); Willard Street (§7.2.5); and West Washington Street (addressed with the transit recommendations in §7.5.3)

### Complete Streets in Greenville

Complete Streets are streets that move people, and not just cars. They seek to balance and accommodate all modes of travel and provide safe and efficient choices for mobility, whether a person decides to travel by foot, bike, car, or on bus. They also provide simple interfaces among the various modes while blending holistically with both the built and natural environments.

Bike lanes encourage alternative transportation

Plantings buffer pedestrians from the street, and street trees provide shade

Ample sidewalks allow for outdoor dining, commerce and a safer environment



Source: Greenville Downtown Streetscape Master Plan

- Residential Streets: Local low-speed, low-volume streets, which make up the majority of rights-of-way in the West Side; examples include Perry Avenue, Cain Street, Mulberry Street, Hampton Avenue, and Oscar Street (§7.2.6)

The design of the area’s two regional corridors, Academy Street and Pete Hollis Boulevard, are a result of federal highway improvement projects designed to strengthen the connection of regional motor vehicular traffic. These designs—vast expanses of pavement, fast moving traffic, and limited pedestrian, transit, and bicycle accommodations—also create barriers to local pedestrian and cyclist traffic, effectively isolating many portions of the West Side neighborhoods.

The area’s neighborhood corridors, Pendleton Street for example, while less problematic than these major arterial streets, also lack adequate facilities for pedestrians and cyclists.

In response, the recommendations in this section propose road and/or lane diets, and reallocation of some of the right-of-way for a variety of viable travel choices. Most of the recommendations can be accommodated within the existing right-of-way, and usually within the existing curblines. This approach allows for significant livability gains without significant capital costs. Since most of these streets are state owned, working in close collaboration with the State Department of Transportation will be a key component of implementation.

Residential streets in the area generally are already pedestrian- and cyclist-friendly, so the recommendations for these streets focus on streetscape and wayfinding improvements.

### 7.2.1: Implement South Academy Street improvements

Responsible Agent(s): **City of Greenville**

Action Type: **Public Investment**

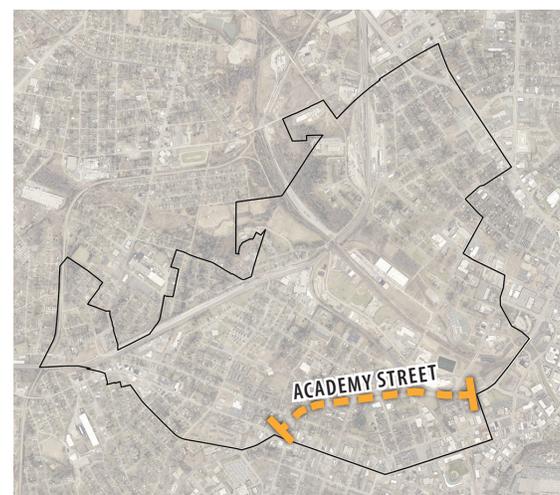
Funding Level: **\$\$-\$\$\$\$**

Time Frame: **Year 1-5**

South Academy Street is currently four lanes plus a center turn lane, and carries approximately 23,000 vehicles per day. It also has many continuous right turn bays that make the street effectively a seven-lane width through much of the study area.

Repurposing this excess pavement would provide space for planted medians and much needed additional width on both sides of the street for pedestrians and cyclists, thereby making South Academy Street safer and more aesthetically pleasing. These improvements also would have the effect of “traffic calming” (overall speed reduction of motor vehicles to appropriate and safe urban speeds), by providing side friction, visually, for the fast-moving traffic, with little effect on overall traffic operations.

Additionally, modifications to key intersections along South Academy Street would provide safer pedestrian and bicycle crossings, and stronger connections between the neighborhood and downtown areas. In particular, improving the Calhoun Street intersection and formalizing the bicycle/pedestrian connection at Douthit Street would strengthen an important bike route for access to the Swamp Rabbit Trail, The Salvation



Army Ray & Joan Kroc Corps Community Center, and neighborhoods on either side of South Academy Street.

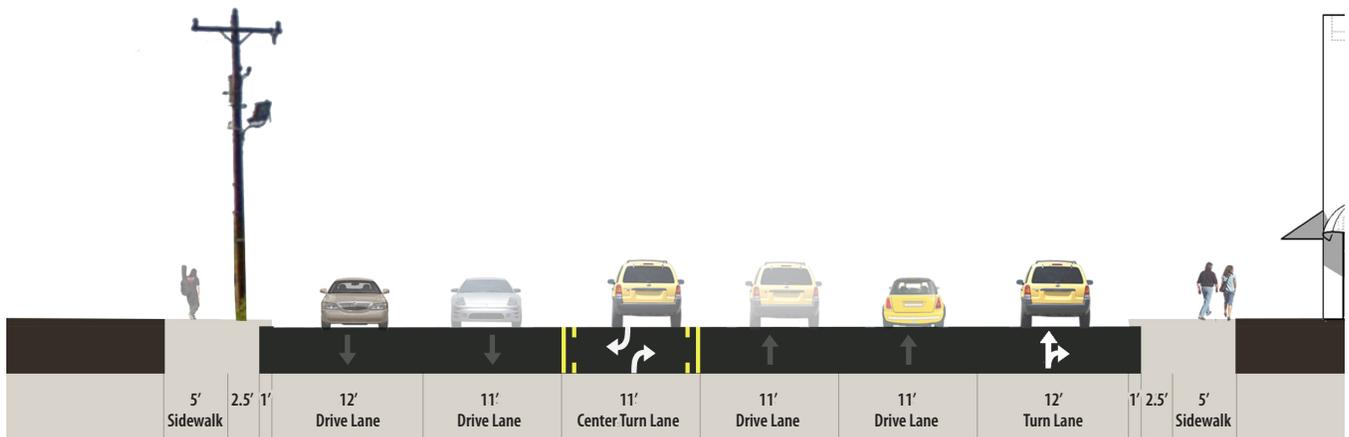
**Key Recommendations**

Proposed modifications are shown in the accompanying street section diagram. In addition, this plan reaffirms the intersection improvements illustrated in the City of Greenville’s Downtown Streetscape Plan, including tightening intersection geometry, reducing pedestrian crossing distance, and enhancing crossing safety at the following intersections:

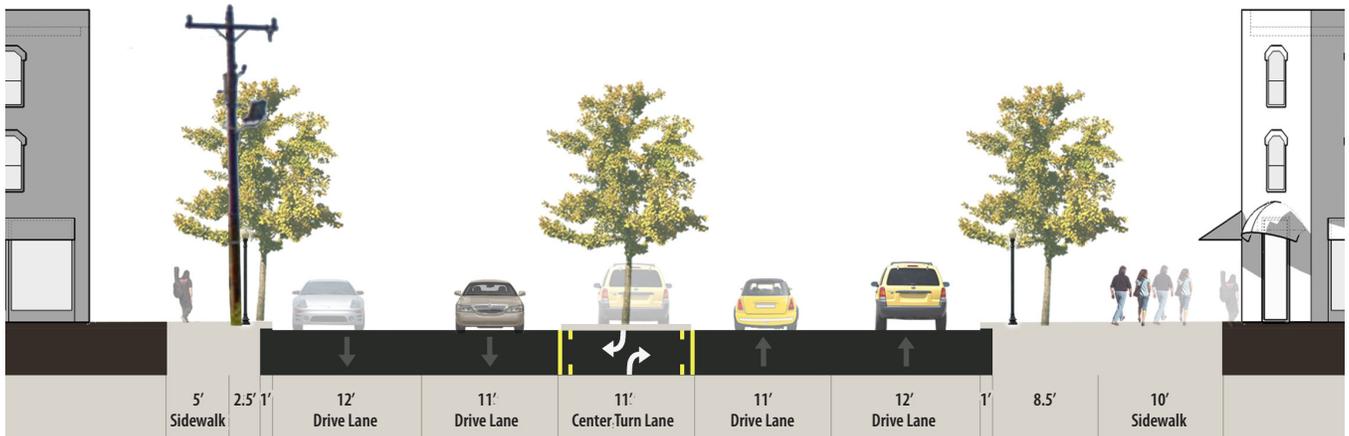
- South Academy and Pendleton Street
- South Academy and Markley Street
- South Academy and Calhoun Street



South Academy Street - Existing Conditions

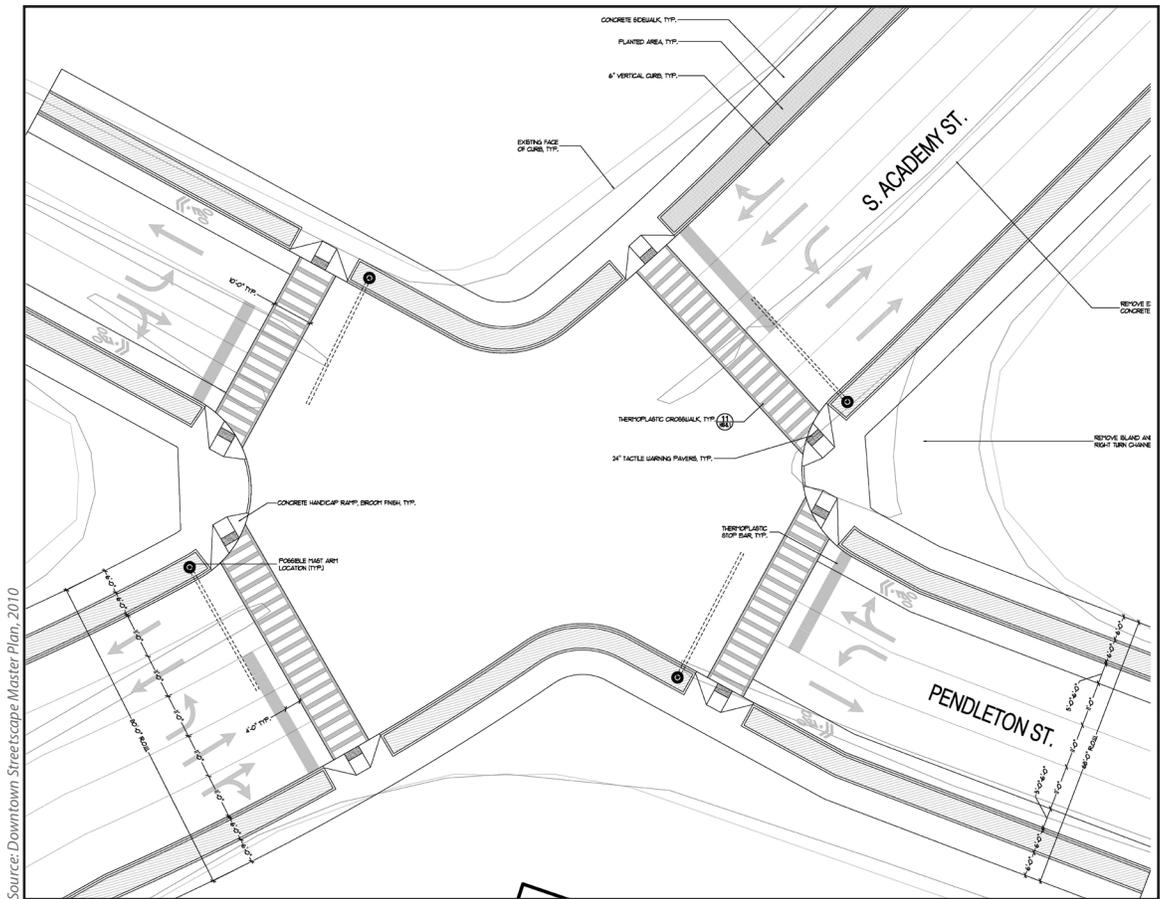


South Academy Street - Existing Conditions



South Academy Street - Proposed Long-term Design Changes: Eliminate continuous right turn lanes and reclaim the space for wider sidewalks or a multi-use path on one or both sides of the street. Install spot planted medians where the continuous center turn lane is not needed.

7: Transportation Improvements



Proposed Intersection Improvements at South Academy Street and Pendleton Street

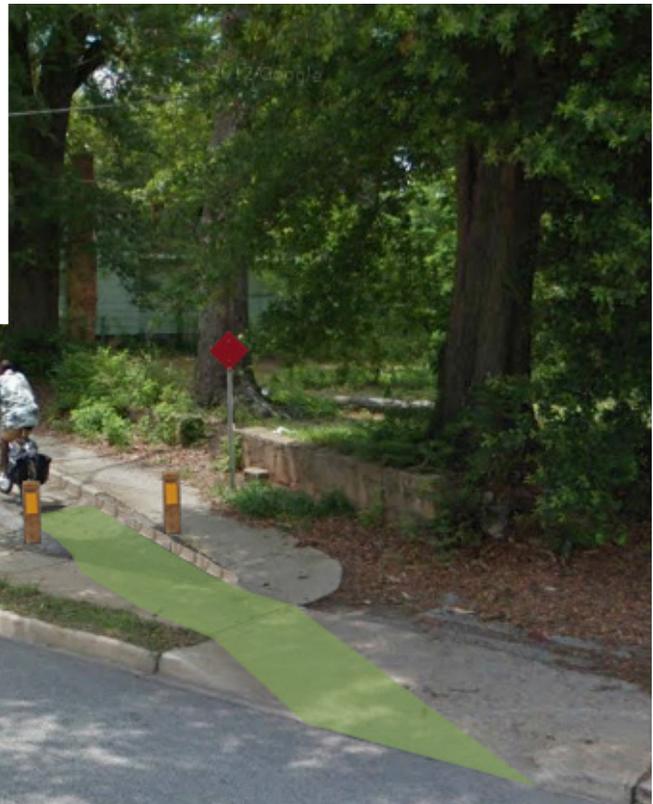


Illustration of Proposed Improvements at South Academy Street and Douthit Street Intersection

## 7.2.2: Implement Pete Hollis Boulevard improvements

Responsible Agent(s): **City of Greenville**

Action Type: **Public Investment**

Funding Level: **\$\$-\$\$\$ for short-term modifications; \$\$\$\$ for long-term redesign**

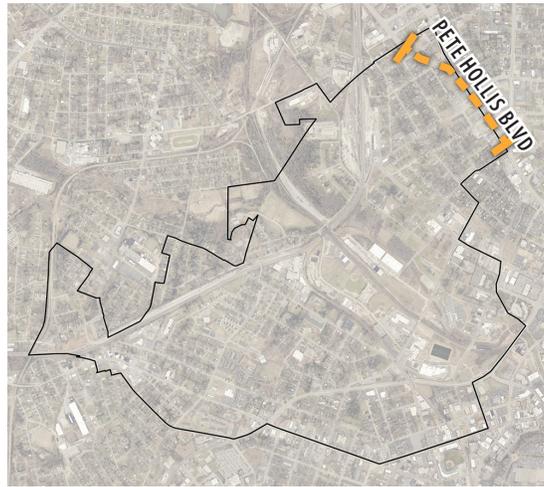
Time Frame: **Year 1-5 for short-term modifications; Year 11-15 for long-term redesign**

Today, Pete Hollis Boulevard is a seven-lane arterial that acts as a barrier between the West Side and the neighborhoods to the east. Pete Hollis Boulevard currently carries about 18,000 vehicles per day. Even though it is signed at 35 miles per hour, excess roadway capacity results in higher vehicle speeds, creating an uncomfortable walking environment.

### Key Recommendations

This plan recommends a phased strategy to better match the capacity of the road to its actual volume of traffic. In addition to providing safer accommodations to pedestrians and cyclists, repurposing excess pavement would provide a more conducive environment to new retail businesses as future development occurs along this important regional commercial corridor (\$10.9).

The proposed design and phasing is illustrated in the street sections on the following page. While the short-term recommendations could be completed with minimal investment as part of a repaving project, the long-term downsizing of Pete Hollis would require reconstruction of the curbline. Analysis of whether or not excess capacity exists is based on comparing traffic counts to generalized traffic capacity numbers for two, four, and six



lane roadways: Detailed analysis may need to be performed to justify initiatives to SCDOT if they require it, which may include updated traffic counts, and intersection and mainline analyses based on Highway Capacity Manual methods. Additionally, use of private property and/or dedication of additional right-of-way would be necessary to support much needed wider sidewalks/multi-use paths.

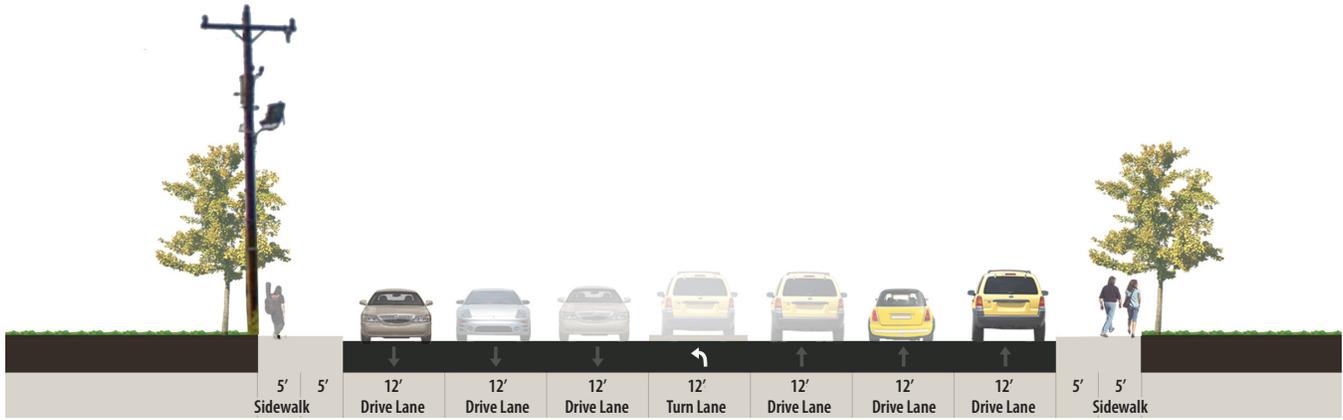
The plan also recommends the following intersection improvements as illustrated in the City's Downtown Streetscape Plan:

- Pete Hollis Boulevard and Rutherford Street
- Buncombe Street, College Street and Whitner Street/Civic Center Drive
- Buncombe Street and Butler Street/Atwood Street
- Pete Hollis Boulevard and James Street
- South Academy Street and Pendleton Street

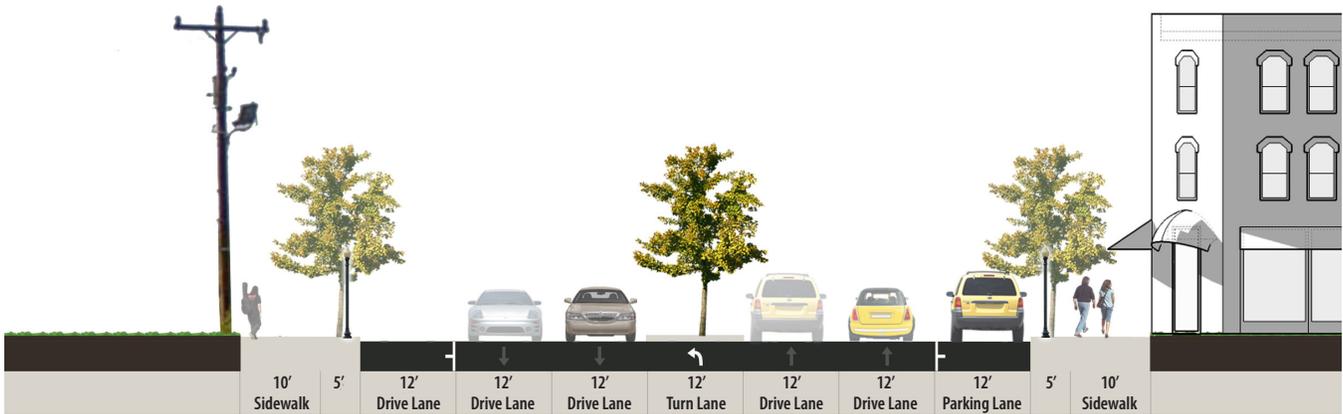


Pete Hollis Boulevard - Existing Conditions

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Pete Hollis Boulevard - Existing Conditions

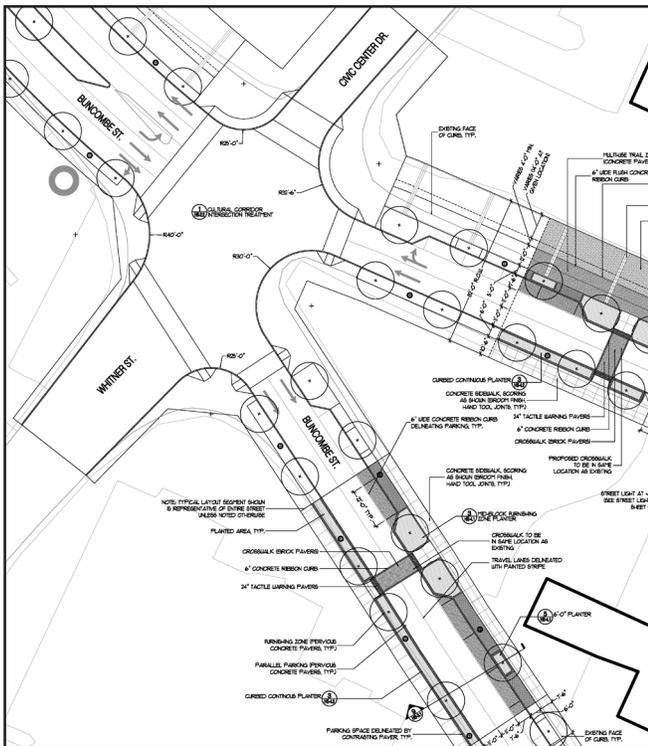


Pete Hollis Boulevard - Proposed Short-term Design Changes: Allow on-street parallel parking in outside travel lane during non-peak hours (no parking from 7-9 am and from 4-6 pm for instance). Construct spot medians in two way left turn lane to break up large expanses of asphalt and allow for planting opportunities in the median. Create wider sidewalks in conjunction with new development.



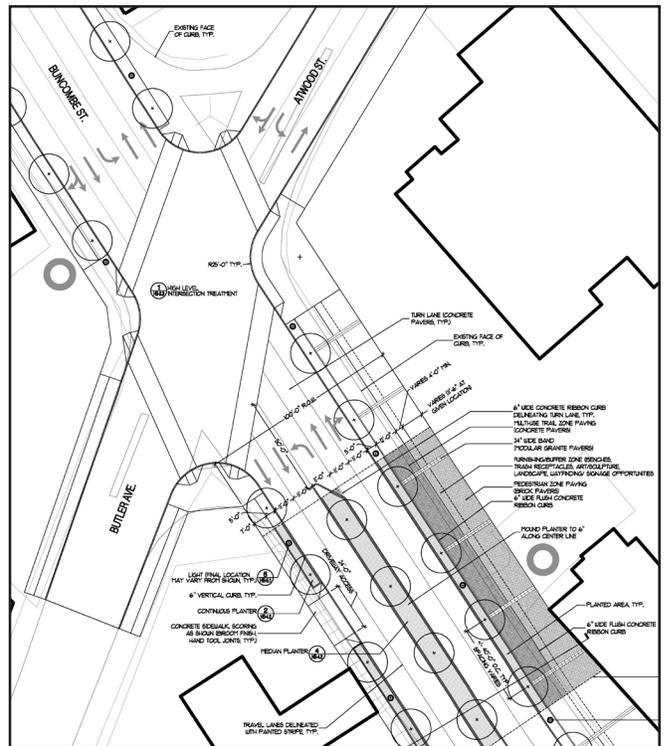
Pete Hollis Boulevard - Proposed Long-term Design Changes: Permanently reclaim outside travel lanes for parking at 8 feet in width. Narrow remaining four travel lanes to 11 feet in width. Expand center spot medians to 20 feet with reclaimed width and formalize as channelized medians with two rows of trees to create a parkway aesthetic. Create wider sidewalks in conjunction with new development.

7.2.2: Implement Pete Hollis Boulevard improvements



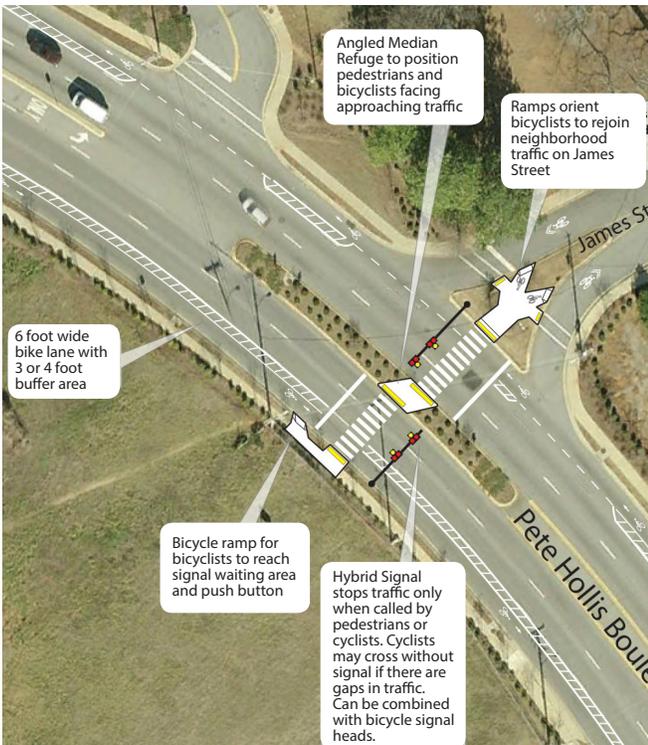
Source: Downtown Streetscape Master Plan, 2010

Proposed Intersection Improvements for Buncombe Street, Civic Center Drive, College Street, and Whitner Street. See detail on city's website: [http://www.greenvillesc.gov/PlanningZoning/forms/DSMP/10\\_DowntownStreetscapeMasterPlan\\_SchematicDesign\\_02.pdf](http://www.greenvillesc.gov/PlanningZoning/forms/DSMP/10_DowntownStreetscapeMasterPlan_SchematicDesign_02.pdf)



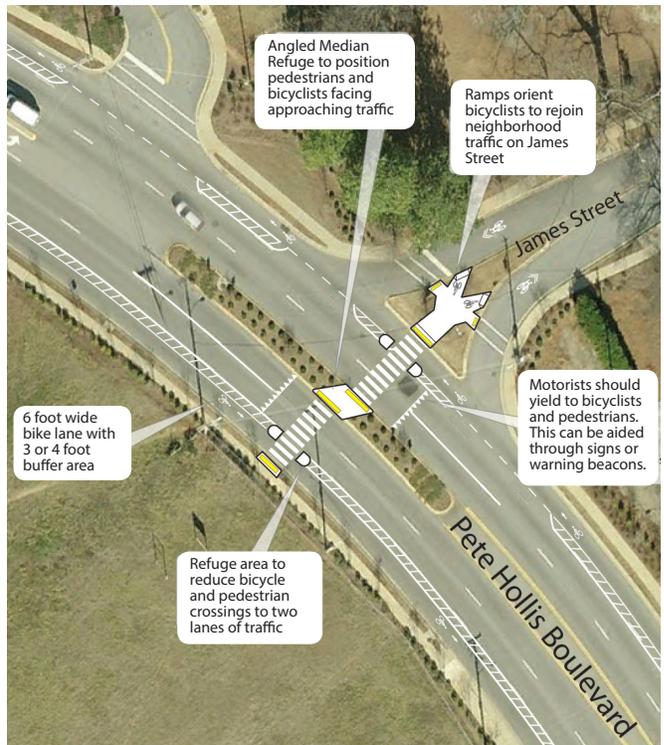
Source: Downtown Streetscape Master Plan, 2010

Proposed Intersection Improvements for Buncombe Street, Atwood Street and Butler Avenue. See detail on city's website: [http://www.greenvillesc.gov/PlanningZoning/forms/DSMP/10\\_DowntownStreetscapeMasterPlan\\_SchematicDesign\\_01.pdf](http://www.greenvillesc.gov/PlanningZoning/forms/DSMP/10_DowntownStreetscapeMasterPlan_SchematicDesign_01.pdf)



Source: Bicycle Master Plan, 2011

Proposed Intersection Improvements for Pete Hollis Boulevard and James Street - Option with a HAWK Signal



Source: Bicycle Master Plan, 2011

Proposed Intersection Improvements for Pete Hollis Boulevard and James Street



### 7.2.3: Convert Pendleton Street to a Complete Street

Responsible Agent(s): **City of Greenville**

Action Type: **Public Investment**

Funding Level: **\$\$-\$\$\$**

Time Frame: **Year 1-5 ; Year 6-10 for expanding sidewalks along with redevelopment**

The Pendleton Street corridor exhibits two distinctly different characters within the study area: east of South Academy Street, Pendleton Street is a 50-foot wide, four-lane, undivided road that carries around 9,000 vehicles per day; West of South Academy Street, Pendleton Street is a two-lane road with bicycle lanes on each side and intermittent on-street parking on one side. Traffic volumes drop off to around 2,000 vehicles per day by the time Pendleton Street exits the City of Greenville limits just west of the Village of West Greenville at its intersection with Woodside Avenue. Traffic volumes within the Village are likely between 2,000 and 9,000 vehicles per day.<sup>1</sup>

The entire length of Pendleton Street within the West Side project area could accommodate the traffic volume with one travel lane per direction. Repurposing this excess pavement would slow vehicle speeds, better accommodate other travel modes, and create a more walkable environment along this section of Pendleton Street. Swinging the street pendulum from fast moving cars toward a walkable environment will be critical to its success as a vibrant, mixed use corridor.

#### Key Recommendations

Proposed design changes are shown in the accompanying street section design. Modifications include installing a raised table at the intersections of Traction Street and Smith Street to further slow vehicle speeds through the Village of Greenville and create a gateway to this emerging district.

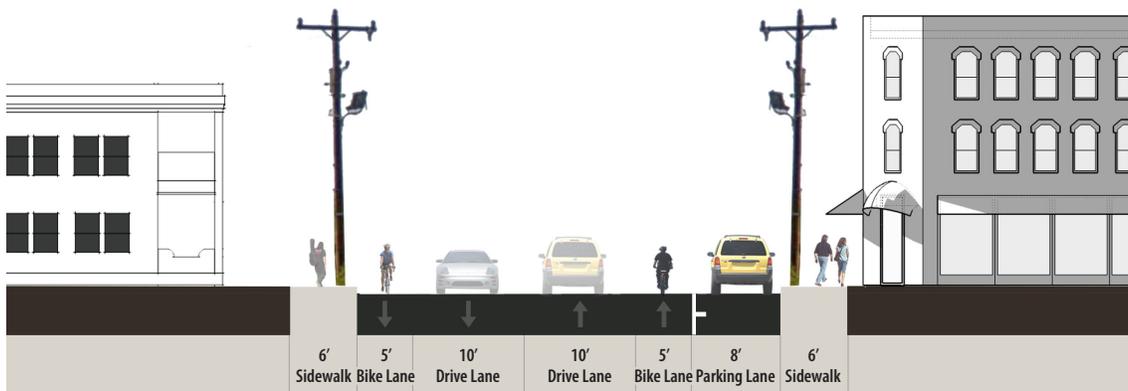


Pendleton Street (West of South Academy Street) - Existing Conditions

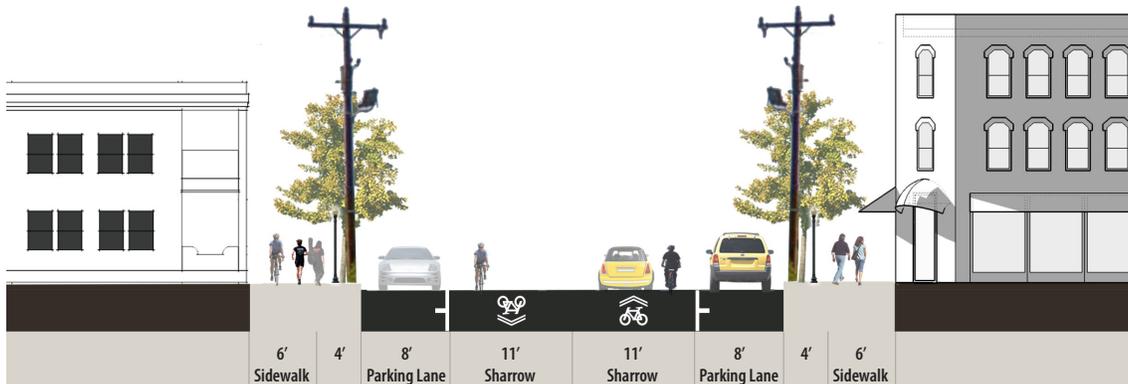


Pendleton Street (East of South Academy Street) - Existing Conditions

<sup>1</sup> All traffic counts from 2012 GPATS data



Pendleton Street (West of South Academy Street) - Existing Conditions



Pendleton Street (West of South Academy Street) - Proposed Design Changes with Parking Option: Convert existing bike lanes to two-sided parallel parking with marked sharrows. (This is most appropriate west of Textile Avenue). The addition of formalized parking on both sides will physically narrow the street and slow speeds while providing additional parking for the Village of West Greenville commercial area. Install sharrows on the travel lanes to signify the shared configuration of the street for cyclists.

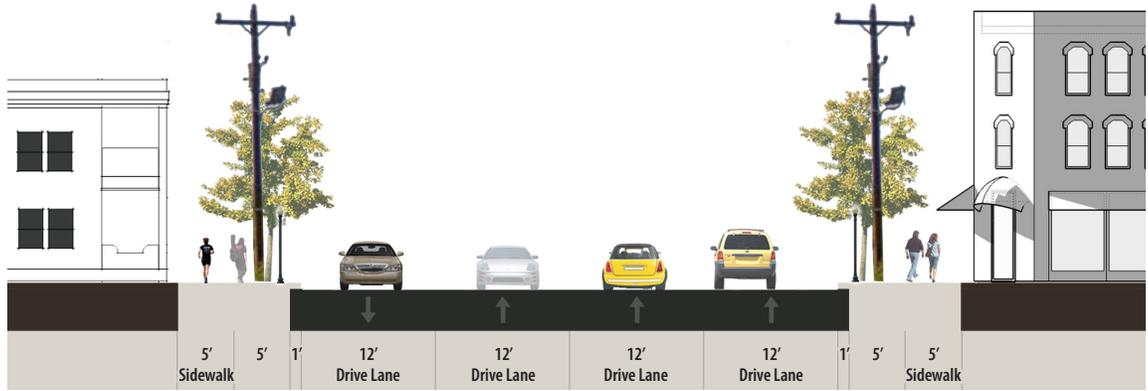


Intersection of Pendleton, Traction, and Smith Streets - Existing Conditions

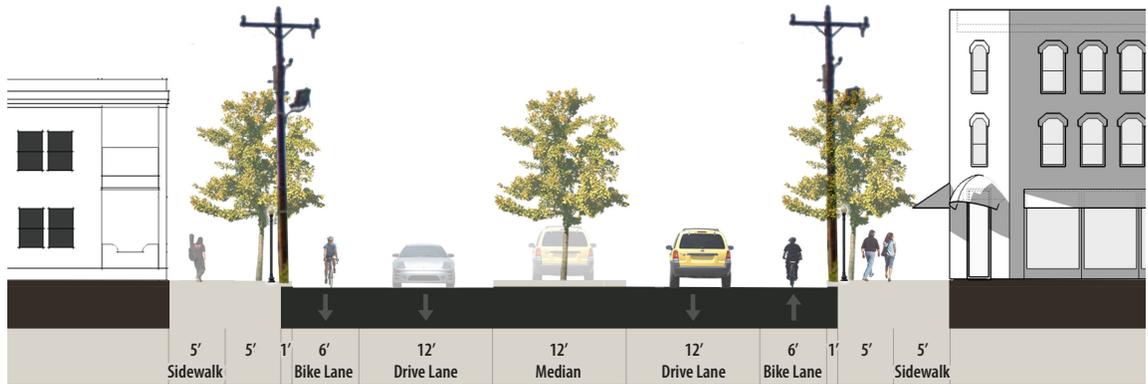


Proposed Speed Table at Intersections of Traction and Smith Streets

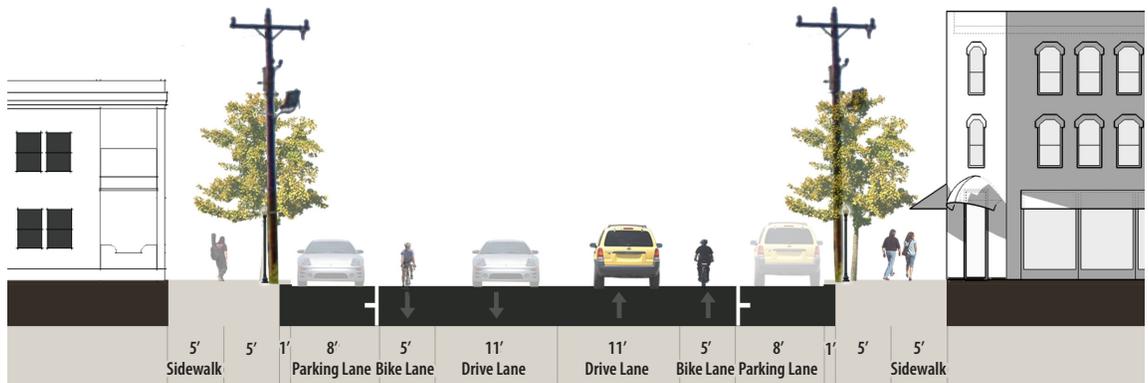
## 7: Transportation Improvements



Pendleton Street (East of South Academy Street) - Typical Existing Conditions



Pendleton Street (East of South Academy Street) - Option 1 Proposed Design Changes: Reduce the 4-lane section to a 3-lane section (2 traffic lanes with turn lane). Re-allocate the additional pavement width for a 6-foot bicycle lane on either side of the street, a combination spot and flush median to facilitate left turns, and median plantings and streetscape.



Pendleton Street (East of South Academy Street) - Option 2 Proposed Design Changes: Reduce the 4-lane section to two undivided lanes with two 8-foot on-street parking bays, two 5-foot bike lanes, and two 11-foot travel lanes. This would provide on street parking if redevelopment along this segment were deemed to need parking to support it.

### 7.2.4: Improve Woodside Avenue, East Bramlett Road, South Hudson Street, and Westfield Street

Responsible Agent(s): City of Greenville / Greenville County / SCDOT

Action Type: Public Investment

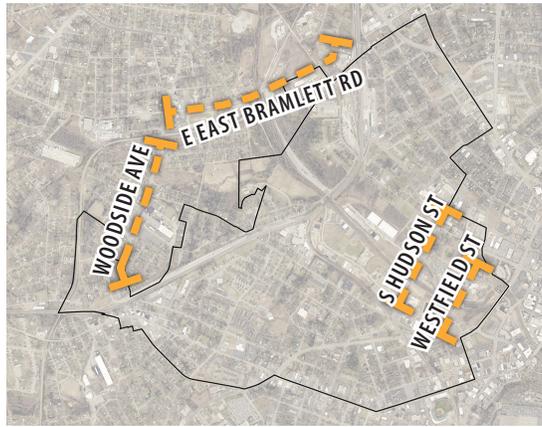
Funding Level: \$\$-\$\$\$

Time Frame: Year 1-5 for South Hudson Street, Westfield Street (Phase I); Year 6-10 for Woodside Avenue and Bramlett Street (Phase 2)

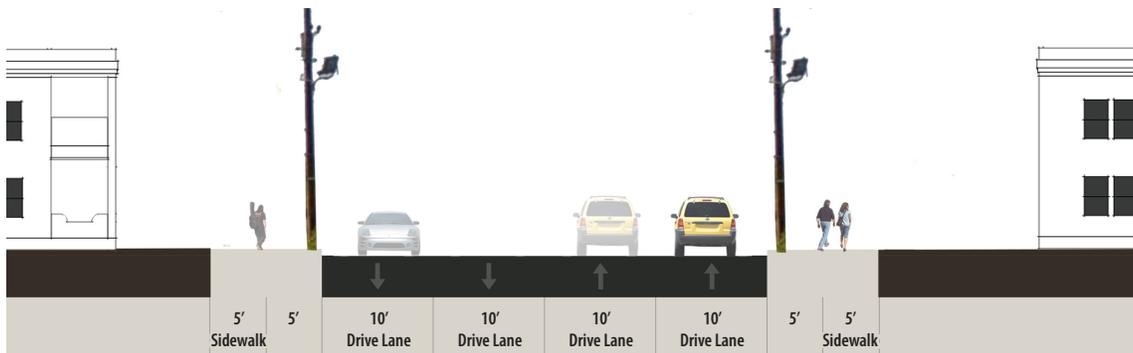
Several other neighborhood corridors in the West Side—Woodside Avenue, East Bramlett Road, South Hudson Street, and Westfield Street—require similar lane reconfigurations, active transportation accommodations, and streetscape additions to become complete streets.

#### Key Recommendations

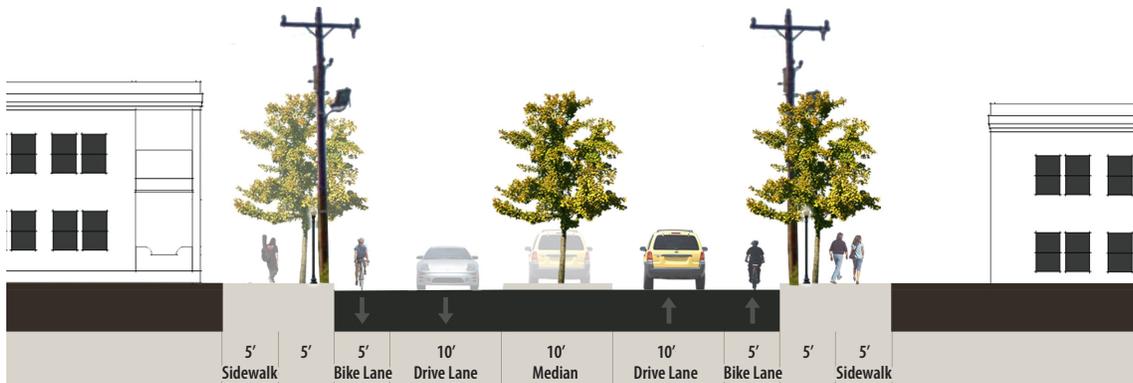
**Woodside Avenue:** Woodside Avenue is currently a 4-lane undivided section in the vicinity of the Woodside Mill that carries



Woodside Avenue - Existing Conditions



Woodside Avenue - Existing Conditions



**Woodside Avenue - Proposed Design Changes:** Reduce the number of vehicular travel lanes from four to two lanes and a center turn lane with spot medians along the length of the street. The addition of a center turn lane improves the safety for all roadway users by permitting left turning vehicles to exit the traffic stream, and allows an opportunity for spot plantings to enhance the overall aesthetic of the street and added safety for crossing pedestrians. Install bicycle lanes on both sides.

approximately 4,600 vehicles per day.<sup>2</sup> As Woodside Mill redevelops (\$10.5), this street may be re-envisioned as a complete street to safely carry modes other than cars and to support existing and future land uses as shown in the accompanying street section.

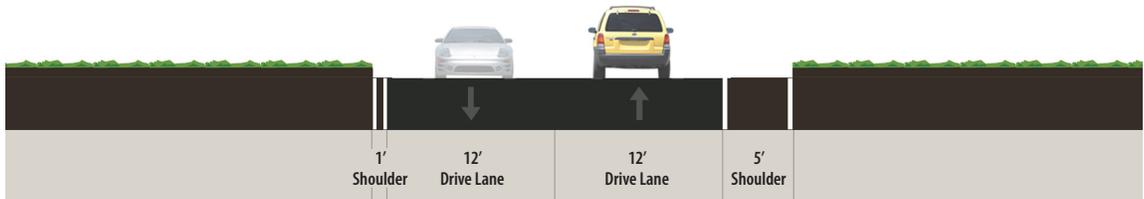
2 2012 GPATS data



East Bramlett Road - Existing Conditions

**East Bramlett Road:** The section of East Bramlett Road between Woodside Avenue and West Washington Street connects the Legacy Charter Schools into a West Side corridor loop and intersects the Swamp Rabbit Trail. Recognizing the importance of this street for the safety of students (see §7.3.1 for related recommendations for a Safe Routes to School program), the plan recommends reducing lane widths to slow cars and separating pedestrians by either providing a wider shoulder or constructing a new multiuse path. Further study may be necessary to determine if construction of the multi-use path would require structural modifications to the bridge on East Bramlett.

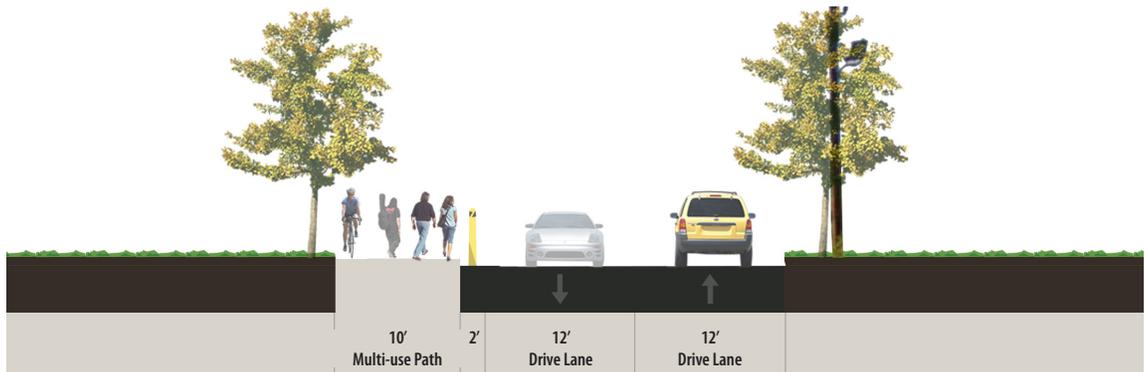
**South Hudson Street and Westfield Street:** South Hudson and Westfield Streets provide direct connections to the Swamp Rabbit Trail and important north-south connections for



East Bramlett Road Bridge Segment - Existing Conditions



East Bramlett Road Bridge Segment - Proposed Design Changes (Option 1): Reduce vehicle lane size on the bridge segment (over the railroad adjacent to the Swamp Rabbit Trail) from 12 feet to 11 feet to allow a wider shoulder on the south side for pedestrians and cyclists, which would connect to the new sidewalk.



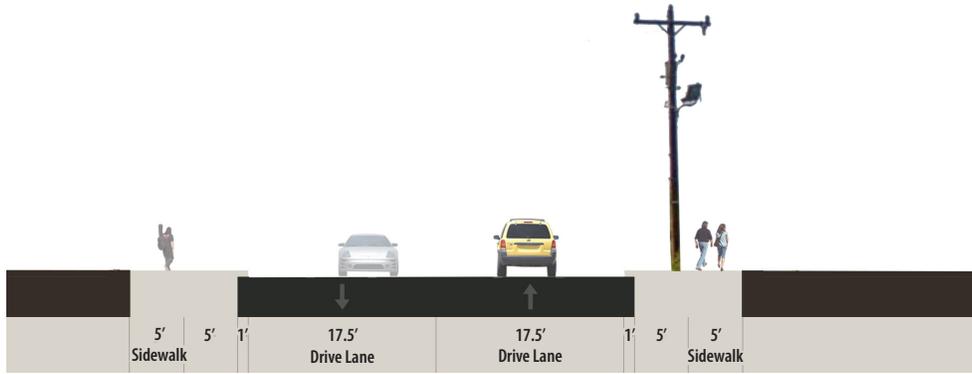
East Bramlett Road - Proposed Design Changes (Option 2): Construct a 10-foot sidewalk on the south side of the street with a 2-foot bollard separation.

the West Side neighborhoods. They both have moderate traffic volumes (4,500 and 8,000 respectively). These volumes warrant separated bikeways, most likely in the form of bike lanes. Measures to reduce motor vehicle speeds, increase awareness of trail crossings, and providing wayfinding along these streets will increase comfort and safety of cyclists and pedestrians moving along and across these streets to and from the Swamp Rabbit Trail.

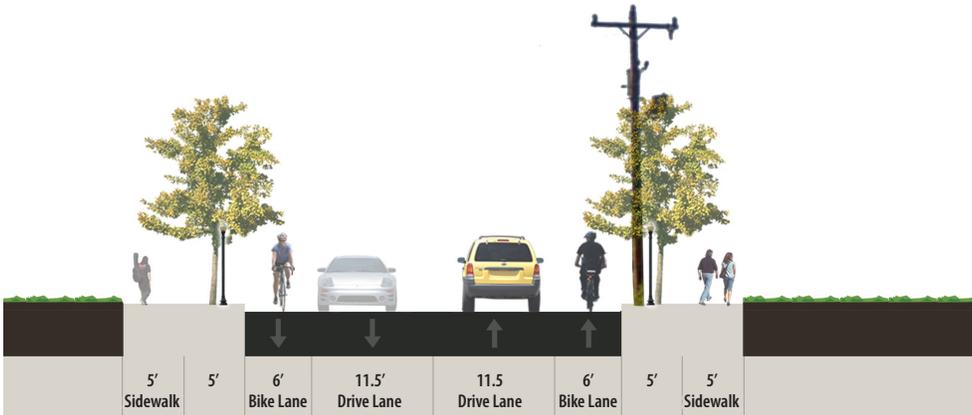


Source: google.com

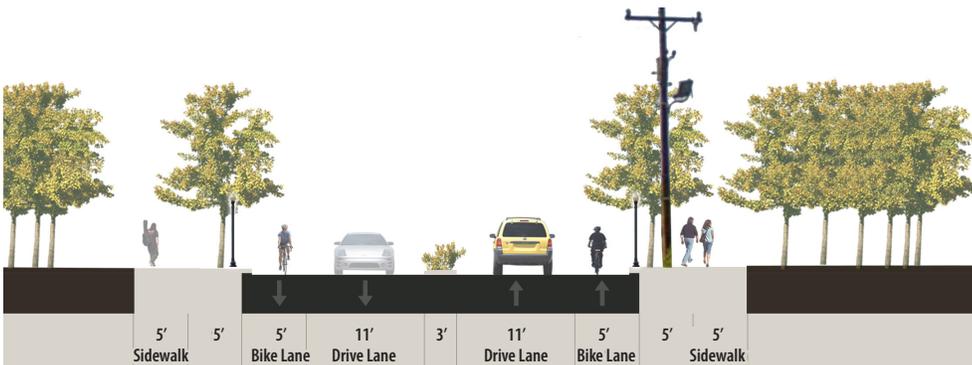
South Hudson Street- Existing Conditions



South Hudson Street and Westfield Drive - Existing Conditions



South Hudson Street and Westfield Drive - Proposed Design Changes: Add 6-foot bike lanes (or sharrows), fill gaps in the sidewalk to provide a continuous pedestrian facility, install lighting, signage, and street trees, and improve sight lines.



South Hudson Street and Westfield Drive - Proposed Design Changes at Swamp Rabbit Trail Crossing: Add 5-foot bike lanes (or sharrows), fill gaps in the sidewalk to provide a continuous pedestrian facility, install lighting and signage, improve sight lines, and enhance intersection at the Swamp Rabbit Trail crossing by adding a pedestrian refuge space

### 7.2.5: Build a sidewalk on Willard Street

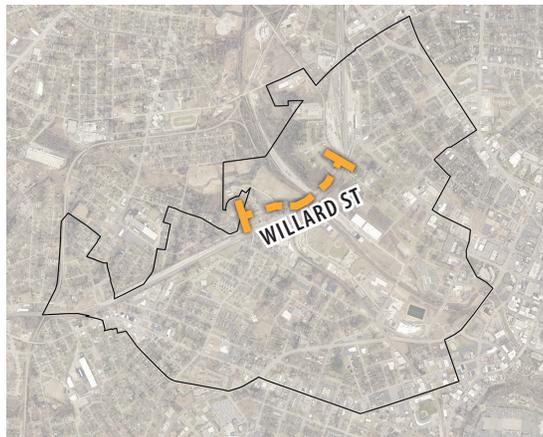
Responsible Agent(s): **City of Greenville, Norfolk Southern**

Action Type: **Public Investment**

Funding Level: **\$\$**

Time Frame: **Year 6-10**

The section of Willard Street between Mayberry Street and West Washington Street runs north-south, parallel to a large berm that supports elevated railroad tracks to the east. The berm, as well as the right-of-way for Willard Street, is located within a designated railroad right-of-way owned by Norfolk-Southern Railroad. Willard Street serves as a major connector for residents in the Newtown



and West Greenville areas and to the Swamp Rabbit Trail, but it lacks pedestrian and cyclist accommodations; it has no sidewalks or streetlights.

#### Key Recommendations:

- Install street lighting (this should continue the recommended lighting improvements to the West Washington Street underpass, \$7.4.2)
- Install a ten-foot sidewalk along the entire length Willard Street between Mayberry Street and West Washington Street. Installing the sidepath within the railroad right-of-way—on either side of Willard Street—would be the most straight forward option, with the preferred location on the east side of the street so as to tie easily into the bicycle and pedestrian facilities along Mayberry and West Washington Streets and the Swamp Rabbit Trail. An alternative is to pursue an easement, or purchase additional right-of-way, to install a sidewalk along the edge of the privately-owned properties abutting Willard Street to the west.



Illustration of Proposed Improvements Along Willard Street

## 7.2.6: Construct a neighborhood bike route network

Responsible Agent(s): **City of Greenville / Bicycle Organizations**

Action Type: **Public Investment**

Funding Level: **\$**

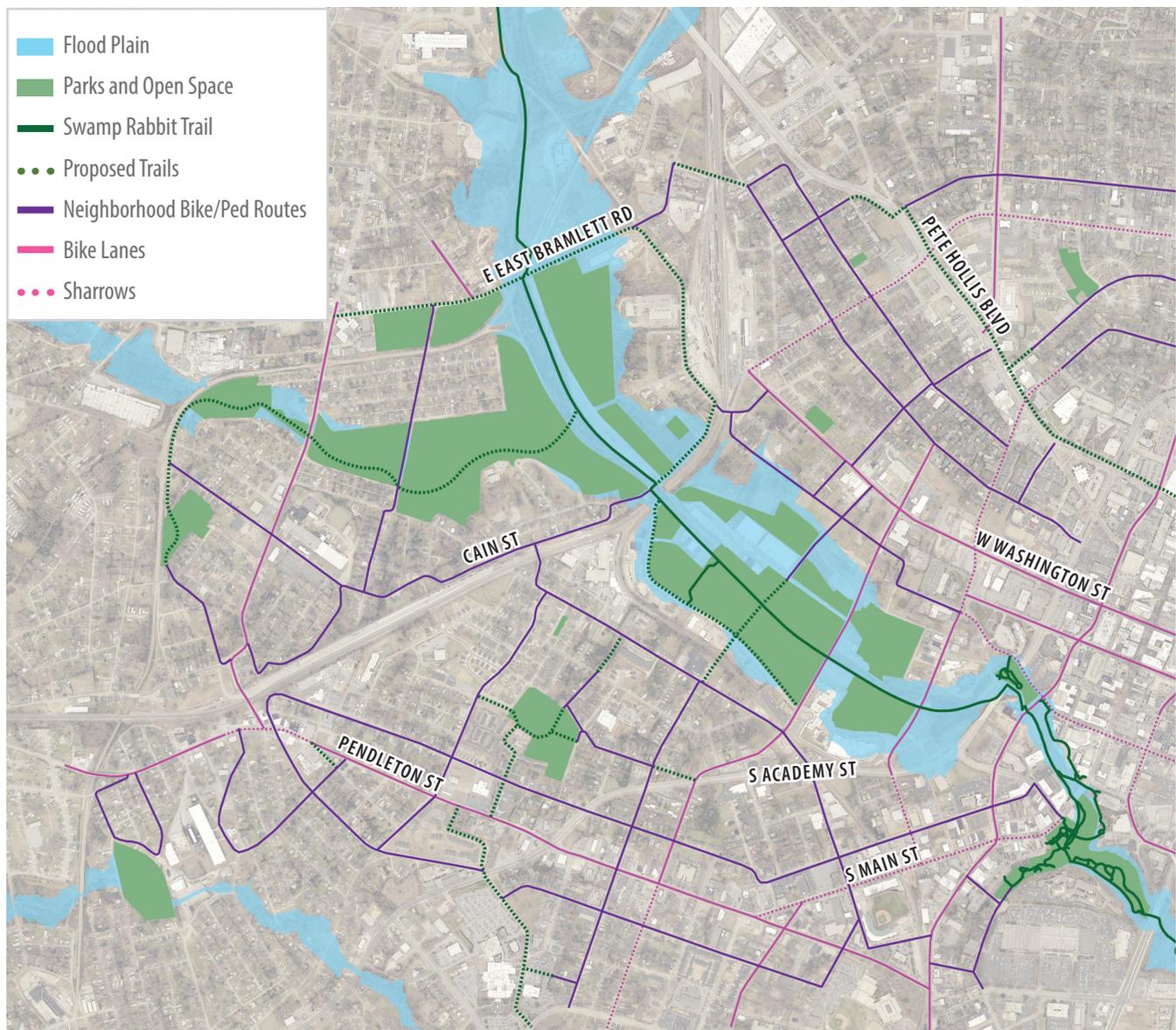
Time Frame: **Year1-5**

Some cyclists, especially children and less-experienced riders, may not feel comfortable using bike lanes on major streets. Instead, this plan recommends utilizing low-speed, low-volume, residential streets designated as neighborhood bike routes (also known as “bicycle boulevards,” “neighborhood

bikeways,” and “neighborhood greenways”) to serve as a low-stress, child- and family-friendly alternative.

Neighborhood bike routes incorporate cost-effective and less physically-intrusive treatments than bike lanes and cycle tracks. The City of Greenville Bicycle Master Plan and the NACTO Urban Bikeway Design Guide<sup>3</sup> contain detailed guidance for the development of “bicycle boulevards.” The City may use these resources in implementing a neighborhood bike route network within the West Side

<sup>3</sup> National Association of City Transportation Officials, <http://nacto.org/cities-for-cycling/design-guide/>



**Proposed Bicycle Network:** This map shows the proposed overall bicycle network in the West Side, including a system of neighborhood bike routes.

## 7: Transportation Improvements

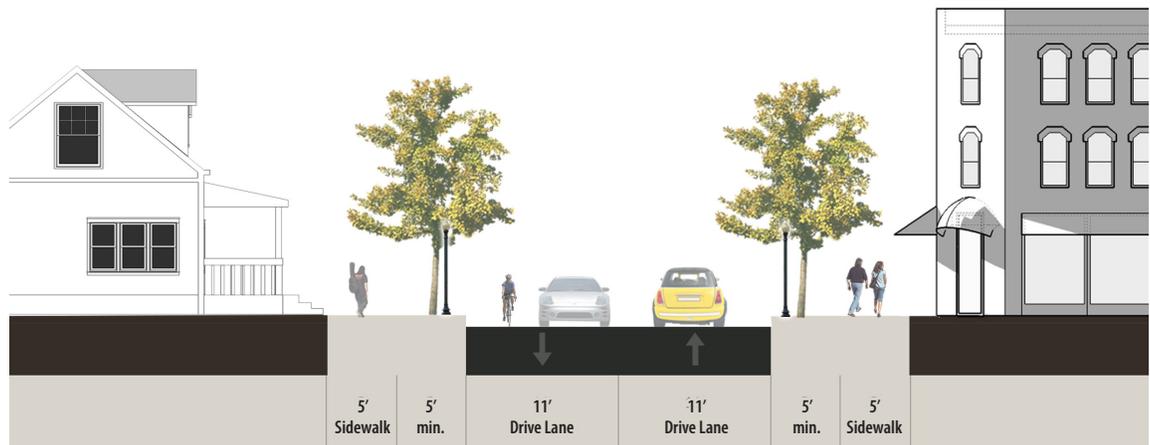


Examples of Neighborhood Bike Routes

neighborhoods with the understanding that these routes should complement the City's overall bikeway network on major streets, and not serve as a substitute.

Within the West Side, the proposed network of neighborhood bike routes would provide parallel, alternative bike routes to major streets such as Pete Hollis Boulevard and South Academy Street. It would also provide north-south and east-west connections to key destinations such as the Swamp Rabbit Trail, local schools, the Village of West Greenville, the West End commercial district, Downtown Greenville and St. Francis Hospital.

Residents living along neighborhood bike routes in the West Side would also benefit from reduced vehicle speeds and less through-traffic. Pedestrians and other users would benefit from neighborhood bike route treatments as well, for example by improving the crossing environment where routes meet major streets and by slowing traffic on neighborhood streets.



**Typical Residential Street/Neighborhood Bike Route:** This graphic illustrates a recommended design for new or reconstructed residential streets, including designated neighborhood bike routes. Existing residential streets should be evaluated as they come up for repaving and/or improvements to look for opportunities to add sidewalks, street trees, or repurpose parts of the road for enhanced pedestrian and bicycle accommodations. This street section is shown as a template that may require modification based on the context and right-of-way width. In general, a 5-foot sidewalk and 5-foot planting strip should be considered a minimum for both new construction and existing streets.

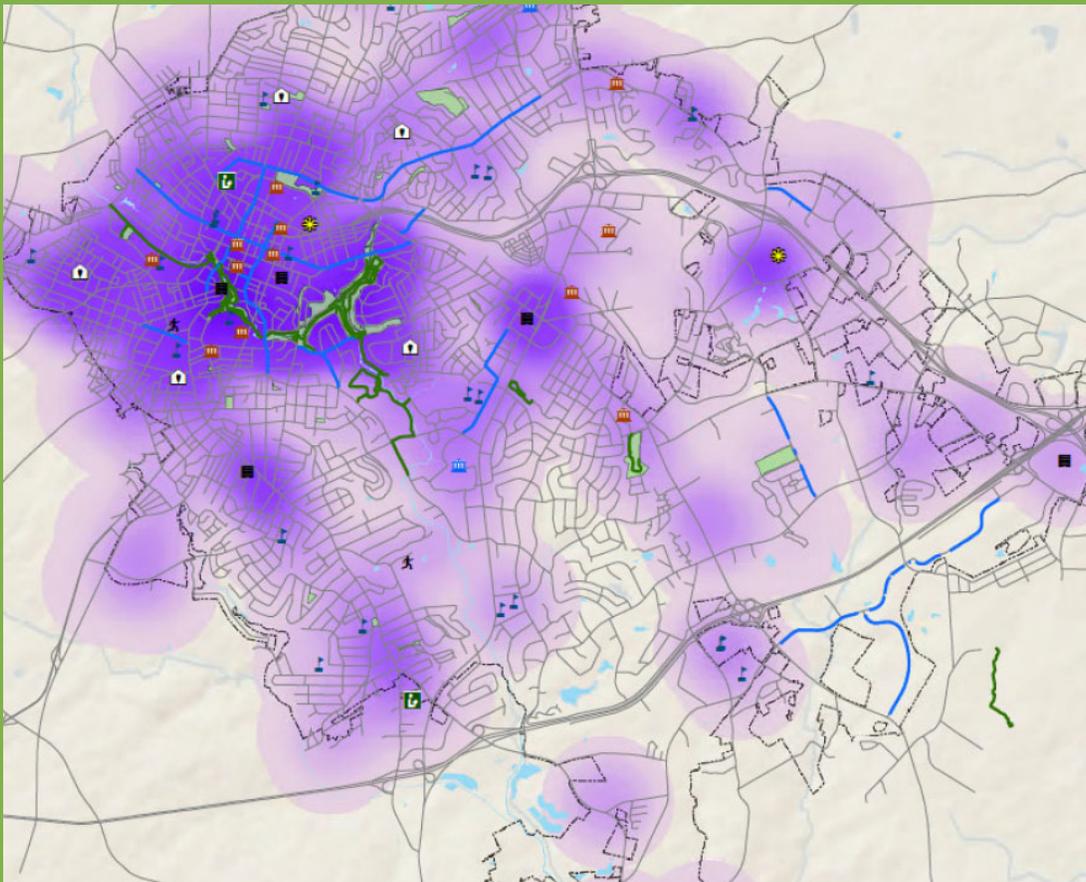
## Relative Demand for Walking and Biking Access to Destinations

(adapted from the 2011 City of Greenville Bicycle Master Plan)

Active transportation (walking and biking) demand potential in Greenville was analyzed based on the “relative attractiveness” for biking and walking access to key destinations in the area. Each destination will generate potential demand from within a “comfortable” walking or cycling radius – the amount of that demand depends on the relative strength of the attractor to walking and biking, its geographic proximity to potential users, and conglomerations of multiple attractions.

Relative attractiveness for walking and biking access is represented by a multiplier that rates the attraction of one destination compared to another and is based on experience in other cities in the U.S. For example, a recreation center is likely to be more attractive than a government building.

GIS spatial analysis was used to model potential active transportation demands in Greenville. Areas of highest potential demand destinations are shown in darkest purple on the map below. Not surprisingly, the areas of highest walking and biking demand are on the West Side and downtown, and along major roadways leading out of the downtown area.



Source: City of Greenville Bicycle Master Plan

### Legend

	High	 Commercial Center	 Recreation Center	<b>Existing Bikeways</b>  Existing Bike lanes  Existing Multi-use Path  WaterBodies  CityParks  City Limits
	Low	 Community Center	 Regional Center	
		 Government	 School	
		 Library	 University	

## 7.3: Programs to Promote Active Transportation

Holistic approaches to building a more active bicycling and walking culture should focus on the “6 Es” approach: Engineering, Education, Encouragement, Enforcement, Evaluation, and Equity. The recommendations in previous sections primarily focus on infrastructure interventions, or the “Engineering” component of mobility. The following section seeks to explore potential action items that address the remaining five components. The recommendations suggest ways for West Side residents, stakeholder organizations, and local partners to promote walking and biking as a healthy, low-cost choice for getting around the city every day.

### 7.3.1: Expand Safe Routes to School program

Responsible Agent(s): School District, Upstate Forever, SCDOT, City of Greenville (Public Works, Engineering, Transportation, Police)

Action Type: Programs & Policy

Funding Level: \$ for program; \$\$ for infrastructure

Time Frame: Year 1-5; On-going

There are a number of schools within the West Side that serve students from the local neighborhoods, as well as students from outside the West Side. Throughout the planning process of this comprehensive plan, residents identified walking and biking to neighborhood schools as a priority. As recommended in Greenville’s Bicycle Master Plan, “helping children walk and bicycle to school is good for children’s health and can reduce congestion, traffic dangers, and air pollution caused by parents driving children to school.” Additionally, promoting walking and biking to schools with parents and older siblings helps to improve the culture of walking and biking in general, as well as create a safer neighborhood by providing more “eyes on the street.”

A Community Transformation grant was awarded to Greenville County in 2012. In partnership with a local non-profit, Upstate

Forever, this grant funded safe route travel plans for five elementary schools, and identified program and infrastructure needs to promote walking and biking to schools. The results of this study will serve as a model program to implement in the West Side.

#### Key Recommendations:

- Strengthen the existing Safe Routes to School program through Greenville County and Upstate Forever; and expand those efforts to include schools within the West Side.
- Develop a detailed infrastructure and program improvement plan for schools in the study area, including cost estimates and a prioritized project list. This improvement plan will serve as a blueprint for future investments, and can be used to apply for further grant funding.
- Residents may support their local schools by coordinating with the City of Greenville and SCDOT’s Safe Routes to School (SRTS) Program to identify funding to assess and improve walking and biking conditions around schools, including education, encouragement, and enforcement programs.

### 7.3.2: Increase access to bikeshare

Responsible Agent(s): Upstate Forever and Community Partners

Action Type: Programs & Policy

Funding Level: \$

Time Frame: Year 1-5; On-going

Greenville’s bike share system, Greenville B-Cycle, is operated by Upstate Forever and funded by a federal Jobs Access and Reverse Commute grant. The program currently has six B-Stations, all located in downtown. The program is actively seeking ways to attract low-income users, as well as to expand access. The plan is to add stops every year for at least the first five years.

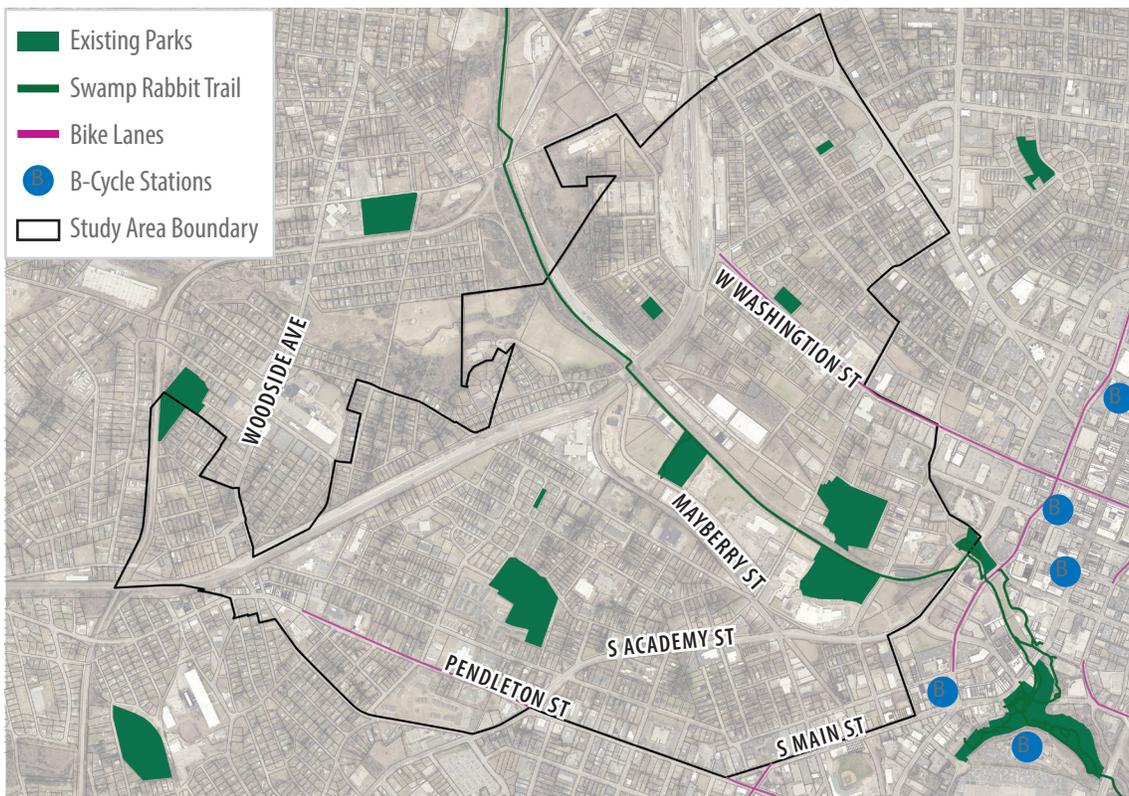
Key barriers to bike share for low income communities include financial impediments, lack of bicycle facilities, and few bike share stations nearby. Approaches to improving access include changes in station siting, bike infrastructure enhancements, financial models to increase access, and outreach and marketing.<sup>4</sup>

This plan recommends that Upstate Forever and stakeholders in the West Side neighborhoods continue to work together on strategies to increase bike share usage and accessibility for area residents, visitors, workers, and students.



B-Cycle Stop in West End

<sup>4</sup> Getting the Wheels Rolling: A Guide to Using Policy to Create Bicycle Friendly Communities (page 83; changelabsolutions.org)



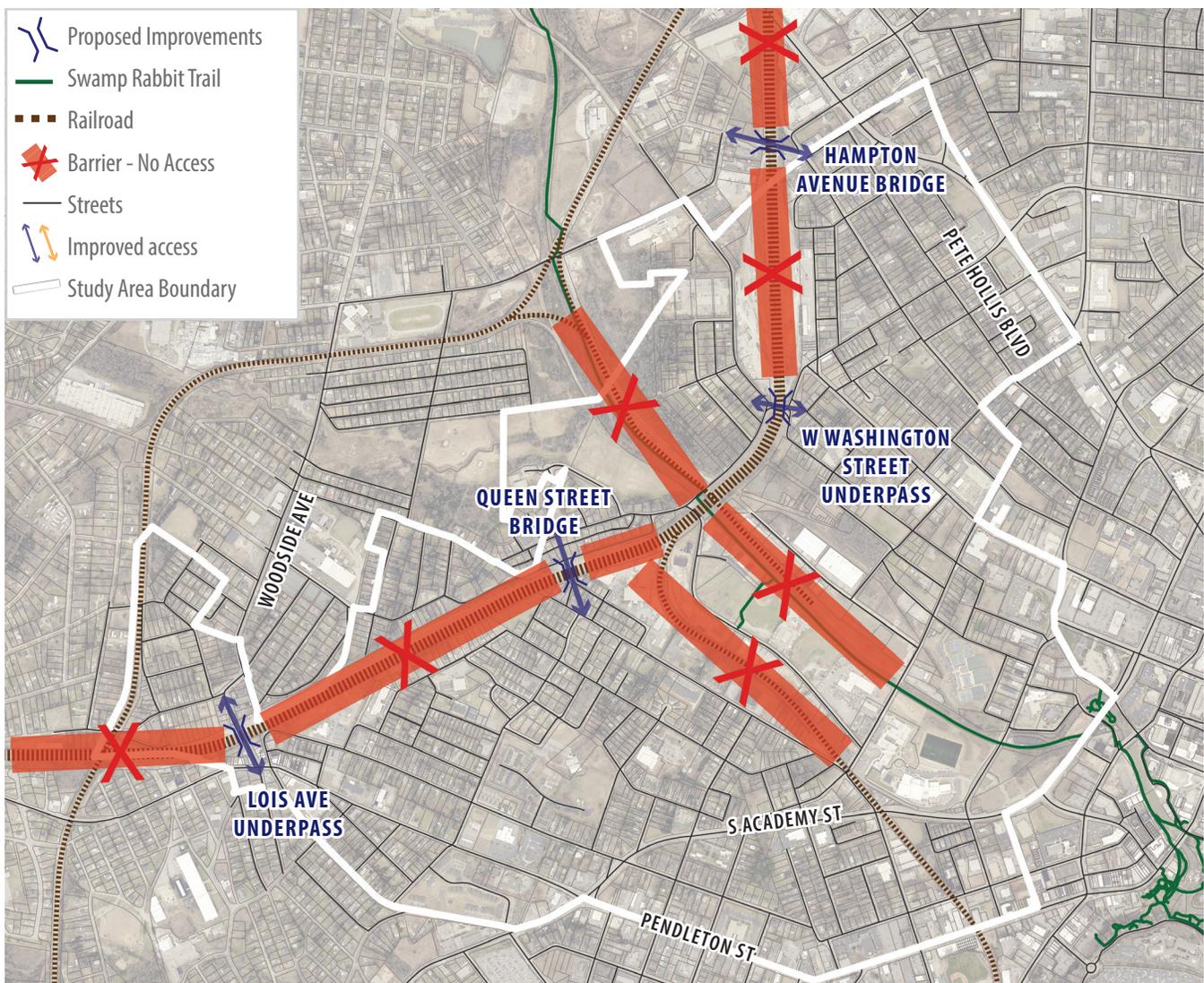
Greenville's Existing Bikeshare Network Map in relation to the West Side project area

## 7.4: Connections Over and Under the Railroad

The railroad infrastructure forms a significant barrier within the West Side, isolating large portions of the Southernside and West Greenville neighborhoods. Limited crossing opportunities for vehicles and even more limited opportunities for pedestrians and cyclists divides the area into separate neighborhoods with long distances between crossings. The railroad also discourages unauthorized crossings by pedestrians and cyclists, and is not likely to permit additional

crossing opportunities, especially if they are not grade-separated, such as through a bridge or tunnel. While some connections exist over or under the rail line, most feel unsafe for pedestrians and cyclists.

Improving the connections over and under the railroad tracks is a critical component to creating a cohesive, equitable, and effective mobility network in the West Side. Additionally, enhancing bridges and underpasses to serve as gateways presents an opportunity to celebrate the history of the neighborhoods.



Map Showing Access Barriers and Bridge/Tunnel Improvement Opportunities

### 7.4.1: Improve the Queen Street bridge

Responsible Agent(s): **City of Greenville**

Action Type: **Public Investment**

Funding Level: **\$-\$\$**

Time Frame: **Year 6-10**

The Queen Street bridge was recently re-opened after repairs to address structural deficiencies. The connection is a critical access point for residents in the Woodside Mill area to reach everyday goods and services.

Although now structurally sound, the current bridge on Queen Street does not provide comfortable or attractive accessibility for pedestrians or cyclists; the bridge deck and sidewalks are narrow, the pavement condition is poor, and access to the bridge is compromised for pedestrians by the guardrail placement. While the bridge design is historic in its fundamental form and should be preserved, the surfaces are worn and deteriorated.

### Key Recommendations

- Improve walkways and pedestrian access leading up to either side of the bridge and increase lighting for night-time users
- Install sharrows on the vehicle lanes to facilitate biking and walking
- Improve pavement surface on the bridge for more comfortable motor vehicle and bicycle access
- Include aesthetic upgrades to the bridge (including local art, if possible) to celebrate the West Side neighborhoods and make the bridge a more appealing gateway to adjacent neighborhoods



Illustration of Proposed Improvements of the Queen Street Bridge



Existing Street Network Around the West Washington Street Underpass



Proposed Street Network and Potential Redevelopment Sites Around the West Washington Street Underpass, including realignment of West Washington Street using Shirley Street

### 7.4.2: Improve the West Washington Street underpass

Responsible Agent(s): **City of Greenville, Private Development Partners**

Action Type: **Public Investment**

Funding Level: **\$\$-\$\$\$**

Time Frame: **Year 6-10**

Today, the West Washington Street underpass feels unsafe, especially at night as it is unlit. Furthermore, because of the tight turns approaching the underpass, there is very limited sight distance for approaching motorists or cyclists.

This crossing serves approximately 2,000 to 3,000 vehicles per day, which makes it feasible to improve accommodations for pedestrians and cyclists and enhance safety for motorists.

#### Key Recommendations

- Some aesthetic improvements to the underpass, such as lighting and decorative wall murals, would help the underpass feel safer and provide a visual

connection to the neighborhood.

- To create safer sight line for vehicles entering the underpass, it is recommended that West Washington Street be realigned along Shirley Street. This would straighten the approach on the southeast side of the underpass as well as create a redevelopment site on the west side of the street.



West Washington Underpass: Existing Conditions:



Conceptual Illustration of Proposed Improvements to West Washington Underpass:

### 7.4.3: Improve the Lois Avenue / Woodside Avenue underpass

Responsible Agent(s): **City of Greenville**

Action Type: **Public Investment**

Funding Level: **\$\$-\$**

Time Frame: **Year 1-5**

The current underpass at Lois Avenue/Woodside Avenue is two travel lanes in width, and does not include separate bicycle facilities or comfortable sidewalks. The following recommendations reallocate the pavement to provide dedicated bicycle space and improved pedestrian space, and capitalize on its location to adorn it as a gateway to the Village of West Greenville.

#### Key Recommendations

- Install lighting to provide a safer and more inviting pedestrian connection
- Stripe bike lanes or install shared lane markings, or “sharrows,” to send a consistent message to motorists to expect cyclists and that the road should be shared
- Improve and mark stormwater grates (bring them up to grade and use bicycle-safe grate covers) at the approaches to the underpass to provide safe passage for cyclists
- Install a mural and lighting on the underpass structure to celebrate the history of the surrounding area and serve as a gateway to the Village—artistic treatments may be refined by area artists and implemented with the help of local residents and students



Conceptual Illustration of Proposed Improvements to Louis Avenue / Woodside Avenue Underpass

## 7.4.4: Rebuild the Hampton Avenue bridge

Responsible Agent(s): **Greenville County, State and Federal Department of Transportation**

Action Type: **Public Investment**

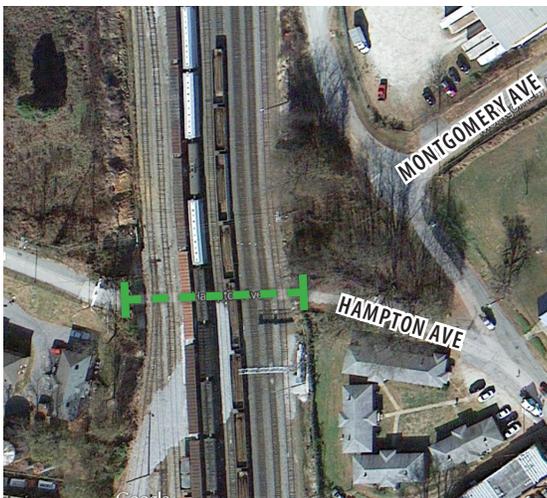
Funding Level: **\$\$\$-\$\$\$\$**

Time Frame: **Year 6-10**

In September 2012, the Hampton Avenue bridge was demolished after SCDOT determined that it was “fracture critical” and therefore unsafe for use. State and local leaders have filed a complaint that “alleges that the Department of Transportation denied residents the chance to be involved in the decision to demolish the bridge because of their race and income level — violating Title VI of the Civil Rights Act.”<sup>5</sup> The Federal Highway Administration’s Office of Civil Rights is currently conducting an investigation.

This plan recognizes that the lack of a bridge connection at this location has significant equity, safety, and connectivity implications for Southernside. This gap lengthens emergency response time and limits other public services, including transit and sanitation. Previously, the bridge also provided a key parallel low-speed, low-volume alternative to Pete Hollis Boulevard for motorists, cyclists, and pedestrians.

5 Lee, A. (August 21, 2013). “Southernside bridge removal spurs civil rights probe.” Greenville Online. <http://www.greenvilleonline.com/article/20130801/NEWS09/308010098/>



Hampton Avenue Overpass - Existing Conditions

## Key Recommendations

It is recommended that a new crossing of the railroad at Hampton Avenue be created to replace the bridge that was removed. The crossing could be pedestrian and bicycle only, or allow for emergency vehicles as well. If designed for emergency vehicles, consideration should be given to constructing the new bridge with the ability to accommodate two lanes of vehicular traffic. Given that the increment of additional cost for construction would not be significant, this would provide flexibility should the community desire to reopen the bridge for vehicle traffic in the future.

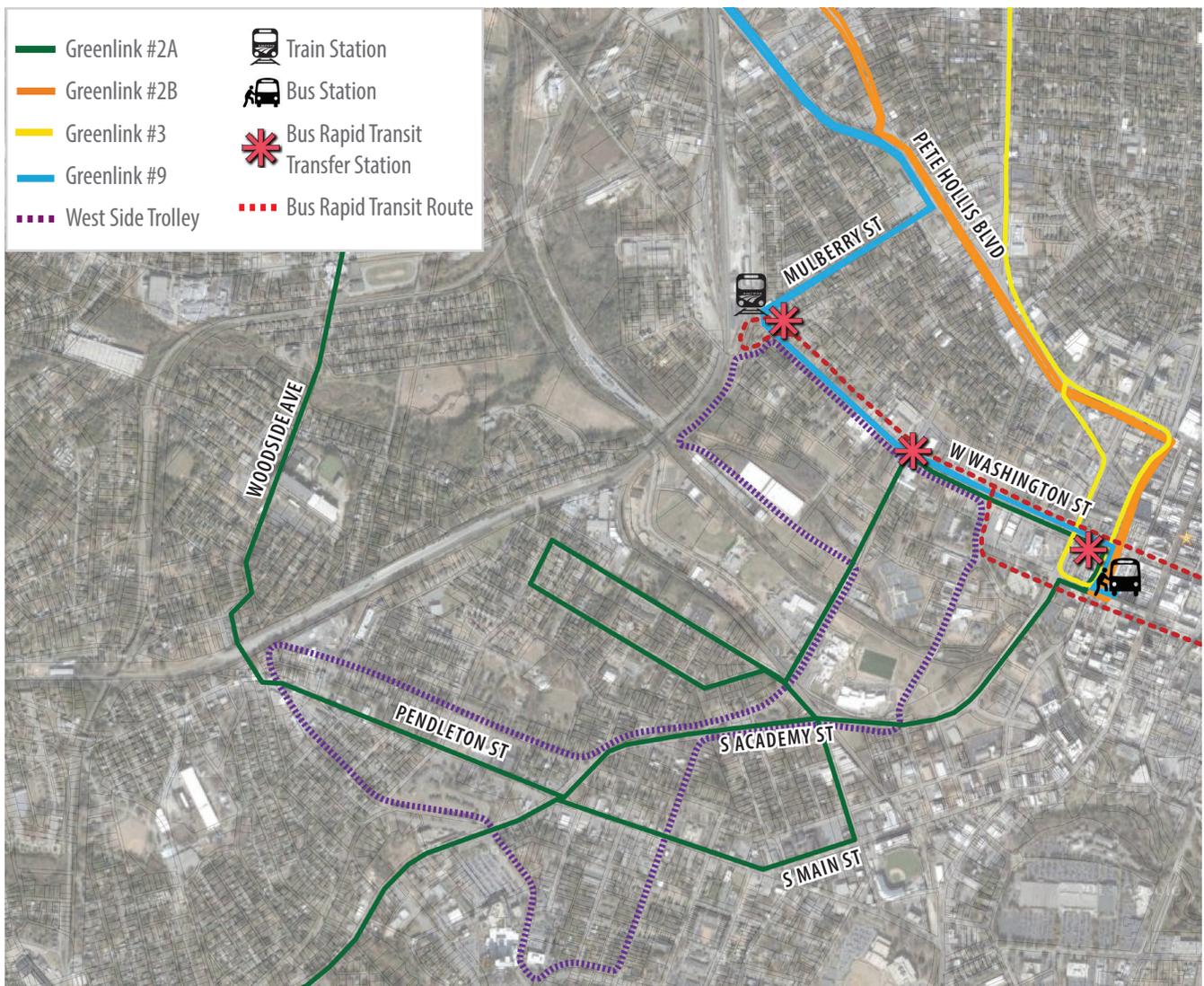


## 7.5: Transit Recommendations

Greenlink is the transit provider for Greenville County, serving 11 fixed transit routes within the City of Greenville and throughout Greenville County and Pickens County. While the current transit system serves various major regional destinations—such as Clemson University, Clemson University International Center for Automotive Research (CU-ICAR), downtown, Fluor Field, and St. Francis Hospital—the routes and operational

hours limit transit as a viable option for many residents and visitors in the West Side.

The transit recommendations for the West Side seek to utilize public transportation as a key component to revitalize the area by expanding existing service and phasing introduction of a bus rapid transit (BRT) line. These improvements are coordinated with the street design recommendations (§7.2) to form a comprehensive transportation network with options for all users.



Map of Proposed Transit Routes

## 7.5.1: Increase local bus route coverage and frequency

Responsible Agent(s): **Greenlink**

Action Type: **Public Investment**

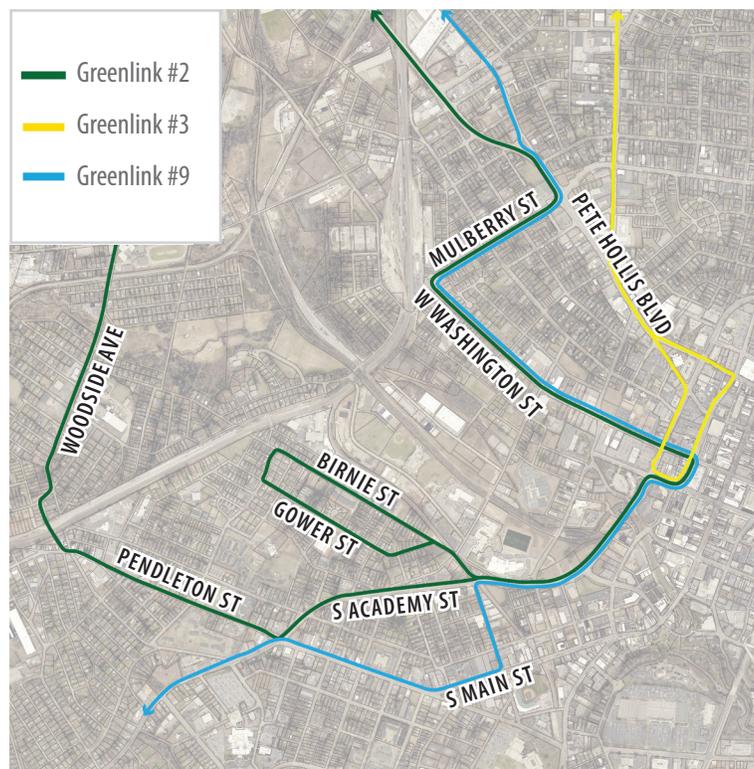
Funding Level: \$-\$\$

Time Frame: **Year 1-5**

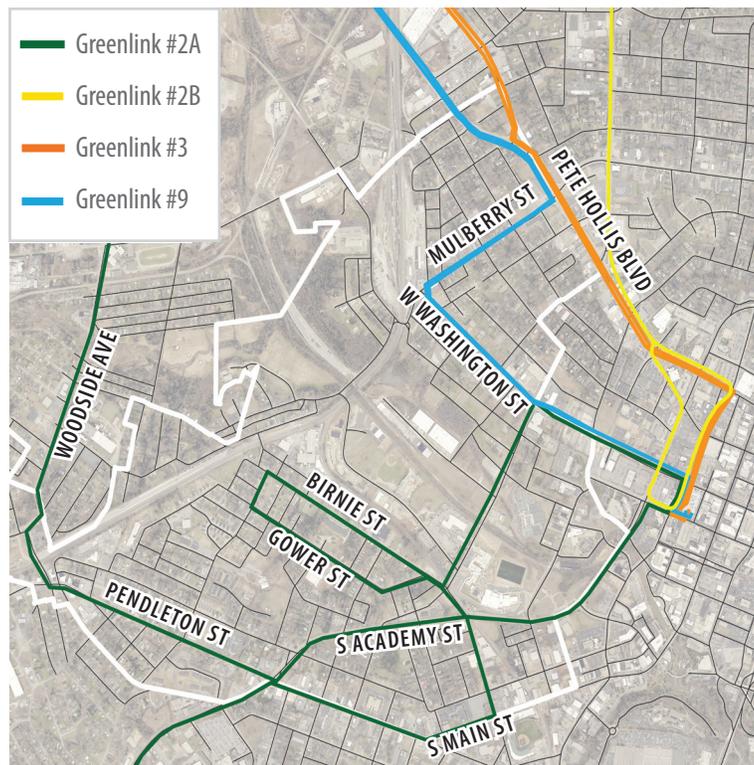
Within the West Side project area, buses operate Monday through Friday from 5:30 am to 7:30 pm for Routes 2 and 9 and on Saturday from 8:30 am to 6:30 pm, with no service on Sundays and holidays. All buses currently operate on 60-minute headways (frequency of service).

As shown in the diagram of current and proposed routes, the current alignments and low route frequencies provide limited direct service to key destinations within the project area. This plan recommends geographical route modifications that would provide direct service to key destinations such as the Kroc Center and A.J. Whittenberg Elementary School, and schedule modifications that would accommodate employees working shift hours and late-night visitors to nearby entertainment and arts districts, as follows:

- Split Route 2 into two separate routes, combining portions of existing Routes 9 with Route 2A serving the western portion of the project area, and Route 2B serving the eastern portion of the project area. The modified, shorter Route 9 would focus most of its service along West Washington Street, Pete Hollis Boulevard and West Parker Road.
- Operate Route 2 headways at 20/30 minutes and Route 9 headways at 15/20 minutes (peak/off-peak, respectively)
- Extend hours of operation for both routes to 5:00 am – 11:00 pm
- Conduct a boarding study to determine levels of bus stop utilization to provide guidance for best capturing ridership
- Perform a bus stop inventory and prioritize improvements such as shelters and benches based on utilization.



Existing Bus Routes



Proposed Changes to the Bus Routes

**7.5.2: Introduce a West Side trolley route**

Responsible Agent(s): **Greenlink**

Action Type: **Public Investment**

Funding Level: **\$\$**

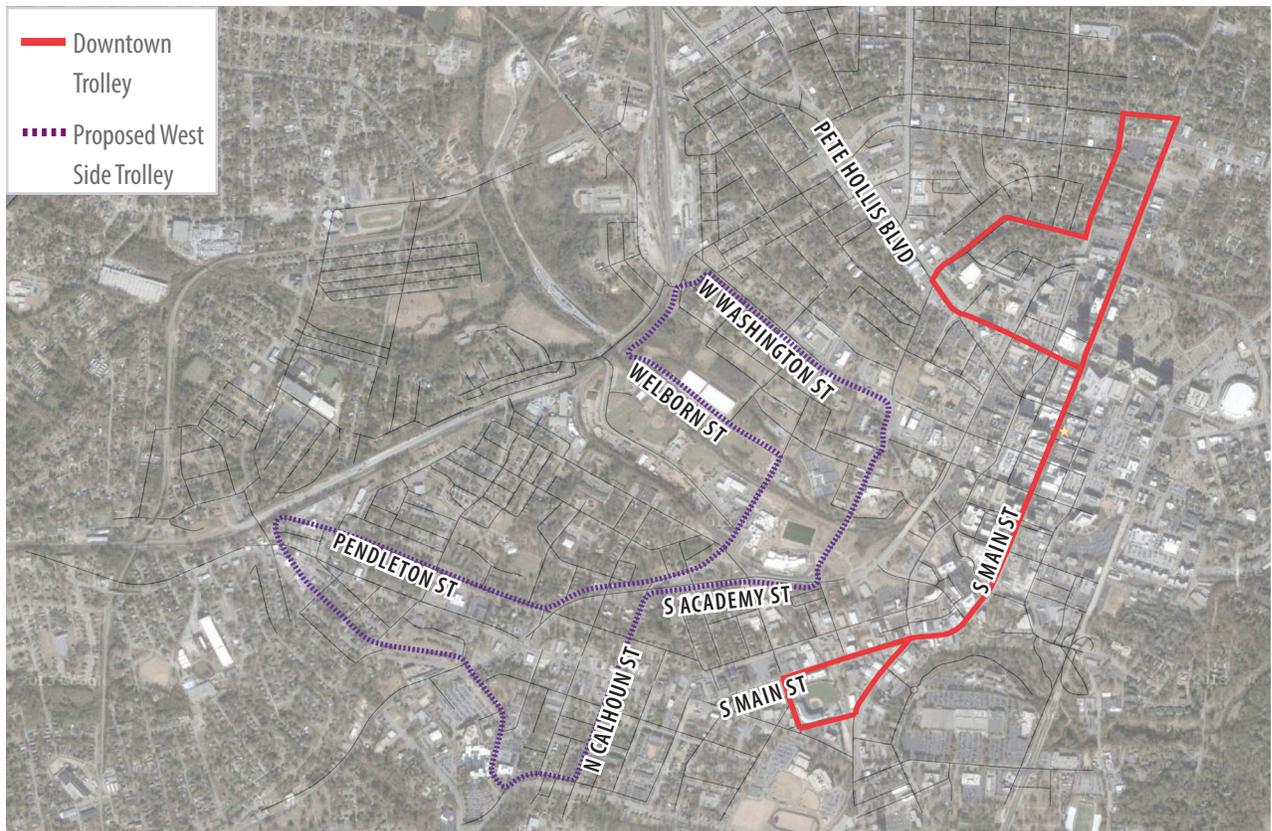
Time Frame: **Year 1-5**

While the proposed local route modifications (§7.5.1) would improve neighborhood residents’ ability to reach city and regional destinations, improvements are necessary to provide more direct links to destinations within the West Side neighborhoods.

The City of Greenville already has invested in the Downtown Trolley, which is free to ride and runs limited hours Thursday through Sunday from Greenville Drive Stadium at the south end of the route to Earle Street at the north end.<sup>6</sup> The following recommendations for a West Side Trolley would build on this success:

<sup>6</sup> Department of Public Works, Downtown Trolley <http://www.greenvillesc.gov/publicworks/trolley.aspx>

- Introduce a West Side Trolley service that provides a direct link to the Kroc Center, the West Greenville Community Center, and St. Francis Hospital, in addition to the Village of West Greenville
- The proposed Trolley Service would operate on 10/15 minute headways (peak/off-peak, respectively) starting at 5:00 am and ending at 11:00 pm. It would connect into the new transfer center proposed at West Washington Street and Mulberry Street (§7.5.3, §10.7) to provide direct connection to modified bus Routes 2A and 9 (§7.5.1)
- Curb-side platforms would provide safe pedestrian connections, as well as a location for automated ticket machines, variable information message boards, and Close Circuit Television (CCTV)
- The proposed trolley service would not be free unless private funding is secured to support the operation



Proposed West Side Trolley and Existing Downtown Trolley Routes

### 7.5.3: Phase implementation of bus rapid transit on West Washington Street

Responsible Agent(s): **Greenlink**

Action Type: **Public Investment**

Funding Level: \$\$ for Phase 1; \$\$\$\$ for Phase 2

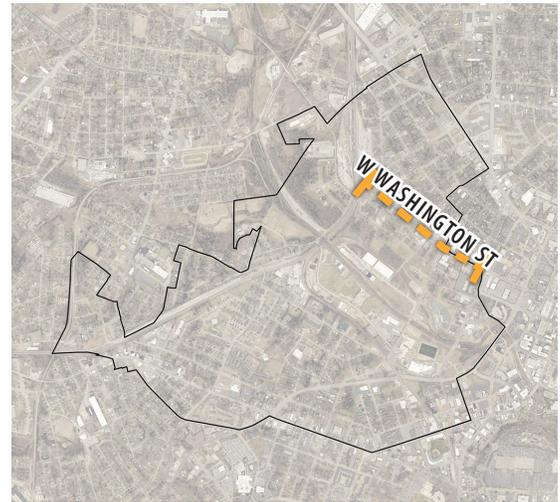
Time Frame: Year 6-10 for Phase 1; Year 16-20 for Phase 2

Currently, the section of West Washington Street between Broad/Butler Street and the Amtrak station, is an underutilized 3-lane road. Vehicular count data near the station shows approximately 2,500 vehicles per day (2012 GPATS data) which indicates that the road is carrying much less traffic than its designed capacity. Based on recommendations in the *West Washington Street Redevelopment Plan*, the City of Greenville recently made minor streetscape improvements.

The *Bus Rapid Transit (BRT) and Transit-Oriented Economic Development (TOD) Feasibility Analysis* recommends a BRT alignment along West Washington Street. As the City explores the implementation of BRT along this corridor through a phased approach as detailed below, additional minor improvements may be made in the short-term. These inexpensive improvements, as shown in the accompanying “pre-BRT” street section designs, would help the corridor’s capacity to support mixed-use development and better serve all users.

The BRT study identified two sites for potential stations in the West Side: the Amtrak Station; and the intersection at Hudson Street. Based on the development strategies detailed in §10.7.3, this plan recommends that the West Washington Street BRT station/transfer center be located at the Amtrak Station, which would provide a multitude of opportunities for TOD and actual station platform locations.

In regards to implementing BRT lanes along West Washington, it is recommended that the first phase be implemented with outside lanes and curb stops. Two options are proposed for phase two, one continuing the outside lanes with curb stops, and other relocating the BRT to a median center-running alignment. The latter is the preferred option, as it would provide the city with a higher level of service.



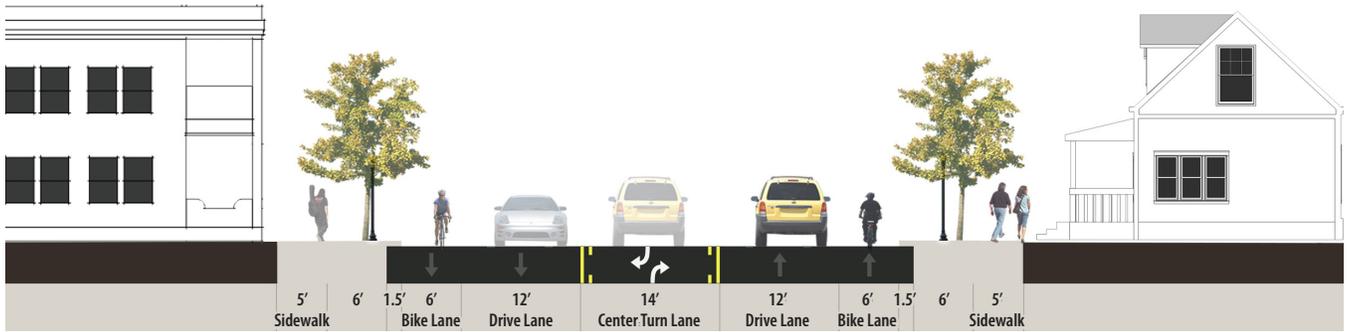
West Washington Street - Existing Conditions

### FTA Very Small Starts/MAP-21

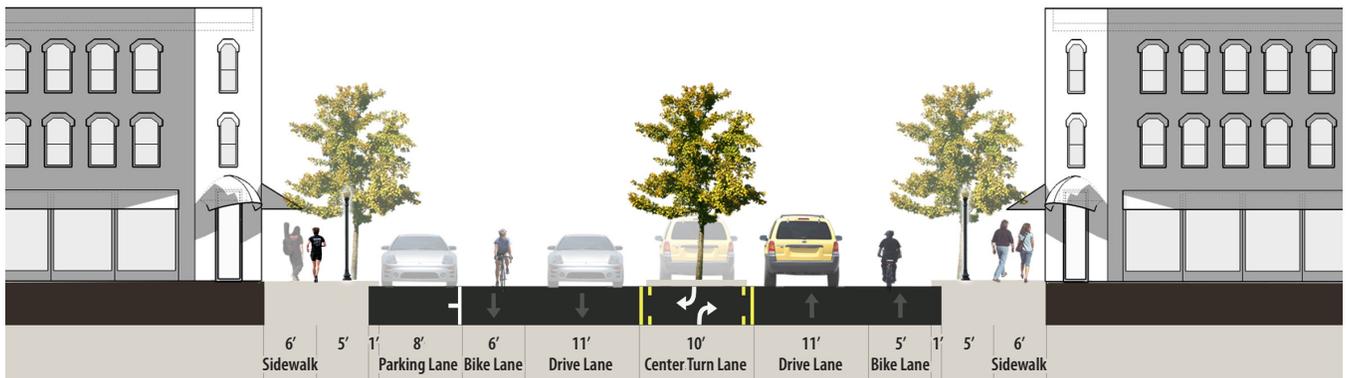
The US Department of Transportation’s Federal Transit Administration offers funding as the corridor develops with Transit Oriented Development and increases potential ridership. Funding should be sought to advance the proposed project through the newly adopted MAP-21 process. In addition, the short term recommendations could be advanced through the Very Small Starts program. This program also has been streamlined through MAP-21, including the efficiency of administering grant programs by consolidating several programs (Rural Area Formula Grant) and creating new programs (Transit-Oriented Development Planning Pilot). Both of these programs are examples of funding sources that could be used to implement some of the short term recommendations from the BRT and TOD Feasibility Analysis.

For more information: [www.fta.dot.gov](http://www.fta.dot.gov)

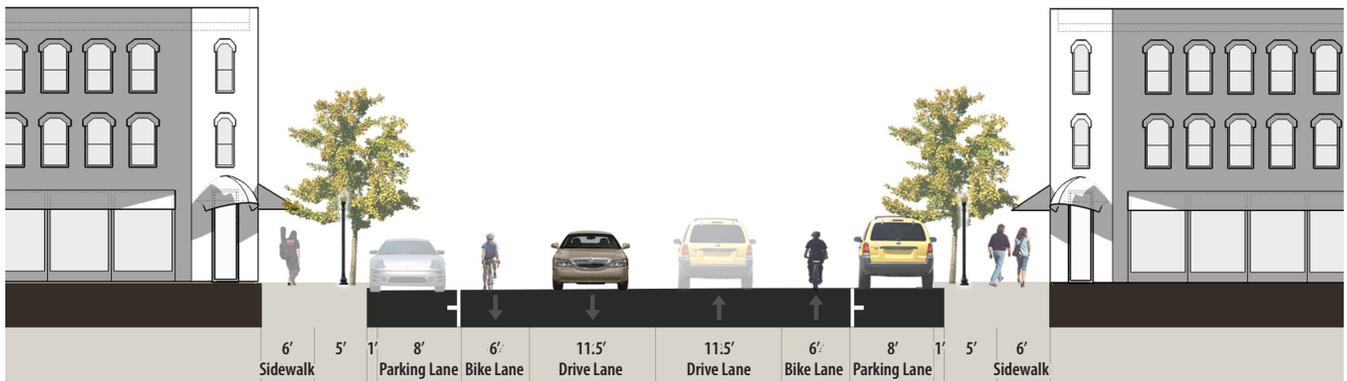
## 7: Transportation Improvements



West Washington Street - Existing Conditions



West Washington Street - Proposed Pre-BRT Design Changes (Option 1): Install a center planted median and continue the tree plantings along each side of the street.



West Washington Street - Proposed Pre-BRT Design Changes (Option 2): Re-stripe West Washington Street to a 2-lane street section with on-street parking on both sides of the street. This on-street parking would not only provide an additional buffer to the pedestrians on the sidewalk, but also support the development of local business.

Additionally, placing the BRT in the median, as oppose to along the curb, would provide a variety of advantages, including:

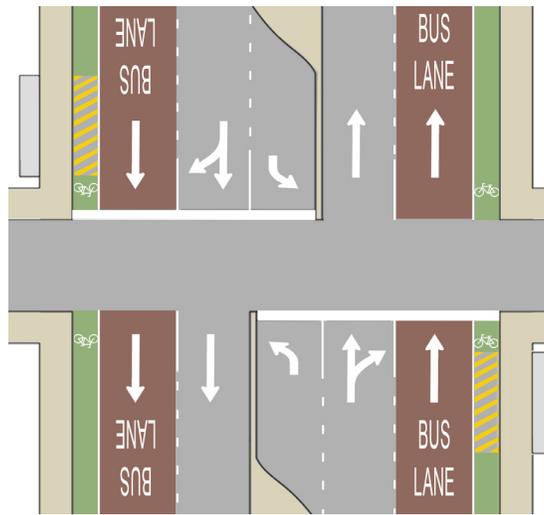
- Eliminating conflicts with right-turning vehicles and bicycles
- Avoiding access management issues with curb cuts
- Providing exclusive signal phasing for transit vehicles
- Breaking up wide streets in a way that can dramatically improve pedestrian crossing
- Increasing travel speeds, decreasing travel time, and enhancing the opportunity for transit riders to move from point A to point B.

**Key Recommendations**

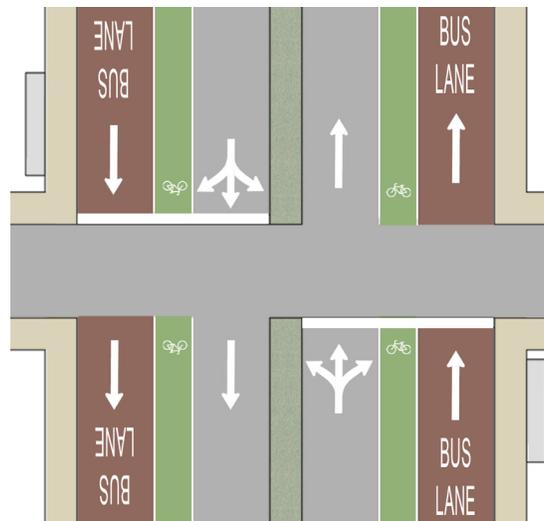
BRT could be introduced on West Washington Street using a phased approach, implementing inexpensive short-term improvements that would provide Greenlink the opportunity to enhance service for transit dependent riders and attract choice riders, before committing to longer-term infrastructure improvements.

**BRT Implementation (Phase 1)**

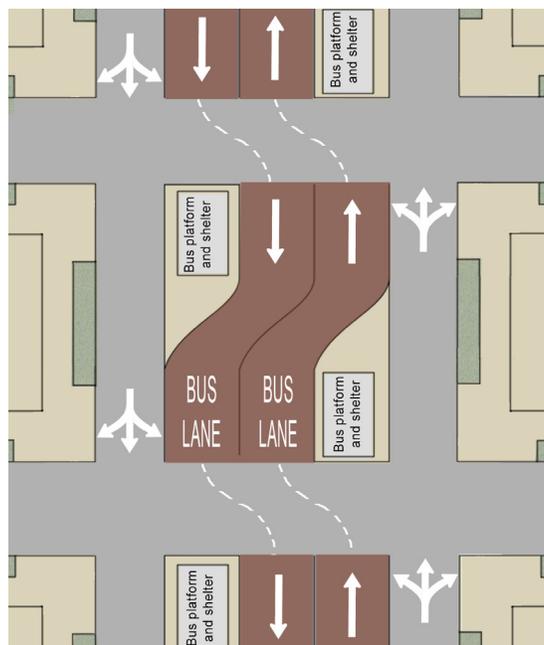
- Investigate and implement signal pre-emption at all of the signalized intersections along the West Washington Street BRT corridor
- Re-stripe curb running bus lanes along West Washington Street to allow for the introduction of BRT “light” operations in the corridor. The BRT vehicles would operate in their own bus lane or bus way, bypassing congestion with the assistance of the Traffic Signal Priority (TSP), or signal pre-emption, where BRT vehicles receive an extended green at traffic signals. This service would operate at 15/20 minute headways (peak/off-peak, respectively) with the opportunity to modify the headways as development occurs.



Phase 1 - BRT Stop Located at Curb - Option 1

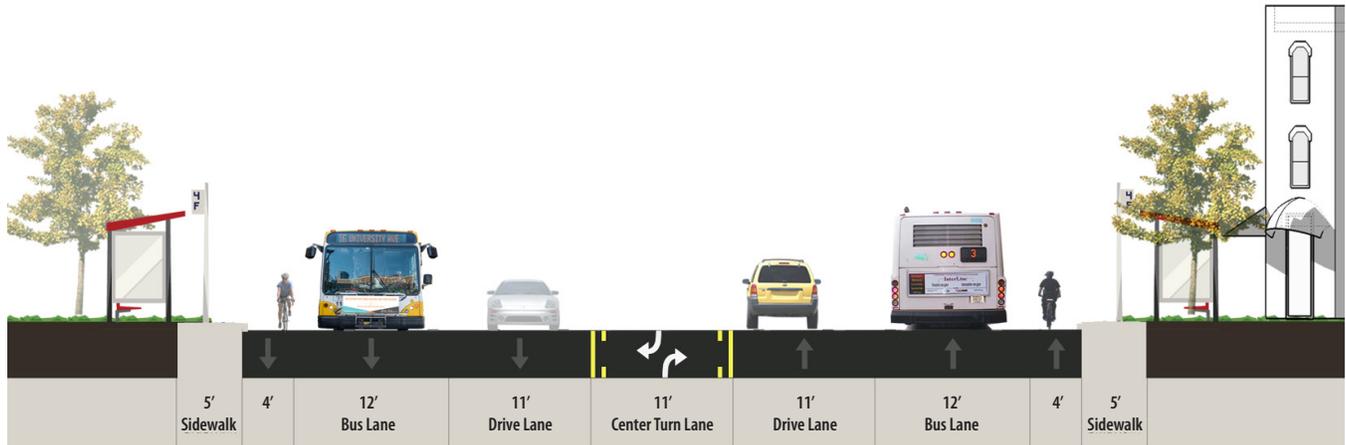


Phase 1 - BRT Stop Located at Curb - Option 2

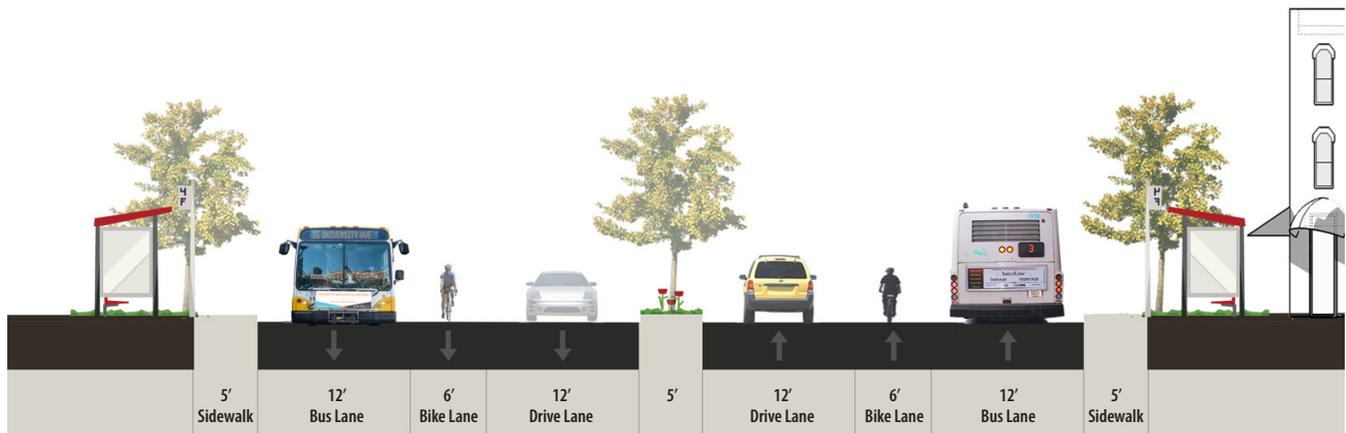


Phase 2 - BRT Stop Located in the Median

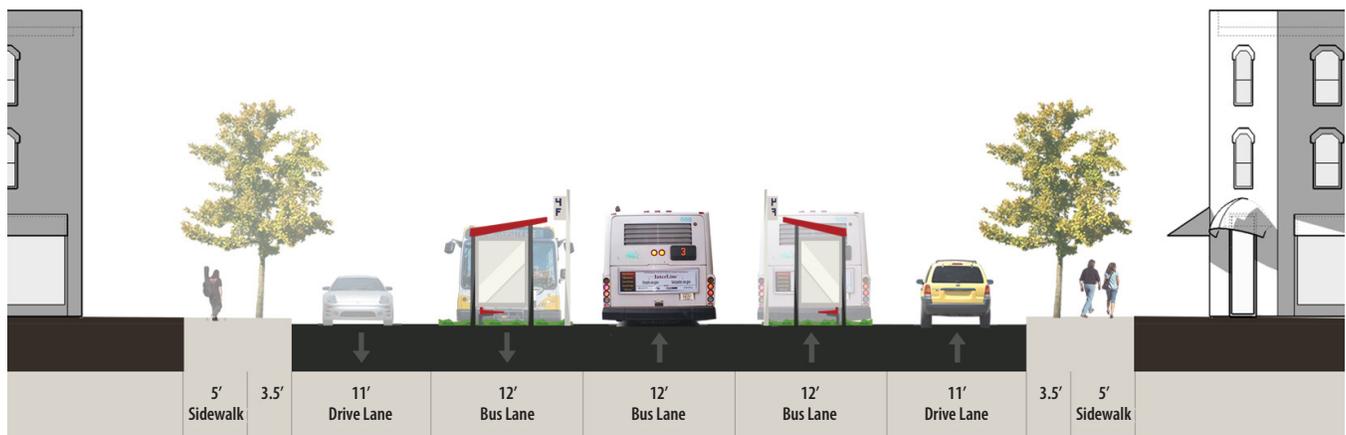
## 7: Transportation Improvements



West Washington Street - Proposed BRT Implementation, Phase 1 - BRT Stop Located at Curb - Option 1: Section as illustrated could be accommodated within existing right-of-way, but would require widening of street and relocation of utility poles. To accommodate within existing street width, section could be modified by reducing travel, turn and bus lane widths, omitting dedicated bike lanes, and creating shared bike/bus lanes."



West Washington Street - Proposed BRT Implementation, Phase 1 - BRT Stop Located at Curb - Option 2: Section as illustrated could be accommodated within existing right-of-way, but would require widening of street and relocation of utility poles. To accommodate within existing street width, section could be modified by omitting dedicated bike lanes and creating shared bike/bus lanes.



West Washington Street - Proposed BRT Implementation, Phase 2 - BRT Stop Located in the Medians: This full build-out scenario assumes significant increased density development along the corridor and at station areas. Section as illustrated could be accommodated within existing right-of-way, but would require widening of street and relocation of utility poles.

- Develop a unique brand for the BRT service to distinguish it from the local fixed bus route service
- Design and install branded station shelters that incorporate automated ticket machines, variable information message boards, and CCTV

### **BRT Implementation (Phase 2)**

- Install dedicated BRT lanes in the median as the corridor redevelops and denser growth supports greater potential for ridership, with operation at 10/15 minute headways (peak/off-peak, respectively)
- Construct a BRT station/transfer center along West Washington between Hudson Street and Butler Avenue to provide a multitude of opportunities for TOD and station platform locations. Platforms would be in the median with pedestrian amenities providing safe connections to the platforms along with automated ticket machines, variable information message boards, and CCTV.
- Identify opportunities for eliminating BRT service during off peak hours to gain operation savings
- Investigate and assemble private funding and branding of routes, buses, station stops. One example of this is the Healthline in Cleveland, Ohio where local hospitals purchased the naming rights to help fund the line.<sup>7</sup>
- Explore funding sources, such as FTA Very Small Starts and MAP-21, to implement short term recommendations from BRT and TOD Feasibility Analysis
- FTA Very Small Starts Funding as corridor develops with TOD uses to help increase potential ridership

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<sup>7</sup> For more details see Urban Land Magazine, July 13, 2012. <http://urbanland.uli.org/economy-markets-trends/healthline-drives-growth-in-cleveland/>