



FORWARD 2045



Santee-Lynches Regional
Long-Range Transportation Plan

Adopted June 2019





Adopted: June 3, 2019

ACKNOWLEDGMENTS

On behalf of the project team, the Santee-Lynches Regional Council of Governments (Santee-Lynches) thanks the diverse group of participants whose input was instrumental to creating the blueprint for a safe, multimodal, and interconnected transportation system for this region. Forward 2045 reflects the collaborative efforts of the public, stakeholders, focus groups, local staff and officials, the South Carolina Department of Transportation (SCDOT), the Federal Highway Administration (FHWA), and Santee-Lynches staff. The efforts of everyone are greatly appreciated.

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EXECUTIVE SUMMARY

Forward 2045, the Long-Range Transportation Plan (LRTP) for the Santee-Lynches rural transportation planning area, outlines a regional strategy for a connected transportation system that accommodates existing and future mobility needs. *Forward 2045* is a financially constrained plan, meaning that it identifies projects and programs that can reasonably be implemented using anticipated funding through the year 2045. In response to federal mandates and the desires of residents, *Forward 2045* addresses all modes of transportation, including automobile, bicycle, pedestrian, transit, air, and rail.

Reason for the Plan

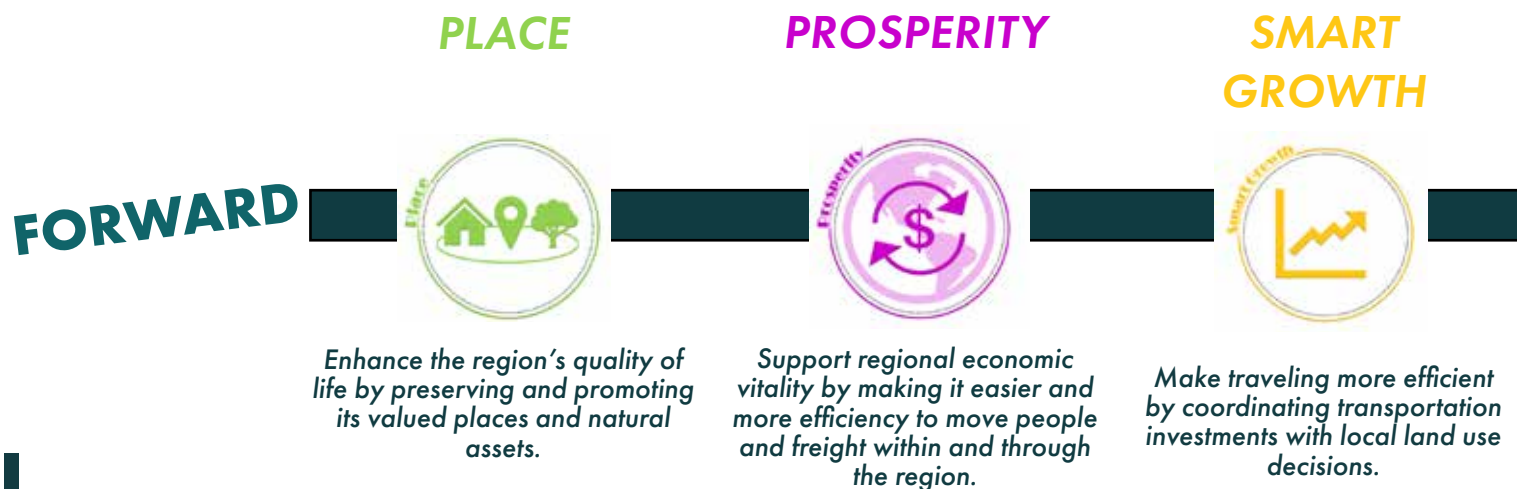
The LRTP is reviewed and updated at least every five (5) years, fulfills federal requirements, and serves as the region's long-range transportation vision. It categorizes current and future transportation needs, outlines the region's goals, identifies multi-modal strategies to address needs through the year 2045, and documents opportunities beyond current funding capabilities. Federal funding cannot be allocated to regionally identified transportation projects unless they are included in the LRTP. In other words, Santee-Lynches cannot plan to spend more money than it reasonably expects to receive.

Planning Process

The *Forward 2045* process began with a review of current conditions. Guiding principles and goals were established, and potential improvement projects identified. Once potential improvements were identified, the project team estimated available resources through the year 2045 and used a prioritization scoring process to rate projects for future implementation. The financially-constrained plan provides a blueprint through the year 2045 and will be re-evaluated in five years, though it can be amended at any time by the Santee-Lynches Board of Directors.

GUIDING PRINCIPLES

The statements below represent six (6) interrelated value statements that conform to national, state, and regional long-range planning goals. The guiding principles, which reflect the region's expressed transportation needs and desires, help inform the prioritization of recommendations.

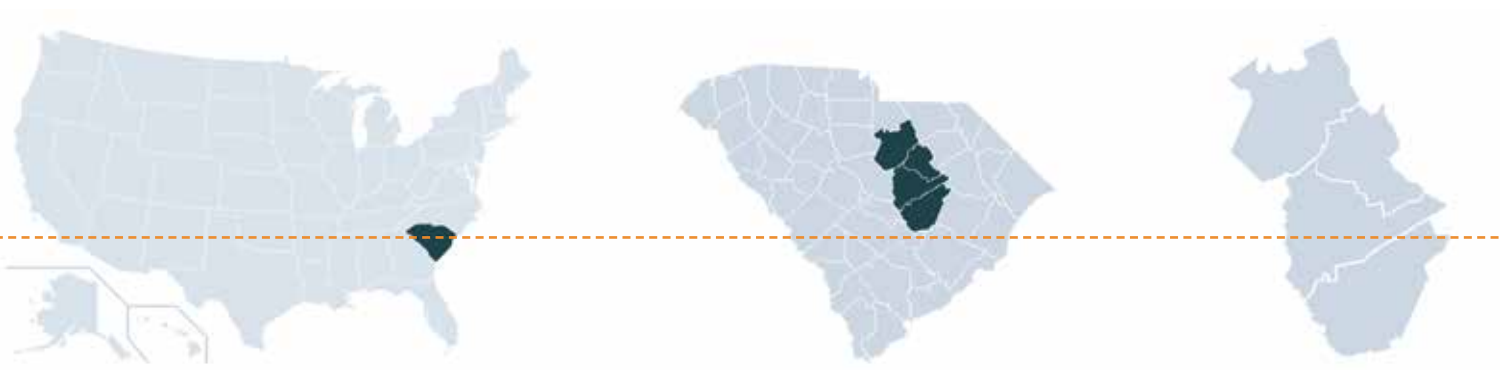


Public Engagement

As part of *Forward 2045*, Santee-Lynches staff engaged municipal and county staff, elected officials, the South Carolina Department of Transportation (SCDOT), the Federal Highways Administration (FHWA), various other public agencies, advocacy groups, and community leaders in a variety of ways. Engagement included five (5) county-level workshops, nine (9) stakeholder and small group interviews, a public survey and Wikimapping tool, and multiple meetings of the Santee-Lynches Regional Council of Governments Board of Directors (Policy Committee) and Regional Transportation Advisory Committee (Study Team).

Study Area

The *Forward 2045* study area covers 2,118 square miles of South Carolina’s Midlands, including all of Clarendon and Lee Counties, and parts of Sumter and Kershaw Counties. Those portions of Sumter and Kershaw Counties not included in the Study Area are part of the Sumter Urban Area Transportation Study (SUATS), and the Columbia Urban Area Transportation Study (COATS) Metropolitan Planning Organizations (MPOs) and are included in separate Long Range Transportation Plans developed by those organizations.



MOBILITY AND ACCESSIBILITY



Provide a balanced transportation system that makes it easier to bike, walk and use public forms of transportation.

SAFETY



Promote a safe transportation system by reducing crashes, making travel reliable and predictable and improving emergency response.

SYSTEM PRESERVATION



Extend the life of the transportation system and promote fiscal responsibility by emphasizing maintenance and operational efficiency.

2045



- **Establish Corridor Plans for important local entry points and commercial areas** - Corridor Plans focus attention on important entrance ways and commercial areas. Design, use, access, and visual appearance issues are examined more closely, and the results inform future implementation of a wide variety of local transportation and development projects.
- **Foster Location-Efficient Decisions** - For many residents, transportation and housing costs combine to exceed 50% of household expenses. We need to promote new models of housing and transportation that increase affordability through emphasis on proximity, livability, choice, and access to economic opportunity. More specifically, movement of people and goods in an efficient manner should focus on minimizing person delay across modes rather than on minimizing vehicle delay only.
- **Build Complete Streets** - Design and build Complete Streets that are equally accessible to pedestrians, bicyclists, motorists, and transit users, to the greatest extent feasible.
- **Conduct Regular Evaluation of Drainage Systems** - Regularly evaluate and clean drainage ditches in high problem areas to help mitigate flooding and standing water.
- **Improve Access Management** - Develop and maintain local access management policies that are in accordance with and, where necessary, stricter than SCDOT's Access and Roadside Management Standards
- **Maximize Connectivity** - Encourage connected street systems within new developments and between new and existing developments in order to maximize the connectivity of local, connector and arterial components of the roadway network. Ensure that all land use and transportation development provides interconnected streets and pathways that provide safe, efficient, and reliable movement for all modes of transportation within and between developments. Streets should connect to other streets.
- **Improve Streetscape Compatibility** - Ensure that roadways are functionally and aesthetically appropriate to the areas they serve.
- **Manage Growth** - encourage new growth to focus on areas that are already developed and served by existing utility services, and commercial entities, and encourage commercial entities to locate on major crossroads or arterial intersections.
- **Improve Wayfinding** - Collaborate with SCDOT and other local stakeholders to develop wayfinding signage for area amenities, sites, and public facilities.

GENERAL POLICY RECOMMENDATIONS



Bike & Pedestrian

Strategies



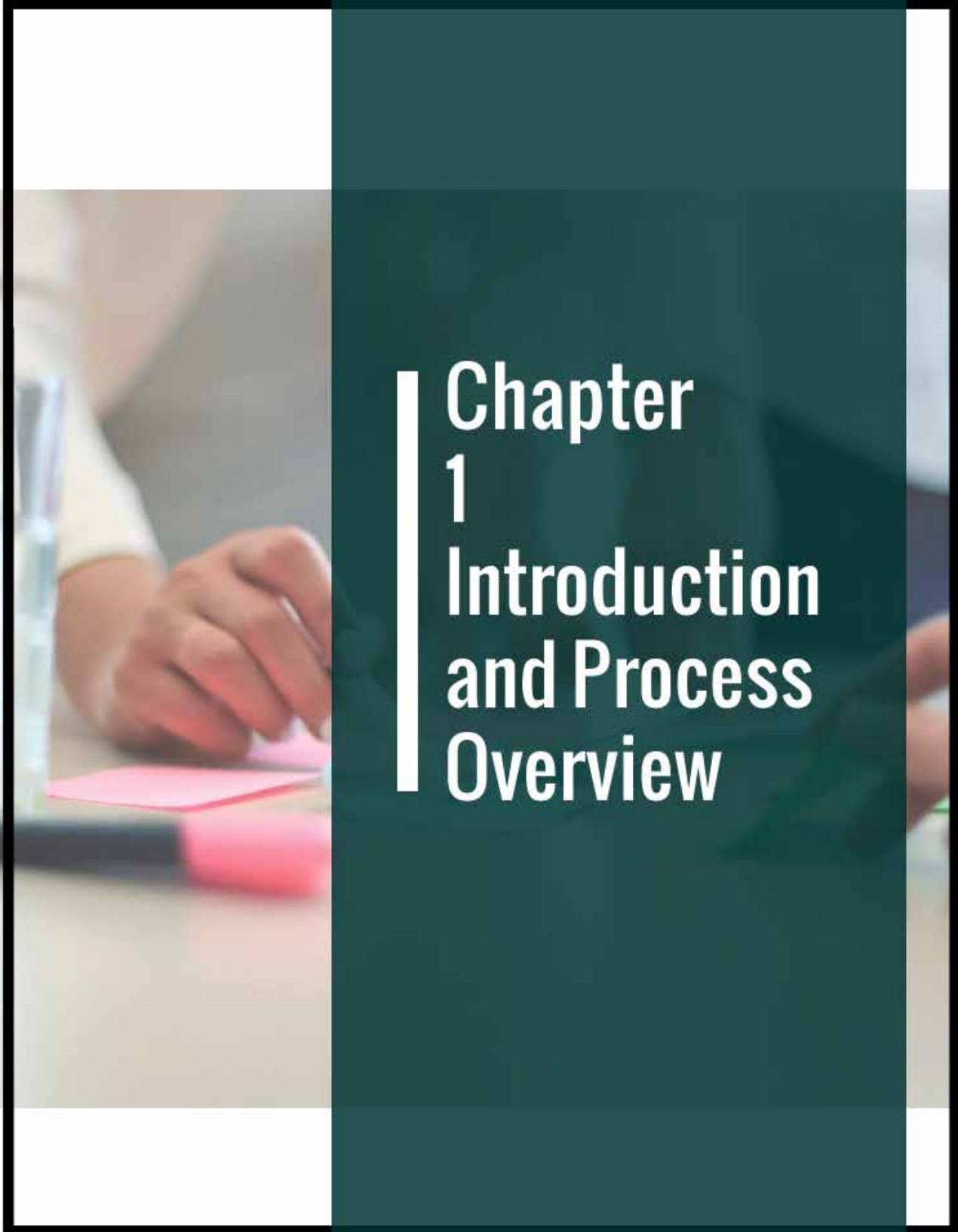
Freight

Strategies



- **Incorporate Bicycle and Pedestrian Transportation in Development of New Residential and Commercial Projects** - Encourage integration of alternative modes of transportation in new developments, and that such infrastructure connects between parcels.
- **Develop Connected Greenways** - Encourage development of greenways to connect natural spaces within the county including community parks, wildlife refuges, state parks and preserves, and public spaces along major lakes and rivers.
- **Create County Bicycle and Pedestrian Plans** - Develop or maintain county-wide bicycle and pedestrian transportation plans that can be used to leverage private investment and be incorporated into SCDOT projects such as pavement marking or paving.
- **Select Accessible Locations for New Public Facilities** - Locate new public facilities in areas that are accessible to pedestrians, bicyclists, and those that rely on public transportation.
- **Build Complete Streets** - Integrate Complete Streets infrastructure and design features into street design and construction to create safe and inviting environments for all users to walk, bicycle, and use public transportation.
- **Multi-Jurisdictional Public/Private Partnerships** - Explore multi-jurisdictional public-private partnerships to promote alternative modes of transportation throughout the County (e.g. bike racks at businesses, car free streets, etc.)
- **Establish Rail Access to I-95 Megaproject** - Continue to pursue development of the I-95 Industrial Mega site through the addition of freight rail service.
- **Operational Changes** - Identify opportunities with private sector businesses where operational decisions could be made to reduce re-occurring congestion (i.e. shifting delivery times, mode shift, etc.)
- **Close First/Last Mile Gaps** - Identify and close first/last mile gaps near major intermodal centers and manufacturing hubs
- **Improve At-Grade Rail Crossings** - Partner with railroads to prioritize at-grade crossing improvements and explore opportunities to make small public improvements to leverage the railroad's responsibility to maintain/improve crossings
- **Ensure Cross-Jurisdictional Freight Planning Consistency** - Coordinate freight plans and programs of with those of SUATS and COATS.

Chapter 1 Introduction and Process Overview



INTRODUCTION AND PROCESS OVERVIEW

Introduction

Background

Related Plans and Studies

State Transportation Legislation

Study Area Map

Chapter

1

Transportation is a fundamental part of daily life. It affects the lives of individuals and plays a critical role in shaping a region's physical and social infrastructure. Transportation infrastructure does more than simply allow people to move from place to place, it is a building block for the places in which they live, and it affects our way of life, in manners that can be both positive and negative.

Reliable access to effective and safe transportation goes a long way toward improving the region's economic equity, environmental footprint, and overall quality of life.

Forward 2045, the Long Range Transportation Plan (LRTP) for the Santee-Lynches transportation planning area, outlines a regional strategy for providing a connected transportation system that accommodates existing and future mobility needs. *Forward 2045* is a financially constrained plan, meaning it identifies projects and programs that can reasonably be implemented with anticipated funding levels through the year 2045. In response to federal mandates and expressed wishes of local residents, this plan addresses all transportation modes, including automobile, bicycle, pedestrian, transit, air, and rail.

Background

The scope of *Forward 2045* includes establishment of goals, review of current plans and studies, analysis of current transportation conditions, engagement with regional residents and stakeholders, identification of multi-modal project recommendations, and development of a financially-constrained plan. The Santee-Lynches Regional Transportation Advisory Committee (Study Team) offered feedback throughout plan development, and the Santee-Lynches Council of Governments Board of Directors (Policy Committee) formally adopts and manages the plan.

At its core, a LRTP identifies ways a region expects to invest resources to enhance its transportation system. The underlying principles and recommended actions reflect choices made by the public and private sectors regarding transportation investments, land use decisions, and infrastructure improvements.

About Santee-Lynches

Santee-Lynches Regional Council of Governments is the regional planning agency for Clarendon, Kershaw, Lee, and Sumter Counties in the Eastern Midlands of South Carolina. Santee-Lynches facilitates a regional, cooperative planning process for a 2,400 square mile area that is home to more than 225,000 residents.

The South Carolina Department of Transportation (SCDOT) has designated Santee-Lynches as a planning partner for the non-urbanized portions of the four-county region. Two Metropolitan Planning Organizations (MPOs) – the Sumter Area Transportation Study (SUATS) and the Columbia Area Transportation Study (COATS) include parts of Sumter and Kershaw Counties respectively.

The Santee-Lynches region has long been an agricultural hub. Soils throughout the region are generally fertile and are adaptable to cultivation of various crops, with some lands under cultivation since the early 18th century. The region's prime agricultural land was a major factor in its initial development, and until the late 20th century, the region remained primarily agricultural. While agriculture remains an important segment of the economy, manufacturing and retail have become dominant employment sectors, and much of the growth in the four counties is tied to the establishment of major manufacturing operations and the influence of the Columbia metro area to the west.

Reason for the Plan

Santee-Lynches completes a comprehensive update to the LRTP every 5 years. The plan fulfills federal requirements and articulates the region's transportation vision. It characterizes current and future transportation needs, outlines the region's long-range transportation goals, identifies multimodal transportation strategies to address needs through 2045, and documents long-term opportunities beyond current funding capabilities. Federal funding cannot be allocated to transportation projects unless they are included in the financially-constrained plan. In other words, Santee-Lynches cannot plan to spend more money than it reasonably expects to receive.

The LRTP consists of two parts - 1) the vision for the region, and 2) a detailed list of policies, operational strategies, and projects to achieve the vision. The LRTP includes a variety of actions that lead to "the development of an integrated inter-

modal transportation system that facilitates the efficient movement of people and goods". These tasks are accomplished within the context of policy review and public involvement to produce an intermodal transportation system that respects the area's history and heritage while providing true choice to all users.

FAST Act

Forward 2045 is shaped by several elements, including federal legislation. The plan is governed by the Fixing America's Surface Transportation Act (FAST Act), which was signed into law on December 4, 2015. The goals of the FAST Act include: strengthening highways, establishing a performance-based program, creating jobs and supporting economic growth, supporting the U.S. Department of Transportation's safety agenda, streamlining federal highway programs, accelerating project delivery, and promoting innovation. Additionally, the FAST Act is the first federal legislation that provides a dedicated source of federal funding for freight projects. This legislation extends through fiscal year 2020.

Related Plans and Studies

Forward 2045 builds on recommendations from previous land use and transportation plans. Following are the key plans reviewed when preparing this plan.

Transportation and Comprehensive Plans

The region's cities, towns, and counties have completed a variety of plans that affect future transportation recommendations, including comprehensive plans, long range transportation plans, corridor studies, and transit plans. Some of the key plans reviewed include:

Statewide

1. Statewide Multimodal Transportation Plan (2014)
www.scdot.org/Multimodal/
2. South Carolina 2040 Strategic Corridors Plan (2014)
www.scdot.org/Multimodal/pdf/SC_MTP_Strategic_Corridors_Plan_FINAL.pdf
3. Palmetto Trail Master Plan: Clarendon + Orangeburg County (2017)

<https://altaplanning.com/wp-content/uploads/Palmetto-Trail-Statewide-Master-Plan.pdf>

Santee-Lynches Region

1. Santee-Lynches 2040 LRTP (revised 2017)
www.santeelynchescog.org/s/Santee-Lynches_LRTP_5117.pdf

MPO

1. COATS 2040 Long Range Transportation Plan
www.centralmidlands.org/wp-content/uploads/2040-LONG-RANGE-TRANSPORTATION-PLAN-APPROVED-AUGUST-27-2015.pdf
2. SUATS 2045 Long Range Transportation Plan
www.sumtersc.gov/planning/SUATS
3. Sumter Connectivity Initiative
www.sumtersc.archive.vc3.com/planning
4. West Wateree Transportation Study (2017)
www.centralmidlands.org/wp-content/uploads/VWVTP-DRAFT-Final-Report-29MAR17o.pdf

Clarendon County

1. Clarendon County Comprehensive Plan
[www.clarendoncountygov.org/files/planning/Clarendon-Tomorrow-Comprehensive-Plan-FINAL\(web\).pdf](http://www.clarendoncountygov.org/files/planning/Clarendon-Tomorrow-Comprehensive-Plan-FINAL(web).pdf)
2. City of Manning Comprehensive Plan
www.santeelynchescog.org/s/Manning-Combined-Comp-Plancompressed.pdf

Kershaw County

1. Kershaw County Comprehensive Plan
www.kershaw.sc.gov/government/departments-h-q/planning-zoning/comprehensive-plan-draft
2. VisionKershaw 2030
www.visionkershaw2030.org/s/VisionKershawFINALweb.pdf
3. City of Camden Comprehensive Plan
www.cityofcamden.org/government/comprehensive-plan
4. Town of Bethune Comprehensive Plan
www.santeelynchescog.org/s/Bethune-Comprehensive-Plan-11817.pdf
5. Black River Road Corridor Study (2017)

www.kershaw.sc.gov/government/departments-h-q/planning-zoning/black-river-road-corridor-study

6. Kershaw County Wildwood Lane Active Living and Pedestrian Master Plan (2017)

www.kershaw.sc.gov/home/showdocument?id=5244

7. Kershaw County Bicycle, Pedestrian, and Greenways Plan (2013)

www.eatsmartmovemore.sc.org/kershawcounty/2013/09/24/bicycle-pedestrian-and-greenways-plan-is-complete-2/

8. Broad Street Road Diet Plan (2012)

www.cityofcamden.org/sites/default/files/files/camden_8_transportation_8-13-18.pdf

Lee County

1. Lee County Comprehensive Plan
2. City of Bishopville Comprehensive Plan
3. Town of Lynchburg Comprehensive Plan

Sumter County

1. Sumter County Comprehensive Plan
http://www.sumtercountysc.org/departments/i_r/planning/sumter_204_comprehensive_plan.php
2. Town of Pinewood Comprehensive Plan
<http://www.santeelynychescog.org/s/Pinewood-Comprehensive-Plan-FINAL.pdf>
3. Town of Mayesville Comprehensive Plan



Figure 1 : Town of Pinewood Comprehensive Plan



Figure 2: SUATS 2045 Long Range Transportation Plan



Figure 3: City of Manning Comprehensive Plan



Figure 4: Clarendon County Comprehensive Plan



Figure 5: VisionKershaw 2030

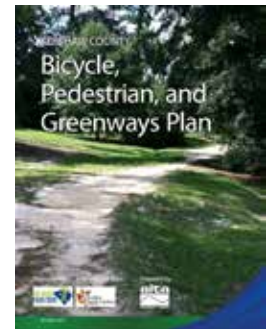


Figure 6: Kershaw County Bicycle, Pedestrian, and Greenway Plan



Figure 7: Black River Road Corridor Study

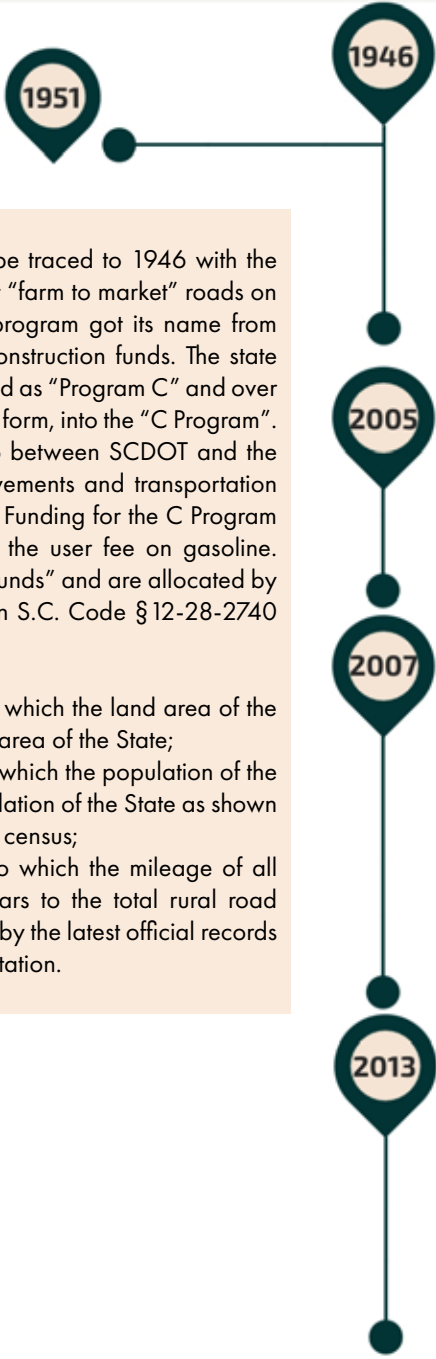


Figure 8: Town of Bethune Comprehensive Plan



Figure 9: Columbia Area Transportation Study 2040 Long Range Transportation Plan

THE HISTORY OF State Transportation Legislation



State "C" Program

The origins of the - Program can be traced to 1946 with the designation of funding to pave dirt "farm to market" roads on the state secondary system. The program got its name from a 1951 listing of state highway construction funds. The state secondary program was designated as "Program C" and over time, this has evolved, in name and form, into the "C Program". The program is now a partnership between SCDOT and the state's 46 counties to fund improvements and transportation projects on state and local roads. Funding for the C Program comes from 2.66¢ per gallon of the user fee on gasoline. These revenues are referred to "C funds" and are allocated by the following formula prescribed in S.C. Code § 12-28-2740 (the C Fund law):

- (1) 33% distributed in the ratio to which the land area of the county bears to the total land area of the State;
- (2) 33% distributed in the ratio to which the population of the county bears to the total population of the State as shown by the latest official decennial census;
- (3) 33% distributed in the ratio to which the mileage of all rural roads in the county bears to the total rural road mileage in the State as shown by the latest official records of the Department of Transportation.

Act 176 - In 2005, the General Assembly passed Act 176. This act established the State Non-Federal Aid Highway Fund as a fund separate from the pre-existing State Highway Fund for SCDOT's use. It is funded by a portion of certain fines, taxes, user fees, driver's license fees and motor vehicle license and registration fees.

Act 114 - In 2007, the General Assembly passed Act 114. This act primarily restructured the governance of SCDOT, and established project prioritization using the following objective criteria: (1) financial viability including a life cycle analysis of estimated maintenance and repair costs over the expected life of the project; (2) public safety; (3) potential for economic development; (4) traffic volume and congestion; (5) truck traffic; (6) the pavement quality index; (7) environmental impact; (8) alternative transportation solutions; and (9) consistency with local land use plans.

Act 98
 In 2013, the General Assembly passed Act 98. The act: Authorized local governments to transfer roads to SCDOT upon mutual consent, Allowed SCDOT to transfer roads to local governments, school, governmental and non-governmental agencies, or individuals, upon the consent of both parties, and stated that 50% of the revenue from sales, use, and casual excise taxes on motor vehicle titles are to be credited to the State Non-Federal Aid Highway Fund and to be used exclusively for highway, road, and bridge maintenance, construction, and repair.

The Transportation Improvement Program (TIP) - The Transportation Improvement Program (TIP) is a project document covering a six-year period. The TIP includes approved regional transportation improvement projects that were identified in the LRTP and comply with Act 114. In addition to projects developed for the “guideshare” account controlled by Santee-Lynches, the TIP covers other federally funded project awards designated to a municipality or agency within our rural jurisdiction.

The State Transportation Improvement Program (STIP) - SCDOT publishes and maintains a 5-year Statewide Transportation Improvement Program (STIP) that details program funding levels, projects, and funding schedules. Through the rural planning process, Councils of Governments (COGs) and Metropolitan Planning Organizations (MPOs) provide SCDOT with updated project priorities for inclusion in the STIP. Projects must be included in the regional LRTPs to be eligible for inclusion in the STIP. Each COG/MPO endorses its regional priorities for consideration by the SCDOT Commission and is responsible for advertising and documenting public comment for any amendment to the STIP within its region (see STIP process for definition of amendment/ adjustment).

The State Maintenance Program (State Plan)

The State Plan is prepared annually as required by Act 113 and contains objectives and performance measures for the preservation and improvement of the non-federal aid secondary system. The projects detailed in the plan are funded solely with state funds and other state revenue sources. It is important to note that the Act 98 and Act 176 funding sources indicated in this plan can only be used on non-federal aid secondary system.

Planned resurfacing and bridge replacement projects are included and identified by specific location. The State Plan also provides an overview of the current condition of various features of the non-federal aid secondary transportation system.

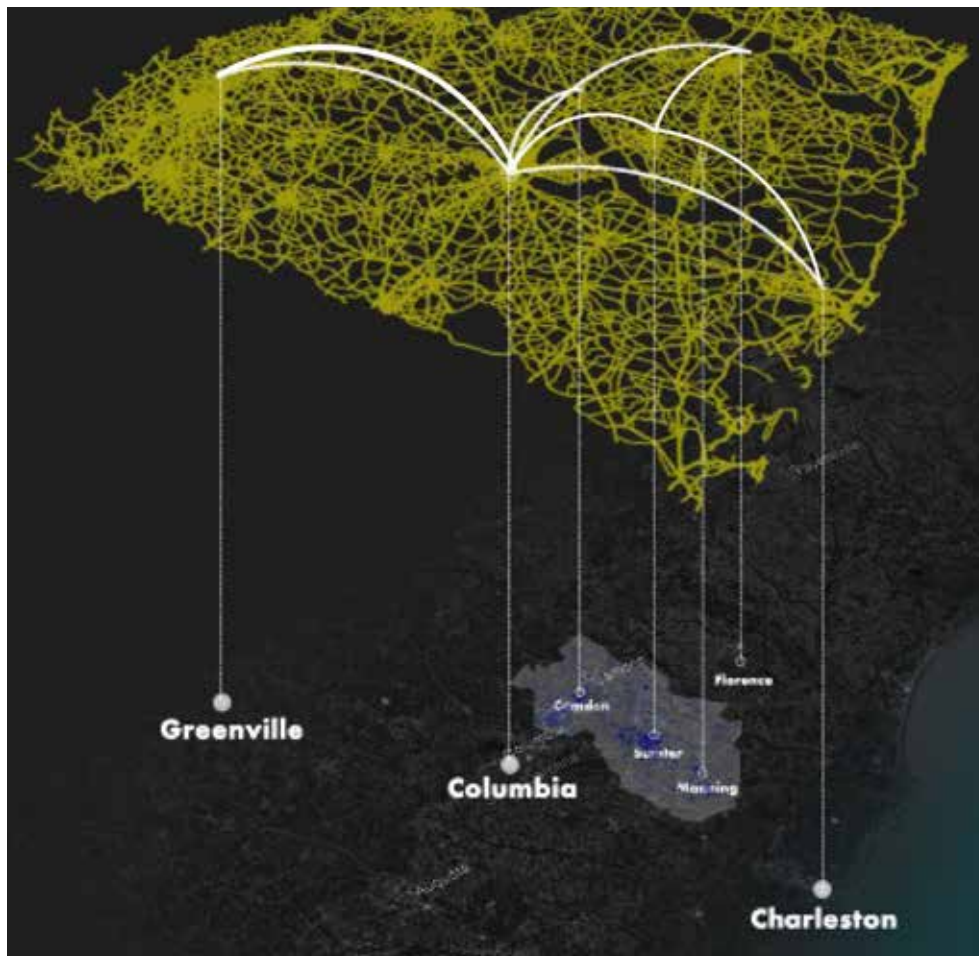


Figure 10: Roadway Network Map
Source: Santee-Lynches COG

Study Area

Santee-Lynches is responsible for transportation policy development, planning, and programming for 2,118 square miles of the Eastern Midlands of South Carolina, including all of Clarendon and Lee Counties and portions of Sumter and Kershaw Counties. As of the last decennial census (2010), over 223,344 people lived in the Santee-Lynches region, with 107,547 of those people residing in the Santee-Lynches Transportation Planning Area.

Santee-Lynches is one of three entities tasked with transportation planning in the four-county region. The Sumter Area Transportation Study (SUATS) is the MPO for the Sumter urbanized area, which includes the City of Sumter and parts of unincorporated Sumter County. Columbia Area Transportation Study (COATS) is the MPO for the Columbia urbanized area, which includes a portion of Western Kershaw County.

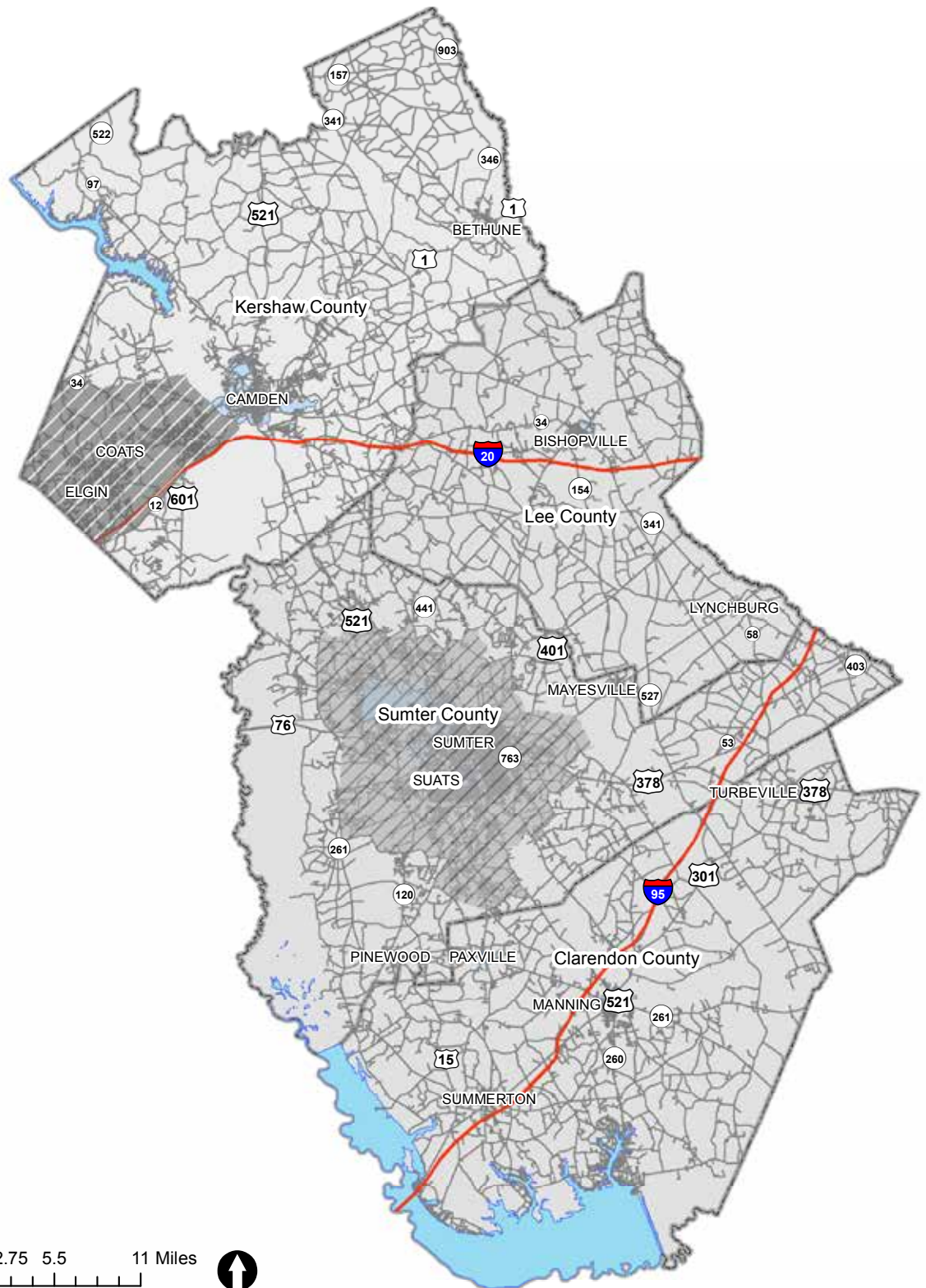


Figure 11: Study Area Map
 Source: Santee-Lynches COG

Chapter 2 Trend and Technology

TRENDS AND TECHNOLOGY

Climate Change

Future Transportation

Information Technologies and the Material Economy

Alternative Work Schedules

Livability

Transportation Workforce Changes

Chapter

2

*Just because something doesn't do what you
planned it to do doesn't mean it's useless.*

-----Thomas Edison

Being that this document has a horizon year of 2045, it is important to understand what challenges and innovations transportation can expect to deal with in the coming future to adequately prepare and plan. This chapter of Forward 2045 looks at coming trends, inventions, and even negative stimuli may have an impact in the Santee-Lynches region by this year. It discusses climate change, autonomous vehicles, and changes to information technology and the economy that are all expected to make an impact on transportation networks across the nation by 2045.

Climate Change

Climate change will have diverse effects on all components of the transportation system. Extreme weather events such as flooding and hurricanes that are regularly experienced in the Santee-Lynches Region, can damage roads, bridges, rail systems, and the vehicles that use these systems. These disaster events result in government spending millions of unplanned dollars to repair infrastructure rather than proactively spending funds on planned upgrades and maintenance.

Over the long term, climate change has the potential to change settlement trends and land-use patterns. Researchers anticipate that the American South will face extreme negative impacts as a result of climate change including agricultural losses, increased mortality, and rising energy costs, along with increased frequency of extreme weather events including hurricanes, heatwaves, and severe flooding.¹ These potential impacts can affect transportation in the following ways:

1. Extreme weather and flooding could overwhelm stormwater drainage systems, causing flooding on roads, weakening bridge foundations, and increasing the chance for vehicle crashes and traffic delays;
2. Higher temperatures can cause infrastructure elements such as asphalt pavement and bridge joints to deteriorate more quickly;
3. Higher temperatures can also cause greater risk to construction workers, which may require adjustments to work

¹ <https://www.theatlantic.com/science/archive/2017/06/global-warming-american-south/532200/>

schedules or reductions to the length of the summer construction season;

4. Shifts in the prevalence of and location of freight traffic moving agricultural products as land suitable for agricultural production changes;

It is important to think of the transportation system as a network, and to ensure that the network contains alternative routes or modes of travel such that damage to one part of the system does not create a cascade of impacts or breaks in the road or rail network for extended periods of time. Additionally, effective evacuation planning will be critical as intense storms become more prevalent making the mainte-



Figure 12: Floodwaters on US-378 in Sumter County



Figure 13: Floodwaters wash out a roadway in Sumter County



Figure 14: Fire Department personnel respond to flooding at Swan Lake in Sumter

nance of designated evacuation routes more important. There may be a need to invest more in maintenance of roads and bridges that are likely to deteriorate faster due to flooding or explore new technologies and construction methods to extend the lifespan of infrastructure.²

Future Transportation

New technologies and emerging trends offer unprecedented opportunities to build a transportation system that works better for our environment and our health. Electric vehicles, ride-sharing services, autonomous car, and advances in information technology, as well as improved bicycling and pedestrian infrastructure, offer new ways to reduce greenhouse gas emissions, make land use more efficient and improve air quality.

Electric Vehicles

Electric Vehicles offer increased fuel efficiency for personal vehicle owners. Public transit vehicle fleets are also adopting electric vehicles and other alternative fuels to cut fuel use and costs. While these innovation could greatly reduce the future environmental impact of our transportation system, the adoption of cleaner fuels depends on what infrastructure and incentives are in place.

Transportation Network Companies



Figure 15: Uber

2025 (Near Term)

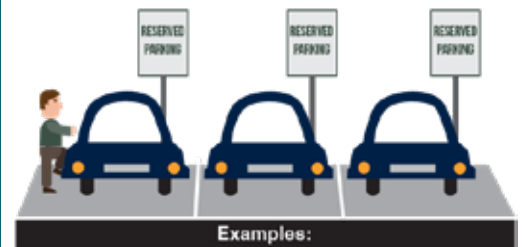


Figure 16: Zipcar



Figure 17: Electric Car

2030 (Short Term)

² <https://nca2014.globalchange.gov/report/sectors/transportation#intro-section-2>

2020(Near Term)

2030 (Mid Term)

2045 (Long Term)



Figure 18: Complete Street



Figure 20: London Heathrow PRT(Personal Rapid Transport), London, England



Figure 19: Automos Car

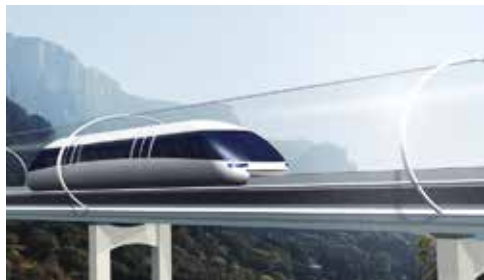


Figure 22: Super Loop



Figure 21: Drone Delivery

Many transportation network companies (TNC) such as Uber and Lyft, offer a viable, cost-effective alternative to driving and could encourage someone to drive less or even give up their personal vehicle. Integrating these companies into a robust and modern transportation network, including fixed-route public transportation, can enhance the environmental benefits of the TNC.

Autonomous Vehicles

Autonomous vehicles have the potential to revolutionize the way people and goods move. While autonomous vehicle technology is still being developed and tested, there is growing speculation regarding the impact the technology will have on American society.

One vision of the future of suggests that autonomous vehicles will reduce car ownership as people share cars and request them when needed, thereby changing commercial landscape through reduced parking, maintenance, and volume needs. In this future, autonomous vehicles would dramatically decrease vehicle crashes by removing human error from the equation. Moreover, those unable to drive, including the elderly or disabled, would benefit from increased mobility. Shared autonomous vehicles could also dramatically reduce vehicle costs by spreading the cost burden across multiple individuals or households.³ An alternative vision contends that if autonomous vehicles are not electrified or shared, it will increase congestion and greenhouse gas emissions. In this future, autonomous vehicles could promote further urban sprawl because commute times would be less of a concern for people, allow-

³ <https://e360.yale.edu/features/will-self-driving-cars-usher-in-a-transportation-utopia-or-dystopia>

ing them to live further from the workplace.⁴ Additionally, in this future, widespread use of autonomous vehicles would require a paradigm shift in the way people view their cars and driving, a challenge in a car-centric society. These skeptics argue that unless policy solutions are developed, such as congestion pricing, reduced parking, and strengthened environmental regulations, the negative impacts of autonomous vehicles could outweigh the positive.⁵

The impacts of autonomous vehicles in the Santee-Lynches Transportation Planning Area would be akin to other regions, though it is expected that the transition to autonomous vehicles may be somewhat slower as the car-sharing culture currently in place in more populated areas via services like Uber, Lyft, and Zipcar does not yet exist. Additionally, the policy changes necessary to strongly encourage people to use shared autonomous vehicles are unlikely to be popular in the region in the near term.

High Speed Rail

Plans for a Southeast high Speed Rail Corridor that links Atlanta and Charlotte may one day include a stop near Greenville. This would improve mobility options for long-range travel and enhance the Upstate's economic connections throughout the Southeast.

Delivery Drones

Parcel delivery drones, currently in experimental use by some companies, deliver package directly to their destination without the need for a delivery truck.

Freight Trucks

Many observers expect freight trucks to be autonomous and operating on the roads well before personal vehicles. Like autonomous vehicles, there are several pilot projects underway in the United States to test and enhance the technology. Potential benefits include (1) greater fuel efficiency due to platooning, (2) reduced congestion because trucks can more easily travel in off-peak times, and (3) improved safety as human factors like driver fatigue are eliminated.⁶ There are many unknowns related to the proliferation of autonomous trucks including the role of drivers, regulatory environ-

ment, costs, and downstream effects on industries that cater to the freight industry.⁷ Even in an early adoption scenario, human drivers would still be necessary for the first- and last-mile portion of the trip, as navigation through cities, towns, and non-highway driving, would still be needed.⁸

The impacts of autonomous freight trucks in the Santee-Lynches Transportation Planning Area would be mostly felt on major freight routes, particularly Interstate-20 and Interstate-95. If freight trucks are able to travel at off-peak times, the logical result would be reduced congestion, fewer crashes involving trucks, and reduced idling due to traffic delays. In the longer term, autonomous freight trucking could shift land use patterns around interstate interchanges as the need for certain services (such as full-service truck stops) changes. Freight will continue to travel throughout the region delivering, but overall operations could fundamentally shift.

Information Technology and the Material Economy

E-Commerce

The retail consumer behavior shift that society has seen in the last 10 years, as consumers shop less at local "bricks and mortar" stores and more via online retailers like Amazon has led to changes in transportation practices, and will continue to drive commercial transportation. What was once a consistent structure in which freight trucks moved bulk product to a single final destination is now shifting to a model in which goods move in smaller and more frequent shipments, often from a distribution warehouse directly to the consumer's front door. The following are some ways in which e-commerce has or could impact the transportation system:

- Expansion of e-commerce will increase need for warehousing space with access to interstates or major highways. These warehouses will require more frequent daily truck movement in order to maintain the variety of products demanded by consumers.⁹
- Increasing numbers of freight delivery vehicles (including large freight trucks and small personal vehicles) utilizing more roadways, which will contribute to congestion, particularly in residential neighbor-

4 <https://www.vtpi.org/avip.pdf>

5 <https://e360.yale.edu/features/will-self-driving-cars-usher-in-a-transportation-utopia-or-dystopia>

6 <https://www.freightwaves.com/news/2017/10/4/examining-the-benefits-risks-of-the-autonomous-truck>

7 <https://www.freightwaves.com/news/2017/10/4/examining-the-benefits-risks-of-the-autonomous-truck>

8 <https://www.trucks.com/2018/02/28/trucking-logistics-autonomous-vehicle-revolution/>

9 <https://static.tti.tamu.edu/tti.tamu.edu/documents/PRC-17-79-F.pdf>

hoods where such traffic was anticipated at the time of design.¹⁰;

- Local roads will require more frequent maintenance as these roads will receive more truck traffic than they were initially designed for in order to meet delivery expectations¹¹;
- Change in driving patterns as concentrated retail centers shrink or close. Consumer and employee travel along these traditional commercial corridors may diminish as retailers leave, resulting in overbuilt roadways for the current need.

There is also nascent discussion in the public space, particularly by companies like Amazon, regarding use of drones to deliver goods in a timely and efficient manner. This innovation would dramatically change a freight system that is already seeing massive change. Commercial drones may have their biggest impact initially on last mile delivery companies, such as FedEx and UPS. For example, an individual delivery truck would no longer pick up a package from a warehouse, travel with it on a route of delivery points, and ultimately deliver it to a customer. A drone would pick up the package from the warehouse and drop it off directly to the consumer¹². This practice would reduce traffic on most roadways. It would also raise other transportation challenges, such as air traffic management, but that does not have the significant capital cost associated with it as construction and maintenance of roadways and bridges.

As with autonomous vehicles, the Santee-Lynches Region would face many similar transportation impacts as other areas. The region will see more delivery vehicles on the road as e-commerce continues to grow and as one-day delivery becomes more widespread or even as local businesses begin offering delivery services for groceries and other items. Commercial drones could then create the opposite effect and reduce the number of vehicles on roadways. However, drones would create a massive new impact on air travel that would need to be managed, which, for the Santee-Lynches Region, would be fairly new territory to navigate.

¹⁰ <https://www.npr.org/2018/08/01/634696340/shopping-online-doesn-t-necessarily-reduce-traffic>

¹¹ <https://static.tti.tamu.edu/tti.tamu.edu/documents/PRC-17-79-F.pdf>

¹² <https://articles.cyberg.com/how-drones-will-affect-the-logistics-industry-in-the-next-10-years/>

Alternative Work Schedules

Alternative work schedules, including flex time, compressed work weeks, and telework, all impact the transportation system. Flex time is being able to work flexible hours within a daily work schedule. This can enable workers to avoid morning and afternoon rush hours and afford the opportunity to create a schedule around public transportation or rideshare availability. A compressed work week means that employees work fewer, but longer, days such as four 10-days each week. Like flex time, this option can reduce peak period traffic and total road travel in general. However, it does not necessarily encourage alternative forms for transportation. The last option, telework, is when employees are able to work from a remote location.

Roughly 5% of the U.S. population teleworks, with the most significant impact being reduced congestion during rush hours¹³. These alternatives can have significant impacts on lowering commute times, reducing traffic congestion, particularly in peak-travel periods, and in some cases can increase public transportation ridership. In fact, some industrial employers in South Carolina where congestion is a growing concern have adjusted the schedules of their production shifts to allow employees to avoid high traffic times of day.

As with other transportation innovations, there are potential negating or negative impacts. Some note that telework does not necessarily reduce the number of vehicle trips. Instead of using a vehicle to travel to and from work, an individual might run additional errands. While these may not occur during peak travel-period, they are still vehicle-miles traveled (VMT). One potential negative impact is that some of these alternatives can discourage carpooling or use of public transit, as it spreads the potential travelers out over a longer time window.

Because the Santee-Lynches region is not densely populated, these options may not have much impact on the region's transportation system, unlike in cities with larger populations and greater congestion. However, people who live in the Santee-Lynches region may be more likely to take advantage of alternative work options if they commute to cities such as Columbia, Florence, or Charleston. If workers use some of these options, it could reduce commuting times and congestion during peak hours on major routes, particularly I-20 and US-378.

¹³ <http://www.governing.com/topics/transportation-infrastructure/gov-telecommuting-impact-transportation.html>

Livability

The concept of livability has been a growing component of transportation planning in recent years. Whereas traditional transportation decisions focused on maximizing efficiency of traffic flow and reducing congestion, transportation planning is increasingly focusing on community livability. According to the Federal Highway Administration (FHWA), livability includes improvement to bicycle and pedestrian infrastructure, enhancement of connections between neighborhoods, fostering downtown revitalization and economic development, pursuing environmental justice, using transportation to promote healthy lifestyles, and creating a more resilient transportation network¹⁴. Many of these concepts are critical components in planning and designing an individual transportation project. Some of the common design components associated with livability in communities include use of complete streets policies, implementation of road diets, construction of roundabouts, installation of bike lanes and/or sidewalks, and improvement to public transportation infrastructure.

These concepts are already shaping and will continue to shape transportation projects and initiatives in the Santee-Lynches Region. To enhance livability in communities, transportation needs to be a part of an integrated approach to planning throughout the region. Land use planning, new residential and commercial development, recreation planning, and other forms of planning must include livability concepts related to transportation to ensure the changing landscape is improving the community as a whole.

¹⁴ <https://www.fhwa.dot.gov/livability/index.cfm>

Transportation Workforce Changes

The highway construction and maintenance industry is facing several significant workforce challenges in the coming years including, 1) the retirement of baby boomers, 2) increases in competition with other industries, and 3) need for enhanced skills from workers. In a 2016 press release, the U.S. Department of Transportation (USDOT) estimated that “more than half the current highway construction workforce is over the age of 45 and, with retirement, separation, and growth, more than a half-million highway construction jobs are projected over the next decade.”¹⁵ With positions already difficult to fill, the problem is only going to get worse in the next decades which will impact the ability to design and deliver transportation projects in a timely manner¹⁶.

As a result, there are numerous efforts being put forth to address this future worker shortage. A national effort has convened partners to identify and train individual in highways construction jobs are different locations throughout the country¹⁷. Additionally, different states have started developing training programs to address shortages in highway construction workers, heavy equipment operators, and other skilled personnel.

The challenge of finding skilled workers could have significant impacts in project development and implementation in the region. With more competition, there is likely to be an increase in project costs as workers’ wages are likely to rise and they have more options. This would limit regional flexibility and ability to fund road projects. As an outcome of higher costs given fairly fixed transpor

tation improvement budgets, fewer projects would be constructed due in part to the lack of qualified workers, therefore delaying much needed improvements on area roads.

¹⁵ <https://www.fhwa.dot.gov/pressroom/fhwa1636.cfm>

¹⁶ <https://www.fhwa.dot.gov/publications/publicroads/17julaug/05.cfm>

¹⁷ <https://www.fhwa.dot.gov/publications/publicroads/17julaug/05.cfm>

In an effort to further expand participation, Santee-Lynches staff made themselves available to present the Forward 2045 planning effort to various community groups, including Rotary Clubs, Kiwanis Clubs, and other civic organizations. The presentation included overview of area transportation factors, as well as a description of the mechanisms for providing input.

**Safety
Improvements**

**Traffic
Congestion**

**Bike lanes and
Trails**

**Commute Time
Increased Taxes**

**Tolls on roads
Transportation
Bonds**

**Impact Fees on
Developers**

Safety

**Lack of Public
Transportation**

**Poor
Pavement
Condition**

Chapter 3 Public Engagement

PUBLIC ENGAGEMENT

Introduction

Outreach Summary

Formal Kick-Off and Sub-Regional Workshops

Job Fair

Other Outreach Survey

Chapter

3

Engagement and integrity are the most two fundamental aspects of building trust; lead from the front by evolving your company strategy, then live your values every day.
----- Richard Edelman

Effective transportation planning and identification of projects requires blending technical data with inputs from the public. Public input can provide a more nuanced understanding of transportation needs in the region by providing the “why” behind certain problem areas or through offering insight into the transportation interests of an area such as better freight movement or more options for multi-modal transportation. Ultimately, public engagement ensures that the outputs of the plan are appropriate, defensible, and implementable.

Outreach Summary

The public engagement process for *Forward 2045* sought to include a range of actors including residents, business owners, local government staff, elected officials, and other relevant stakeholders. Multiple viewpoints are critical in this process to ensure that the plan is reflective of the diverse groups and interests in the region. The following stakeholder groups were invited to share their thoughts via a public engagement opportunity:

- Santee-Lynches Regional Council of Governments staff
- Municipal and County staff
- SCDOT staff
- Elected officials
- Economic development agencies
- Utility providers
- Not-for-Profit Organizations
- Public transportation providers
- Bicycle and pedestrian advocates
- Senior Citizens

Multiple avenues were used to obtain public input in the region. The following is a summary of the public engagement events and tools used as part of the process.



Figure 23: Public Input Workshop-Lee County



Figure 24: Resident Completing an Input Exercise



Figure 25: Residents Completing an Input Exercise



Figure 26: Resident Mapping Preferred Routes

Where We Started Engagement

Outreach to residents throughout region.



There are series of public workshops, community event held consistently for gathering public opinions in 4 counties.

Outreach to local residents via social media

From March 2018 through June 2019, social media posts were made over 15 times advertising opportunities to engage with the Long Range Transportation Planning process via Santee-Lynches social media platforms.



Identify transportation topics of concern



In the process of engaging more than 100 organizations and thousands of citizen through community outreach, 14 transportation topic areas were identified and discussed.

Explore a shared vision through GIS

135 maps were used during workshops to help citizens to explore a future land use and transportation vision for our region's future.



Citizen-mapped ideas for future improvements



Between March and June 2018, a Wiki-mapping platform was set up online for members of the public to draw lines on a web-based map to help guide planners to the concerns of the communities in the region.

There were 655 lines and points drawn by the public through Wikimapping.

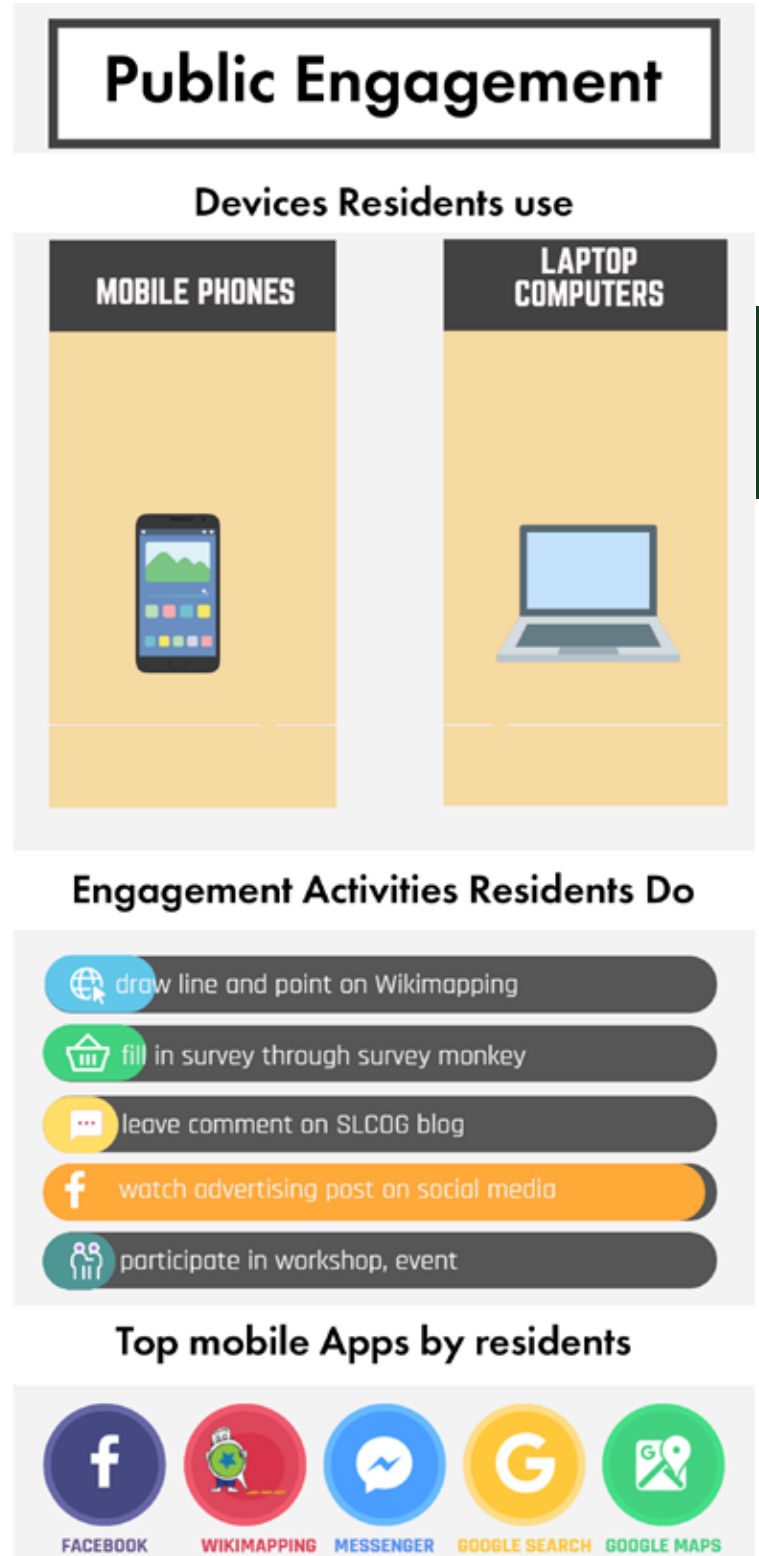


Figure 27: Social Media Survey Result Analysis
 Source: Santee-Lynches COG

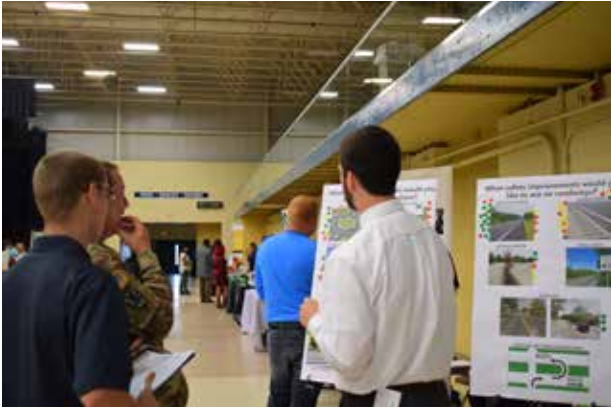
Event	Audience	Description
County Workshops (five events)	Community at large	<ul style="list-style-type: none"> • Create interest and participation in the plan • Provide transportation infrastructure information to county residents • Assess community's transportation priorities • Obtain specific project input
Stakeholder Outreach	Elected Officials Local staff – Economic Development, Chambers of Commerce, Public Works, Planning	<ul style="list-style-type: none"> • Provide transportation infrastructure information to stakeholders • Assess community's transportation priorities
Council Presentations (county and municipal councils)	Elected officials	<ul style="list-style-type: none"> • Inform councils on public participation and data analysis outcomes • Validate information
Individual Santee-Lynches Staff Interactions	Clients, Business leaders, community at large	<ul style="list-style-type: none"> • Assess community's transportation priorities • Obtain specific project input
Survey	Community at large	<ul style="list-style-type: none"> • Collect data on issues, needs, and trends
Wikimapping	Community at large	<ul style="list-style-type: none"> • Gather map-based feedback on potential projects and priorities
Project Webpage	Community at large	<ul style="list-style-type: none"> • Serve as portal for plan information • Promote upcoming events, news, documents, resources, and meeting summaries
Social Media (Facebook, Instagram, Twitter)	Community at large	<ul style="list-style-type: none"> • Educate the public • Promote events, news, and meetings

The formal public engagement process began on June 4, 2018 at the Santee-Lynches Regional Council of Governments Board of Directors' meeting. This group is a 29-member Board which includes elected representatives and citizens from across the four counties in the Santee-Lynches planning jurisdiction. This event, along with sub-regional workshops, stakeholder meetings, participation at local job fairs, and use of survey tools made up the bulk of this public engagement process. The following is a more detailed description of the different public engagement events and tools used to obtain input from around the region.

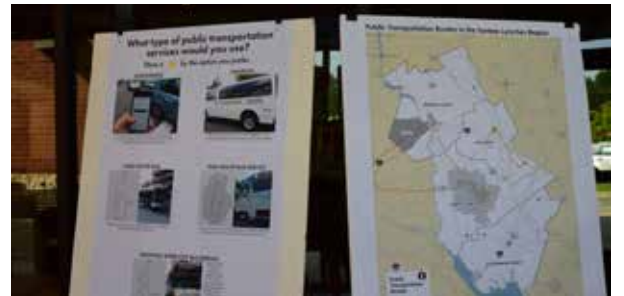
Formal Kick-Off and Sub-Regional Workshops

Public engagement formally began at the Santee-Lynches Regional Council of Governments Board of Directors' Meeting on June 4, 2018 with a briefing to representatives from each county about the plan, the process, and the upcoming county-based workshops. Of the 29 board members, 20 attended this meeting. The goal of this kick-off was for community representatives to be able to return to their localities and share the information about this plan with their constituents, friends, and neighbors.

Public Engagement Activities



2018
Engagement Events



2019



Figure 28: Community Engagement Pictures
 Source: Santee-Lynches COG

Sub-Regional Workshops

Following this meeting, interactive workshops were held in each county (in Sumter County two separate sessions were held, one in Pinewood and one in Mayesville) to inform the community about relevant, area-specific transportation information and then to obtain input on transportation priorities and projects in the region.

Over 34 people attended at least one of the five **Forward 2045** workshops held throughout the region. Designed as a drop-in workshop, participants traveled to five different stations studying relevant information and offering feedback on the station's topic. The following is a brief description of each station.

Infrastructure

This station displayed information about pavement quality and bridge condition in and around the location of the workshop. For example, the workshop held in Manning, SC displayed data about Clarendon County rather than the entire Santee-Lynches region. Participants were asked to comment on the most frustrating roads and intersections to drive on.

Safety

The information presented at this station included a map showing the density of crashes involving an injury in the respective county or area for the workshop location. The intention was to display road or intersections that have a high frequency of traffic crashes. Participants were asked to identify locations where they would like to see safety improvements such as lighting, better road markings and striping, improved road design like wider shoulders or rumble strips, or areas that need to have enhancements made to pedestrian safety.

Bike/Pedestrian

No data was presented to participants at this station, instead each person was requested to draw locations for additional or improved sidewalks and bicycle lanes. Participants were also asked to identify their preference for sidewalk design and bicycle facilities in different settings using a visual preference survey.

Public Transportation

Information presented at this station included a map showing existing bus routes in the region and a map displaying

the percentage of households without access to a vehicle by Census tract. Participants were asked to then draw on a map the general routes where they would like to see public transportation and then asked to identify which type of public transportation they would take in the region using a visual preference survey.

Funding Priorities

For this activity, participants were asked to spend \$5 million on transportation improvements in the region using real estimated costs for different projects such as one mile of sidewalk or one mile of road widenings. This activity helped staff gauge the priorities of the public in the region.

Job Fairs

In an effort to expand participation, Santee-Lynches staff set up booths at job fairs in Sumter and Lee Counties during the public engagement period. The Sumter County Job Fair, held on May 23, 2018, drew 516 job seekers. **Forward 2045** engagement focused on gaining general input about the types of transportation improvements the public would like to see. The booth included four visual preference posters – Bike and Pedestrian Facilities, Intersection Improvements, Public Transportation, and Roadway Improvements. Participants put a dot beside the improvement they most liked or thought was most necessary in the region.

The Lee County Job Fair, held on August 8, 2018 drew 227 job seekers. **Forward 2045** engagement was more focused on identifying specific projects in the region. Participants were asked about the most needed transportation improvements ranging from road improvements to locations for bus service.

Other Outreach

In an effort to further expand participation, Santee-Lynches staff made themselves available to present the **Forward 2045** planning effort to various community groups, including Rotary Clubs, Kiwanis Clubs, and other civic organizations. The presentation included overview of area transportation factors, as well as a description of the mechanisms for providing input.

Survey

A public survey distributed to the general public provided the project team with information on a variety of topics. The questionnaire was made on the Internet and via printed format on June 1, 2018 and was available online until August 31, 2018. The 11-question survey asked a variety of questions on all aspects of the transportation network. In addition, respondents were given the opportunity to offer feedback using an interactive map. The survey results were combined with information obtained during the public workshops, stakeholder sessions, council meetings, and other contacts made during the public engagement process.

The results of this effort helped to direct the recommendations development process.

Top Three Transportation Problems

An important question from the survey asked to identify their top three transportation problems. The responses indicated that the three most significant concerns were:



This indicates that priority should be given to system preservation and mobility projects.

What are the top THREE (3) transportation problems you are most concerned with?

36,956
 TOTAL ENGAGEMENT
 IMPACT

Poor Pavement Condition 269	Lack of Public Transportation 179	Safety 159	
	Lack of biking/walking options 163	Traffic Congestion 112	Commute 49
			Other 21

Top Three Areas for Transportation Investment

Another question asked those same respondents to identify areas where resources should be directed, via a top three preferred investment areas scenario. The responses indicated that the three most desired areas were:



Interestingly, though bicycling and walking infrastructure and pavement condition were cited as areas of concern in the previous question, survey participants chose to prioritize new road construction and widening as well as safety improvements for funding instead. However, public transportation remained consistent as a concern and area for priority funding.

What are the top THREE (3) transportation investments you prefer to be funded in the Region?

New Roads/ Widenings 209	Public Transportation 179	Maintenance and Preservation 143	Sidewalks and Crosswalks 139
	Safety Improvements 168	Bike Lanes and Trails 97	Other 24

Preferred Sources of Transportation Funding

Finally, the survey asked participants to identify sources of funding that they would support for transportation improvements in the region, based on a list of options provided. Responses indicated that the three most supported funding avenues were:



The responses indicate that there is generally a willingness to consider alternative methods of funding needed improvements, as only 18% of respondents indicated that they would not support additional funding of some kind

Which of the following sources you support to fund transportation improvements?

Public-Private Partnerships 170	Impact Fees on Developers 120	Increased Tax 66	I Do Not Support Additional Funding for Improvement 63
	Transportation Bonds 106	Tolls on Roads 55	
			Other 16

Final Result

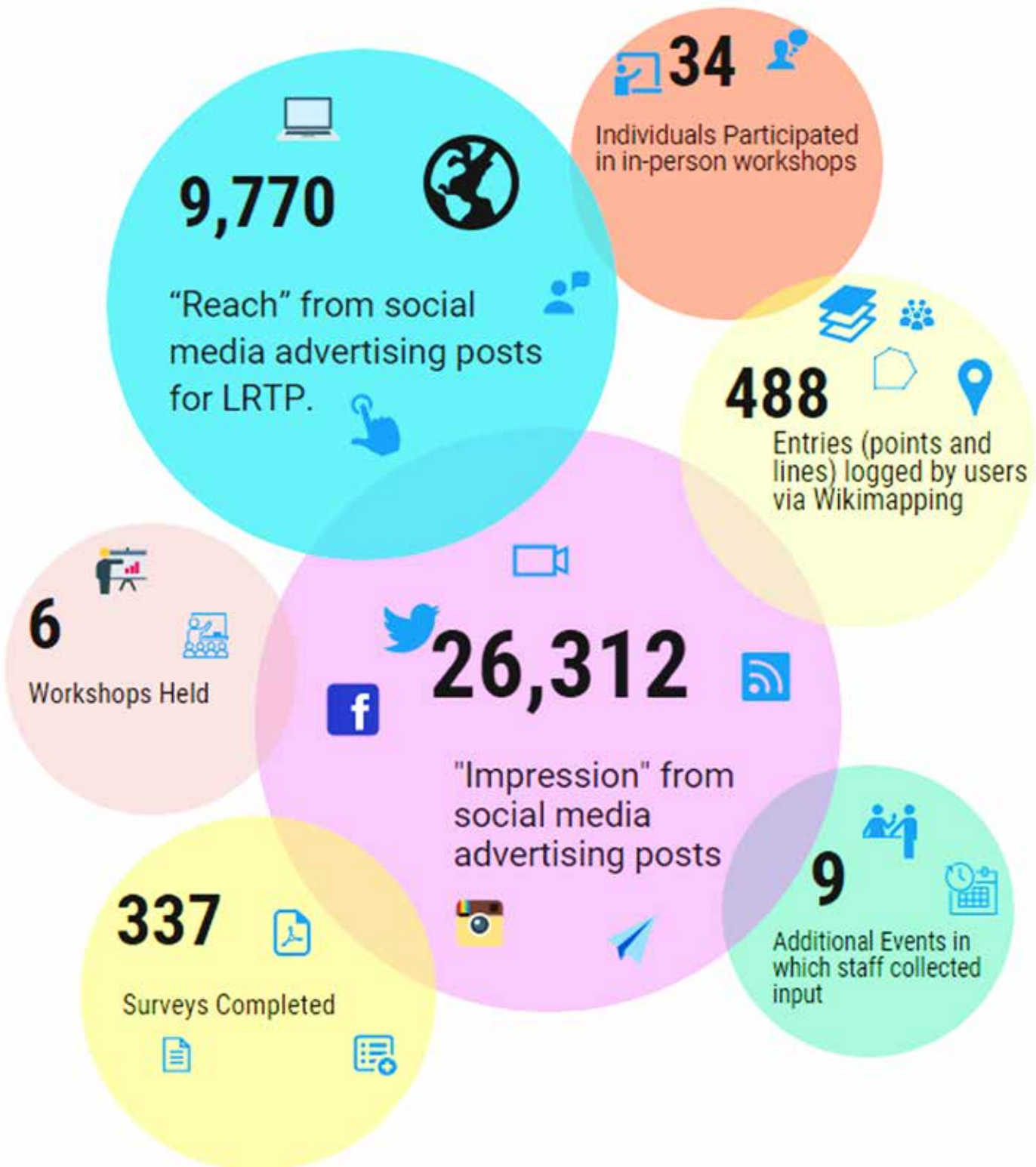


Figure 29: Public Engagement Final Result
 Source: Santee-Lynches COG



Chapter 4 Region Overview

REGION OVERVIEW

Introduction

Population

Economy

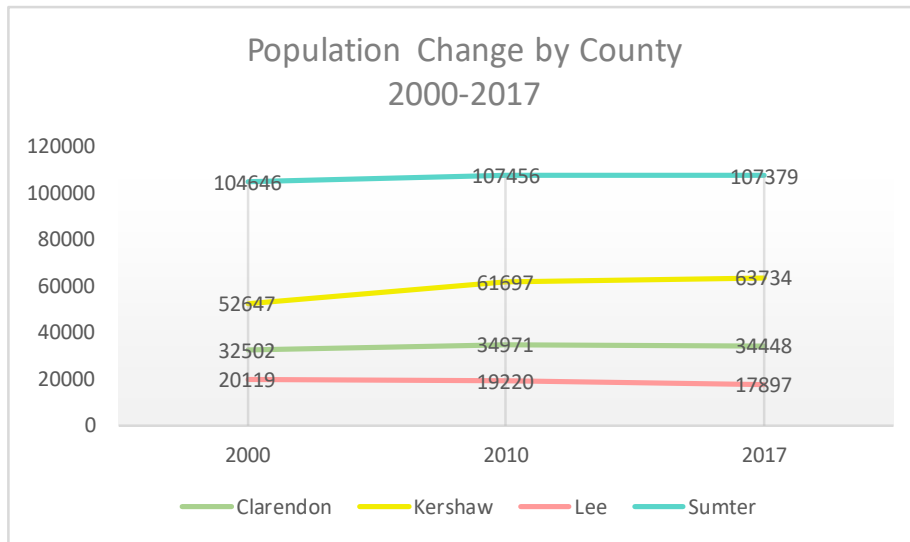
Environment

Chapter

4

As part of ensuring that *Forward 2045* sets reasonable and necessary goals that improve the Santee-Lynches Transportation Planning Area; it is first important to understand what is happening in the area, and how that will drive future transportation needs. This section highlights existing conditions and trends that can help predict the region's future transportation needs, and how the challenges or opportunities that might arise along the way should be addressed. The information found in this section serves as a basis for all goals and strategies that follow in the *Forward 2045* plan.

Table 1: Clarendon, Kershaw, Lee, Sumter County Demography
Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates



Population

Forward 2045 ultimately seeks to improve the lives of Santee-Lynches region residents through improved mobility. The needs of these individuals predicate what will be required of future transportation improvements. Access to jobs, education, entertainment, and healthcare are crucial when creating a transportation plan. Reflecting these needs allows *Forward 2045* to create concise, achievable goals that can help make the Santee-Lynches region more prosperous and a desirable place to live for current and future generations.

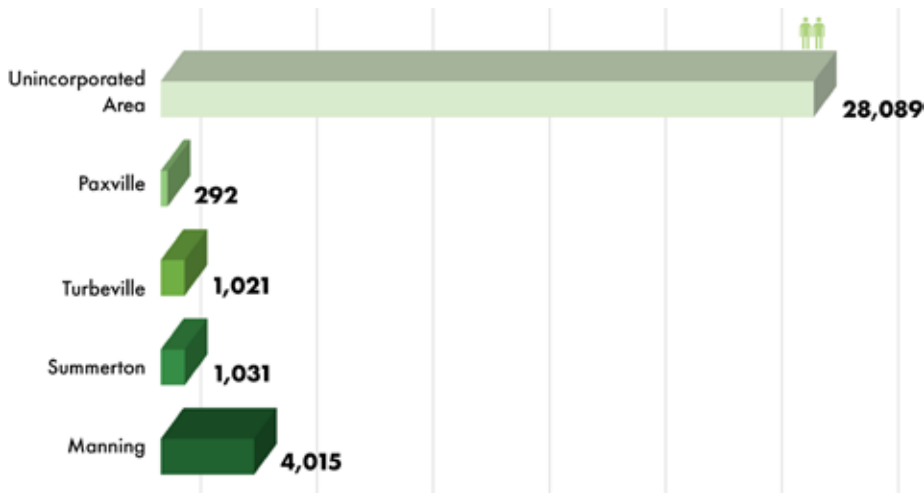


Table 2: Clarendon County Population
Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates



Clarendon County

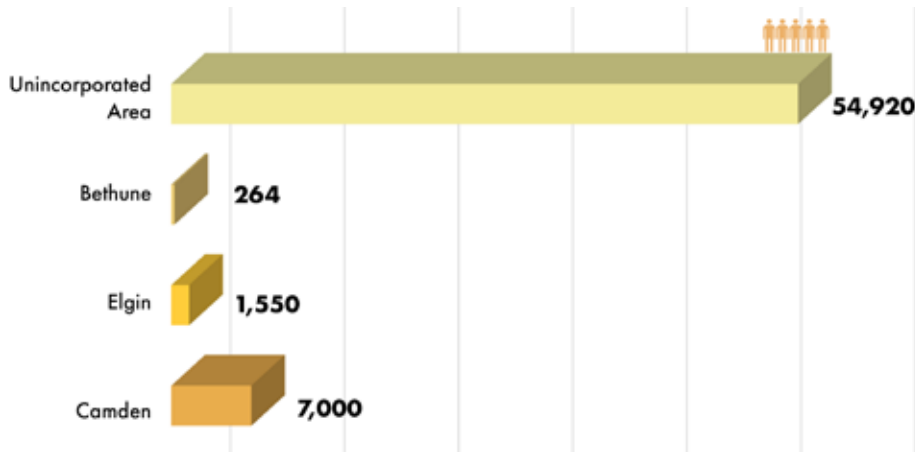


Table 3: Kershaw County Population
 Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates



Kershaw County

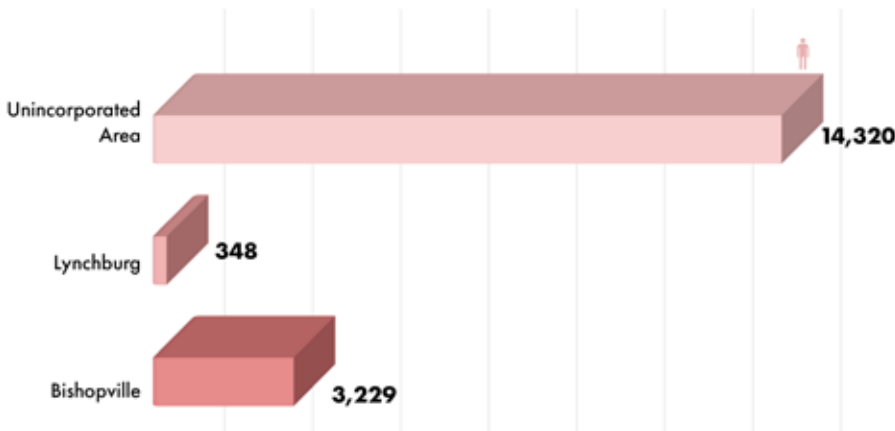


Table 4: Lee County Population
 Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates



Lee County

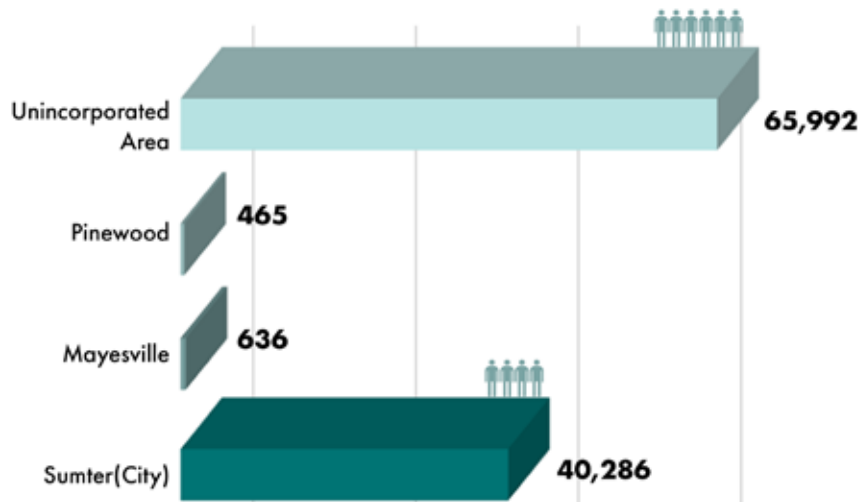


Table 5: Sumter County Population
 Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates



Sumter County

Population Growth

Between 2000 and 2017 the Santee-Lynches region saw around a 6% growth rate. This level of growth raised the population of the region from around 210,000 to slightly over 223,000 individuals in this time frame, with most growth occurring before 2010. This growth has not been universal in the region, however, with western Kershaw County experiencing the largest increase at 1,200 individuals; while Lee County as a whole declined by 3,000 people, or just under 14% of its total population. These numbers indicate what has been apparent in the region for nearly a decade: rural areas are declining as people move towards major population centers for more opportunity. These conclusions are also supported in the next section.

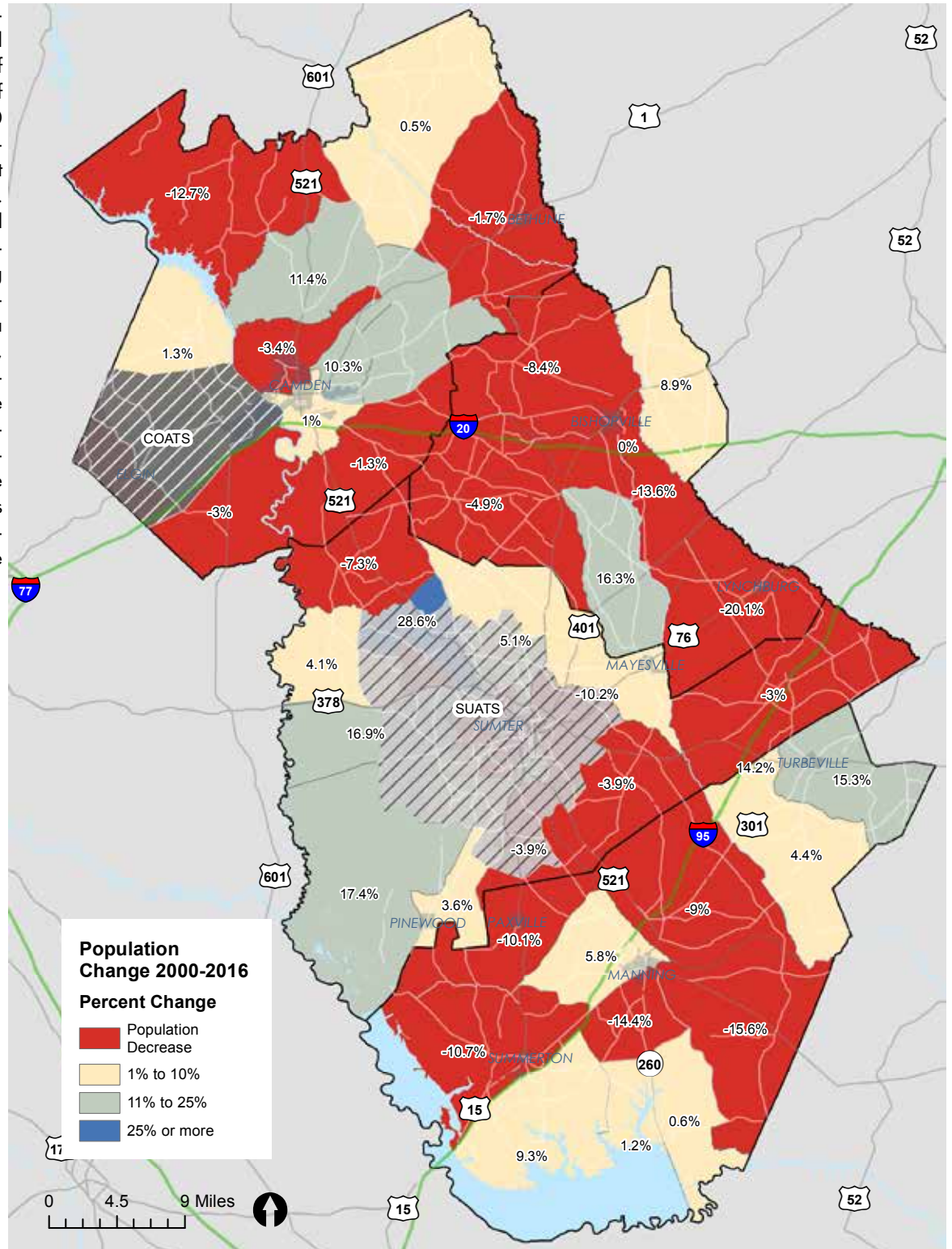


Figure 30: Population Change Map
Source: Santee-Lynches COG

Population Density

The distribution of the population of the Santee-Lynches transportation planning area varies greatly. There are some areas, in northern Kershaw County near Lake Wateree for instance, in the region with as few as 14 individuals per square mile. That number can increase to up to just over 350 people per square mile on the Eastern side of the city of Camden. As expected, the areas around Camden and Sumter are the densest populated in the region, with most of the rural areas and smaller municipalities having fairly low-density figures.

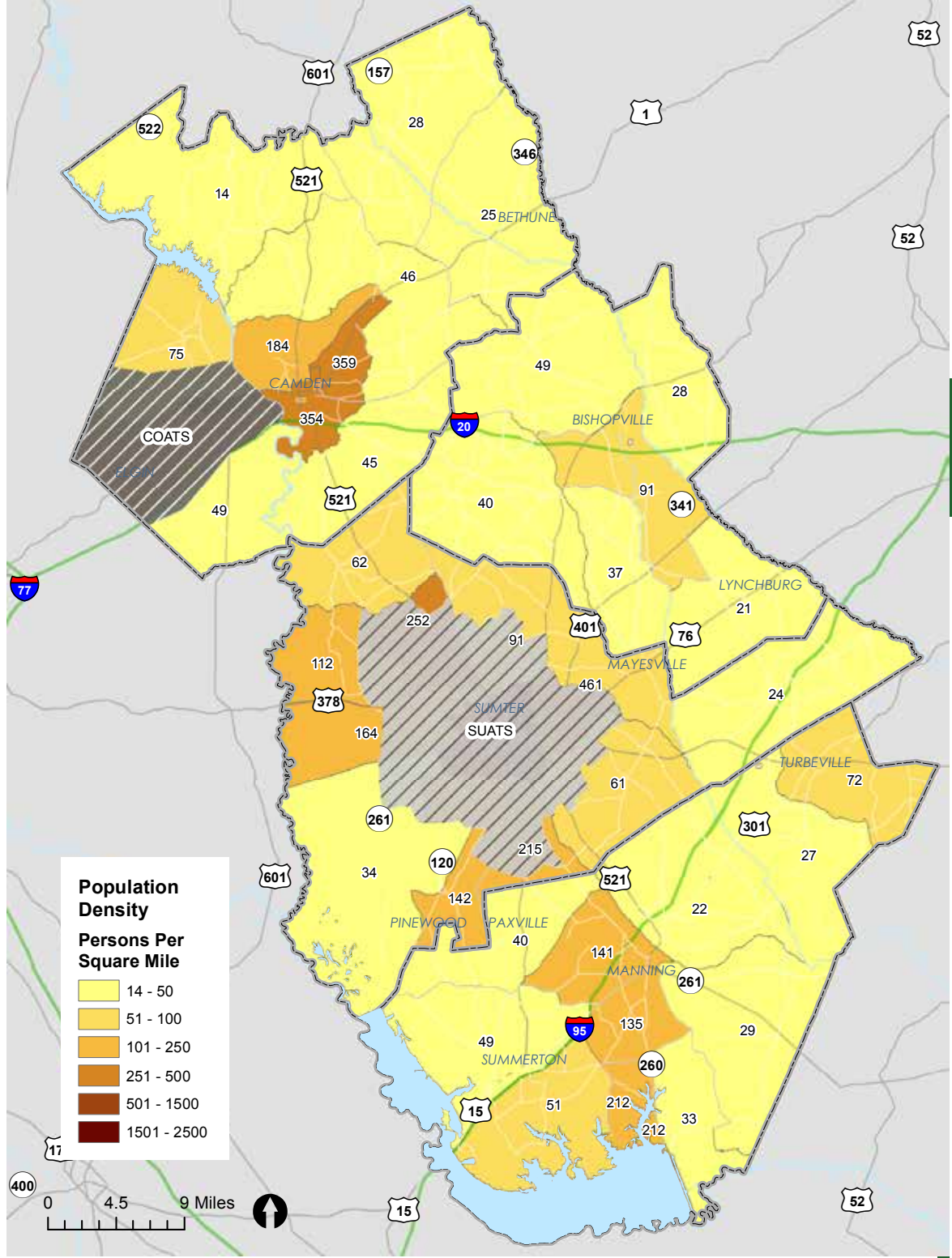


Figure 31: Population Density Map
 Source: Santee-Lynches COG

Demographic Trends

Age is important to understand when planning for transportation because individuals over 65 and under 18 represent a significant portion of the population who may need their travels needs addressed more directly, through features such as public transportation, than those between those ages who may be able to travel more independently. The population of the Santee-Lynches Region, in general, is aging. Each of the four counties in the region has experienced an increase in its median age since 2010. Clarendon County is the most drastic example of this change with the median age for the county rising by nearly four years from 41.4 to 45 in the last 8 years. This could possibly be explained by the development around Lake Marion becoming a popular retirement destination for seniors in the area. Sumter has been and remains the youngest county of the four with a median age of 36.4 as of 2017 ACS estimates. However, like Lee and Clarendon Counties, Sumter has seen a decrease in the number of individuals under the age of 18 living in the county. This means that there are fewer children who need transportation to school and home in most of the region, freeing up resources in both the roadways and local public transportation systems at typically peak travel times. Kershaw County is the only one with a growing population of children, again likely driven by proximity to the Columbia metropolitan area.

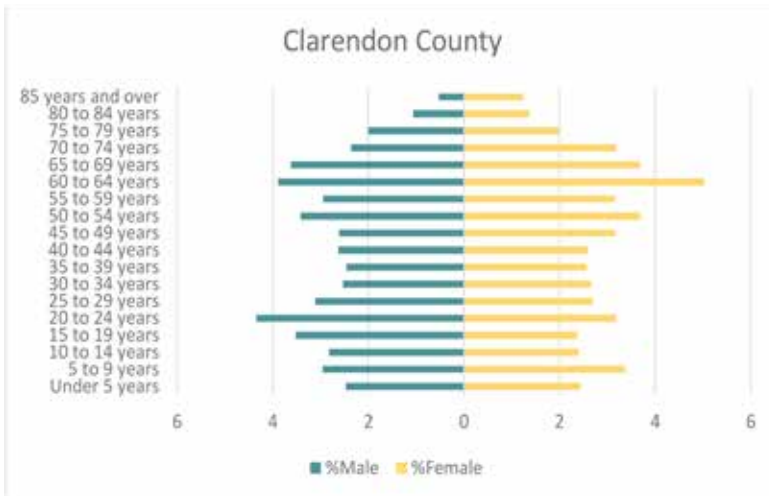


Figure 32: Clarendon County Population
Source: Jobs EQ

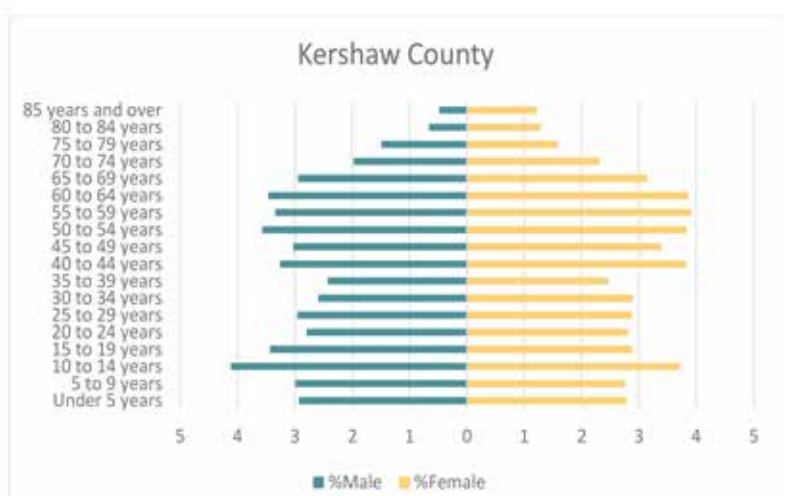


Figure 33: Kershaw County Population
Source: Jobs EQ

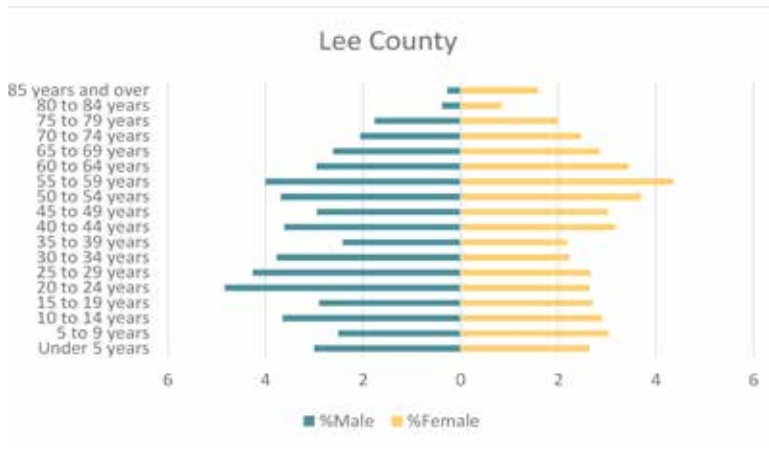


Figure 34: Lee County Population
Source: Jobs EQ

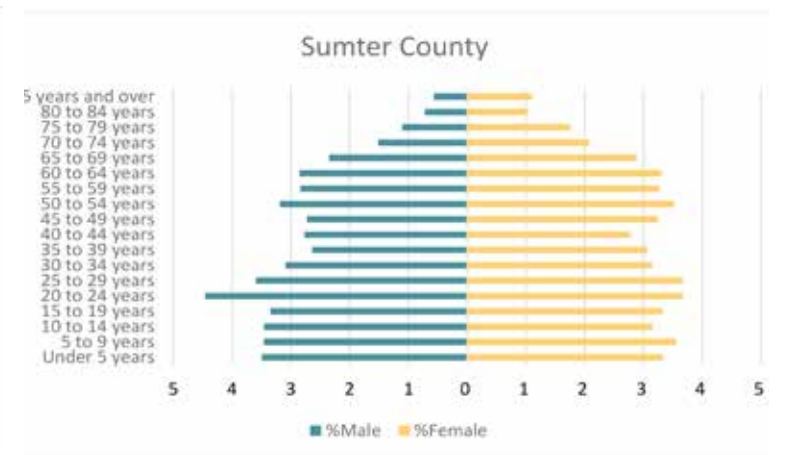


Figure 35: Sumter County Population
Source: Jobs EQ

Race/Ethnicity

The area has a nearly even split in terms of minority and non-minority individuals. The non-white population of the region comprises 45.6% of all Santee-Lynches residents. In two counties, Clarendon and Lee, the non-white populations actually comprise the majority in each county at 51% and 65% respectively. The most heavily non-white populated areas occur to the direct near the Manning area in Clarendon County and between Bishopville and Lynchburg in Lee County.

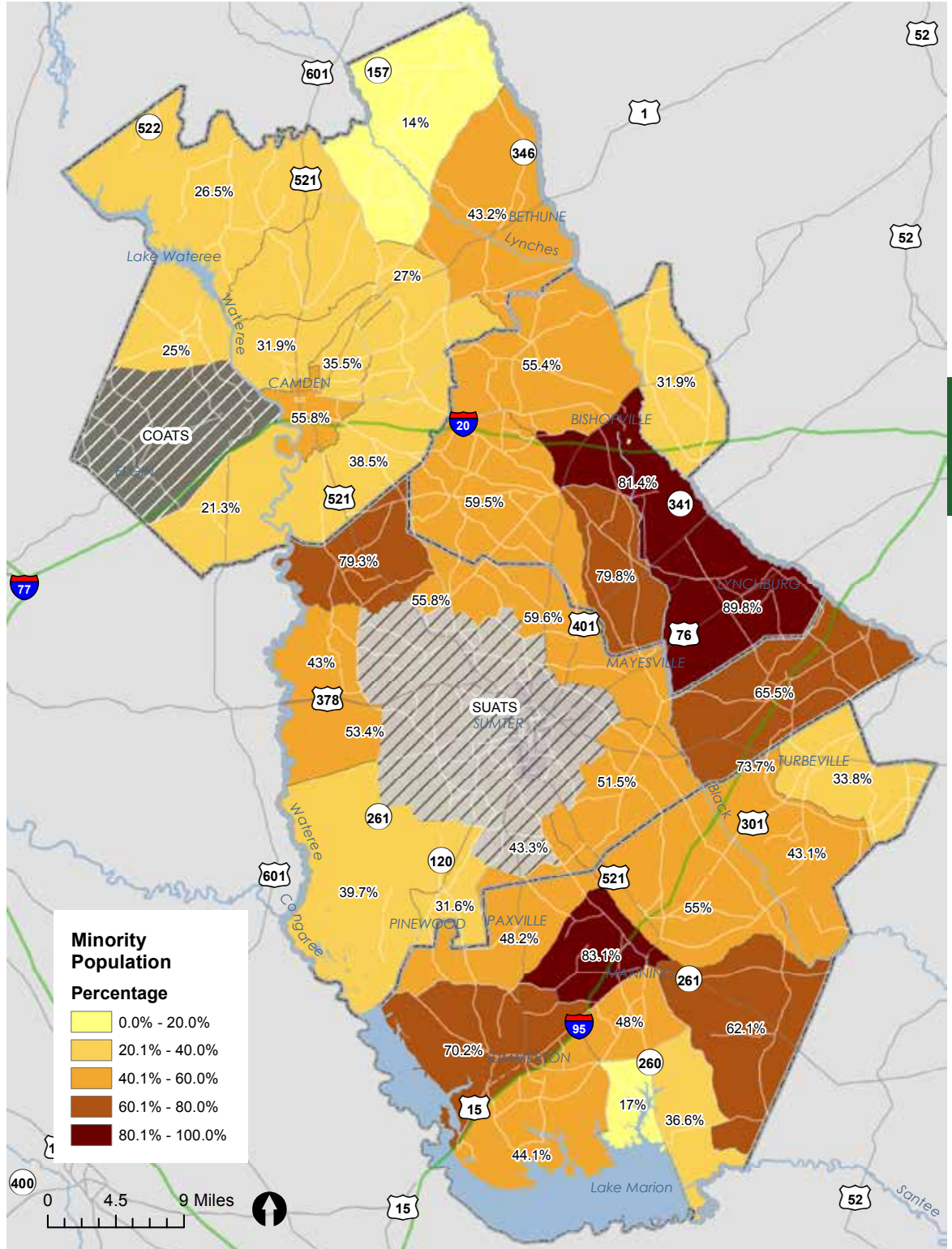


Figure 36: Minority Population Map
 Source: Santee-Lynches COG

Households without Access to Vehicle

Around 7.4% of all households in the Santee-Lynches region do not have access to a car. The highest concentrated areas of households with no vehicle occur near the west side of Sumter County and the southern regions of both Lee and Clarendon counties. The generally rural and sprawling nature of the Santee-Lynches region makes it difficult for travel without a vehicle. As such, these populations have a need for alternative forms of transportation.

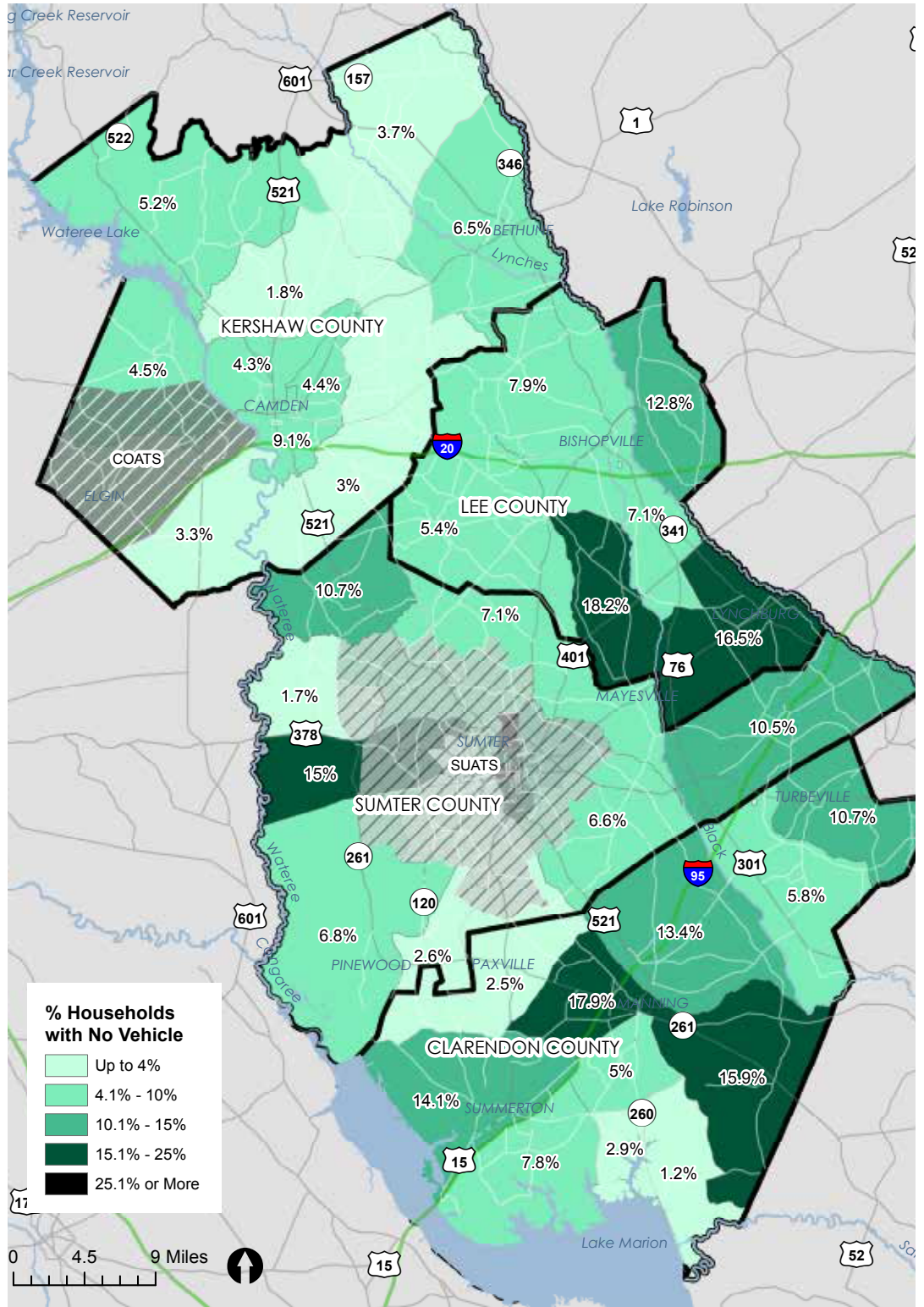


Figure 37: Percentage of Households with No Vehicle Map
Source: Santee-Lynches COG

Growth Trends and Projections

Growth in the Santee-Lynches region is expected to keep at a slow pace over the next 25 years. This map shows projected growth through 2045 by traffic analysis zone (TAZ) in the region. A TAZ is the most common unit of geographical division for transportation planning, and generally includes an area of less than 3,000 individuals. Most areas in the region are expected to see marginal growth or population decline. In fact, three out of the four counties in the region are expected to see a net population decline by 2045, with Kershaw County being the sole exception. Only select areas, mainly around the municipalities and Lake Marion, are expected to see growth between 400 and 1000 people. One area of significant growth is around Elgin and north of Lugoff in western Kershaw County. The growth in this area is driven by the expansion of suburban Columbia. For this reason this area is captured in the COATS MPO's transportation planning. Evaluation of the Region's roadway systems must focus on improving safety and connectivity, rather than addressing congestion, as it is not a significant driver of concern.

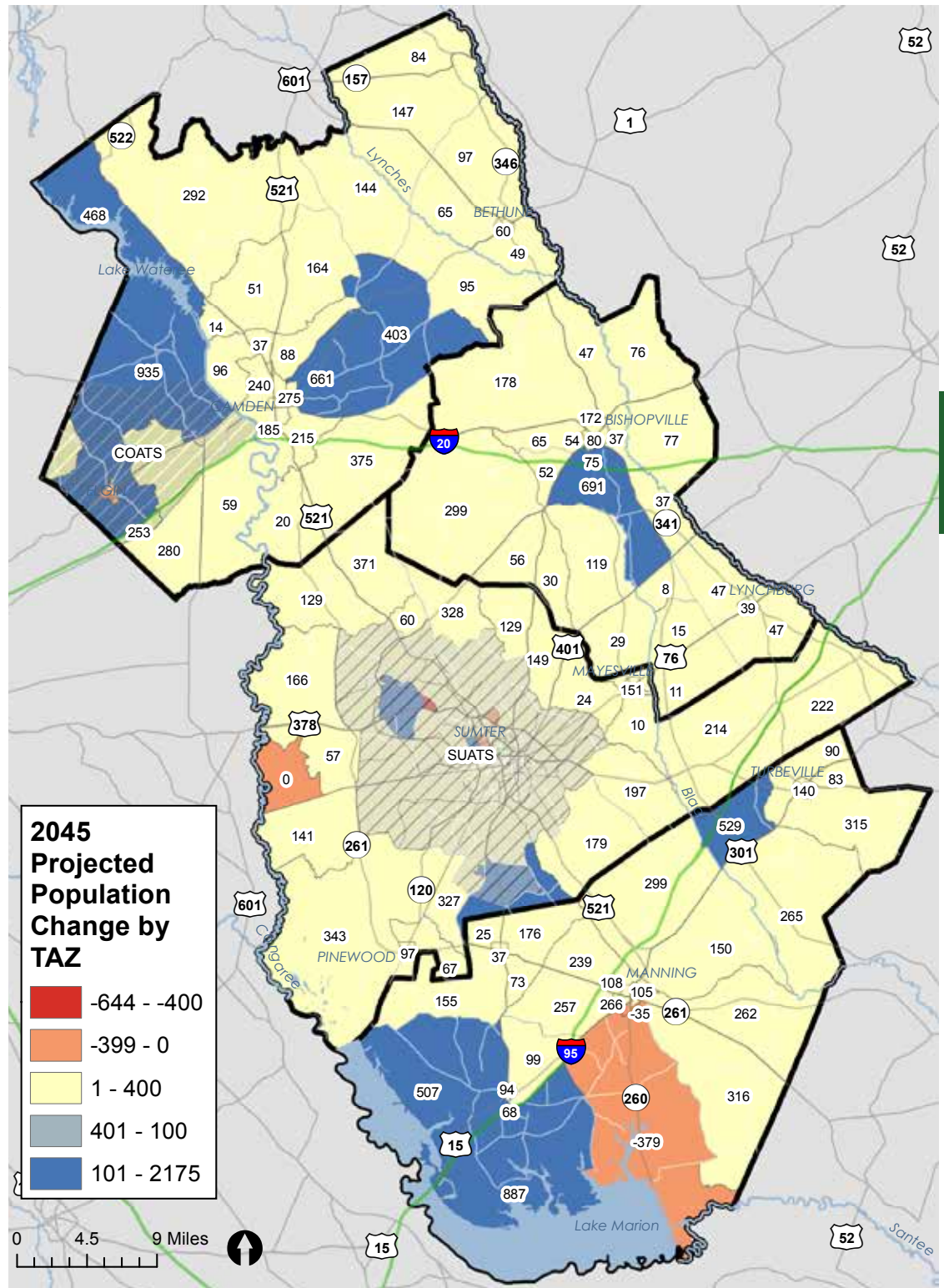


Figure 38: Projected Population Map
 Source: Santee-Lynches COG

The region's top industries by employment are: healthcare and social assistance, manufacturing, retail trade, accommodation and food services, and educational services. Together, these industries represent nearly 61% of all employment in the Santee-Lynches region and drive the region forward economically as a whole. All five of these sectors have seen growth over the past decade, with food services growing at the fastest rate of 4%. Moving forward, it will be important to support these industries through transportation efforts to maintain this growth and continue improving the region's economy.



Industry (NAICS Code)

	2011	2016	Change in Jobs
Healthcare & Social Assistance (62)	10,593	11,153	▲ 5.3%
Manufacturing (31)	9,771	10,520	▲ 7.7%
Retail Trade (44)	8,749	9,522	▲ 8.8%
Accommodation & Food Services (72)	4,919	6,363	▲ 29.4%
Educational Services (61)	5,970	6,199	▲ 3.8%
Admin., Waste Mgmt., & Remediation Services (56)	3,380	5,358	▲ 58.5%
Public Administration (92)	5,355	4,819	▼ -10.0%
Construction (23)	4,093	3,954	▼ -3.4%
Other Services (except Public Administration) (81)	3,894	3,871	▼ -0.6%
Transportation & Warehousing (48)	2,071	2,022	▼ -2.4%

Agriculture (Farm to Market)

24% of land in the Santee-Lynches Region is identified as cropland, or areas ideal for agricultural production. As such, agri-business is a major industry and influencer of the economy for the Region. For this, it is important to be aware of operating farms and timber lands in the area and how their transportation needs might be met to continue their prosperity in our region.

County	Farms	Acreage in Farms	Market Value of Products Sold	State Rank (Market Value of Products Sold)
Clarendon County	422	173,865	\$139 Million	4 out of 46
Kershaw County	483	82,877	\$147 Million	3 out of 46
Lee County	386	142,449	\$118 Million	12 out of 46
Sumter County	515	176,002	\$130 Million	7 out of 46
Total	1,806	575,193	\$535 Million	

Table 6: Agriculture Economic
Source: 2012 USDA Census of Agriculture

Employment Concentrations/ Major Employers

Most employment opportunities in the Santee-Lynches Region are concentrated in or around the region's 4 major cities: Sumter, Camden, Bishopville and Manning all contain the most concentrated centers for jobs in the region and their respective counties. Another key, and growing, job center is on the west side of Kershaw County in the Lugoff-Elgin area, locally known as West Wateree. These identified areas employ a majority of the workers in the Santee-Lynches Region, and as such special attention must be paid to their transportation needs in order to ensure safe and efficient travel for the region's workers. This will not only make the daily lives of these workers better, but can work to attract new employment opportunities to the area by showing a strong transportation network for moving of goods and services.

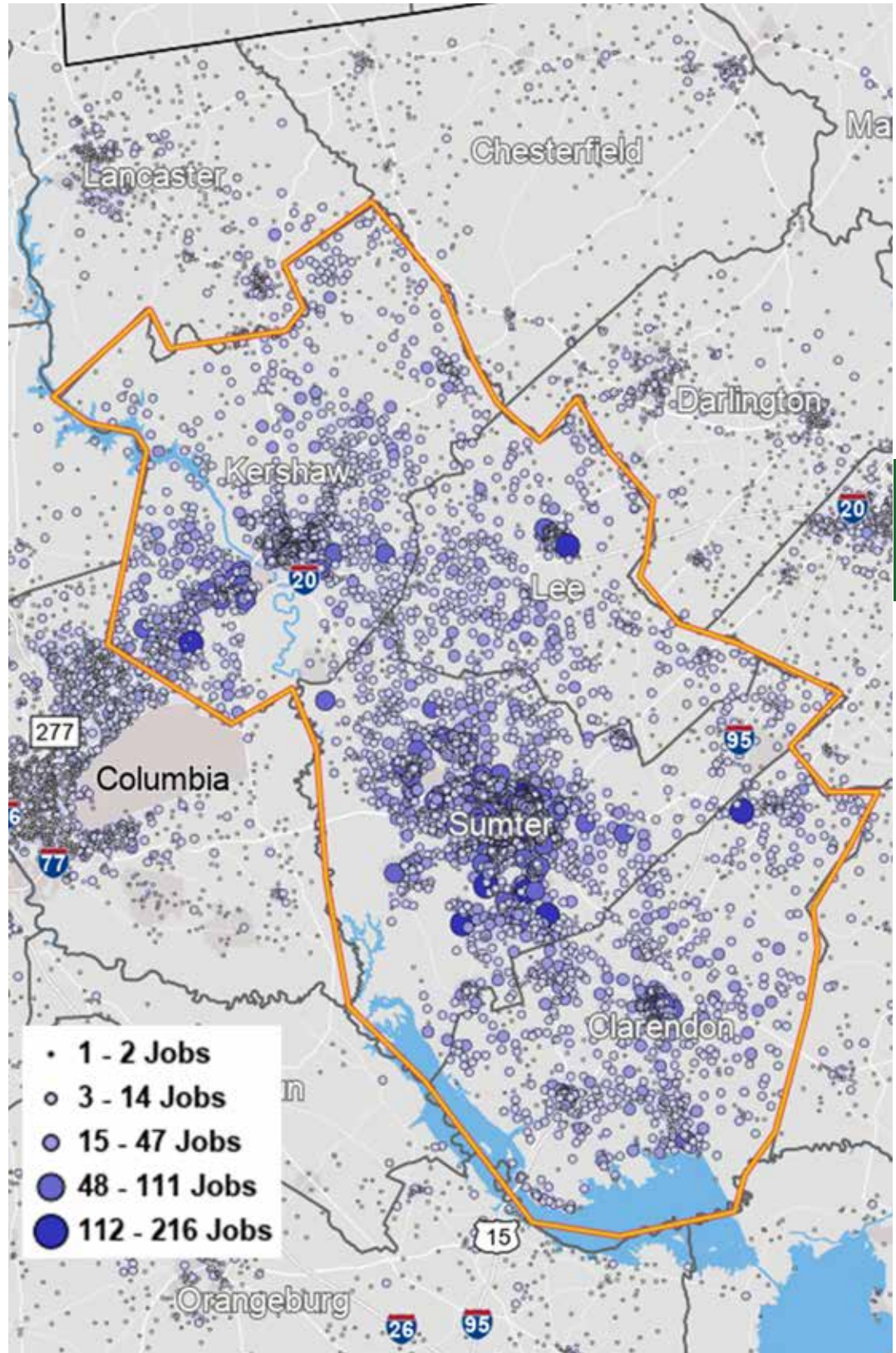


Figure 39: Job Concentration
 Source: <https://onthemap.ces.census.gov/>

Commuting Patterns

There are currently 84,793 workers living in the Santee Lynchess Region. 50.3% (42,615) of workers commute outside the region for work while 49.7% (42,178) both live and work within the region. These numbers show that, while there is significant employment opportunity in the region, many Santee-Lynchess residents rely on employment centers that surround the region, particularly Columbia and Florence. This creates significant demand for commuter routes of the region's roadway system, such as US-378 and US-1.

There are currently 63,516 jobs in the Santee Lynchess region. Of those jobs, 66.4% (42,178) are filled by residents that live in the region, while outside commuters make up the remaining 33.6%.

Commuters in the region also tend to travel alone to their place of employment. 84.7% of Santee-Lynchess region commuters travel through driving alone; this number is slightly higher than the state and national averages average for solo commuting. The geographic size of the region and low population density make it difficult for alternative modes of travel to succeed.

Job Counts by Distance/Direction in 2015

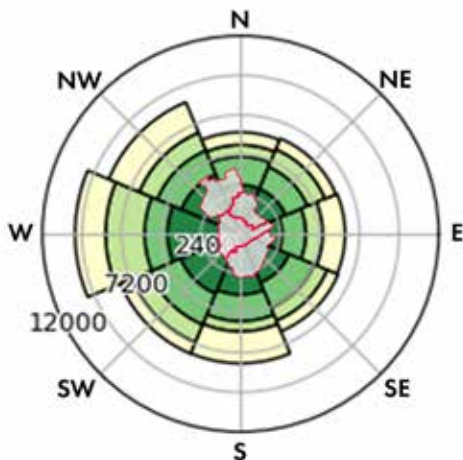


Figure 40: Job Counts by Distance/Direction in 2015
Source: <https://onthemap.ces.census.gov/>

Inflow/Outflow Job Counts in 2015



Figure 41: Inflow and Outflow Job
Source: <https://onthemap.ces.census.gov/>

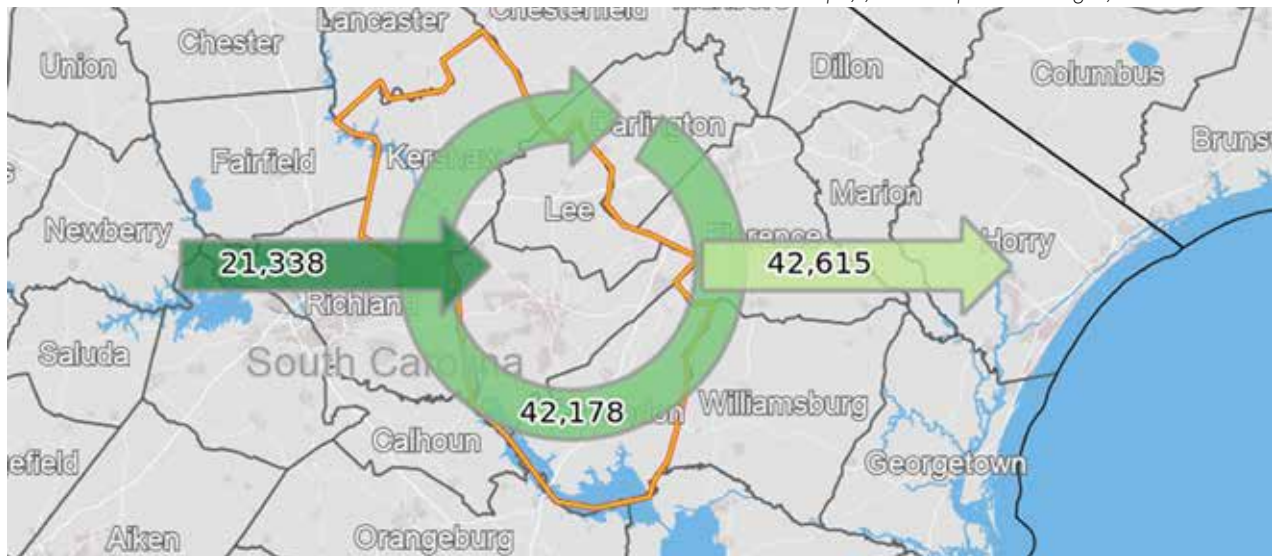


Figure 42: Inflow and Outflow Worker Travel Direction
Source: <https://onthemap.ces.census.gov/>

Poverty

At the most recent measure, 20.3% of Santee-Lynches households live below the poverty threshold. This number has been hovering around this point for more than a decade, with recent trends keeping the percentage of individuals in poverty at or above 19% since 2010. Areas of high concentration of poverty include: north and south of the City of Sumter, northeast of Camden, around Manning in Clarendon County, and throughout central Lee County. These populations are likely to be in most need of transportation assistance, and play a significant role in the development of *Forward 2045*.

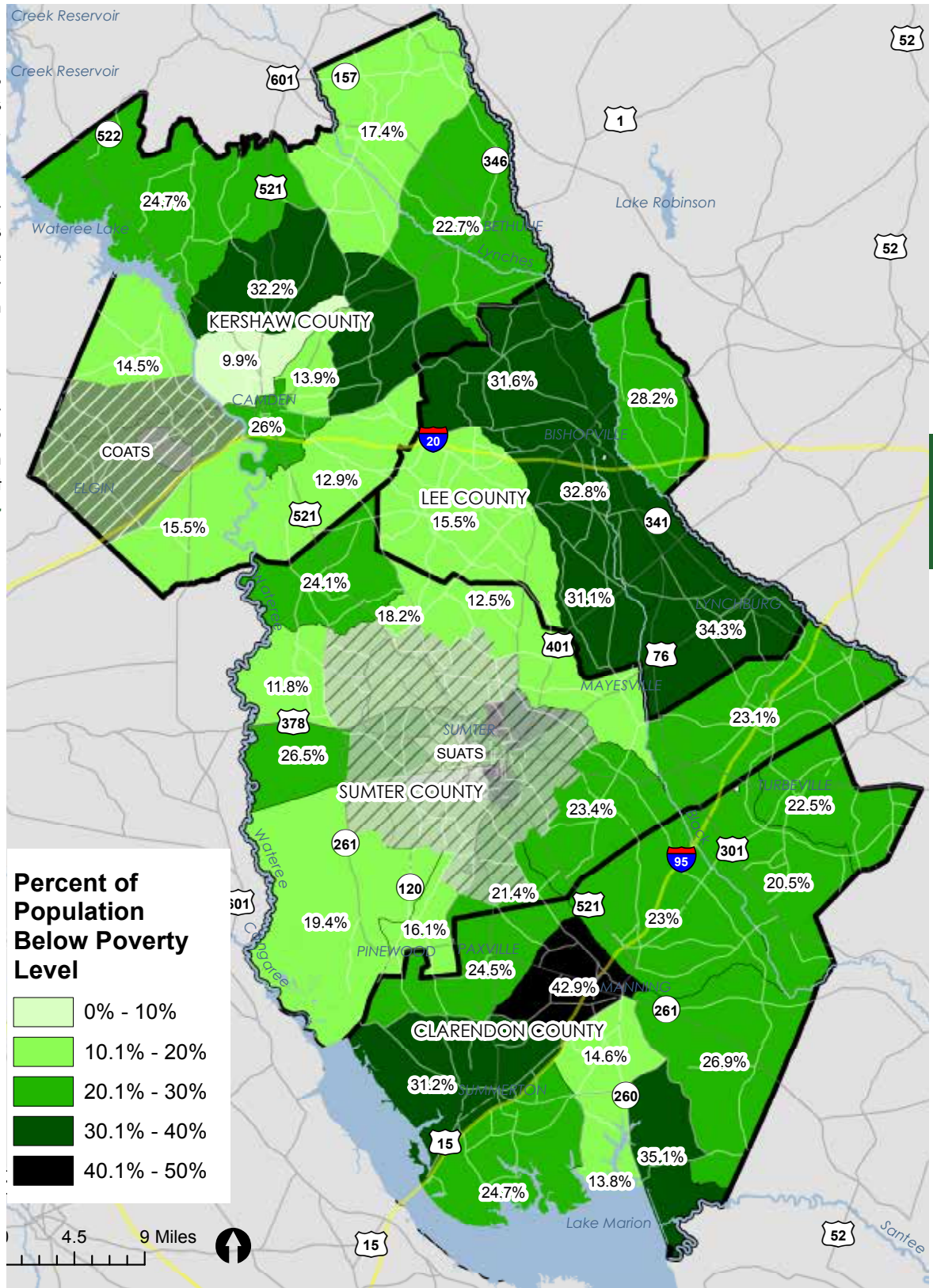
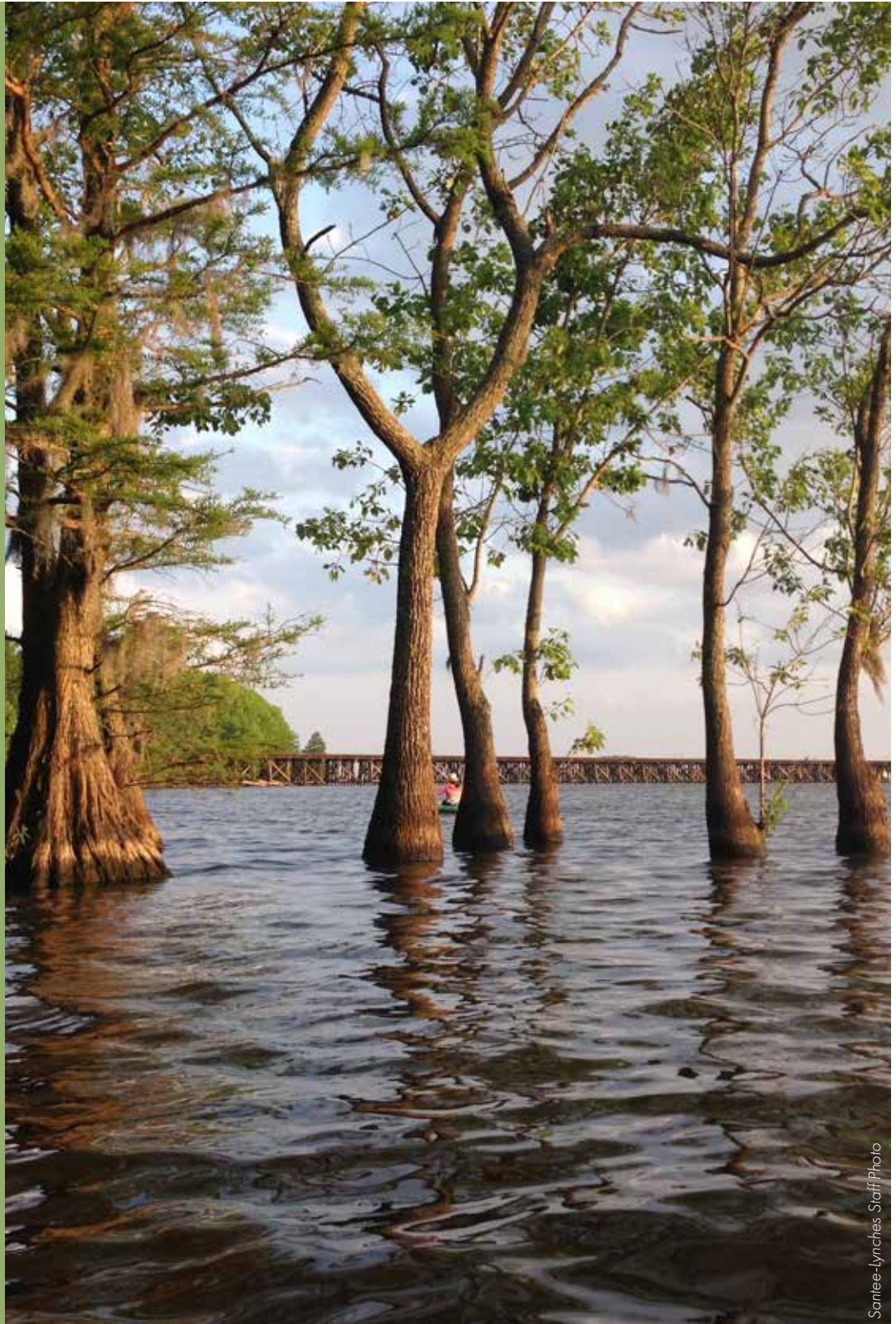


Figure 43: Percentage of Population Below Poverty Map
Source: Santee-Lynches COG

Environment

In ensuring and promoting the prosperity of a region it is not only important to protect and service the individuals who live there, but also protect and maintain the natural assets around them and connect individuals to nature, rather than destroy it for the purpose of progress. As such, *Forward 2045* has taken inventory of some of the most important natural assets that the Santee-Lynches Region has to offer and should be consider while continuing to develop the transportation network. This section makes note of these features for the purpose of incorporating their protection and promotion into the overall plan.



Santee-Lynches Staff Photo

Figure 44: Lake Marion at Packs Landing

Green Infrastructure

In 2017 the Santee-Lynches Regional Council of Governments conducted a regional inventory of green infrastructure. Green infrastructure is defined as, “(a) natural life support system – an interconnected network of waterways, wetlands, woodlands, wildlife habitats, and other natural areas; greenways, parks, and other conservation lands; working farms, ranches and forests; and wilderness and other open spaces that support native species, maintain natural ecological processes, sustain air and water resources and contribute to the health and quality of life for America’s communities and people.” Green infrastructure is becoming an important feature in planning. The importance of having this interconnected network of natural assets is becoming more and more apparent to protect quality of life for both residents and the environment as a whole. In the coming years, Santee-Lynches and other regions across the nation must take into account these intact natural habitats when making transportation decisions and make efforts to protect and preserve them for generations to come.

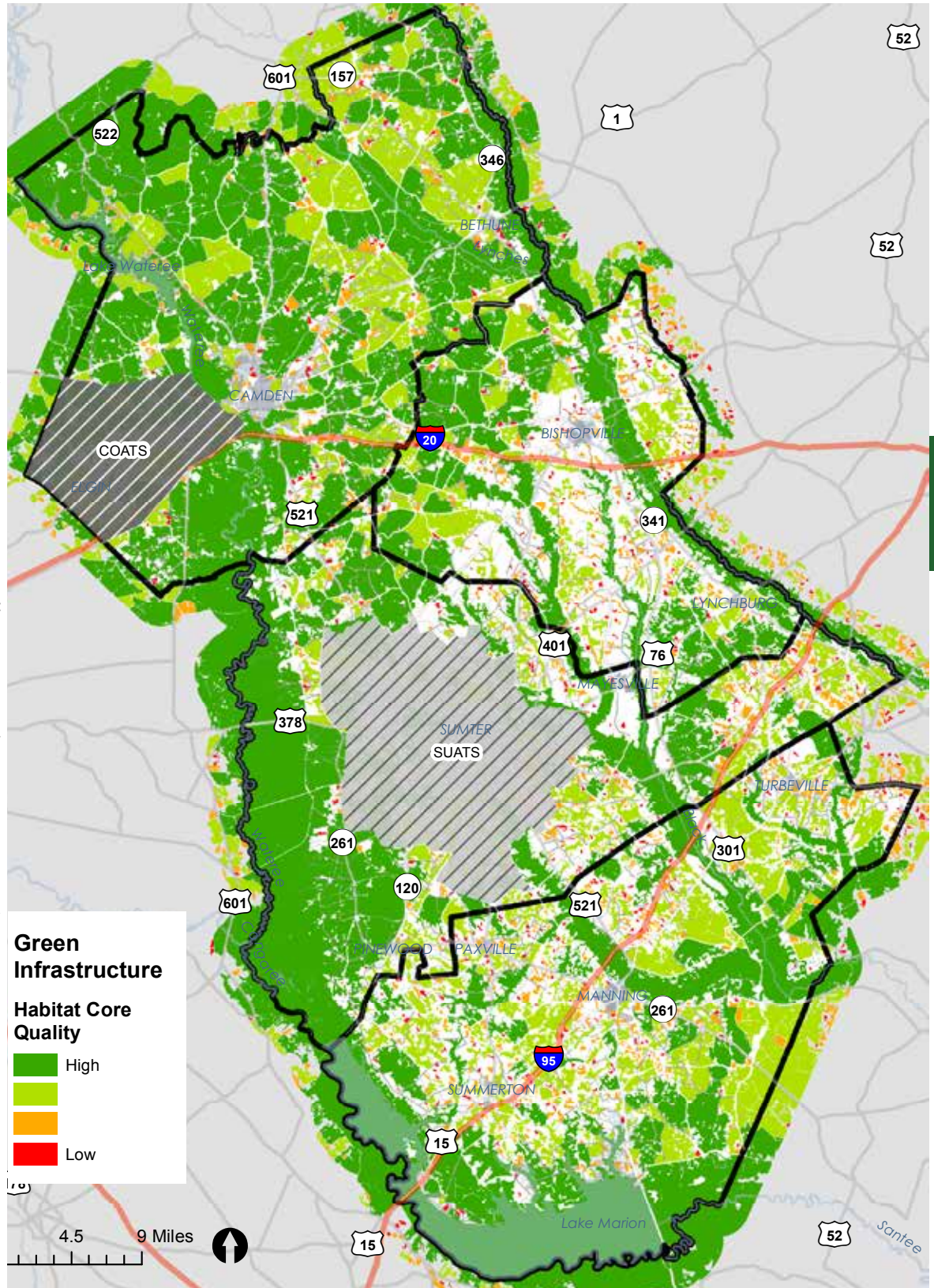


Figure 45: Green Infrastructure Map
 Source: Santee-Lynches COG

Natural/Recreational/ Cultural Assets

These assets represent specific locations in the region that have been identified for their significance to the environment, residents, or visitors of the Santee-Lynches Region. Special consideration must be taken for these areas as there may be higher volumes of traffic demand than expected or special conservation considerations that must be put in place. These locations may also present destination points for bike and pedestrian trails throughout the region.

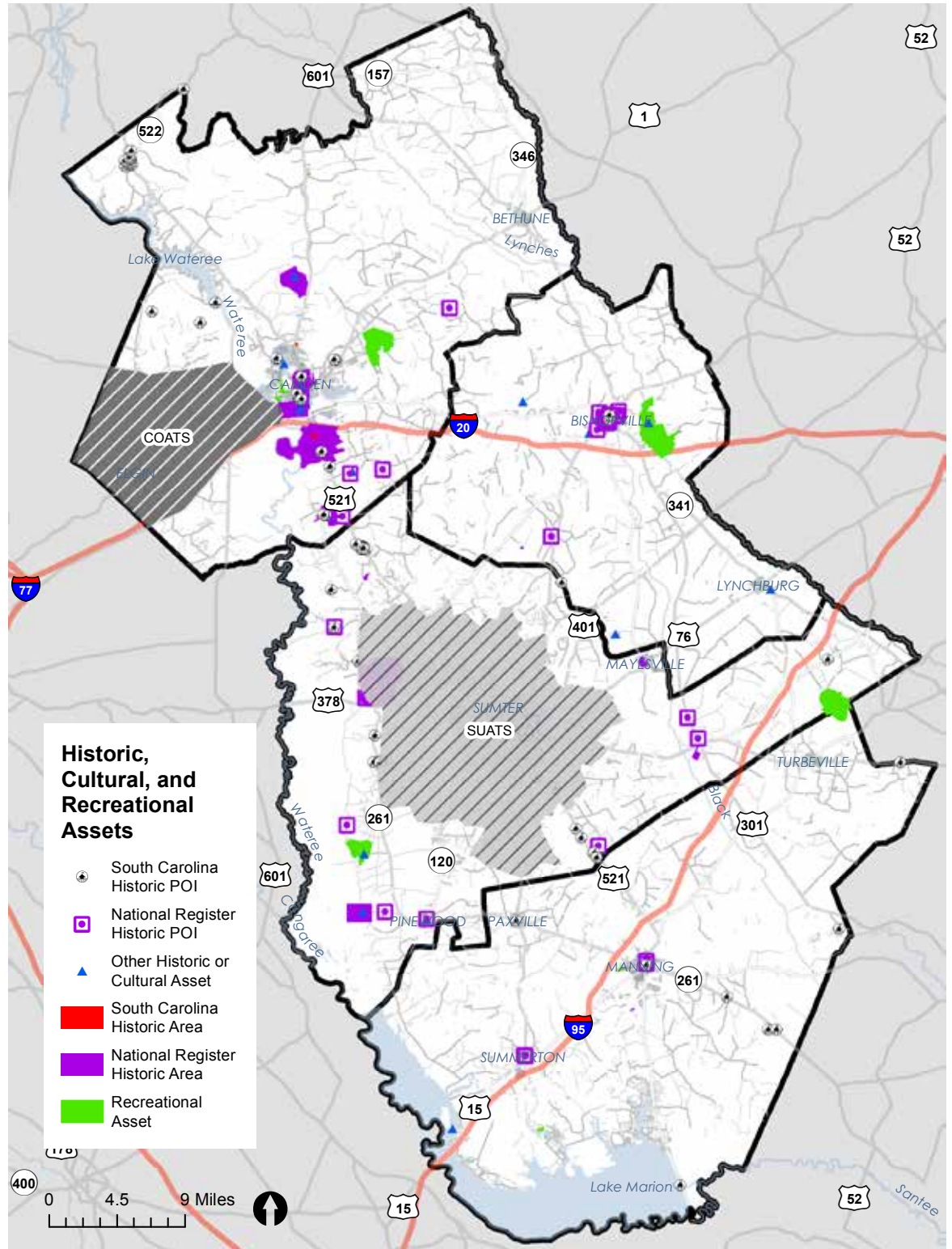


Figure 46: Cultural Resources Map
Source: Santee-Lynches COG

Wetlands

24% of the Santee-Lynches Region is classified as wetlands. Wetlands, present a unique challenge to planning in general, in that they are highly protected and under the jurisdiction of the U.S. Army Corp of Engineers (USACE). If at all possible, development in these areas should be avoided for two major reasons. First, development located within wetland boundaries are significantly more likely to face flooding and the issues that come with it. Secondly, wetlands provide locations for water runoff, helping reduce the likelihood of flooding in other areas that could end up underwater if appropriate drainage is not available.

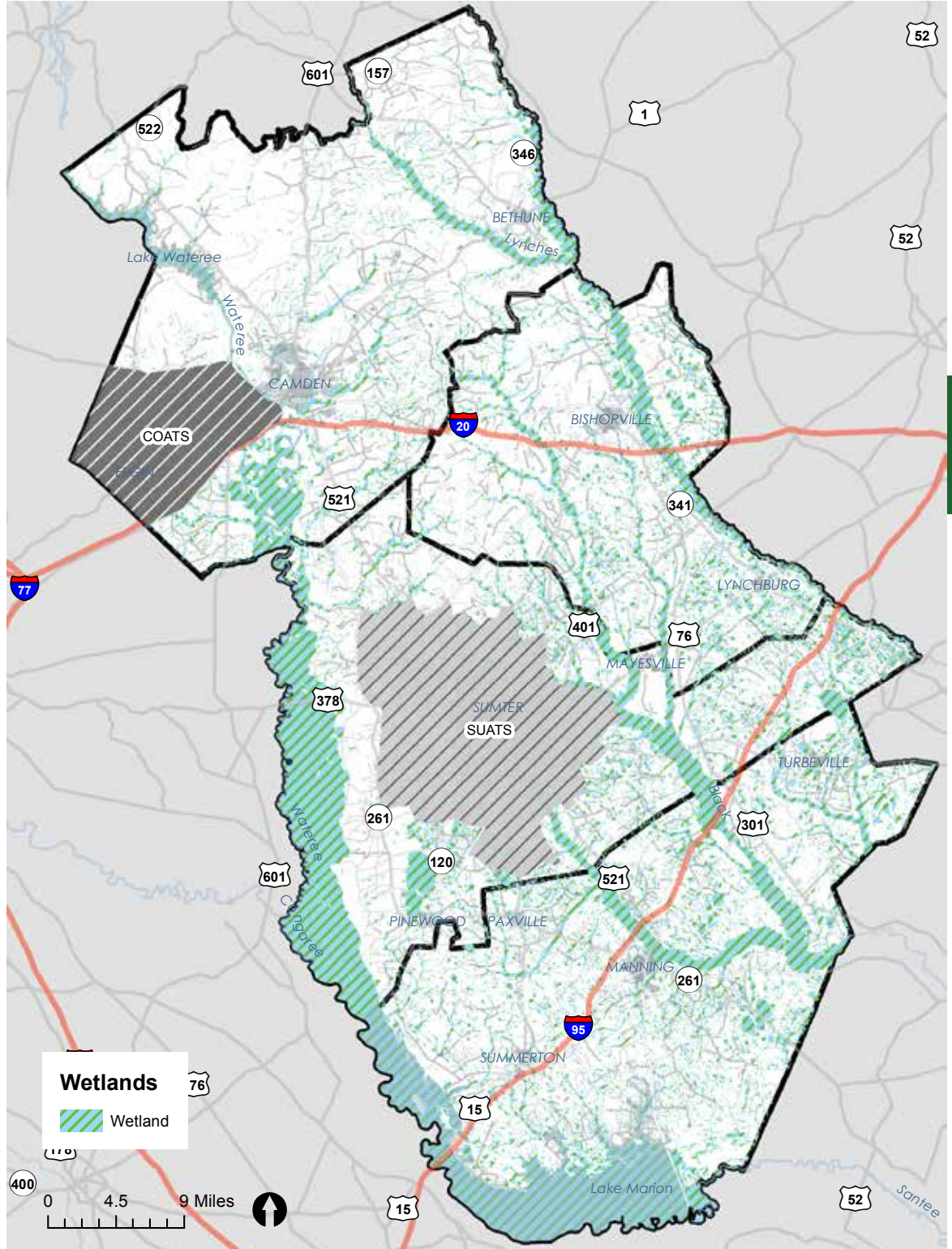
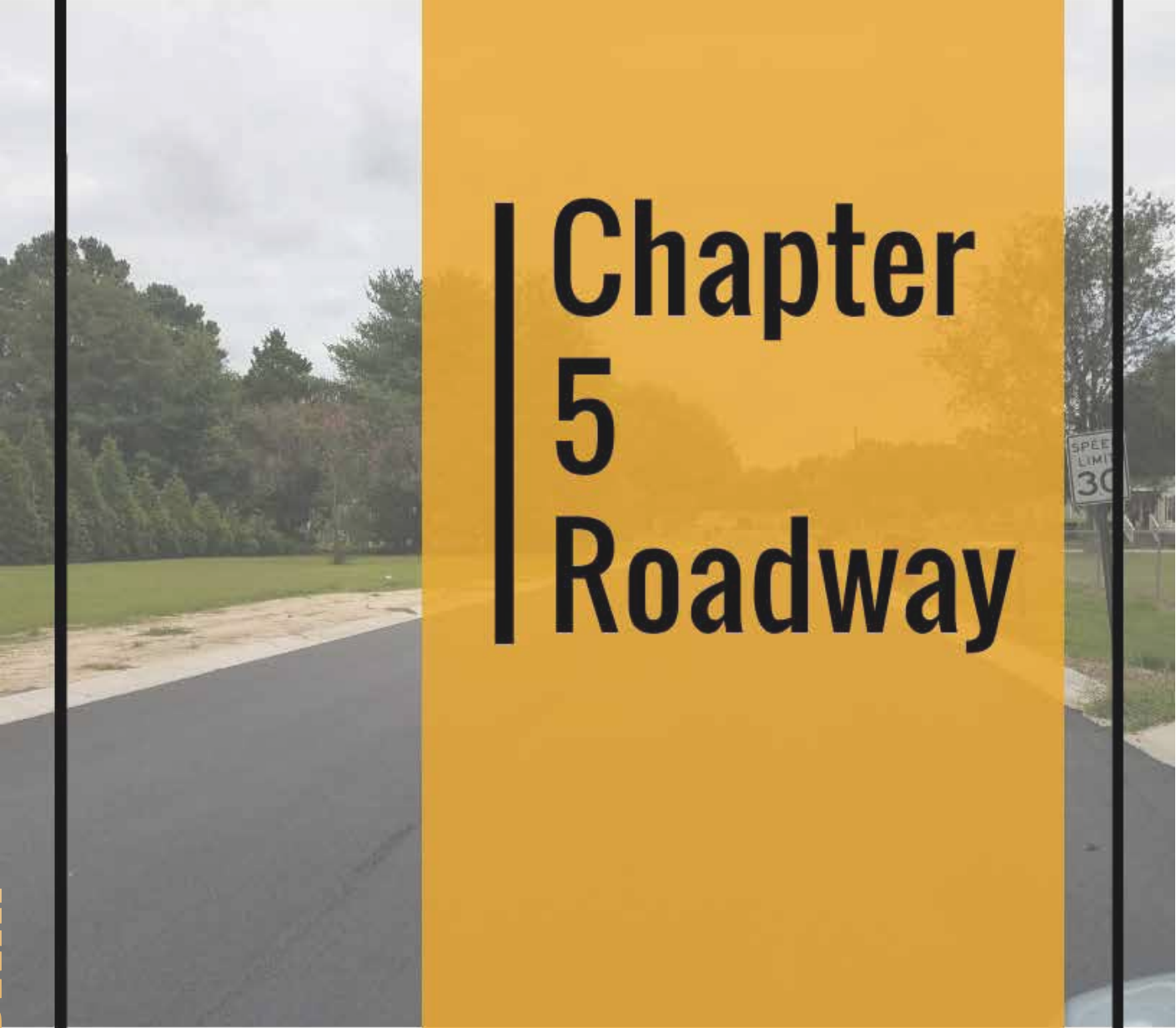


Figure 47: Wetland Map
 Source: Santee-Lynches COG



Chapter 5 Roadway

ROADWAY

Introduction

Network

Traffic

Population Growth

Safety

Infrastructure Condition

Chapter

5

Currently, there are 5,832 centerline miles of paved roads in the Santee-Lynches Region.

The road network of the Santee-Lynches Region must work to adequately meet both the current and future needs of residents and businesses. This section of *Forward 2045* seeks to provide general trends of the road network for the Region, and provide insight on how issues or challenges to its future growth might be addressed. This is key not only to improve efficiency, but also provide opportunities for future economic growth by presenting a roadway system that will facilitate the movement of goods and services.



Network

Functional Classifications

The functional classification system for roadways categorizes roads by characteristic and purpose based on their importance to the transportation network of an area. This system has been adopted by the Federal Highway Administration (FHWA) and is used by engineers, planners, elected officials, and others to define the purpose and general characteristics of roads, and how they should be improved or used in the system. The road network in the Santee-Lynches transportation planning area currently has 4,456 functionally classified centerline miles of roadway.

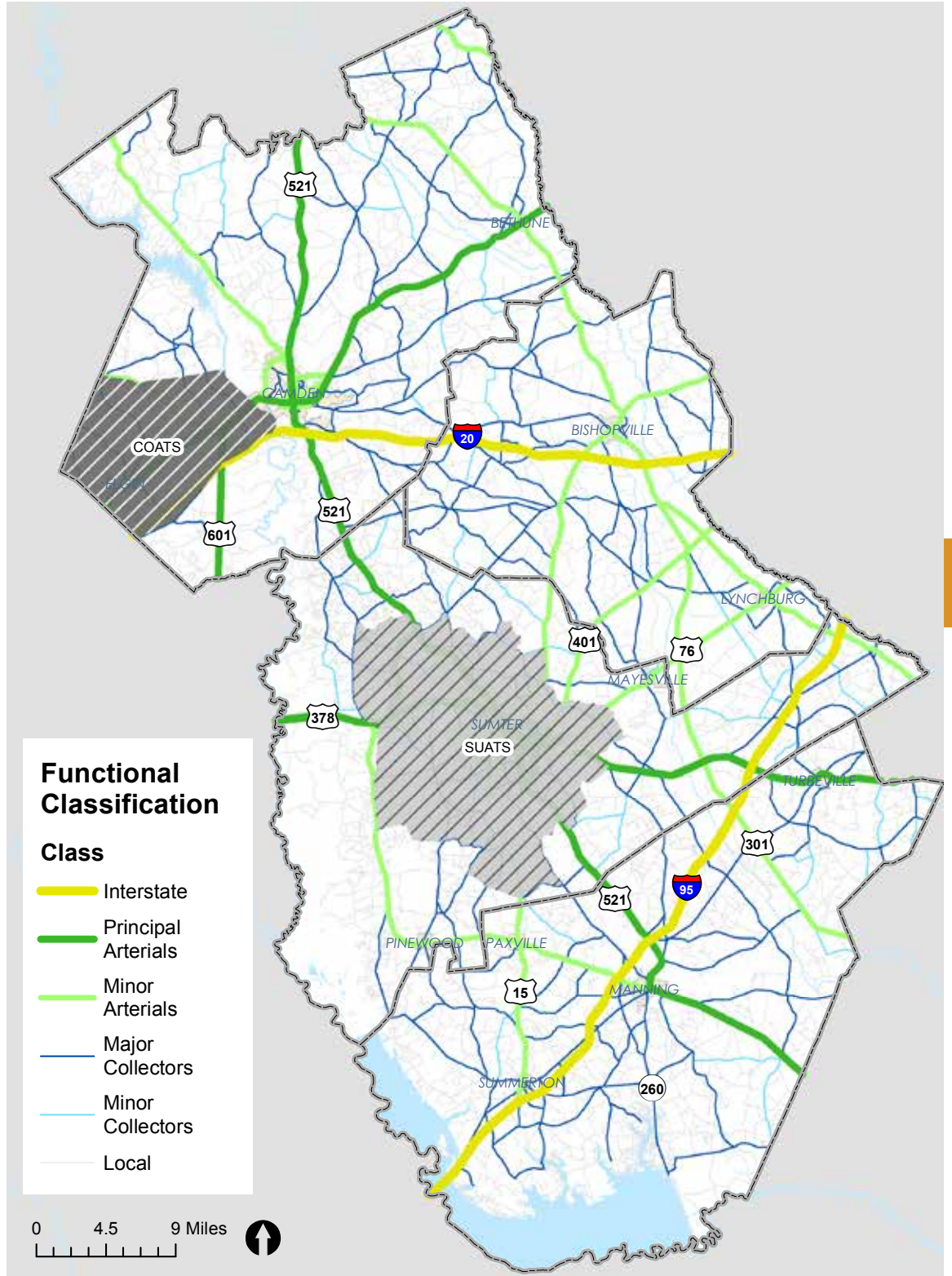


Figure 48: Roadway Classification Map
 Source: Santee-Lynches COG

Roadway Ownership

Currently, there are 5,832 centerline miles of paved roads in the Santee-Lynches region. 4,456 of these are covered by this document in the Santee-Lynches Transportation Area, while the remaining balance is subject to either COATS or SUATS planning jurisdictions. Of these roads, 2,890 centerline miles are owned, operated and maintained by SCDOT while the remaining 1,566 centerline miles are owned by the respective counties of their location. This impacts how these roads are maintained and possible funding structures that would fiscally allow those improvements.

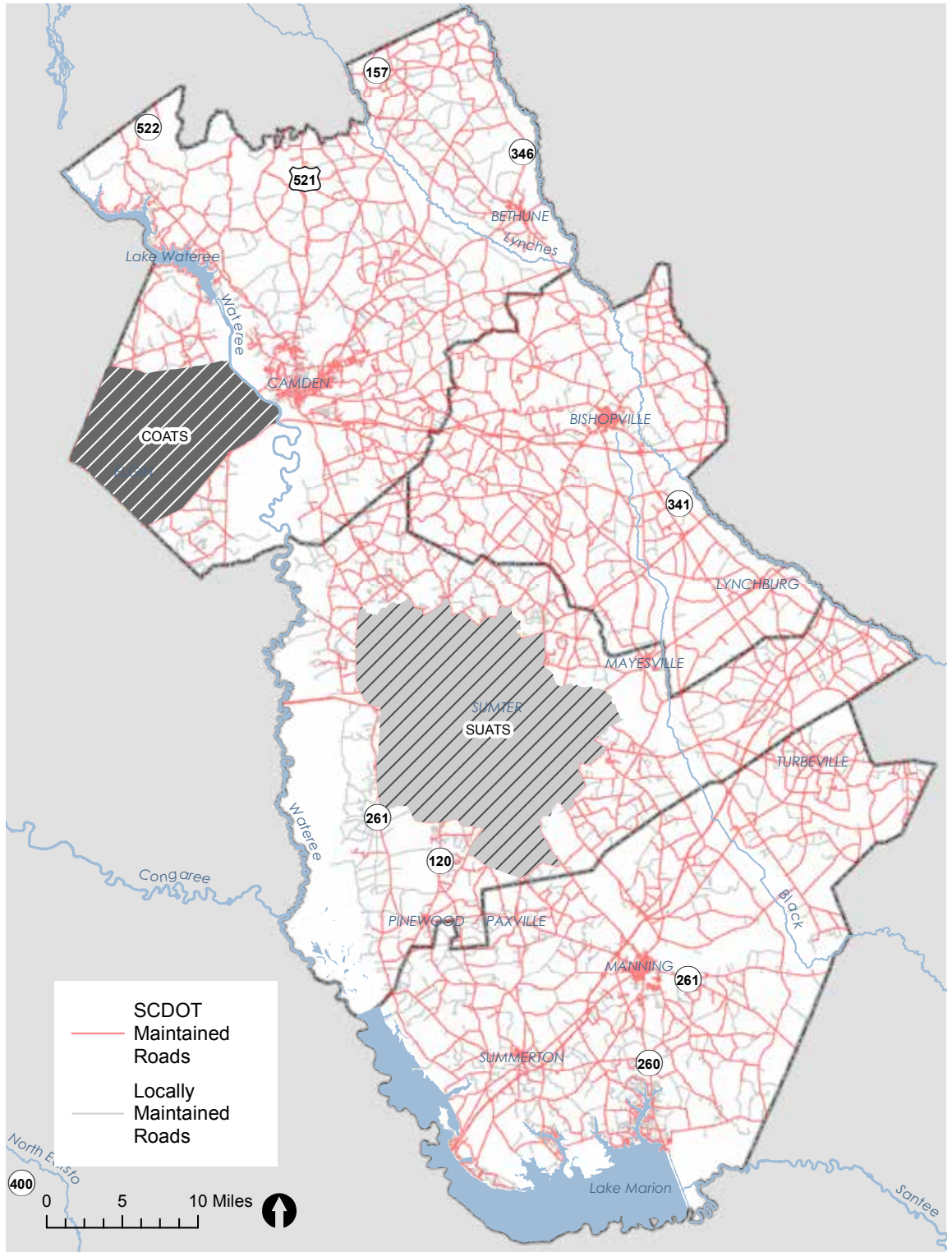


Figure 49: Roadway Ownership Map
Source: Santee-Lynches COG

Annual Average Daily Traffic

Annual Average Daily Traffic (AADT) is a measure of usage of roads based on daily traffic volume. Daily traffic in the Santee-Lynches Region ranges between 1 and 47,000 vehicles. The most traveled portion of road in the region is I-20 in the Lugoff-Elgin area of Kershaw County. This significant figure likely comes from a combination of through travelers on the interstate as well as local commuters traveling to and from the Columbia area. The rest of the roads in the region average fewer than 40,000 travelers per day. These figures are important when planning the future for the network, because heavily travelled areas may need improvement or preservation at a greater rate than less traveled roads.

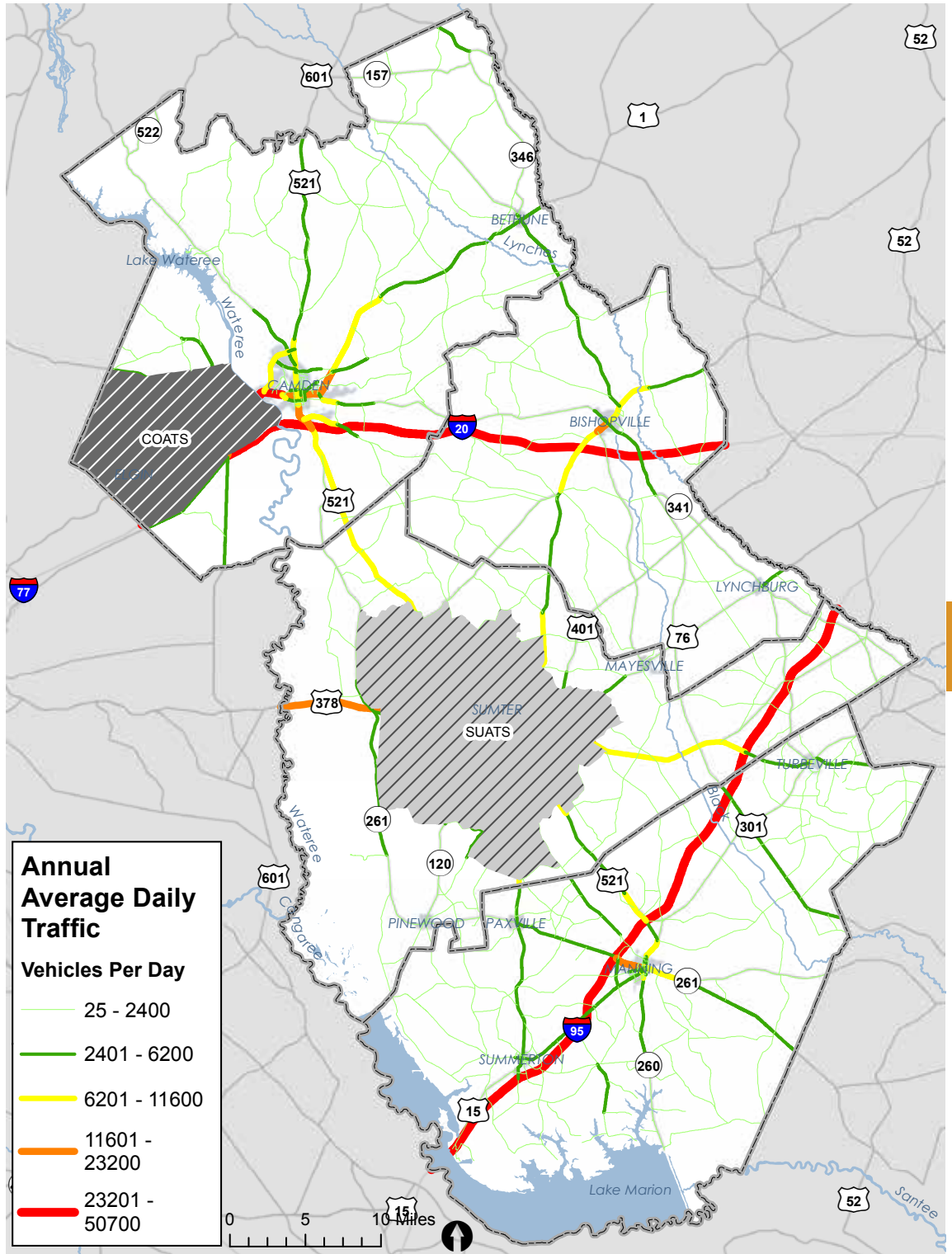


Figure 50: Annual Average Daily Traffic Map
 Source: Santee-Lynches COG

Annual Average Daily Traffic-City of Camden

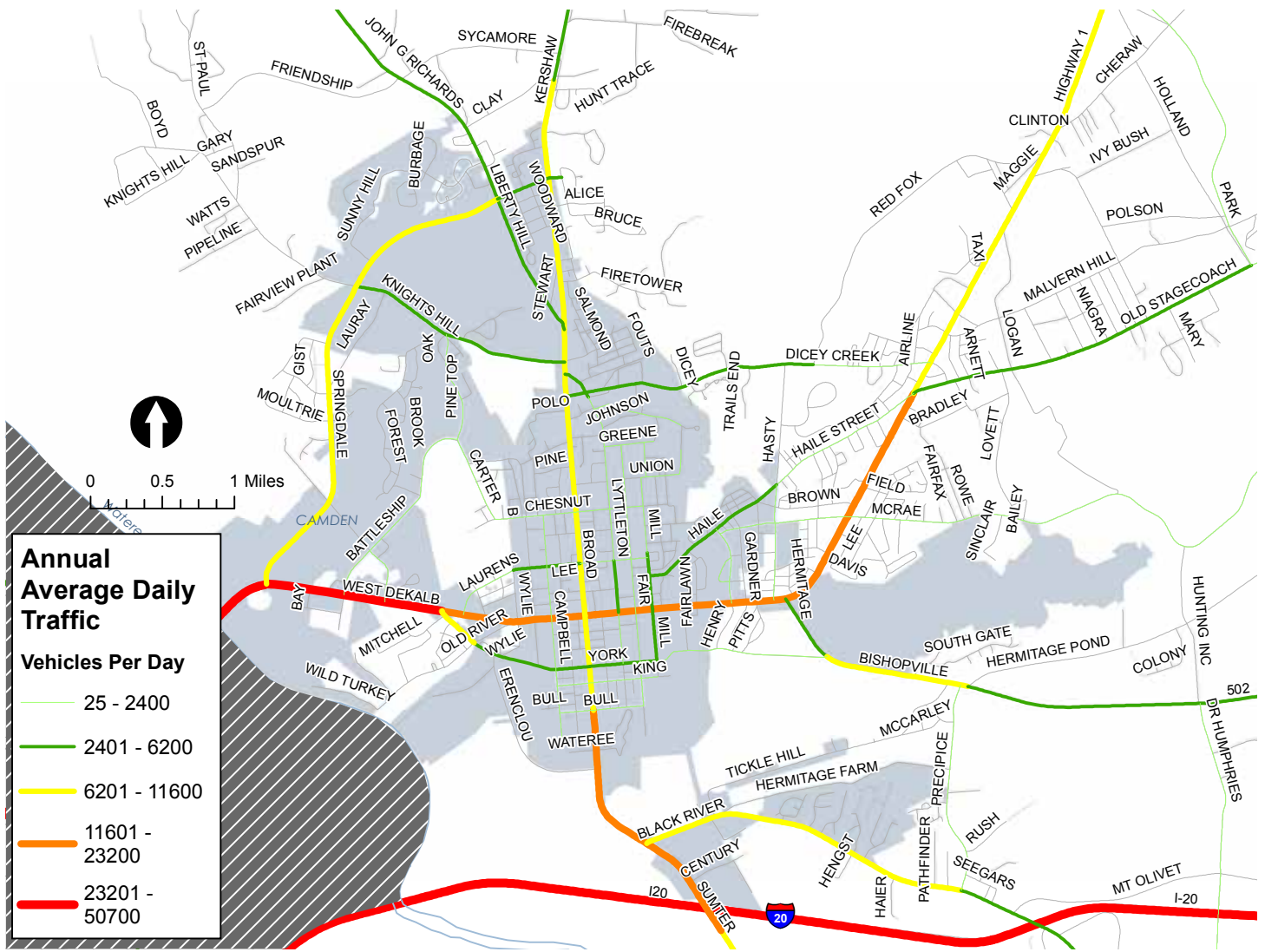


Figure 51: City of Camden Annual Average Traffic Map
Source: Santee-Lynches COG

Camden has the most traffic of any area in the Santee-Lynches transportation study area. US-1 is the most trafficked, non-interstate road in the area, particularly on the west side of Camden heading toward the West Waterree area. US-521 from Bull Street to I-20 is another significant route, not only due to the number of individuals exiting the interstate, but also because of the presence of a Central Carolina Technical College campus just off of the route along Century Boulevard and a two industrial parks located along Black River Road. This also contributes to Black River Road being a relatively highly traveled route, similar to Springdale Drive on the northwest side of the city limits that carries individuals from US-521 to US-1 while missing downtown congestion.

Annual Average Daily Traffic-City of Manning

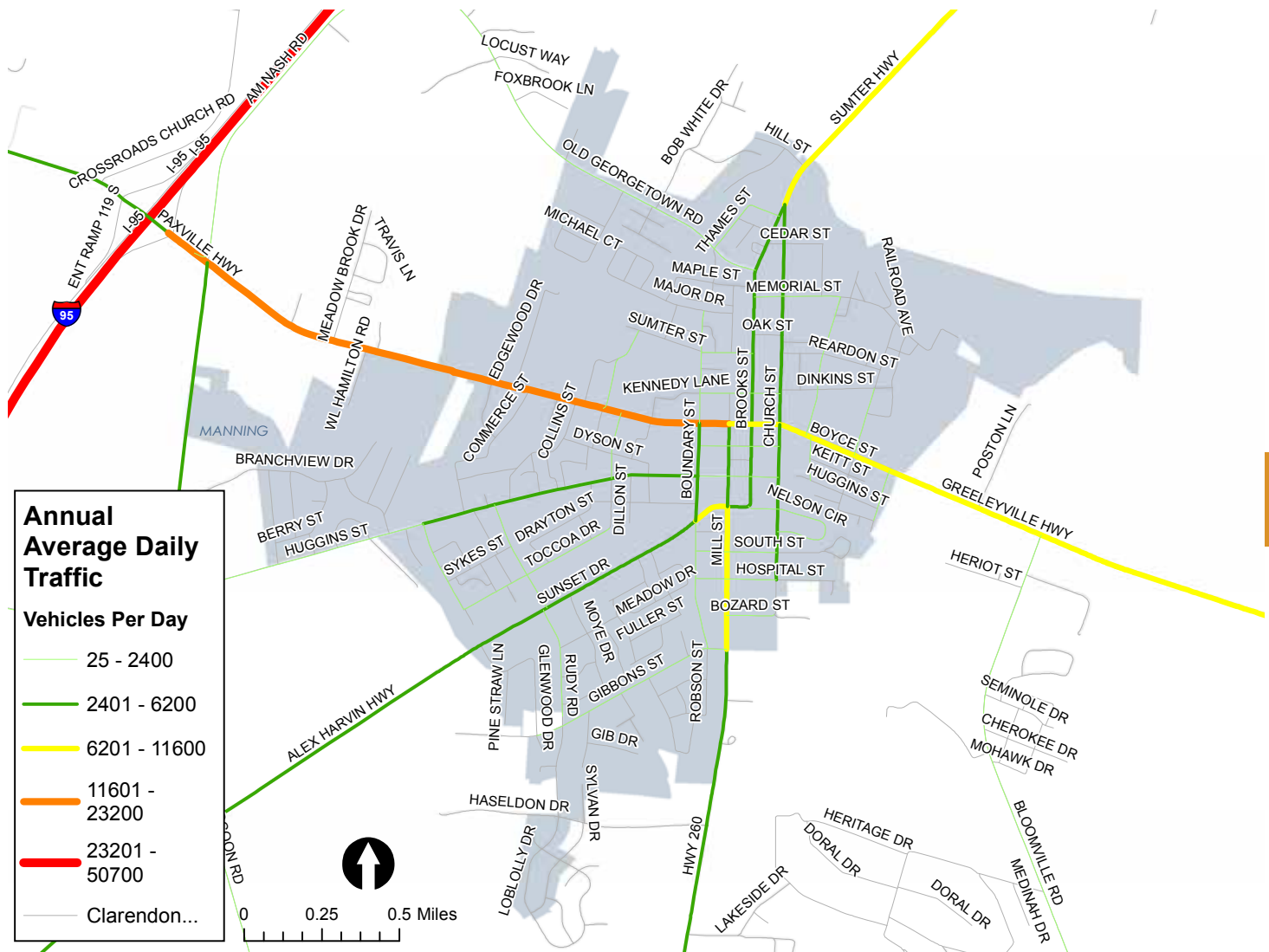


Figure 52: City of Manning Annual Average Traffic Map
Source: Santee-Lynches COG

Manning is significantly less trafficked than Camden, but due to its proximity to I-95, there are still a significant number of cars on its roads. SC-261 from Mill Street in downtown to I-95 is the most trafficked local route. Outside of this, the other areas of significant travelers are around the edges of the city, on the major routes that take individuals in and out of the town like US-521 in the North, US-521/SC-261 to the east, and SC-260 to the south towards Lake Marion.

2045 Population Projection

To provide a plan that is most effective for the future of the region, it is important to understand the growth patterns in the area moving forward. Growth in the Santee-Lynches region is expected to occur at a slow pace over the next 25 years. This map shows projected growth through 2045 by Traffic Analysis Zone (TAZ). A TAZ is the most common unit of geographical division when discussing transportation planning, and generally includes an area of less than 3,000 individuals. Most areas in the region are expected to see marginal growth or population decline. In fact, three out of the four counties in the region are expected to see a net population decline by 2045, with Kershaw County being the sole exception. Only select areas, mainly around the municipalities and Lake Marion, are expected to see growth between 400 and 1000 people. One area of significant growth in the region, however, is around Elgin and Lugoff in Western Kershaw County. The growth in this area is being driven by the expansion of suburban Columbia and Richland County, and is part of the Columbia Urban Area Transportation Study (COATS). For this reason, the Lugoff-Elgin area is considered part of COATS, and is outside the Santee-Lynches transportation planning study area. For areas under jurisdiction of *Forward 2045*, based on current factors identified in this document, should see little change in the coming years, from the lack of growth and development pressures.

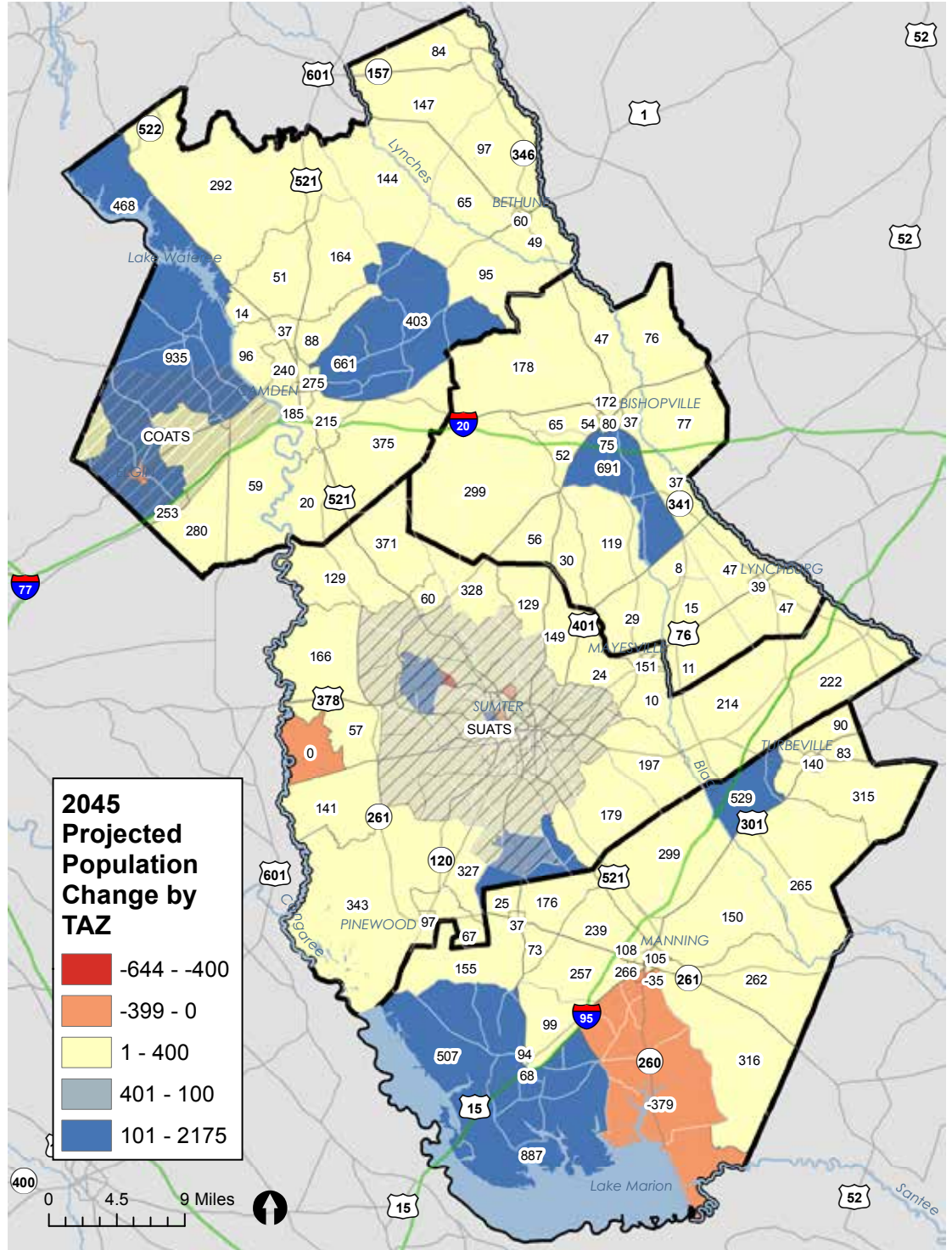


Figure 53: 2045 Projected Population Map
Source: Santee-Lynches COG

Safety

Between 2011 and 2016, there were 11,989 total crashes recorded in the Santee-Lynches transportation planning study area. Of those crashes, 4% were serious or fatal crashes. The following is a breakdown of the crashes by severity in the study area over a five-year period.

- 65% - no injury – (7,793 crashes)
- 25% - possible injury – (2,997 crashes)
- 6% - non-incapacitating injury - (719 crashes)
- 2% - incapacitating injury - (240 crashes)
- 2% - fatal - (240 crashes)

This portion of the plan seeks to further identify these areas and look at ways that could potentially improve the conditions that lead to such a significant rate of crashes in the region.

Proven Safety Countermeasures



Figure 54: Safety Guideline
 Source: Federal Highways Administration

Crash Frequency

Areas of specific concern for the study area occur around the region's municipalities. Camden has the highest concentration of crashes followed by Manning. Of note is that both these locations are situated along the region's two interstate highways (I-95 and I-20). Also shown via the map below is that a significant portion of crashes are located along the interstate highways. This statistic makes sense, as these are the most heavily traveled roads in the region. Therefore, because of the lower traffic volume and higher rate of accidents, specific attention must be given to the identified municipalities, and especially at intersections located within their boundaries.

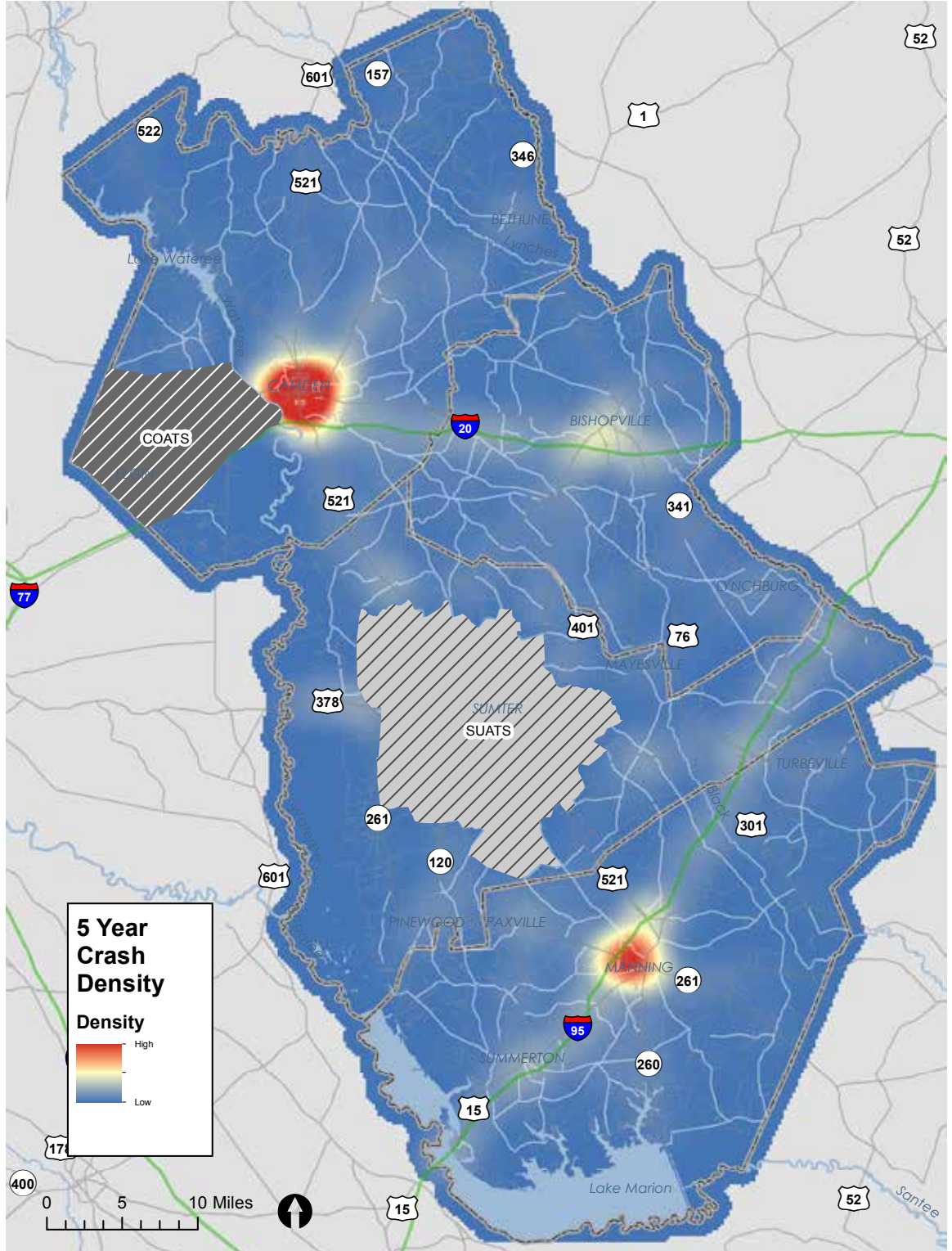


Figure 55: 5 year Crash Density Map
Source: Santee-Lynches COG

Fatal and Severe Crashes

As of 2017, the national fatality rate for vehicle crashes was 1.16 deaths per 100 million vehicle miles traveled (VMT). Comparatively, in the same period, South Carolina as a whole had the highest fatality rate in the US at a rate of 1.8 deaths per the same measure; while the Santee-Lynches Region specifically sat at an even higher rate of 2.33. This figure is extremely high and shows the importance of addressing roadway safety in the region. An important factor to note is that crashes, especially severe and fatal crashes, tend to happen on rural roads more frequently than urban ones because of higher speeds, less lighting, and typically more chance of disrepair. Since a significant majority of the roads in the Santee-Lynches transportation planning area are classified as rural roads, this can serve as one explanation for this high mark. This is supported by the fact that 87% of the Region's 480 fatal and severe accidents between 2011 and 2016 occurred on rural classified roadways, with over half of these being due to roadway departure (SCDOT, 2016). This understanding can serve as the base for evaluation of repair or improvement of roadways in the region based on safety.

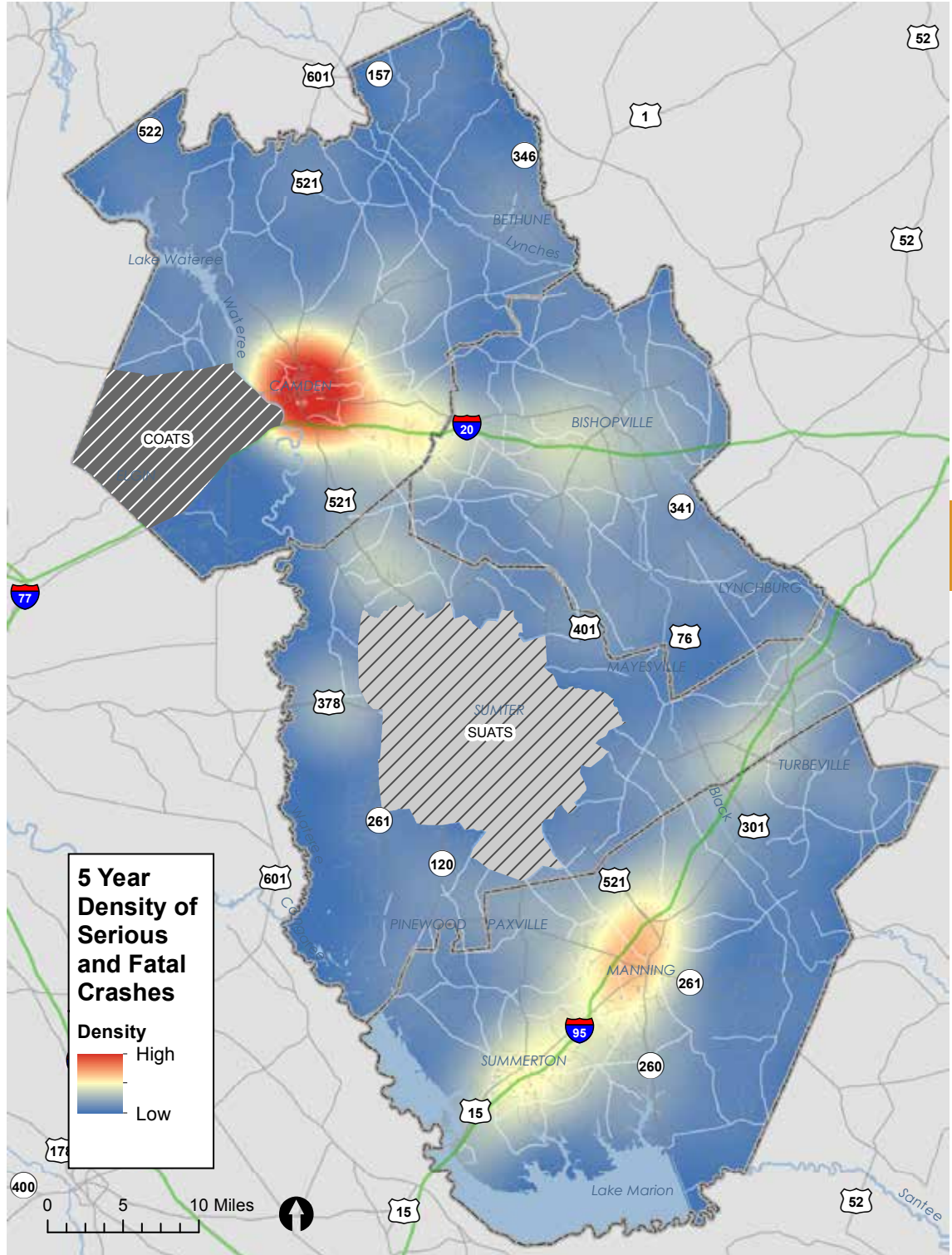


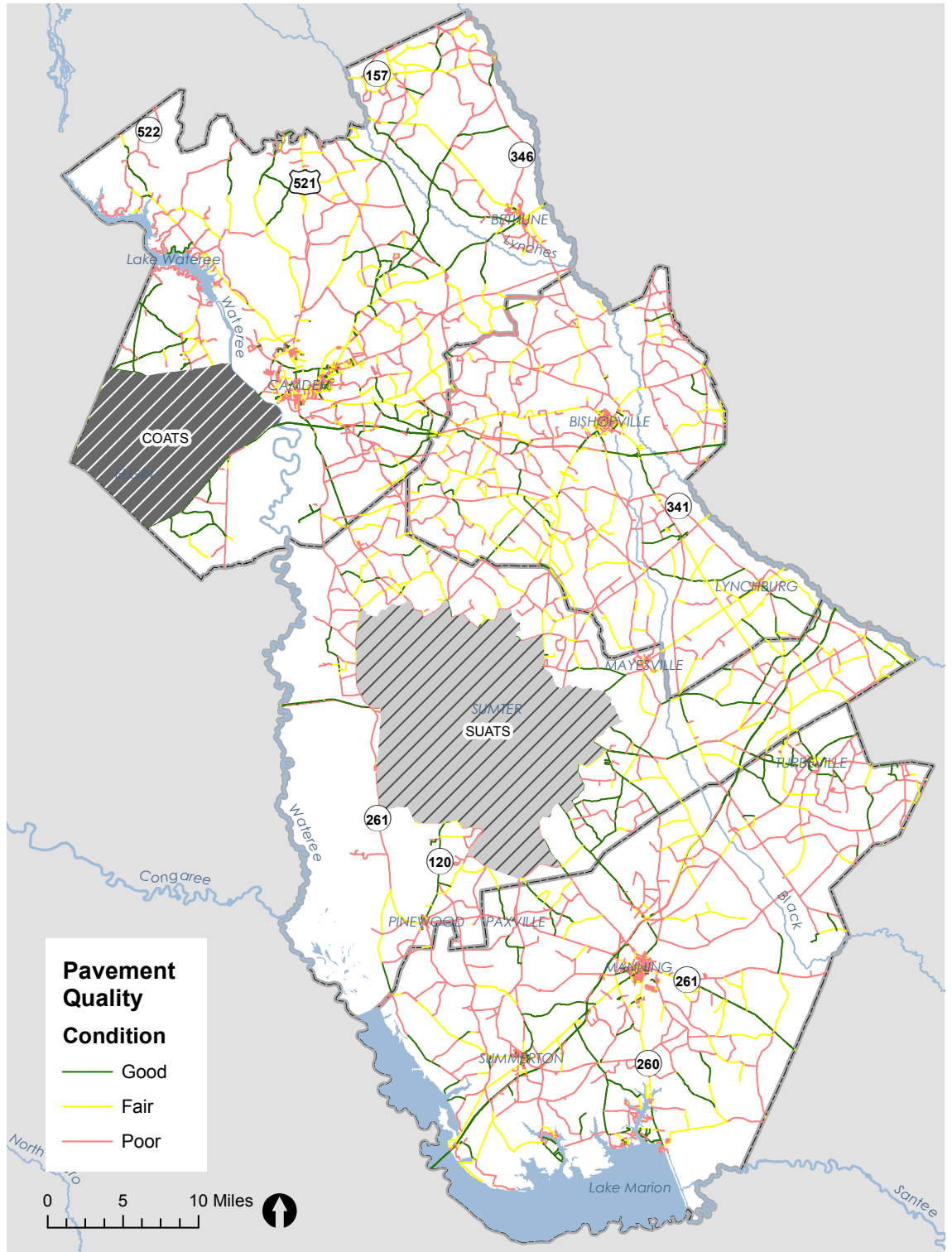
Figure 56: 5 year Density of Serious and Fatal Crash Map
Source: Santee-Lynches COG

Conditions

Pavement Quality

The 2016 SCDOT Pavement Quality Index (PQI) surveyed nearly 3,000 centerline miles of road in the Santee-Lynches transportation planning study area with the pavement receiving a rating of Poor, Fair, or Good. These ratings generally describe the condition of pavement and the remaining service life (RSL) with poor pavement having an RSL of five years or less and good pavement having an RSL of ten years or more.

53.6% of roads in the study area have a Poor rating, 25.2% have a rating of Fair, and 21.2% have a Good rating



Condition	Percentage
Good	14.6%
Fair	24.8%
Poor	60.6%

Figure 57: Pavement Quality Map
Source: Santee-Lynches COG

Bridge Condition

Bridges provide vital connections to locations that typically may be separated from the road network by various geographic or infrastructure features. As such, it is important to monitor the condition of the existing bridges and identify where improvements need to be made to keep connectivity in the network at a high level. Currently, 23.7% of bridges in the Santee-Lynches Region are rated as fair or poor condition, with a breakdown of 13.1% and 10.6% respectively.

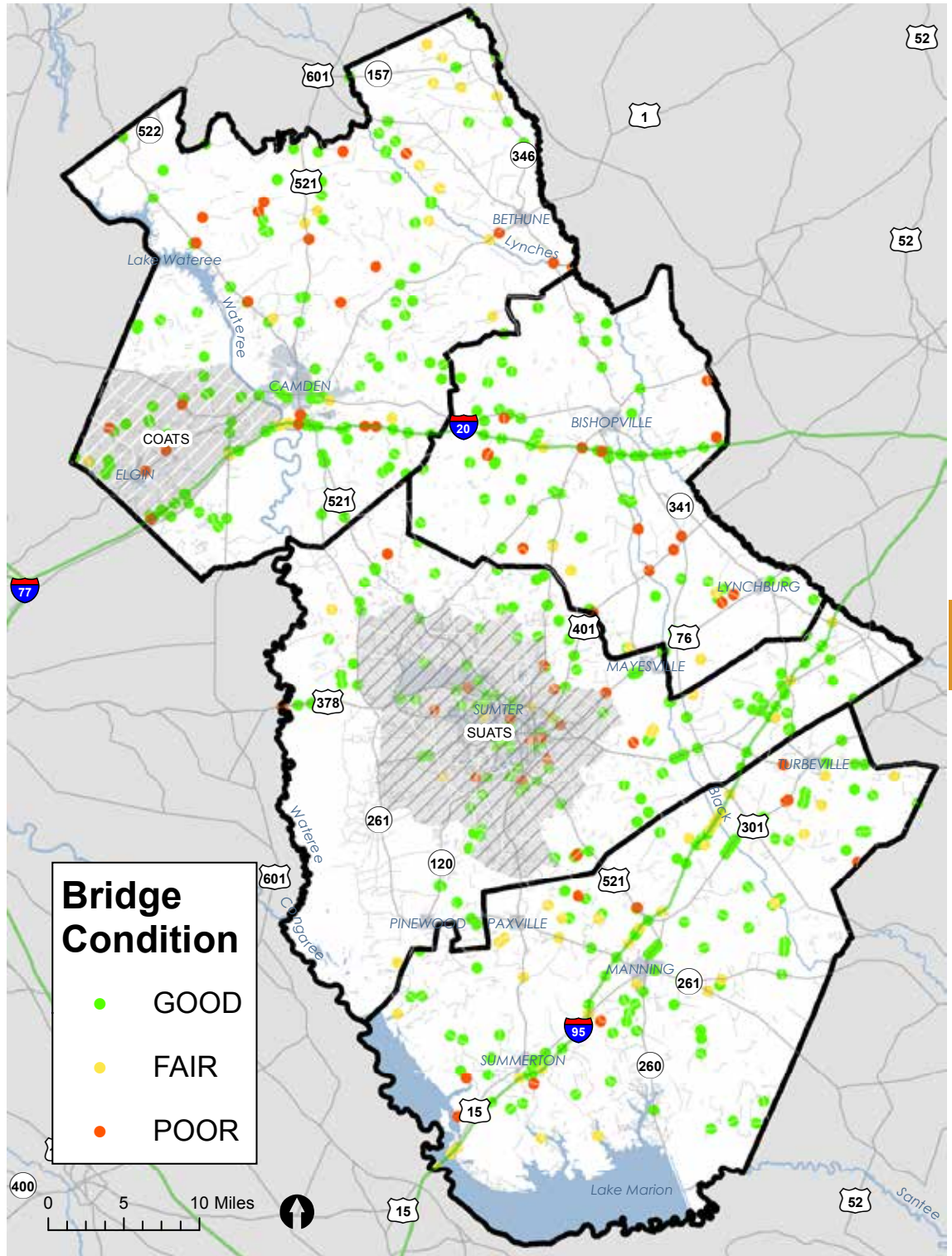


Figure 58: Bridge Condition Map
Source: Santee-Lynches COG

Total: 605 Bridges

462 Good	<div style="width: 76.3%; height: 10px; background-color: green;"></div>	76.3%
79 Fair	<div style="width: 13.1%; height: 10px; background-color: yellow;"></div>	13.1%
64 Poor	<div style="width: 10.6%; height: 10px; background-color: orange;"></div>	10.6%

Corridor Recommendations

The roadway improvement projects recommended in *Forward 2045* take several forms. The diagrams below explain some of the most common project types. While widenings and new roadways increase capacity, congestion may still worsen over time as travel demand increases. (Roadway cross-sections developed via www.streetmix.com)

New Roadway

Construct new roadways to improve the region's overall connectivity



Corridor Improvements

Repave, add pedestrian and bicycle infrastructure, improve intersections, and streetscape



Access Management

Restrict turns, improve lane markings, and consolidate driveways to improve safety and flow



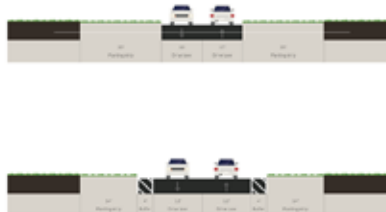
Road Diet

Reduce travel lanes, improve safety, and add bicycle and pedestrian infrastructure



Roadway Design Improvement

Widen travel lanes, add paved shoulders and adjust roadway dimensions to current standards.



Widening

Add travel lanes to increase capacity



Figure 58: Street Sections
Source: www.streetmix.com

Access Management Toolbox

As part of a coordinated system-level plan, access management strategies make turning movements more predictable and can minimize congestion and reduce potential for crashes.

Access management strategies control the location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway. Areas with poor access management, which can include unprotected left turns and curb cuts within a short distance, often have higher crash rates, greater congestion, and more spillover cut-through traffic on adjacent residential streets.

Dotted Line Markings

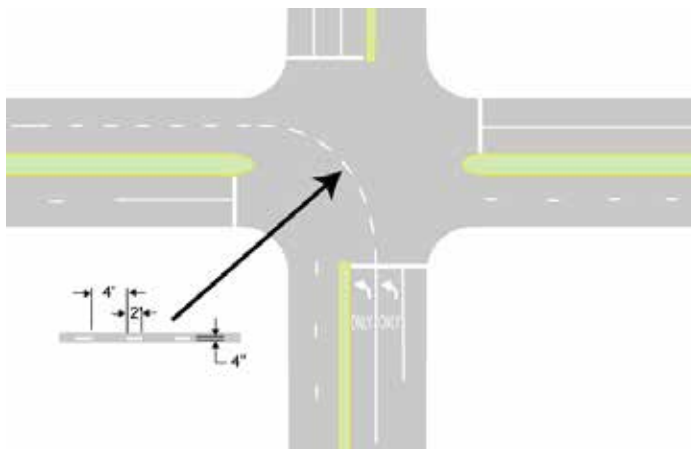


Figure 59: Lane Line Markings
 Source: <https://www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/TrafficEngineeringBranch/BMTE/calcSigns/SignsAndMarkingsTutorials/long-Markings/Pages/laneLineMarkings.aspx>

These pavement markings reduce driver confusion and increase safety by guiding drivers through complex intersections, including those with long traversing distances.

Driveway Length

Increasing the driveway length to commercial development prevents internal site operations from affecting the adjacent street.

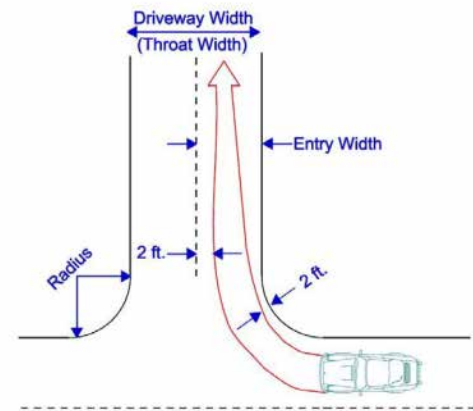


Figure 60: Driveway Length
 Source: <https://www.google.com>

Driveway Consolidation and Relocation

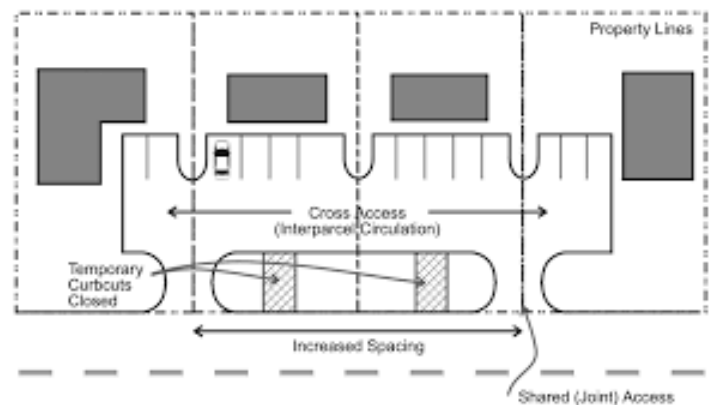


Figure 61: Driveway Consolidation and Relocation
 Source: <https://www.google.com>

Shared access driveways minimize curb cuts and reduce traffic conflicts. They are particularly effective near intersections.

Left Turn Storage Lanes

Left turn lanes reduce vehicle delay when drivers are waiting for vehicles to turn and may decrease the frequency of collisions caused by lane backages.

Safety Improvement Toolbox

There are a wide range of efforts are underway to support roadway improvement.

Traffic Engineering

In some case, traffic control devices, such s signs, are improperly used, placed in the wrong location, are too small to be seen, or have suffered damage or deterioration:

1. Upgrade and supplementing signs

Sustained enforcement efforts have been proven to lower both intersction violations and crash rates, sometimes to a dramatic extent.

2. Add more singles

Proving separate signals over each; installing higher intensity signals over each lanes; and changing the length of signals cycle can reduce crashes caused by poor visibility.



Figure 62: Road Signs
Source: <https://www.drive-safely.net/road-signs-meanings/>

Pavement Condition

The pavement quality can be upgraded to better drain the road and help resist skidding.

- Lane utilization arrow
- Rumble strips
- Edge marking
- Recessed pavement markers

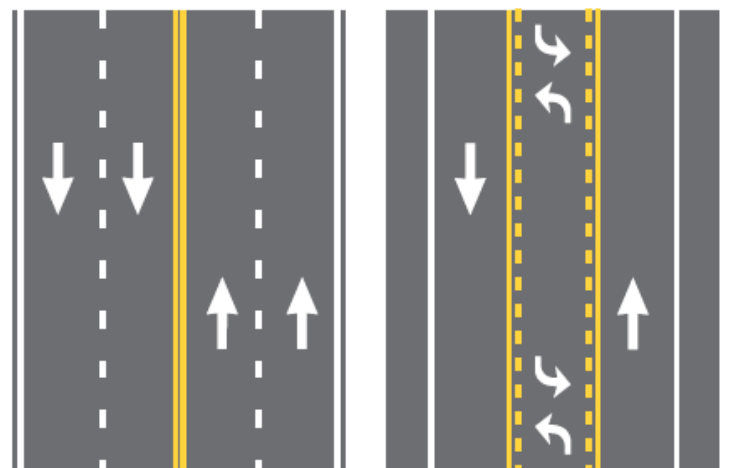


Figure 63: Road Pavement Sign
Source: https://safety.fhwa.dot.gov/road_diets/brochure/

Improve Geometry Design

Both the intersections and their approach roadways can be factors. A major aspect of safety design is restricted sight distance, where drivers do not have enough time to stop or avoiding hitting a pedestrian or another vehicle.

- Flatten curves
- Minimize intersection conflict points
- Improve shoulder
- Install median

Non-traditional Intersection Design

Non traditional intersection design such as roundabout or traffic cycle can reduce the number of serious crashes while improving traffic flow.

Addition of Turn Lanes at Intersections to Improve Connectivity

Turns lanes are used to separate turning traffic from through traffic. Studies have shown that providing turn lanes for left-turning vehicles can reduce accidents by approximately 32%.

Driver Licensing and Education

Some drivers do not know the basic traffic laws, fail to understand the meaning of certain signs and pavement marking, or do not respect safety needs of pedestrian.

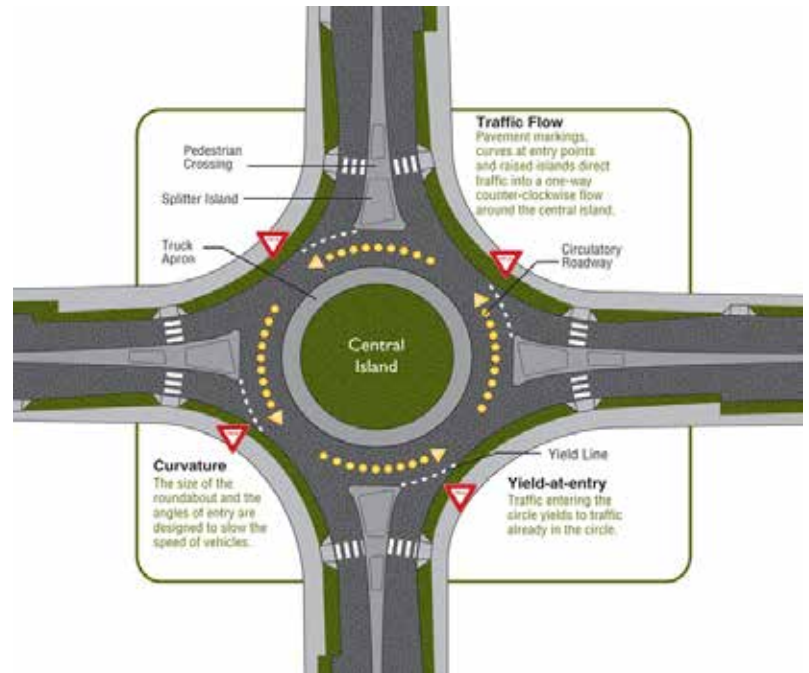


Figure 64: Roundabout Design
 Source: <http://www.mikeontraffic.com/why-build-roundabouts/>



Figure 65: Intersection Turn Lane
 Source: <http://motorbikes-passion.info/bike-lane-design.html>

Chapter 6 Bike and Pedestrian



BIKE AND PEDESTRIAN

Introduction

Existing Conditions

The Five 'E's Approach to Bicycle and Pedestrian Planning

Challenges and Opportunities

Complete Streets

Bike and Pedestrian Design Best Practices

Chapter

6

Based on recent trends, communities are becoming aware that developing multiple modes of transportation is important to a more livable, sustainable, and people-friendly communities. This is particularly relevant as residents of communities age and are no longer willing and/or able to drive. In addition, survey results show that, millennials and subsequent generations increasingly prefer not to drive their own automobiles. Instead, they are choosing to live in walkable, bikeable, transit-rich communities. The increasing desire to use multiple modes of transportation has led to a renewed focus on developing bicycle and pedestrian infrastructure, which would allow communities to establish greater connectivity and provide people with more mobility options and opportunities for physical activity.

Providing improved and safer facilities for bicycle and pedestrian forms of transportation is essential. There were 144 pedestrian fatalities in South Carolina in 2016, the third highest pedestrian fatality rate (2.90) per 100,000 people in the nation. Furthermore, the state experienced 25 cyclist deaths in 2016, the second highest cyclist fatality rate (5.04) per million people in the nation.¹ SCDOT has already completed some analysis of bicycle needs via its Multimodal Transportation Plan, with those statewide bicycle needs are estimated to cost \$1.2 billion based on existing and planned bikeways data. This assessment does not necessarily include pedestrian infrastructure needs.² In addition to addressing the safety problem, investment in these facilities can improve personal health, help communities thrive, and improve the environment.

Santee-Lynches recognizes the need to develop and enhance bicycle and pedestrian infrastructure in individual communities and throughout the region. Throughout the planning process, two major goals emerged: 1) providing greater pedestrian connectivity within communities, and 2) regional connectivity for recreation and leisure, particularly for bicycling. These overarching goals are reflected in the planning considerations and policies recommended in *Forward 2045*.

Existing Conditions

Bicycle and pedestrian infrastructure in the Santee-Lynches transportation planning jurisdiction is limited. While some

dedicated bicycle lanes are present in within the SUATS MPO, there are no dedicated bicycle lanes in the Santee-Lynches rural region. Each municipality and some rural crossroads do have some sidewalks, but they are often incomplete and disconnected. There are two short greenways in the planning jurisdiction.

Sidewalks By Location

- Blue lines indicate sidewalks on both sides of roadway
- Yellow lines indicate sidewalks on one side of roadway

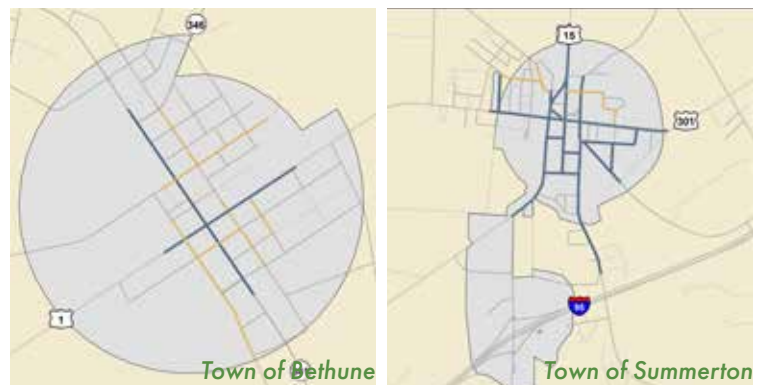
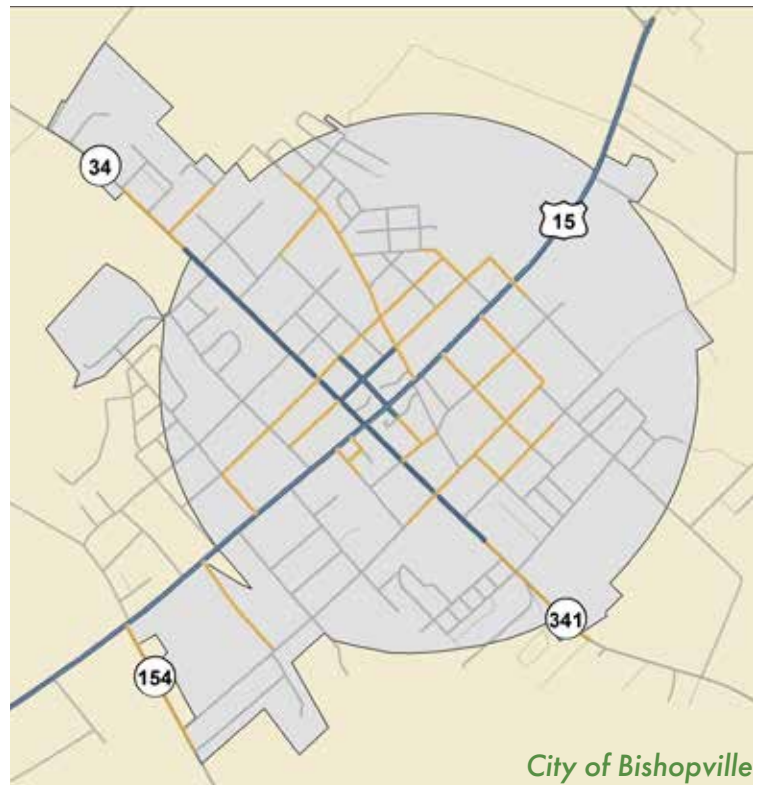
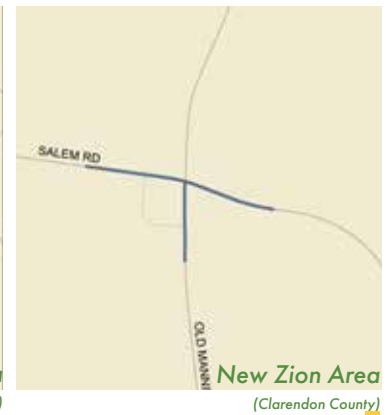
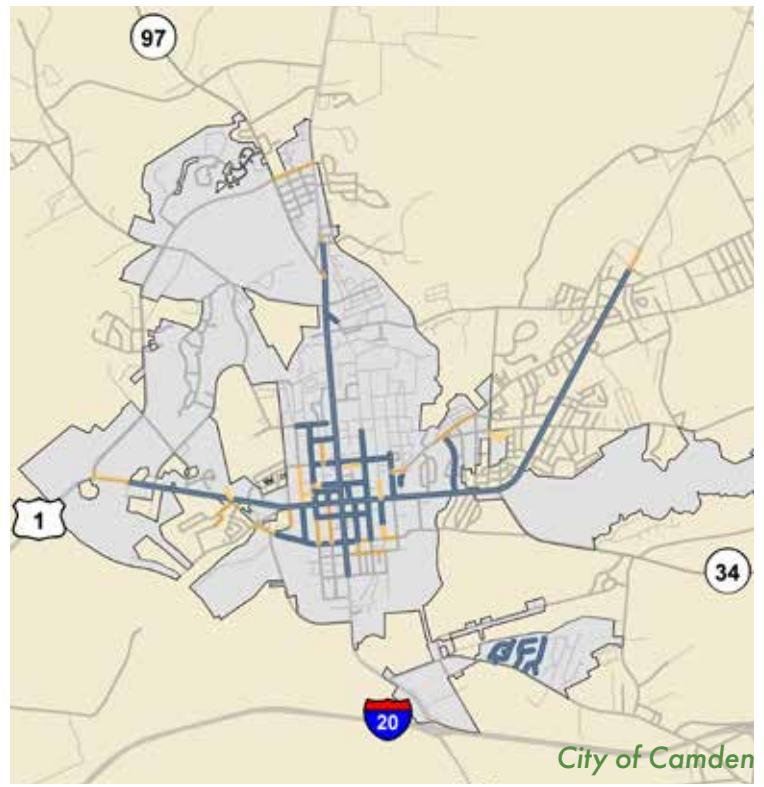


Figure 66: Sidewalk Map
Source: Santee-Lynches COG

1 NHTSA National Center for Statistics and Analysis Traffic Safety Facts 2016

2 https://www.scdot.org/Multimodal/pdf/SC_MTP_mode.pdf



The Five E's Approach to Bicycle and Pedestrian Planning

Research has shown that a comprehensive approach to improving conditions for walking and bicycling is more effective than a singular approach that would address infrastructure only. Recognizing this, the national *Bicycle Friendly Community program*, administered by the League of American Bicyclists, and the *Walk Friendly Community Program*, administered by the National Center for Walking and Bicycling, recommend a multi-faceted approach based on the following five 'E's: Engineering, Education, Encouragement, Enforcement, and Evaluation.



Engineering

- Designing, engineering, operating, and maintaining quality pedestrian and bicycle facilities is a critical component in creating a pedestrian-friendly and bicyclefriendly community. This category includes projects that address and impact the built environment, such as adding new bicycle and pedestrian specific infrastructure, improvements to street crossings, traffic calming, trail design, traffic management, school zones, and other related strategies. **Forward 2045** allocates guideshare funding for several priority investments to expand bicycle and pedestrian infrastructure throughout the region.



Education

- Educational opportunities are critical for bicycle and pedestrian safety. Education should span all age groups and include motorists as well as cyclists and pedestrians. The focus of an educational campaign can range from information about the rights and responsibilities of road users to tips for safe behavior; from awareness of the community wide benefits of bicycling and walking to technical trainings for municipal and agency staff.



Encouragement

- Encouragement programs are critical for promoting and increasing walking and bicycling. These programs should address all ages and user groups from school children, to working adults, to the elderly and also address recreation and transportation users. The goal of encouragement programs is to increase the amount of bicycling and walking that occurs in a community. Programs can range from work-place commuter incentives to a "walking school bus" at an elementary school; and from bicycle-friendly route maps to a bicycle co-op.



Enforcement

- Enforcement is critical to ensure that motorists, bicyclists, and pedestrians are obeying common laws. It serves as a means to educate and protect all users. The goal of enforcement is for bicyclists, pedestrians, and motorists to recognize and respect each other's rights on the roadway. In many cases, officers and citizens do not fully understand state and local laws for motorists, bicyclists, and pedestrians, making targeted education an important component of every enforcement effort.



Evaluation

- Evaluation methods can include quarterly meetings, the development of an annual performance report, update of bicycle and pedestrian infrastructure databases, pedestrian and bicycle counts, assessment of new facilities, and plan updates. Monitoring implementation of this Plan on a regular basis and establishing policies that ensure long-term investment in the bike and pedestrian network are critical to effective evaluation. Monitoring progress of implementation will facilitate continued momentum and provide opportunities for updates and changes to process if necessary.

Challenges and Opportunities

The landscape of the Santee-Lynches Region, at 2,400 square miles, is a significant challenge when planning non-motorized infrastructure. It is a region dominated by undeveloped land which includes large agricultural uses, forested lands, and wetlands. The urbanized areas are spread across the region and are all separated by miles of undeveloped land. Even within the urbanized areas, many of the uses are highly separated. Therefore, it is challenging to lay a strong foundation and infrastructure to support a culture of cycling and walking. Automobile dependency is also linked with the urban spatial structure, as cities with a low levels of car dependency tend to be centralized with high levels of density, while cities with a high level of automobile dependency have low levels of centrality and density. Low density and high automobile dependency are therefore interrelated.³

Yet, expanding the infrastructure to support bicycling and walking is important for improving health outcomes, providing access, and addressing safety issues.

In the Santee-Lynches region, three major health issues can be linked to lack of mobility: obesity, hypertension, and access to health care.⁴ Cycling and walking can improve wellness, and provide additional options for mobility for those without access to a vehicle. Concerns about health and obesity have directed attention to the possible link between physical exercise levels and the built environment. Bike and pedestrian travel will help to increase safe and convenient opportunities for residents and visitors to walk, bike and lead to increase frequency and duration of physical activities among residents. Development could in turn lead to reduce risk sickness and save healthcare. If we do not build communities that support physical activity, we perpetuate the health consequences of inactivity and obesity.

Second, bike and pedestrian infrastructure can increase mobility, particularly for those without access to a vehicle. In Santee-Lynches region, 7.4% of households have no access to a vehicle. The elderly, children, and the poor are the least likely to be accommodated by today's dominant transportation modes. To build nonmotor connection between community and within communities will offer an accessible, affordable, and reliable transportation network that effectively serve all people; will enhance a social connections and culture about

feeling safe in the city, especially for young, elders, and people with no vehicle.

Third, bike and pedestrian infrastructure can promote economic development. numerous studies of existing greenways and rails-to-trails of varying lengths have revealed that people are willing to travel to use bicycle and pedestrian infrastructure for recreation, and will spend money on goods and services in connection with that use.

Economic Impact Case Study: Greenville's Swamp Rabbit Trail



Figure 67: Greenville's Swamp Rabbit Trail

Source <https://greenvillerec.com/prisma-health-swamp-rabbit-trail/>

The Swamp Rabbit Trail is a 20-mile multi-use (walking & bicycling) connected greenway network that traverses along the Reedy River, an old railroad corridor, and City parks to connect Travelers Rest with the City of Greenville, South Carolina.

A December 2013 study of the Swamp Rabbit Trail by Furman University showed that 25% of the users in the trail's third year were tourists who spent \$6.7 million in Greenville County. The report included a survey of 19 businesses in close proximity to the trail. Those businesses reported an increase in sales, some as much as 85%.

Two bike shops reported an average of 75% of their customers purchased bikes to use the trail in 2013. These two bike shops reported revenue ranging from \$300,000 to \$400,000 from trail users.

The majority of the businesses surveyed reported increases in sales and revenue ranging from 10% to as high as 85%.

One bike store that focuses on rentals reported that customers were:

- 50% local
- 30% from Spartanburg and suburbs
- 20% from outside areas, such as Atlanta

3 https://transportgeography.org/?page_id=5160

4 <https://www.palmettohealth.org/document-library/documents/2016-chna-report>

Complete Streets

Complete streets are community-oriented streets that safely and conveniently accommodate multiple modes of travel. They are designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists and transit riders of all ages and abilities. Complete Streets make it easy to cross the street, walk to shops, and bicycle to work. They allow buses to run on time.

Creating Complete Streets means that we must change our approach to roads. By adopting Complete Streets policy, communities direct planners and engineers to routinely design and operate the entire right of way to enable safe access for all users, regardless of age, ability, or mode of transportation. This means that every transportation project will make the street network better and safer for drivers, transit users, pedestrians, and bicyclists—making places more livable.

What Does a Complete Street Look Like?

There is no singular design prescription for a Complete Street; each is unique and responds to its community context. A complete street may include: sidewalks, bike lanes (or wide paved shoulders), special bus lanes, comfortable and accessible public transportation stops, frequent and safe crossing

opportunities, median islands, accessible pedestrian signals, curb extensions, narrower travel lanes, roundabouts, and more.

A rural Complete Street will look quite different from an urban Complete Street, but both are designed to balance safety and convenience for everyone using the road.

Forward 2045 seeks to balance regional mobility and multimodal accessibility to provide effective transportation facilities for all travelers by identifying ways in which the region should seek to invest in active transportation, including roadway improvements co-located with bike and pedestrian improvement projects.

Successful complete streets programs are based on the following principles:

- Achieve community objectives for mobility, quality of life, and economic development.
- Blend street design with the character of the area served.
- Capitalize on a public investment to spur private investment in the area.
- Ensure that the rights of pedestrians, bicyclists, and transit riders to use the street safely are not overshadowed by motorists.

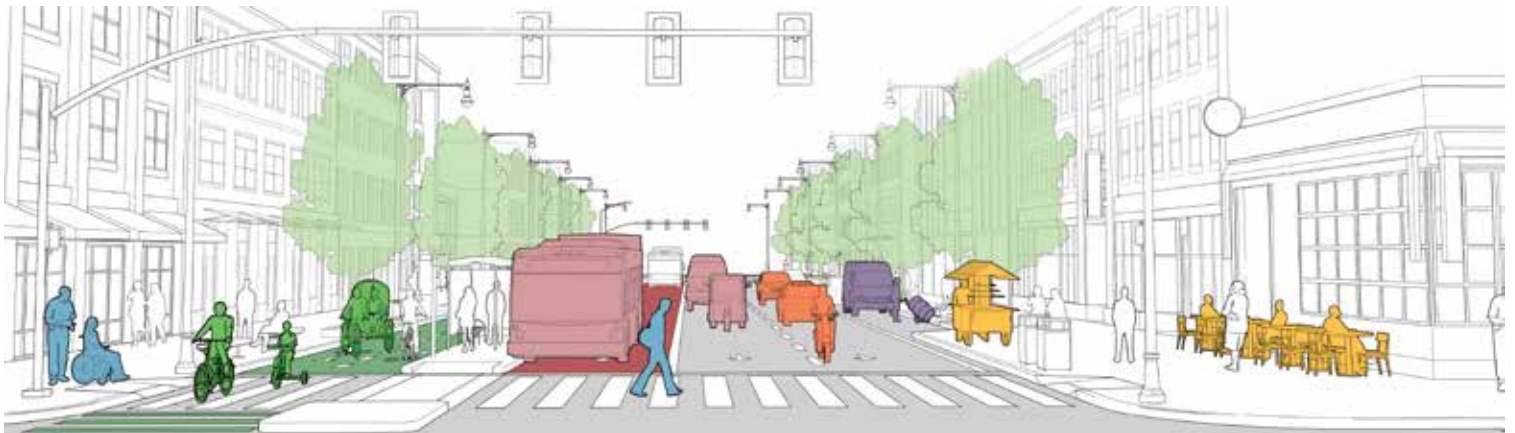


Figure 68: Complete Street Design

Source: <https://globaldesigningcities.org/publication/global-street-design-guide/designing-streets-people/a-variety-of-street-users/>

Motorists



Pedestrians



Cyclists



Freight Operators
and Service
Providers



People Doing
Business



Transit Riders

Bicycle and Pedestrian Design Best Practices

Proper design of bicycle and pedestrian infrastructure is essential to a safe, efficient, active transportation network.

Design for Pedestrians



The regional transportation network should accommodate pedestrians with a variety of needs, abilities, and impairments. Age is one major factor that affects pedestrians' physical characteristics, walking speed, and environmental perception, and should be taken into consideration when designing pedestrian infrastructure.

Sidewalks

Sidewalks should be provided on both sides of major roadways and on at least one side of collectors and minor arterials or residential streets with at least three homes per acre. Sidewalks typically are constructed of concrete and separated from the roadway.

Intersections

Pedestrian safety must be a priority at intersections, with thoughtful design to increase visibility, accessibility, separation from traffic, and lighting.



Figure 69: Inclusive Street Design
 Source: <https://nacto.org/publication/transit-street-design-guide/stations-stops/stop-design-factors/universal-design-elements/>

Program Recommendations

Bicycle and walking education, encouragement, and enforcement programs are key to building support for infrastructure recommendations.

While there are countless programs that could be implemented to support walking and bicycling, a few are very well-established and have proven successful in communities in South Carolina and throughout the country. A number of resources and funding sources exist for nationally recognized programs such as:

- Transportation Alternatives Program (TAP)
- Safe Routes to School (SRTS)
- Park and Walk Campaign
- Safe Routes to Bus Stops
- International Walk to School Day
- Youth bicycle and pedestrian safety education
- National Bike Month
- Bicycle and Walk Friendly Community Programs
- Bicycling and walking maps
- Active Older Adults Walking Programs
- Bicycle and pedestrian advisory committees

Design for Bicyclists



Similar to motor vehicles, cyclists and their bicycles exist in a variety of sizes and configurations. These variations occur in the types of vehicle (such as a conventional bicycle, a recumbent bicycle or a tricycle), and behavioral characteristics (such as the comfort level of the bicyclist). The design of a bike-way should consider the reasonably expected bicycle types, skill levels, and traffic levels on and around the facility and utilize appropriate dimensions.

Bicycle Facility Types

Forward 2045 recommends implementing the following facility types in the Santee-Lynches region:

Marked Bicycle Routes

Marked by bicycle wayfinding signage along roadway networks, these facilities may not exhibit other infrastructure improvements.

Shared Lane Markings (“Sharrows”)

Enhanced bicycle routes on local street networks, at a minimum, are designated by pavement markings and bicycle wayfinding signage. Traffic calming devices such as traffic diverters, chicanes, and chokers may also be used with sharrows to reduce vehicle speeds and volumes but maintain bicycle access.



Figure 70: Bicycle Boulevard
Source: <http://ruraldesignguide.com/mixed-traffic/bicycle-boulevard>

Dedicated Bicycle Lanes

On-street bicycle lanes use striping and optional signage to delineate the right-of-way assigned to bicyclists and motorists. Bike lanes encourage predictable movements by bicyclists and motorists.



Figure 71: Bicycle Lane
Source: <http://ruraldesignguide.com/mixed-traffic/bicycle-boulevard>

Paved Shoulders

Typically found in more rural areas, these roadways provide paved shoulders wide enough for bicycle travel (4-foot or wider). Shoulder bikeways often, but not always, include signage that alerts motorists to expect bicycle travel along roadway. In rural areas, shoulders also provide an area for pedestrian travel where traffic volumes or development may not warrant sidewalks.

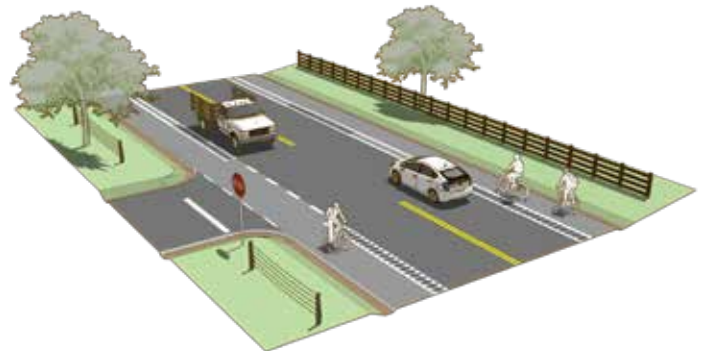


Figure 72: Paved Shoulder
Source: <http://ruraldesignguide.com/mixed-traffic/bicycle-boulevard>

Buffered Bicycle Lanes

Conventional bicycle lanes are paired with a designated space to separate the bicycle lane from the adjacent vehicle travel lane and/or parking lane.



Figure 73: Buffered Bike Lane
 Source: <http://ruraldesignguide.com/mixed-traffic/bicycle-boulevard>

Separated Bicycle Lanes or Cycle Tracks:

Exclusive bike facilities that combine the use experience of a separated path with the on-street infrastructure of conventional bike lanes. These are also referred to as protected bicycle lanes. Cycle tracks are either raised or at street level and use a variety of elements for physical protection from passing traffic.



Figure 74: Separated Bike Lane
 Source: <http://ruraldesignguide.com/mixed-traffic/bicycle-boulevard>

Shared-use Paths or Multi-use Paths

Facilities separated from roadways for use by bicyclists and pedestrians. Sidepaths usually refer to shared-use paths immediately adjacent to the roadway. Greenways refer to shared-use paths that don't necessarily follow a roadway alignment and typically follow other features such as railroads, utility lines, or streams.



Figure 75: Shared Use Path
 Source: <http://ruraldesignguide.com/mixed-traffic/bicycle-boulevard>

Bicycle Parking

To encourage bicycling, plentiful, and attractive bicycle parking should be provided. This may be short-term parking of two hours or less or long-term parking for employees, students, residents, and commuters. While specific bicycle parking locations are not identified, bicycle parking should be provided at popular bicycling destinations such as parks, schools, retail areas, and other gathering spaces. Localities could better ensure this inclusion by making bicycle parking requirements for new development.

Intersections

Intersections can either be facilitators of or barriers to bicycle transportation. If potential bicyclists know that they must cross an uncomfortable intersection to reach their destination, they may be less likely to bicycle. Thoughtful design must be used to promote safety through increased visibility, accessibility, separation from traffic, and lighting.



Chapter 7 Freight

FREIGHT

Introduction

Overview

Freight Network

Chapter

7

Freight is defined as moving goods in bulk by truck, rail, ship, or aircraft. Freight is vital to the success and economic integrity of a region. This is especially true in a relatively rural state like South Carolina that also has a strong manufacturing industry and access to both inland and major ocean ports. Thus, the State and regions such as Santee-Lynches must work together to ensure a strong freight network that is structurally maintained and contiguous throughout the state and beyond. As such, the state of South Carolina produced the South Carolina Statewide Freight Plan (SFP) as part of the state's larger Multimodal Transportation Plan in 2014. This plan identifies the following five infrastructure goals related to freight travel that align with the guiding principles of *Forward 2045*:

As can be seen, there is a significant overlap of the goals of the statewide freight plan and this document. These common goals and objectives will help to make implementation of the ideas in this section more efficient and possibly expedient. This element of the *Forward 2045* plan seeks to take inventory the region's current freight network and patterns in order to make suggestions for improvement moving forward based on these guidelines outlined by the state department of transportation.

Forward 2045 Guiding Principles

1. Mobility and Accessibility-Provide a balanced transportation system that makes it easier to bike, walk, and use public forms of transportation.
2. Safety - Promote a safe transportation system by reducing crashes, making travel reliable and predictable, and improving emergency response.
3. System Preservation - Extend the life of the transportation system and promote fiscal responsibility by emphasizing maintenance and operational efficiency.
4. Prosperity - Support regional economic vitality by making it easier and more efficient to move people and freight within and through the region.
- 5a. Place - Enhance the region's quality of life by preserving and promoting its valued places and natural assets.
- 5b. Smart Growth - Make traveling more efficient by coordinating transportation investments with local land use decisions.

Other key freight routes within the region include: US-521, US-378, US-1, US-15 and US-601 which all serve as major truck routes, carrying between 1.0 and 2.2 million tons of goods annually. It is important not only to identify and improve these primary routes, but also to improve the arterials and collectors that feed freight traffic to them so goods can move efficiently through the region and not become a burden for other travelers. These efforts seek to strengthen what is commonly known as the "last mile". The "last mile" issue refers to the inefficiency that accompanies attempting to transfer bulk goods from a higher transportation capacity area to one with lower capacity for movement of goods.

This portion of the journey also accounts for 28% of the overall cost of freight movements and, being such a small portion of the overall trip, illustrates why it is necessary to make sure these secondary roads are able to handle the necessary freight traffic in an efficient and safe manner. This includes not only smaller, rural roads, but also routes within urban areas where congestion can become an issue. Accomplishing this goal requires inter-agency cooperation, as these routes connect or cross the COATS and SUATS MPOs, especially within the City of Sumter which includes US-521, US-378, and US-15.

SCDOT Statewide Freight Plan Goals and Objectives

1. Mobility and System Reliability: Provide surface transportation infrastructure and services that advance the efficient and reliable movement of people and goods throughout the State.
2. Safety: Improve the safety and security of the transportation system by implementing strategies that reduce fatalities and serious injuries as well as enabling effective emergency management operations.
3. Infrastructure Condition: Maintain surface transportation infrastructure assets in a state of good repair.
4. Economic and Community Vitality: Provide an efficient and effective interconnected transportation system that is coordinated with the state and local planning efforts to support thriving communities and South Carolina's economic competitiveness in global markets.
5. Environmental: Partner to sustain South Carolina's natural and cultural resources by minimizing and mitigating the impacts of state transportation improvements. These goals were used to set up performance measures in the Statewide Freight Plan.

Overview

Truck

Existing Freight Network

The most utilized freight route in the Santee-Lynches region, by far, is I-95 which runs through Clarendon and a part of Sumter Counties. Freight traffic along this route carries just over 35 million tons of goods annually through the Santee-Lynches Region. The second most utilized route, I-20, comparatively carries just under 15 million tons of goods over the same time span through Kershaw and Lee Counties. This significant variance in the two most trafficked freight routes highlights the roles in the overall freight network these two routes play; as I-95 is a major national interstate running along the east coast from Miami to Maine attracting freight traffic from across the nation while I-20 is a more localized route helping to connect Atlanta, Columbia, and I-95 near Florence. After these two interstates, the most freight tonnage carried on a route in the Santee-Lynches region is 2.2 million tons along a short portion of US-521 between Camden and I-20. This route connects one of the Region's most significant population centers, a major industrial park along Black River Road, and I-20, showing why it is third on the list of most traveled freight routes. However, is also shows the significant drop in amount of freight carried into the region as opposed to through the region along I-95 or I-20.

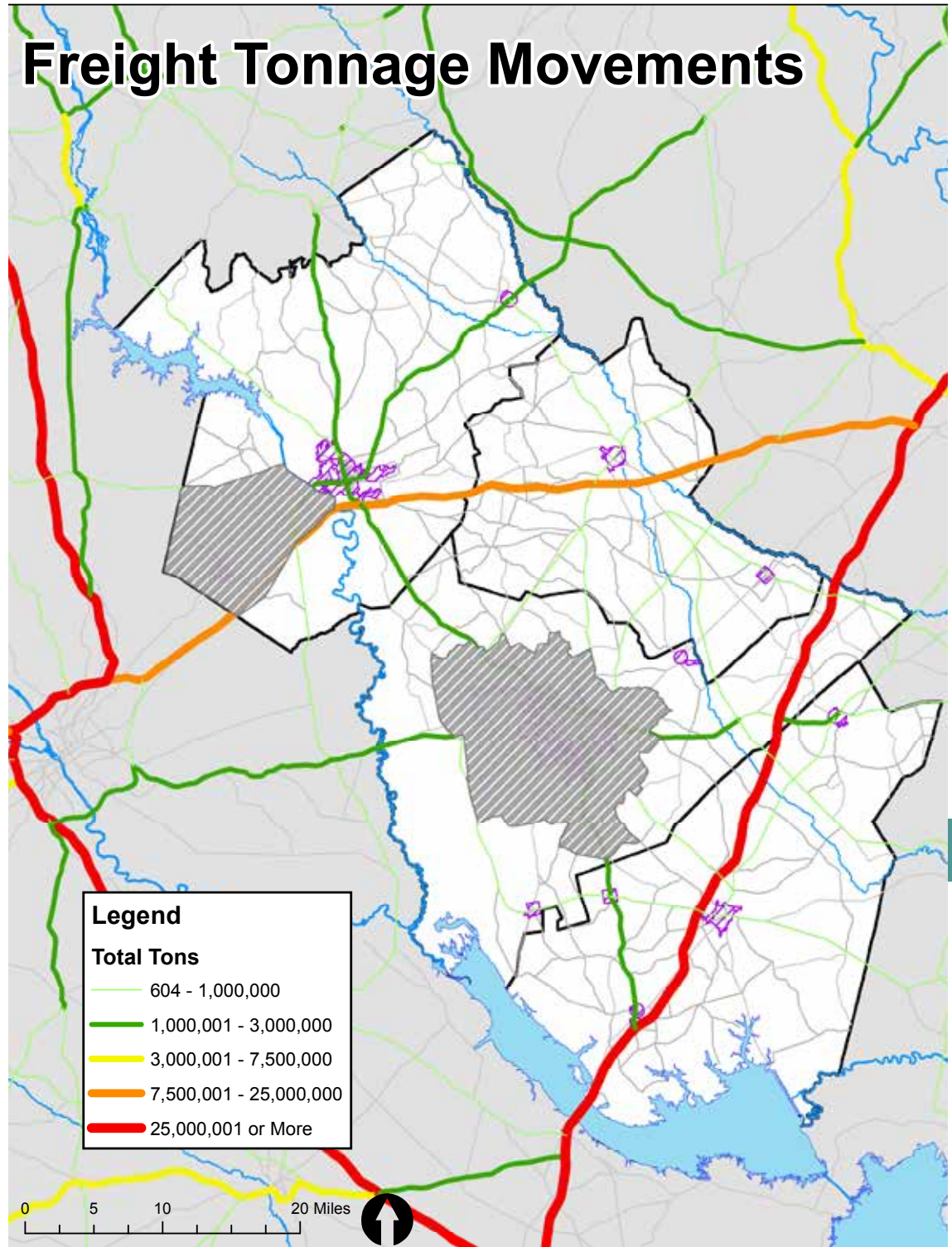


Figure 76: Freight Tonnage Map
 Source: Santee-Lynches COG

Truck

Future Trends

As national and regional populations continue to grow, and demand for goods increases over the next 20 years, so too will the demand on roads in the Santee-Lynches region to be able to carry these freight movements. Every major freight route identified in the region, except for three, will see and increase in freight movements between now and 2045. The only three routes that are anticipated to see a decrease in freight movements are: SC-341, SC-441, and US-401. All other identified routes will see an increase of anywhere between 77% and 267% of tonnage carried over the next 25 years compared to current levels. Routes to take of note of for potential improvements to accommodate this growth are: I-85, which will see an 87% increase from 35 million to 67 million tons carried annually, I-20, a XX% increase from 15 million to 25 million tons annually, US-521 between Camden and I-20 which will increase by 79% from 2.2 to 4 million, and US-378 on the west side of Sumter which will increase by XX% from 1.9 to 2.8 million. Though the latter two of these routes will see significantly less tonnage carried as compare to the others, the volume increase along those routes will still be significant and upgrades may need to be made to prepare for this significant growth

MAP

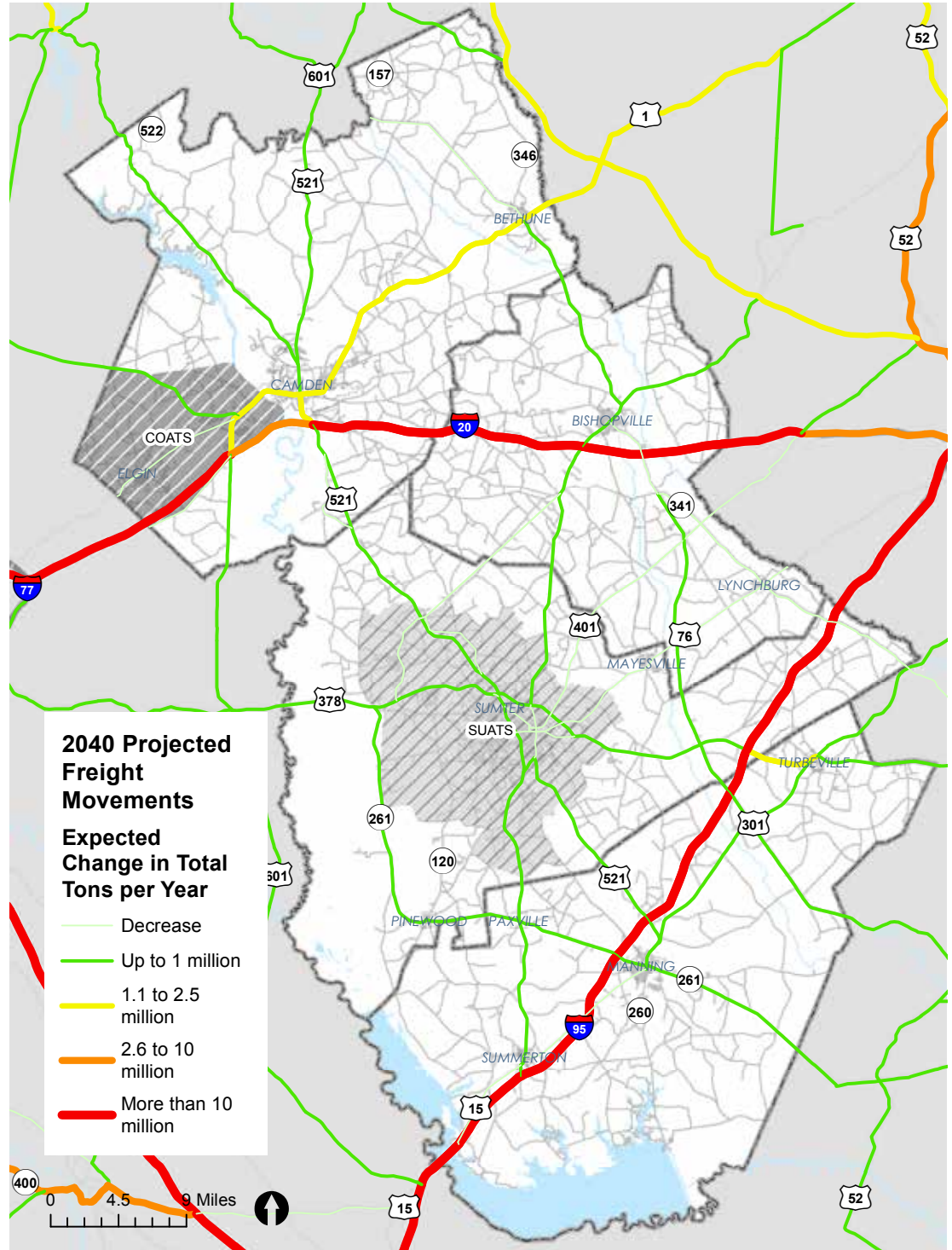


Figure 77: 2040 Projected Freight Movements Map
Source: Santee-Lynches COG

Rail

The region's rail lines are maintained by CSX Transportation Lines and the SC Central Railroad. As of 2016, the rail system includes several hundred miles of track throughout the Santee-Lynches Region. A CSX line operating from Hamlet, NC to Columbia extends through Elgin, Camden, and Bethune and allows for onward connections to Raleigh, Winston-Salem, and Charlotte. In the southern portion of the region, a CSX line extends from Charleston to Columbia through Manning and Sumter. There is currently a proposal for an extension of this line to the I-95 industrial megasite between Sumter and Clarendon Counties pending occupation of this site which could vastly impact freight movements through the region. Another CSX line extends from Cope in Orangeburg County to the City of Sumter. In Bishopville, the S.C. Central Railroad maintains a short line that extends to Darlington and a short line to Shaw Air Force Base. Additionally, Norfolk Southern operates a rail line from Charleston to Orangeburg that intersects the Cope-Sumter CSX line.

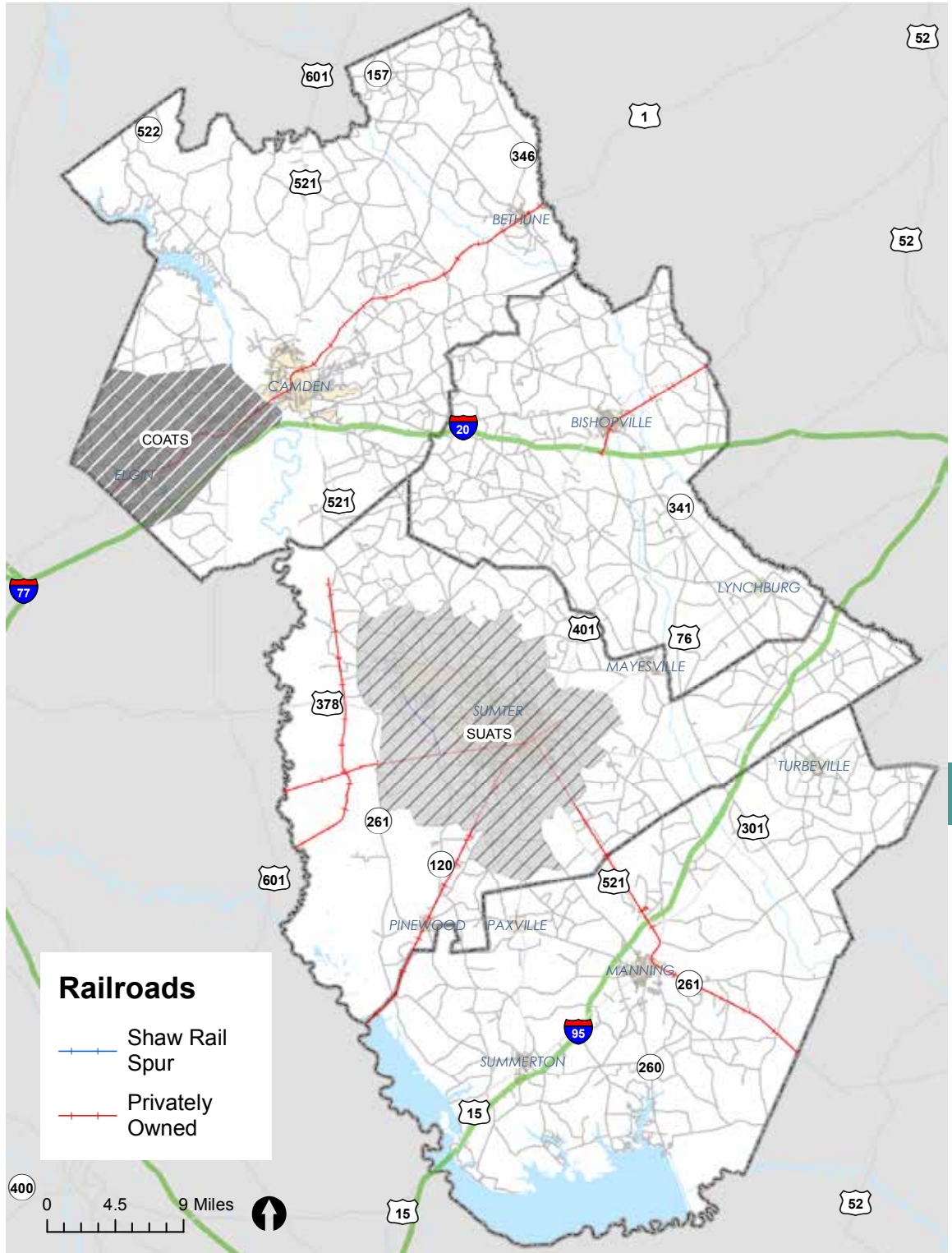


Figure 78: Railroads Map
 Source: Santee-Lynches COG

Ports

The region's central location within the state and location along I-95 and I-20 provides access to two major U.S. seaports – the Port of Charleston (ranked 9th in Thousands of Twenty-foot Equivalent Units [TEUs]) and the Port of Savannah (ranked 4th in Thousands of TEUs). With the Panama Canal expansion completed in 2014, larger cargo vessels are entering these ports. The Port of Charleston currently has the deepest channels in the region, capable of handling vessels drawing up to 48 feet, and is in the midst of a project to deepen the channel to 50 feet, which will accommodate the largest cargo vessels now moving freight. Subsequently, freight movement is expected to increase accordingly both by rail and truck. Ground transportation from either of these ports utilizing the I-20 to I-95 corridor provides easy North-South access within the region, state, and nationally, plus locations West by connectivity with I-26 and I-20. Further, regional access to I-77 via US-76/378 and I-20 and SC-34 in Kershaw County provides connection to the interior of the US.

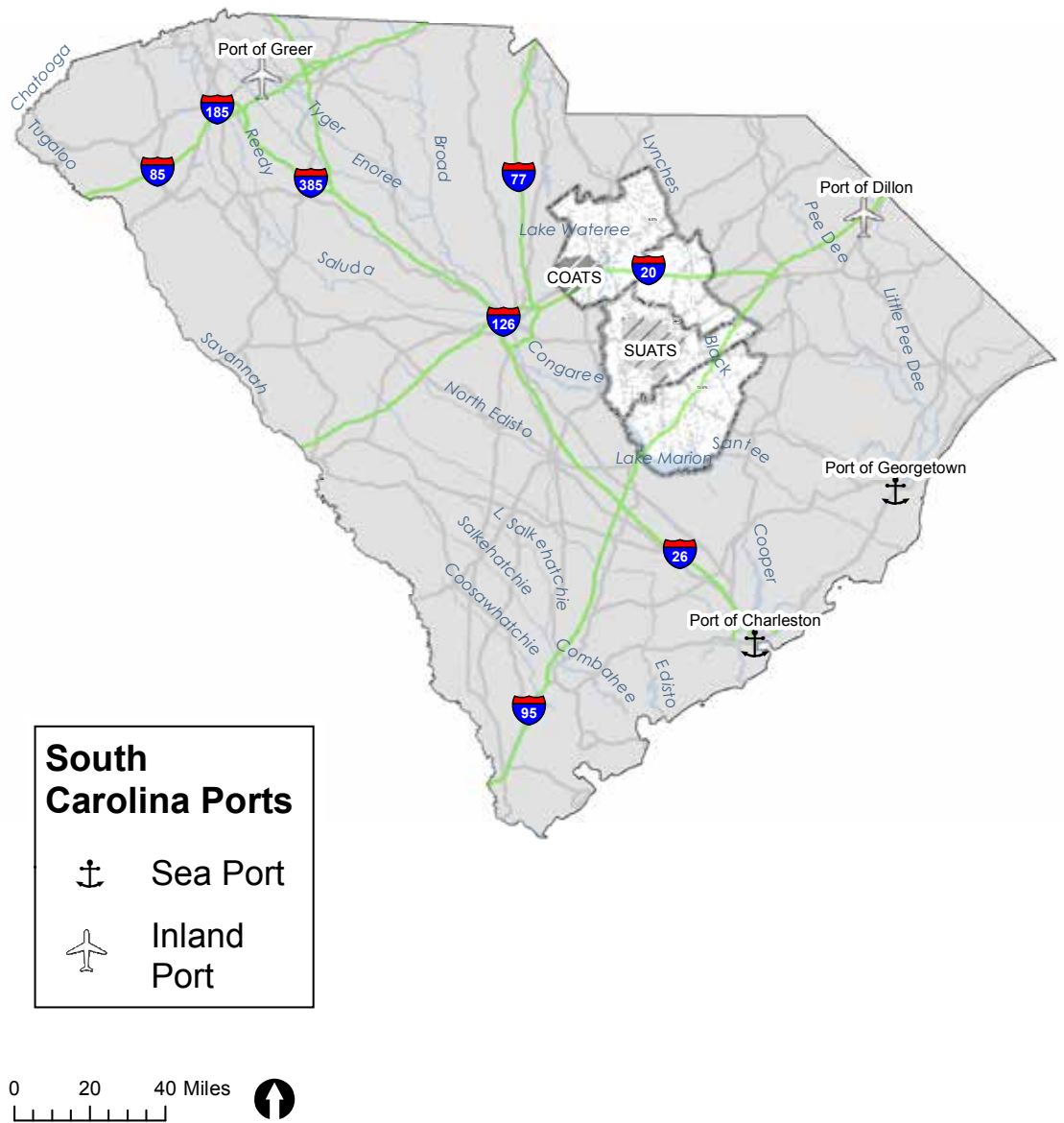


Figure 79: South Carolina Ports Map
Source: Santee-Lynches COG

Aviation

There are four public airports located in the Santee-Lynches Region, one in each county. The Sumter Municipal Airport (SUM) in Sumter County and Woodward Field Airport (CDN) in Kershaw County are classified as Transport Airports and are able to handle corporate jets, small passenger and cargo jet aircraft used in regional service, and small airplanes. Lee County Airport in Lee County and Santee Cooper Regional Airport in Clarendon County are classified as Basic Utility Airports and are able to handle small general aviation single and twin-engine aircraft.

Within 30 to 50 minutes of the region are the Florence Regional Airport (FLO) and Columbia Metropolitan Airport (CAE). These two airports provide service to a large percentage of the population and employment centers within the U.S. through a combination of direct flights as well as flights to regional hubs, predominately located in Atlanta, Georgia and Charlotte, North Carolina. Columbia Metropolitan Airport handles robust air cargo service for FedEx and UPS, with UPS operating a regional air cargo hub that serves the southeastern portion of the United States.

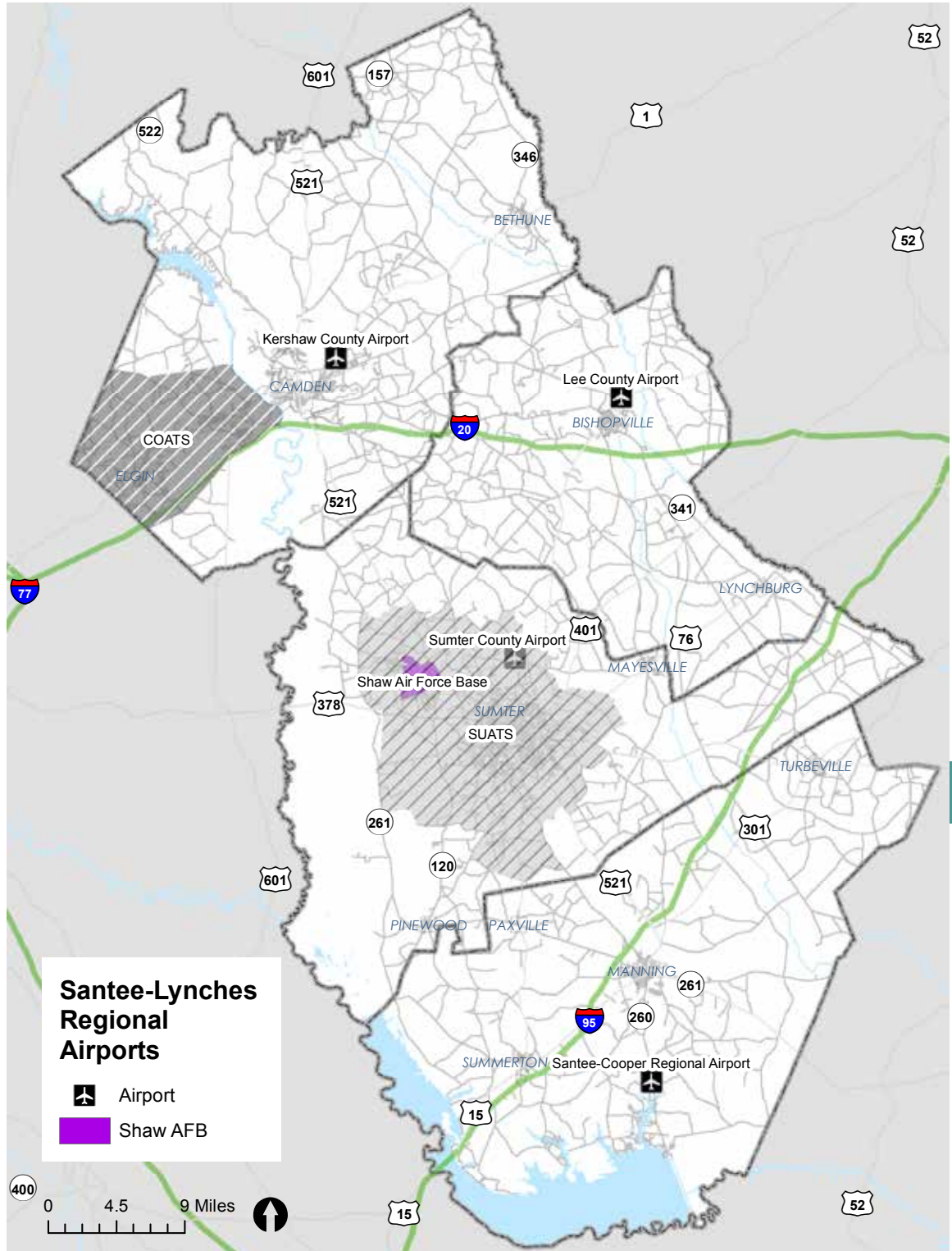


Figure 80: Santee-Lynches Regional Airport Map
Source: Santee-Lynches COG

Chapter 8 Public Transportation



PUBLIC TRANSPORTATION

Introduction

Overview

Types of Public Transportation

Existing Service

Regional Passenger Rail

Chapter

8

Available Public transportation is vital to the success a well-being of a community. Many residents rely on public transportation to get to work, school, home, healthcare, the grocery store, and government offices. The public transportation element of *Forward 2045* seeks to inventory current public transportation efforts and opportunities in the Santee-Lynches Region. This section will also note ongoing trends and plans related to public transportation and how these could impact the future for residents of the region. Finally, recommendations will be made about the future of public transportation in the region based on this inventory of efforts and opportunities. These recommendations will seek to put the Santee-Lynches Region in the most advantageous position for mobility moving forward in order to help ensure prosperity to all who live and work within the confines of the area.

Overview

Riders provide the basis for any public transportation system. Without anyone to serve, there is no point in having a public transit option. However, as has been shown throughout the history of transportation, there will never be a world without riders and users of public transportation. These riders are what are known as Captive Riders. These individuals use public transportation not by choice, but because there is some limiting factor to their mobility, such as: age, disability, or economic condition that prevents them from owning automobile vehicle. These are the most common users of public transportation options and make up a large population that needs attention when addressing public transportation planning.

The other common type of public transportation user is what is typically known as a Choice Rider. These persons make the conscious decision to use public transportation for a variety of reasons including convenience, cost saving, environmental consciousness, or any other factor that makes them choose public transportation over a personal vehicle. Conventional rider classifications suggest that to improve public transportation, the goal must be to attract more choice riders to the systems provided. However, choice riders make up a very small portion of public transportation users, especially in rural areas like the Santee-Lynches Region. They also tend to demand a higher degree of reliability and convenience

in advance of making the shift to public transportation. This means that allocation of resources and funds to attract these riders can ultimately take away from efforts to provide for captive riders and harm the core user base of a public transportation system.

Public transportation requires balancing service provision to the most individuals possible, broad geographic reach (more opportunity to serve captive riders), and system profitability. To balance these factors, decisions (and sometimes sacrifices) must be made. For example, in order to maintain profitability and maximize ridership, public transportation systems may exclude more rural, lower density areas. Serving a few people may not be cost effective compared choice is to serve more populated areas when captive and choice riders can be more easily served. Yet, because captive riders are most dependent on public transportation, it is essential to figure out how to effectively serve them as well. This is the balance that must be found for the region, how to provide service to a large area with widespread geographic distribution of at-risk individuals, but also maintain a system that is reliable and user-friendly to all who may want to use it.

Types of Public Transportation

Bus

Buses are the most common forms of public transportation. This form of transportation makes frequent stops and is intermixed with daily personal vehicle traffic. Alternative fuel buses are becoming more commonplace, with many cities running routes using all-electric busses. General route types of bus transportation include: standard, circulator, and express.

Trolley

Trolleys are most commonly seen in urban areas where they make short trips and deliver a limited number of riders along a set route. These vehicles can be powered by gas, diesel, battery, or other alternative fuels and intermix with traffic on the street. Trolleys are a form of limited bus transportation.

Light Rail (LRT)

Light rail is becoming increasingly popular in developing urban centers that may want to connect to major points, typically where residents commonly live and work. This type of transportation runs on its own track, away from daily traffic,

is powered by an overhead electric line, and makes a limited number of stops compared to bus transportation lines. These systems typically only consist of one or two cars and deliver limited numbers of individuals.

Heavy Rail (HRT)

Heavy rail is most easily thought of as subway systems in major urban cities. These are larger trains with designated, electrified tracks that have their own routes and schedules. These trains are often high speed and deliver larger numbers of passengers to multiple stops along the route.

Personal Rapid Transportation (PRT)

Personal rapid transportation is a growing area of the public transportation field. These are typically smaller vehicles that operate on their own fixed route and deliver individuals or small groups to their selected destination. These forms of transportation often use automation and require no operator, making them cost effective in the long run but expensive to install.

Existing Services

SWRTA

There is currently a single public transportation provider in the Santee-Lynches Region. The Santee-Wateree Regional Transportation Authority (SWRTA) operates 12 fixed bus routes throughout the region, running seven days a week with buses departing every one to four hours, depending on the route, with operating hours from 5am to 8:30pm. Half of these routes are located within the City of Sumter, and are within the the Sumter Urban Area Transportation Study (SUATS) MPO. Of the remaining six routes, four are in Lee County centered in the City of Bishopville. The remaining two active routes carry passengers from Sumter to Columbia and from Sumter to Columbia via Camden. However, since adding the four Bishopville routes in 2014, SWRTA has also experienced a decline in ridership by nearly one third of its annual passengers, falling from 221,886 riders in 2014 to 145,045 in 2016. This decline may be explained by a reduction in routes within Sumter’s city limits, as SWRTA stopped a route that ran to the vocational rehabilitation center near the city.

Challenges

The primary challenge, by far, in providing public transportation to the Santee-Lynches region is the dispersed population of the region. Most of the region is extremely rural and has very low population density, meaning that even if routes could be provided to an area or municipality, there would be relatively few potential riders served with a single route. This makes public transportation expensive and inefficient to operate and compounds the already existing fiscal challenges SWRTA already faces. A common solution to this is to develop areas with sidewalks and bike lanes that make it easier for individuals to get to a bus stop that may be a little further away but more centrally located to serve more individuals. However, most of this region is so rural that even these methods may not be effective.

Making public transportation available on a wide scale will continue to be a significant challenge for the Santee-Lynches Region in the years to come. One possible silver lining is the growing areas of the region are closer to municipalities. Based on current trends, the region’s population will concentrate in these areas and make providing transportation options to these more densely populated areas more efficient and cost-effective.

Coordination with Other Planning Efforts

Currently, Santee-Lynches is working in coordination with SWRTA to undertake a community transportation needs assessment scheduled for completion in 2019. This study will dig deeper into some of the information and trends provided and addressed here to help establish a more efficient and effective public transportation system for the region. Not only will this upcoming assessment look at public methods of transportation, but also private companies and rideshare options such as Uber or Lyft and how they might play a role in making moving around the region easier for anyone who might need it. The conclusions reached in that study will work in tandem with *Forward 2045* to help accomplish goals set forth in both documents.

Existing SWRTA Routes-Lee County

Lee Trans operates as a subsidiary of Santee-Wateree RTA in Lee County. This system includes four fixed-route buses that focus around the city of Bishopville. Two of the routes, Loops 1 and 2, operate in the city limits while Loop 3 serves the Rembert area and Loop 4 connects to Lynchburg in the southern part of the county. Loops 1-3 operate 5 days a week while Loop 4 operates just one day per week. The routes leave at intervals of anywhere between an hour and a half and three hours.

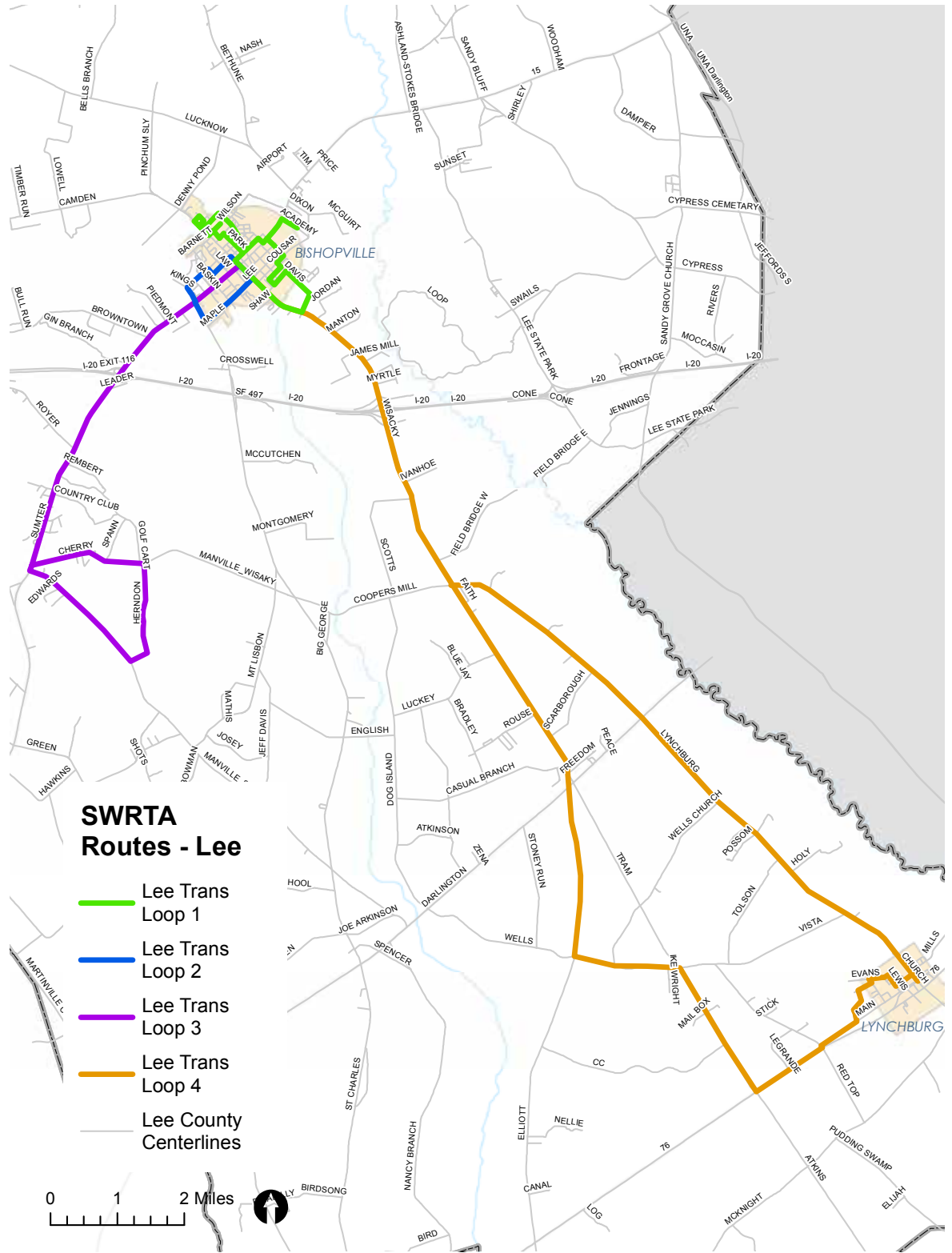


Figure 81: Lee County Bus Route Map
Source: Santee-Lynches COG

Existing SWRTA Routes-Sumter County

Santee-Wateree Regional Transportation Authority (SWRTA) currently operates 7 routes in the city of Sumter. Though this system is not in the study area, it is important to note, as it is one of only two cities in the Santee-Lynches Region with active public transportation. The system operates 7 days a week from 5am to 8:30pm with most routes running on the hour or every half-hour. Most of the routes operate directly within the city limits and do not venture into the less densely populated rural area surrounding the City. Focus for the existing system is the downtown and Broad Street areas of Sumter with the West Liberty Route serving Sumter Highschool and the commercial area at the intersection of Pinewood Road and McCrays Mill Road and the Shaw Shuttle carrying individuals between downtown and Shaw Air Force Base.

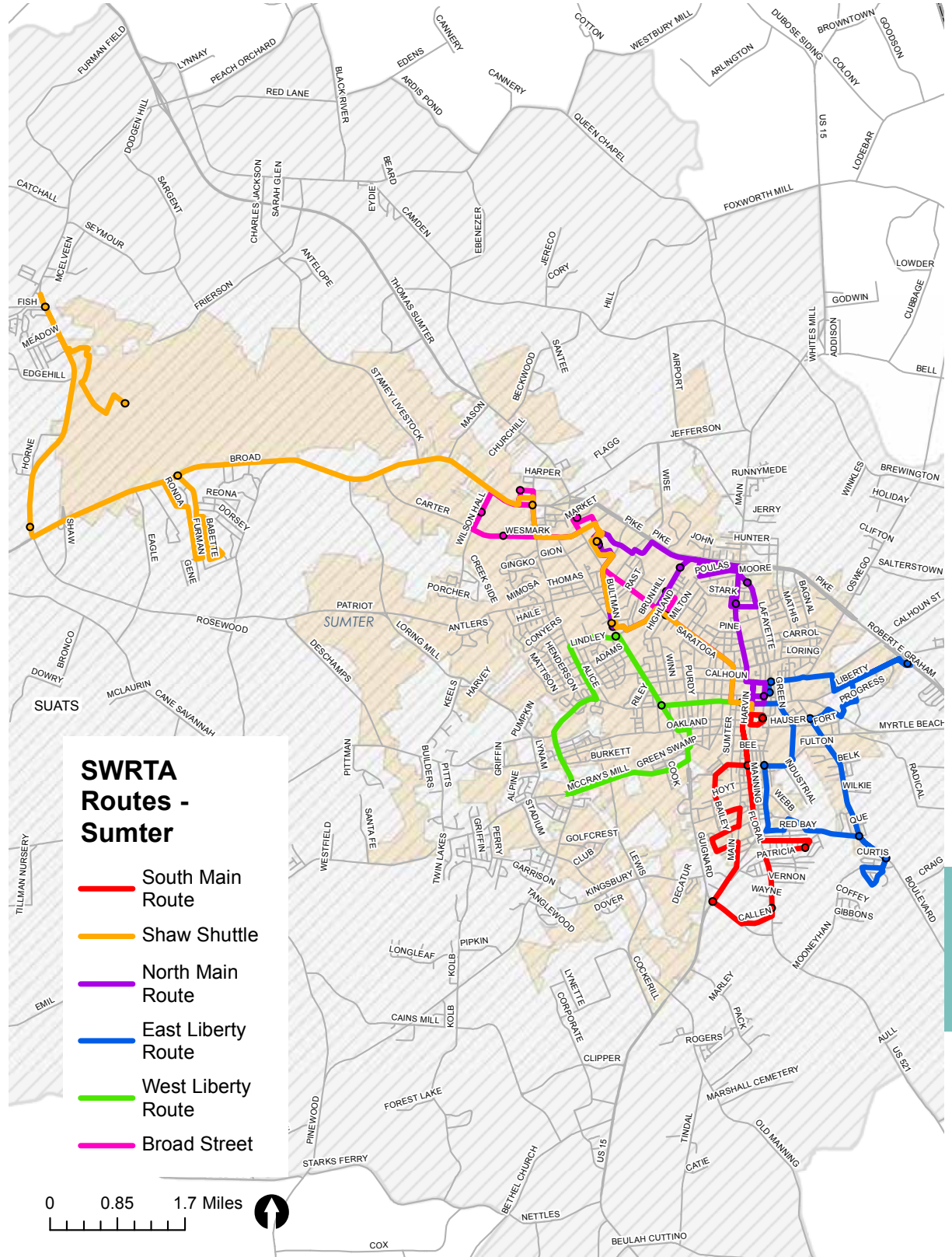


Figure 82: Sumter County Bus Route Map
 Source: Santee-Lynches COG

Regional Passenger Rail

Regional passenger rail service to New York and Miami is provided by Amtrak along three routes, which stop in Camden, Florence, and Kingstree, South Carolina. Two trains are available daily from Camden, one Southbound and one Northbound with connecting stops in Savannah and Raleigh respectively. Florence has five trains that depart daily, with three northbound and two southbound that connect to the same respective stops as the Camden station. The Kingstree station is on the same route as Florence, and thus has a similar schedule.

As commuter high-speed rail corridors are investigated and implemented within the state and nationwide, theantee-Lynches region should consider commuter rail connections. Two specific potential opportunities in the region are a Camden - Columbia local commuter rail connection and a Columbia– Sumter – Florence commuter rail connection.

The Central Midlands Council of Governments (CMCOG) has been exploring commuter rail service since 2000 when it completed its first study. The results of that study, which assessed nine corridors, identified the Camden - Columbia route as possessing characteristics that would benefit from commuter rail service. Another work effort concluded in 2006 was intended to further evaluate the three corridors previously identified. This effort also contained a peer area comparison and examined alternative technologies. After evaluation, each corridor was compared and ranked based on:

- Ridership potential,
- Station access and land use support,
- Potential implementation cost,
- Ease of implementation, and
- Public opinion.

The Camden/Columbia Alternatives Analysis evaluated rapid transportation options for the corridor between Camden and Columbia, including urban areas of Columbia, suburban areas of northeast Richland County, and rural areas of Kershaw County, with project goals of:

- Fostering economic development along the corridor,
- Providing regional connectivity,
- Managing congestion,
- Improving regional air quality,

- Increasing smart growth initiatives, and

Expanding transportation options available to commuters.

The study was a follow-up to the previously mentioned 2006 Commuter Rail Feasibility Study. Existing transportation corridors in the study area included: Interstate 20, US Highway 1, and a CSX single-track railroad line. Existing bus transportation service in the corridor at the time of the study included routes in the Central Midlands Transit (COMET) system, along with SWRTA's route connecting Camden to Columbia.

Of the three corridors, the Camden - Columbia corridor was the clear choice receiving the highest ranking overall in four of the five criteria. It also compared favorably with peer corridors in Albuquerque, Charlotte, and Nashville. Ridership was estimated to range between 1,900-2,300 per day and the capital cost estimated at \$80 million.

Camden-Columbia Alternatives Analysis Study

In May of 2011, the Camden - Columbia Alternatives Analysis Study was completed. Three "build" alternatives were identified: one commuter rail and two bus rapid transportation (BRT). Ultimately, the study found that the three build alternatives were too costly relative to the need for transportation service at the time. Instead, low cost investments enhancing mobility options for traveling within Columbia were recommended.

Inter-City Bus Services

Similar to rail routes in the area, there are daily inter-city bus offerings through Greyhound Bus service. With stations located in Sumter, Camden, and Florence, there are opportunities for residents of the region to travel across the country and beyond via these services. Each of these stations receive two buses per day, one in each direction running north and south. These routes connect to Raleigh and Savannah respectively, from which a variety of travel options are located for travel around the United States and beyond.

Last Mile Problem

Unfortunately, transit service usually are unable to drop riders off directly at their destinations, creating something called the “last mile” problem. Transit riders rely on a good network of sidewalks, trails, and bike ways to move between transit service and their final destinations. The sidewalk network in the Santee-Lynches transportation planning area is dilapidated, disjointed, and disconnected. Where sidewalks to exit, there often is adjacent traffic moving so fast it discourages use. Therefore, planning for active transportation infrastructure in tandem with transit routes is critical to the system’s success.

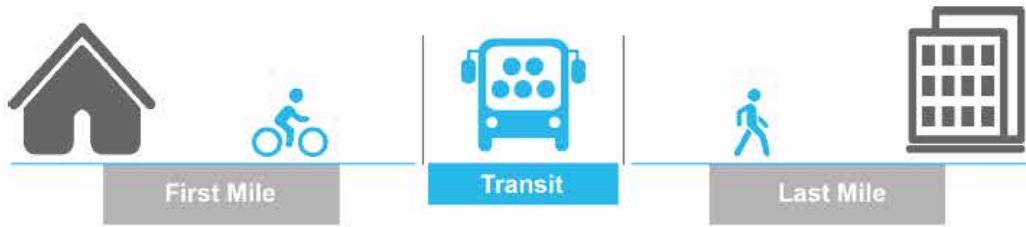
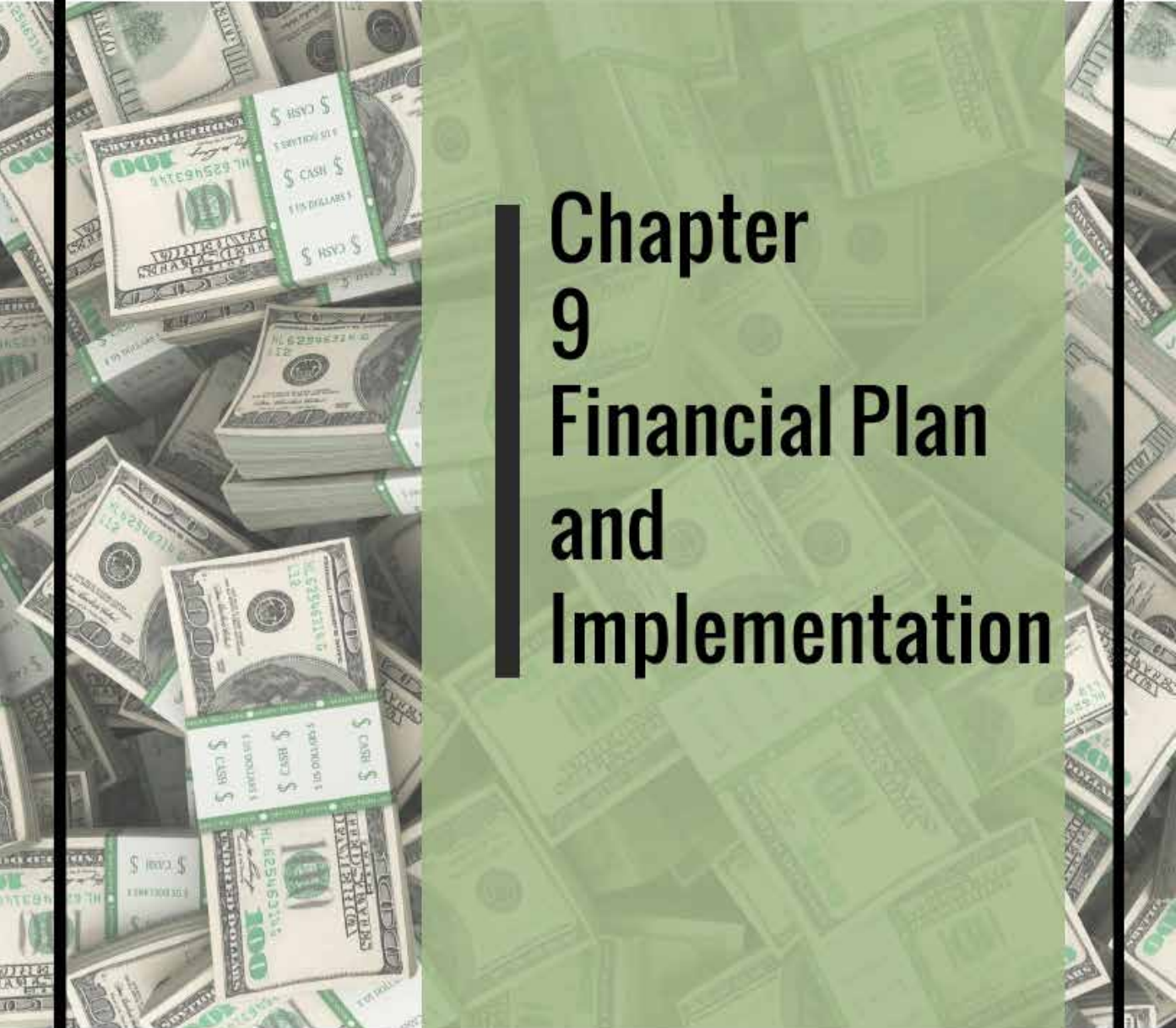


Figure 83: “last mile” Problem Street Section Map
 Source: ActiveSwitch.ca



Chapter 9 Financial Plan and Implementation

FINANCIAL PLAN AND IMPLEMENTATION

Introduction

Roadway Project Prioritization

Transit Project Prioritization

Financial Plan Development

Financially Constrained Projects

Alternative Funding Strategies

Conclusion

Chapter

9

Transportation planners have historically worked to balance the technical aspects of engineering and design with engaging the public and elected leaders in the decision-making process. These two pressures can make it difficult to evaluate how well the transportation system addresses the community's mobility needs and how well future projects will improve quality of life. *Forward 2045* serves as the region's long-range transportation strategy and combines technical data with engagement results in an attempt to bridge this gap.

As mandated by the Federal FAST Act, this plan is also financially constrained. The financial plan shows proposed investments that are realistic in the context of anticipated future revenues over the life of the plan. For the purpose of *Forward 2045*, this is funding through the year 2045. Meeting this test is referred to as "financial constraint." This process demonstrates how recommended and prioritized projects can realistically be funded during the life of the plan. Because funding is always limited, it is critical that measures be taken to ensure that appropriate projects and programs are prioritized and eventually implemented. To do this, Santee-Lynches must demonstrate a reasonable expectation of future funding levels, estimate project costs, and project future needs of all travel modes. The financially-constrained plan allows Santee-Lynches and supporting agencies to focus on near-term opportunities. This chapter discusses the process used to determine financial constraint, including project prioritization and estimated funding levels.

Revenue forecasts were developed based on a review of previous state and local expenditures, current funding trends, and likely future funding levels. All dollar figures discussed in this section are analyzed as current year dollars (i.e. 2019) and project estimates are inflated to reflect the projected year(s) of funding/implementation. Based on current national standards, an annual inflation rate of 5% was used to forecast costs and revenues. This chapter provides an overview of revenue assumptions, probable cost estimates, and financial strategies along with the detailed research results used to derive these values. Since this is a planning level funding exercise, all funding programs, projects, and assumptions will need to be reevaluated in subsequent plan updates and as individual projects are further scoped.

Roadway Project Prioritization

Chapter 5 of *Forward 2045* introduced the plan's proposed roadway recommendations, along with the prioritization method. Using a combination of qualitative and quantitative metrics, the planning team assessed the relative importance of each project. It should be noted that the prioritized projects are not fiscally constrained. Projects are initially grouped into near-, mid-, and long-term improvements, regardless of available funding. The prioritization process allows for flexibility in the order projects are implemented rather than proceeding in strict rank order so Santee-Lynches can most effectively utilize allotted funding as conditions mature and change occurs.

Finally, although bicycle & pedestrian, intersection, transit, and planning projects were independently prioritized, Santee-Lynches will attempt to implement these improvements concurrently with roadway enhancements where these projects align. This approach is most cost-effective and minimizes construction impacts to the surrounding network, as well as the potential for inefficiency in construction.

The tables on the following pages display, in rank order, the near-, mid-, and long-term corridor and intersection projects that were prioritized. The scoring process is described in Table 9.1.

Table 9.1 – Project Scoring

Each project was scored based on an SCDOT-driven process, which is standardized across the state. A project receives an individual score based on its performance in each category, listed below, and is scored on a scale of 1 (worst) to 10 (best). Project types are ranked using the same criteria, but each category is weighted differently, given each project a separate "weighted score" by which it is ranked. For more information on the prioritization process, see Appendix X.

Transit Project Prioritization

Federal transit funding went through a shift as a result of the MAP-21 and FAST Act legislation. This plan assumes a continued funding level consistent with historical funding for both transit capital and operations projects.

Specific Public Transit funded projects are not forecasted in this document, but the majority of funds will be acquired by the Public Transit Agency- Santee Wateree Regional Transportation Authority (SWRTA) using available SCDOT and Federal Transit Administration Grants. Funding and support will dictate the outcome of the projects. Once funding is determined, the specific project will be annotated in the Santee-Lynches Transportation Improvement Program (TIP).

Capital Transit Funding

Capital transit funds come from several federal and state sources. Currently, SWRTA receives Federal 5307, 5310, 5311, and State funds. The funding amounts are projected to increase with inflation. At present, SWRTA services outside the SUATS MPO are limited to four (4) bus routes in Lee County operated in part with funds from a Lee County penny sales tax as well as a single route that connects Sumter to Columbia via Camden.

Transit Operations Funding

Transit operations funding comes from Federal 5307 grants, State funds, member local government contributions, local cash fares, local contracts, and other local miscellaneous sources. For more information on SWRTA, see <http://www.swrta.com/>.

Financial Plan Development

Financial Plan Overview

The Fixing America’s Surface Transportation Act (FAST Act), Public Law 114-94, became law on December 4, 2015. The FAST Act funds transportation programs for fiscal years 2016 through 2020. It is the first long-term surface transportation authorization enacted in a decade that provides funding certainty for surface transportation. The FAST Act builds off prior federal legislation – Public Law 112-141, the Moving Ahead for Progress in the 21st Century Act (MAP-21) – and continues an emphasis on performance evaluation and addresses national priorities, as identified below.

This fiscally constrained plan shows proposed investments that are realistic based on future funding availability during the life of the plan and a series of funding periods. Meeting this test is referred to as “financial constraint” the funding periods identified for **Forward 2045** are:

- 2019-2022 *
- 2023-2034
- 2035-2045

(* Guideshare funds for 2019-2022 have been committed to projects via the current Santee-Lynches Transportation Improvement Program (TIP))

The 2019-2023 funding period includes current committed projects and associated funding from the STIP. Projects and funding levels identified during this time period were identified as priority projects during previous planning efforts and have been discussed in previous chapters of this document. As such, they are not re-evaluated as part of this plan. The 2025-2035 and 2036-2045 funding periods divide the remainder of the projected revenues and projects into time bands less than or

equal to ten years. Projects that cannot be funded within the 2045 financially constrained plan are considered part of the unfunded vision plan.

Projected Revenue

SCDOT allocates federal funding to MPOs and Councils of Government through a program known as Guideshare. Separate from the Guideshare program, SCDOT budgets other funds on a statewide basis for items including maintenance, safety, and interstates. Funds are allocated and prioritized at a statewide level. In 2018, the Santee-Lynches Transportation Planning Region received a total of \$3.209 million in Guideshare funding, inclusive of a 20% state match provided by SCDOT.¹ The 2018 funding amount is expected to stay constant throughout the life of the plan, with increases to the total amount of Guideshare funds available offset by increases after each major census to MPO area boundaries. When this occurs, the amount of Guideshare funding will decrease for the rural Transportation Planning Area, and will increase for the MPO that is expanding. When inflation is considered, this will lead to a decline in the region's purchasing power using Guideshare funds.

Santee-Lynches has the opportunity to consider how best to allocate these Guideshare funds during the life of the plan and engaged the public as well as regional stakeholder organizations via workshops and online survey for input. The responses received strongly advocated for investment in new roads and roadway widenings, public transportation, and safety improvements. These priorities were taken into account by the planning team, the Santee-Lynches Regional Transportation Advisory Committee (RTAC), and the Santee-Lynches Council of Governments Board of Directors when establishing percentage allocation of Guideshare Funding, as described below.

Roadway Corridors – 50% Guideshare funding

Projects within the roadway category include widening projects, new location projects, access management projects, road diets, and improvement of existing roadways with a focus on safety and geometry/design standards.

Intersections – 35% Guideshare funding

Projects within the intersection category include intersection and interchange projects that have been identified as safety or capacity challenges.

Transit – 8% Guideshare funding

Projects within the transit category consist of capital projects rather than operations and maintenance projects. This funding is in addition to transit capital and operations and maintenance funding received through other statewide sources.

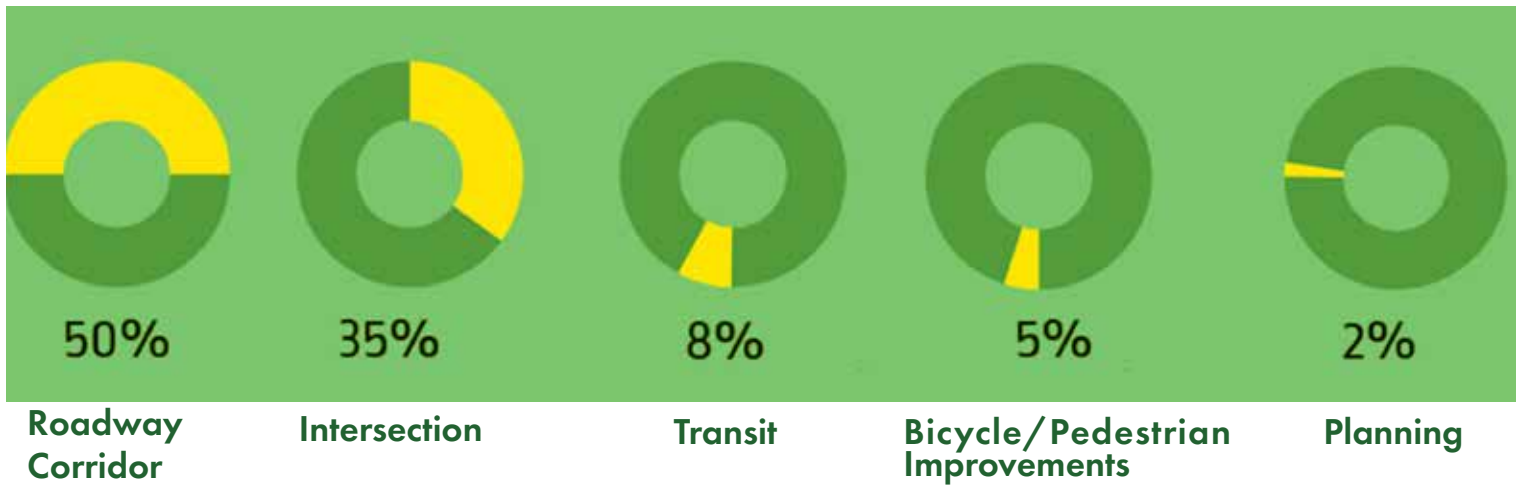
Bicycle/Pedestrian Improvements – 5% Guideshare funding

Projects within the bicycle and pedestrian category include on- and off-street projects independent of other roadway improvements. This allocation is in addition to potential Transportation Alternatives Program (TAP) monies that can be applied for by individual jurisdictions. For a bicycle or pedestrian project to be considered for Guideshare funding, the project must satisfy a series of criteria set forth by SCDOT. Projects should be vetted against these criteria prior to consideration.

Planning – 2% Guideshare funding

Projects within the planning category consist of corridor studies and other related advance planning work required to more effectively scope needs in targeted sub-areas of the region.

¹ With the completion of debt service in 2020 on previously funded projects, Santee-Lynches will again receive its full amount of annual Guideshare allocation.



Santee-Lynches currently receives nearly 100% of its transportation project funding via the federal and state Guideshare program. This funding amount is determined largely by current and projected regional population and vehicle miles traveled compared to other regions of the state. As a result, funding levels are not expected to increase substantially over the life of this plan. These funding levels will not be sufficient to implement many of the projects identified as a part of this study, thereby leaving many deficiencies unaddressed across all modes of transportation. In order to mitigate this funding shortage, alternative funding sources that can be generated using other methods need to be identified. These funding sources will be discussed in greater detail at the end of this chapter. It is important to note that the purpose of *Forward 2045* is only to provide a reasonable expectation of future funding. The composition of any future funding referenda will be a topic of discussion for local units of government, and will ultimately be decided on by elected officials and voters.

Santee-Lynches Guideshare Modal Splits

	Roadway Corridors	Intersections	Transit	Bike/Ped	Planning	Totals
2023-2034	\$18,884,500	\$11,330,700	\$3,021,520	\$3,776,900	\$755,380	\$37,769,000
2035-2045	\$17,649,500	\$10,589,700	\$2,823,920	\$3,529,900	\$705,980	\$35,299,000
Total	\$36,534,000	\$21,920,400	\$5,845,440	\$7,306,800	\$1,461,360	\$73,068,000
% Allocation	50%	35%	8%	10%	2%	100%

Note: This table shows funding availability for those years that are not already programmed in the currently adopted TIP and STIP. Assumptions have been made about modal splits within available Guideshare funds to create more opportunities for bicycle, pedestrian, transit, and intersection projects.

Table 7: Santee-Lynches Guideshare Modal Splits
 Source: Santee-Lynches COG



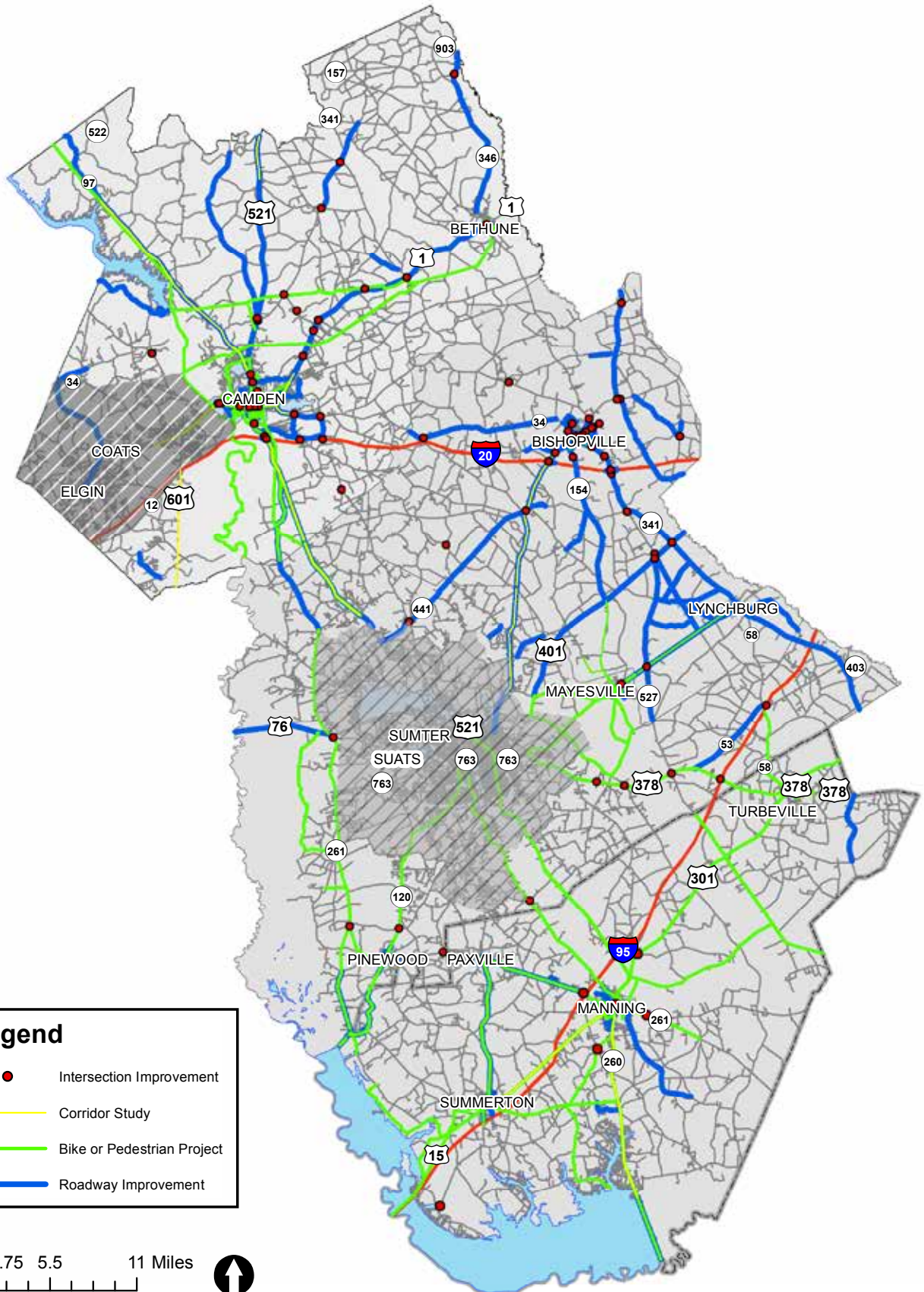
Proposed Projects Matrix

The following table shows a bread down of all potential projects identified in the **Forward 2045** Long Range Transportation Plan by category and county. While The map at the right shows the geography distribution of these projects.

County	Roadway Projects	Intersection Projects	Bike and Pedestrian Project	Planning Projects	Transit Projects	Railway Projects	Total Projects/County
Clarendon County	33	7	73	3	TBD	1	117
Kershaw County	43	34	72	7	TBD	1	157
Lee County	63	34	17	1	TBD	0	115
Sumter County	26	43	37	3	TBD	0	79
Total Projects/Category	165	88	199	14	TBD	2	468

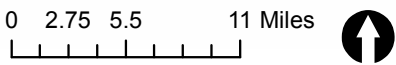
Table 8: All Proposed Projects List
Source: Santee-Lynches COG

Figure 84 (opposite page):
All Proposed Projects Map
Source: Santee-Lynches COG



Legend

- Intersection Improvement
- Corridor Study
- Bike or Pedestrian Project
- Roadway Improvement





Preserve and protect a healthy environment; offer easy access to institutions.

Maximize region's watershed quality.

Improve public access to parks, greenways, and waterfronts.

In 2045 our economic will be competitive with shared prosperity that spreads economic opportunities and benefits to all residents in the region.

Reduce transportation infrastructure land use.

Ensure access to opportunities and services.

Encourage various use to share complete street.

Preserve and create a seamless transportation environment.

Fully build out a system of connected corridor throughout the region.

PLACE

PROSPERITY

**SMART
GROWTH**

**MOBILITY &
ACCESSIBILITY**

SAFETY

**SYSTEM
PRESERVATION**

GOALS AND GUIDING PRINCIPLES



QUALITY

Reduce negative impacts of local transportation on region's air quality.

CONNECTIVITY

Improve active transportation option. Improve multi-modal access to neighborhood service.

Reduce region freight delays.

SAFETY AND ENGINEERING CONSIDERATIONS

Improve transportation system for pedestrians, cyclists, vehicle drivers.

INSTITUTIONAL SUPPORT AND FUNDING

Minimize local government cost and Maximize benefits from infrastructure investment.

Project Ranking Methodology: Roadway and Intersection Project Base Scoring

Guiding Principle	Measure Definition	Scoring Weight	Max Points
Place	Environmental Impacts: Based on an assessment of potential impacts to natural, social, and cultural resources. Environmental features are defined as wetlands, historic properties, bodies of water, and institutions such as schools, parks, and recreation areas	10: Improvement more than 500 ft from environmental feature	10
		5: Improvement 100-499 ft from environmental feature	
		1: Improvement less than 100 ft from environmental feature	
Prosperity	Truck Traffic: Based on current truck percentages	10: 75th percentile or higher of truck traffic	20
		5: 26th to 74th percentile of truck traffic	
		1: Bottom 25th percentile of truck traffic	
		0: No data or data not available	
	Economic Development: Based on a 10-factor methodology developed by Santee-Lynches. The methodology assesses the economic development impact of transportation infrastructure projects.	10: score over 20	
5: score between 10 and 20			
1: score below 10			
Smart Growth	Located on a priority network: Based on a project's location in relationship to defined priority networks, including the National Highway System (NHS), SCDOT Strategic Freight Network, and other strategic corridors).	10: Located on or intersecting an NHS road, SCDOT strategic corridor, or SCDOT freight route	10
		5: Within 1 mile of a priority network road	
		1: greater than 1 mile away from on a priority network road	
	Consistency with Local Land Use Plans: Verification of consistency with local land use plans is confirmed during the STIP process.	All projects are assumed to be consistent with local land use plans at this time	
Mobility and Accessibility	Traffic Volume and Congestion: Based on current and future traffic volumes and the associated level of service condition.	10: V/C ratio above 0.50	20
		7: V/C ratio between 0.41 and 0.50	
		5: V/C ratio between 0.31 and 0.40	
		3: V/C ratio between 0.21 and 0.30	
		1: V/C ratio below 0.20	
	Alternative Transportation Solutions: Based on feasibility of including additional public transportation and/or bicycle/pedestrian facilities.	10: Project can support public transportation and bicycle/pedestrian facilities	
5: Project can support either public transportation or bicycle/pedestrian facilities			
1: Project cannot support public transportation or bicycle/pedestrian facilities			
Safety	Public Safety: Based on a crash rate calculated by the number and severity of crashes.	10: Safety score of 5	20
		7: Safety score of 4	
		5: Safety score of 3	
		3: Safety score of 2	
		1: Safety score of 1	
	Geometric Alignment Status: Based on an assessment of the intersection's functionality and operational characteristics.	10: Intersections with safety as primary purpose	
5: Intersections with congestion as primary project purpose			
1: Intersections with operations or other as primary purpose			
System Preservation	Financial Viability: Based on estimated project cost in comparison to the annual Guideshare budget. Additional consideration will be given to projects supplemented with local project funding and/or other federal or state funding.	10: Estimated cost is less than 50% of annual guideshare budget	20
		5: Estimated cost is less than annual guideshare budget	
		1: Estimated cost is more than three times annual guideshare budget	
		0: Estimated cost is more than six times annual guideshare budget	
	Pavement Quality: Based on pavement condition assessments using the SCDOT Pavement Quality Index (PQI). For the purpose of ranking, the lowest PQI score on the segment is used.	10: PQI 1.37 or below	
		5: PQI between 1.38 and 3.08	
1: PQI greater than 3.09			

Table 9: Roadway and Intersection Project Ranking System
Source: Santee-Lynches COG

Project Ranking Methodology: Roadway and Intersection Project Weighting

Roadway and intersection projects, though prioritized using the same factors, have different weighting for each score category due to the fundamental differences between a corridor and an intersection. These weightings are shown below. The weights are used to calculate a project's final "weighted" score, which determines the project's overall ranking.

Guiding Principle	Measure	Roadway Improvements	Intersections
Place	Environmental Impacts: Based on an assessment of potential impacts to natural, social, and cultural resources. Environmental features are defined as wetlands, historic properties, bodies of water, and institutions such as schools, parks, and recreation areas	10%	2%
Prosperity	Truck Traffic: Based on current truck percentages	10%	15%
	Economic Development: Based on a 10-factor methodology developed by Santee-Lynches. The methodology assesses the economic development impact of transportation infrastructure projects.	15%	15%
Smart Growth	Located on a priority network: Based on a project's location in relationship to defined priority networks, including the National Highway System (NHS), SCDOT Strategic Freight Network, and other strategic corridors).	20%	15%
	Consistency with Local Land Use Plans: Verification of consistency with local land use plans is confirmed during the STIP process.	N/A	N/A
Mobility and Accessibility	Traffic Volume and Congestion: Based on current and future traffic volumes and the associated level of service condition.	15%	10%
	Alternative Transportation Solutions: Based on feasibility of including additional public transportation and/or bicycle/pedestrian facilities.	5%	5%
Safety	Public Safety: Based on a crash rate calculated by the number and severity of crashes.	10%	15%
	Geometric Alignment Status: Based on an assessment of the intersection's functionality and operational characteristics.	5%	10%
System Preservation	Financial Viability: Based on estimated project cost in comparison to the annual Guideshare budget. Additional consideration will be given to projects supplemented with local project funding and/or other federal or state funding.	5%	5%
	Pavement Quality: Based on pavement condition assessments using the SCDOT Pavement Quality Index (PQI). For the purpose of ranking, the lowest PQI score on the segment is used.	5%	8%

Table 10: Roadway and Intersection Project Weighting
 Source: Santee-Lynches COG



Project Ranking Methodology: Bicycle and Pedestrian Projects

Code	Criteria	Scoring Weight	Max Points
Quality			
Q1	Increases coverage of existing facilities	Yes = 3; No = 0	6
Q2	Improves or expands Palmetto Trail, state bicycle routes, or other major existing bicycle or pedestrian facilities	Yes = 3; No = 0	
Connectivity			
C1	Connects to a nearby tourist, cultural, or historic point of interest	Yes = 3; No = 0	16
C2	Provides or enhances access within 0.5 miles of a K-12 school or college campus	Yes = 3; No = 0	
C3	Provides connection to/from existing state-designated bicycle routes, existing and proposed trails and greenways, or state/local parks	Yes = 2; No = 0	
C4	Enhances connectivity to existing or planned transit services	Yes = 2; No = 0	
C5	Removes a barrier in a route or improves a major roadway or river crossing	Yes = 3; No = 0	
C6	Eliminates gap in existing bicycle or pedestrian facility or provides connection to existing sidewalk or pedestrian facility	Yes = 2; No = 0	
C7	Supports economic development for a downtown commercial district, rural community, or other commercial area	Yes = 1; No = 0	
Safety and Engineering Considerations			
SE1	Improves safety in areas where bicycle/pedestrian crashes have occurred	Yes = 3; No = 0	13
SE2	Improves an area where a bicycle or pedestrian fatality has been noted	Yes = 4; No = 0	
SE3	Improvements to comply with ADA or that provide enhanced ADA facilities	Yes = 2; No = 0	
SE4	Improvement located on a high volume road (greater than 5,000 AADT).	Yes = 2; No = 0	
SE5	Provides traffic calming or speed management benefits	Yes = 2; No = 0	
Institutional Support and Funding			
IS1	Improvement is on or connects to a roadway project contained in Santee-Lynches LRTP or an existing master plan	Yes = 3; No = 0	11
IS2	Financial Viability based on estimated project cost in comparison to the LRTP budget set-aside for Bicycle and Pedestrian Projects	< 10% of bike/ped allocation = 5 > 10% but less than 50% of allocation = 3 > 50% but less than 100% of allocation = 1 > 100% of allocation = 0	
IS3	Eligible for funding through Guideshare program	Yes = 3; No = 0	

Table 11: Bike and Pedestrian Project Ranking System
Source: Santee-Lynches COG

Project Ranking Methodology: Planning (PL) Projects

Code	Criteria	Scoring Weight	Max Points
C1	Study Area includes a tourist, cultural, or historic point of interest	Yes = 3; No = 0	14
C2	Study Area includes a K-12 school or college campus	Yes = 3; No = 0	
C3	Study Area includes a known barrier in a route	Yes = 3; No = 0	
C4	Study Area includes recent or planned development activity	Yes = 3; No = 0	
C5	Supports economic development for a downtown commercial district, rural community, or other commercial area	Yes = 2; No = 0	
SE1	Crashes noted in the Study Area	1 - 5 crashes = 2 6 - 10 crashes = 3 11 + crashes = 4	13
SE2	Study Area contains a location where a fatality has been noted	Yes = 3; No = 0	
SE3	Study Area includes known ADA facility needs	Yes = 2; No = 0	
SE4	Study Area includes a high volume road (greater than 5,000 AADT)	Yes = 2; No = 0	
IS1	Study area contains one or more projects specified in Santee-Lynches LRTP	one project = 1 two projects = 2 three projects = 3 four projects = 4	12
IS2	Study Area is noted in municipal or county Comprehensive Plan	Yes = 2; No = 0	
IS3	Eligible for funding through Guideshare program	Yes = 3; No = 0	
IS4	Study Area recommended during stakeholder outreach process	Yes = 3; No = 0	

Economic Development Score Methodology

Code	Criteria	Scoring Weight	Max Points
C1	Project serves a workforce development facility (i.e. college campus, vocational rehabilitation site) (within 1.0 mi)	Yes = 3; No = 0	12
C2	Project directly supports an existing or planned industrial site	Yes = 4; No = 0	
C3	Project improves connectivity in the transportation network	Yes = 2; No = 0	
C4	Project supports economic development efforts for a downtown commercial district, rural community, or other commercial area	Yes = 3; No = 0	
E1	Project located on a critical rural freight corridor or connects directly to a critical rural freight corridor	Yes = 3; No = 0	10
E2	Project improves roadway's design safety for freight traffic	Yes = 3; No = 0	
E3	Project improves multimodal accessibility	Yes = 2; No = 0	
E4	Project includes a high volume road (greater than 5,000 AADT)	Yes = 2; No = 0	
IS1	Project includes existing local commitment of funds	Yes = 3; No = 0	6
IS2	Corridor or Feasibility Study has been completed	Yes = 3; No = 0	

Table 12: Planning Project Weighting
Source: Santee-Lynches COG

Fiscally Constrained Projects

The planning team undertook a financial constraint exercise for the prioritized projects in the roadway corridors, intersections, and bicycle and pedestrian categories. Additional detail is provided in the following section about the methodology applied to each category. Wherever the planning team assessed for financial constraint, they determined it against the total funding available for that category and for the horizon-year periods considered. Any additional funding not allocated in the first horizon year period was placed in the second horizon year period.

Roadway Corridors

The capital roadway projects identified as part of the recommendations development, detailed in Chapter 5 and earlier in this chapter, were later prioritized. The capital roadway project prioritization process evaluated recommendations based on qualitative and quantitative measures drawn from Forward 2045’s guiding principles. The outcome, a list of prioritized projects, will be considered for incorporation into the financially constrained plan. While it would be ideal to implement every project, only a portion can be funded. As a result, higher ranked projects were considered first for funding. To do this, the priority project list was compared to the available funds determined through the Guideshare modal split.

The planning team also determined planning cost estimates for the roadway corridor projects. These estimates attempt to capture the full cost of a project, including construction, right-of-way acquisition, design, contingency, and environmental/utility costs. While these costs were all initially prepared in 2019 dollars, they must be inflated to the available funding during our horizon year periods. To maintain a consistent approach, projects considered for the first horizon-year period (2024-2034) were inflated for the midpoint of that period (2030). Projects that were unable to be funded within the first horizon year period were then considered for the second horizon year period (2035-2045), with a midpoint of 2040. Once available funds were allocated, the remaining projects were placed in the unfunded vision.

The financially constrained roadway corridors are all pulled from *Forward 2045*’s near-term project list. Given available funding, many of the near-term projects cannot be funded by 2045 and are part of the unfunded vision.

ID	County	Extents	Planning Level Cost Estimate	Rank
1050	Kershaw	Broad Street From Ehrenclou Dr to SC-97	\$1,156,600	1
1122	Kershaw	US-521 from Boykin Rd to Sycamore Rd	\$2,967,139	2
1025	Kershaw	Broad St from York St. to West DeKalb St	\$5,783,000	3
1051	Kershaw	US-1 from Wateree River to Academy Dr	\$2,313,200	4
1038	Lee	US-15 from Browntown Rd to I-20	\$241,900	5
1063	Kershaw	US-521 from Camden City Limits to Lancaster County Line	\$4,849,822	6
1061	Lee	SC-341 from US-15 (Main St) to I-20	\$9,895,611	7
1037	Lee	US-15 from SC-341 to Edmund Ave	\$400,144	8
1012	Lee	US-15 from Main St to SC-441	\$2,081,682	9
1052	Kershaw	US-1 from Chesterfield County Line to SC-34	\$6,293,284	10

Table 13: Top 10 Fiscally Constrained Roadways Projects List
Source: Santee-Lynches COG

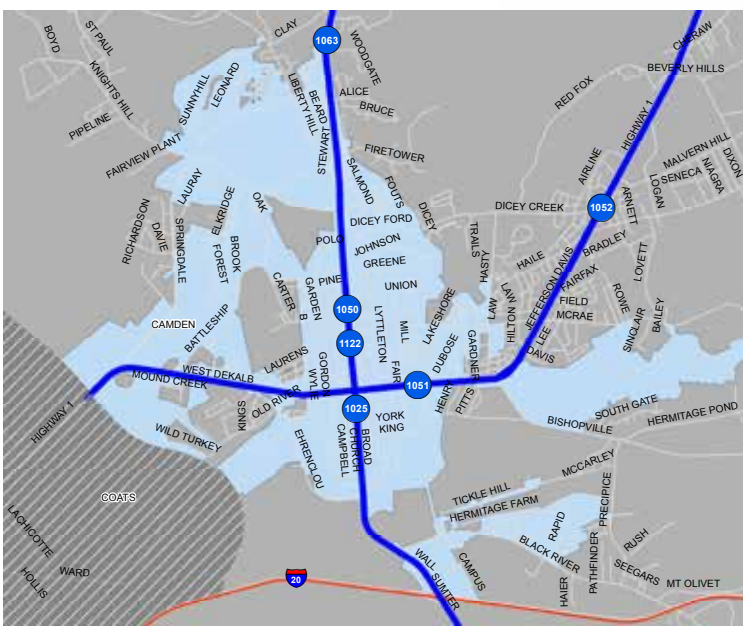
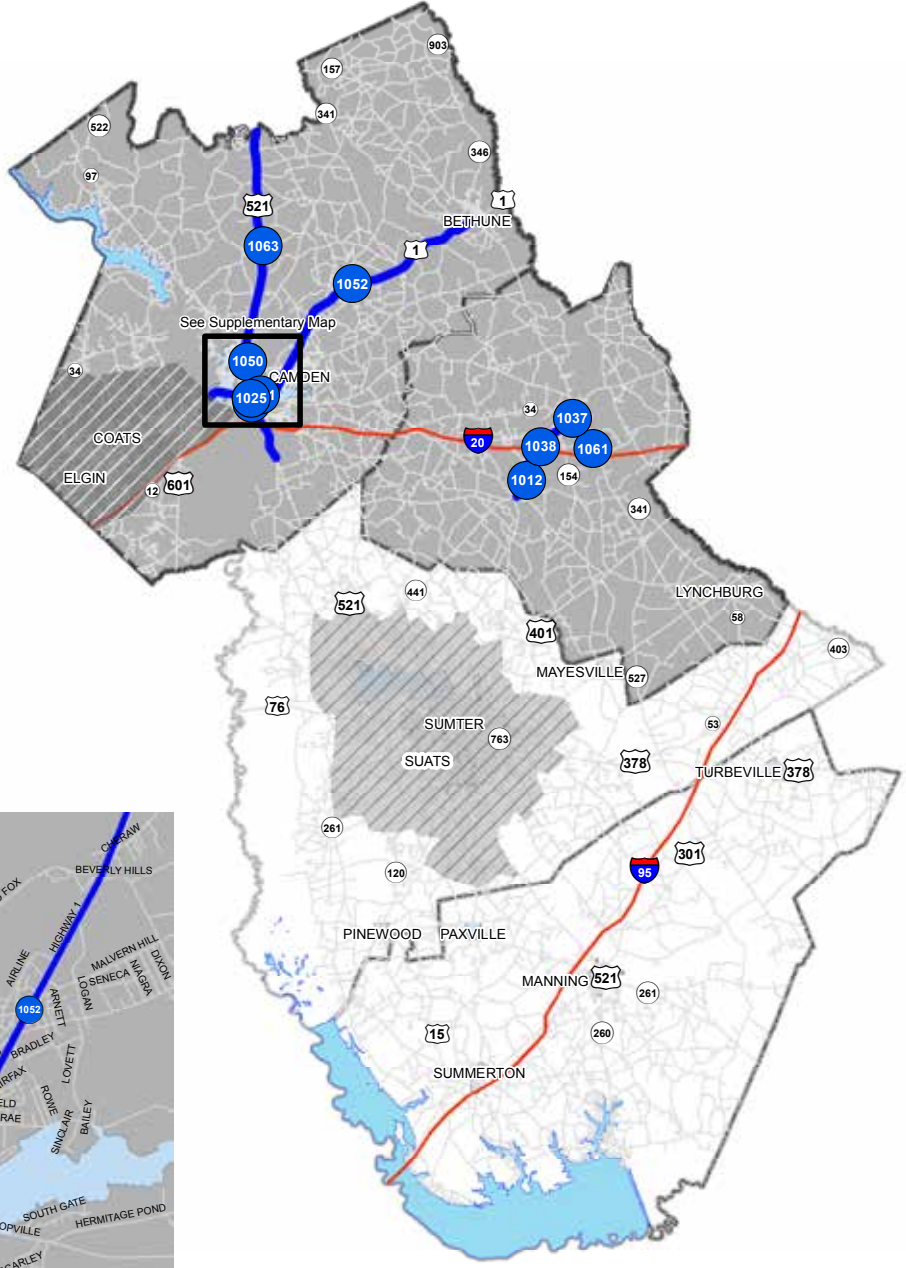


Figure 85: City of Camden Fiscally Constrained Roadway Projects
 Source: Santee-Lynches COG

Figure 86: All Fiscally Constrained Roadway Projects
 Source: Santee-Lynches COG

Intersections

Using a process identical to that used in the roadway corridors section, intersection-level projects were also financially constrained based on available funding. As with the roadway corridor projects, all the financially-constrained projects are near-term projects, and many are unfunded. If additional funding (such as through the statewide safety program) is secured for a certain intersection, the financially constrained plan can be adjusted to accommodate another near-term intersection project.

ID	County	Extents	Planning Level Cost Estimate	Rank
2017	Kershaw	US-1 @ Springdale Shopping Center	\$500,000	1
2061	Kershaw	US-521 @ I-20	\$1,000,000	2
2032	Lee	US-15 @ I-20	\$1,000,000	3
2051	Kershaw	US-1 @ Springdale Dr	\$5,000,000	4
2071	Sumter	US-378 @ I-95	\$1,500,000	5
2005	Kershaw	US-521 @ Laurens St	\$1,500,000	6
2057	Kershaw	US-1 @ Little St	\$1,000,000	7
2059	Kershaw	US-1 @ Market St	\$1,000,000	8
2056	Kershaw	US-521 @ SC-97	\$2,500,000	9
2066	Kershaw	US-1 @ Laurens St	\$1,000,000	10
2027	Lee	US-15 @ Gregg St	\$400,000	11
2072	Kershaw	US-1 @ West Dr	\$1,000,000	12
2065	Kershaw	US-1 @ Campbell St	\$1,000,000	13
2021	Kershaw	US-1 @ Old Elliott Rd	\$500,000	14

Table 14: Top 14 Fiscally Constrained Intersection Projects List
Source: Santee-Lynches COG

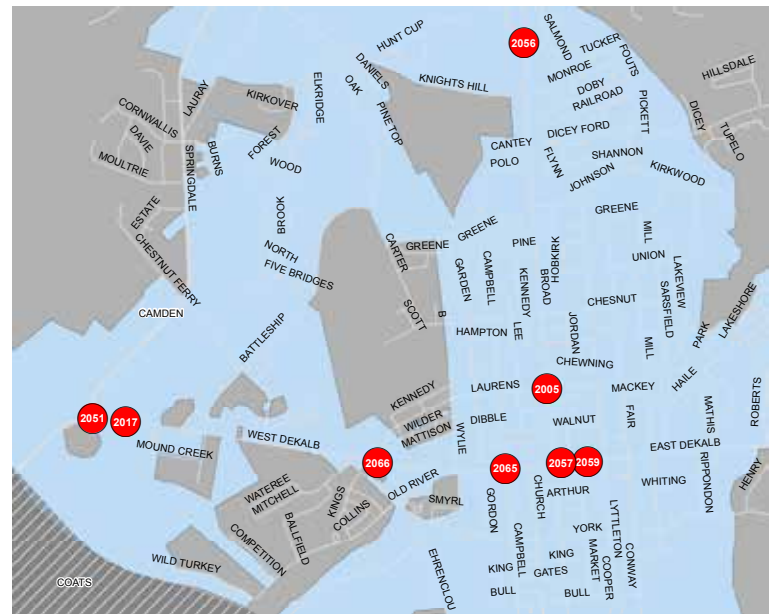


Figure 87: City of Camden Fiscally Constrained Intersection Projects
Source: Santee-Lynches COG

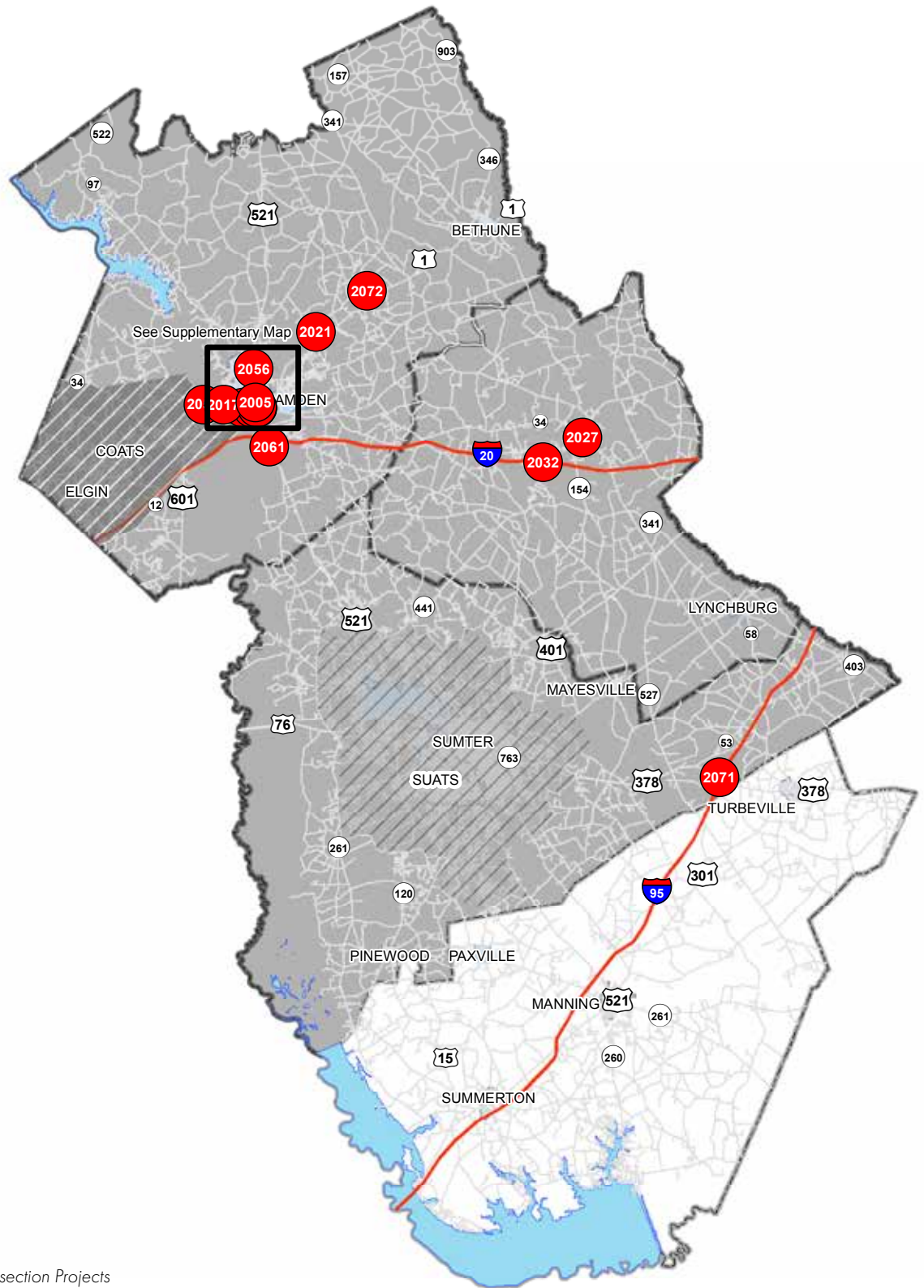


Figure 88: All Fiscally Constrained Intersection Projects
 Source: Santee-Lynches COG

Bicycle and Pedestrian

The recommendations development process for bicycle and pedestrian projects detailed in Chapter 6 resulted in 182 recommended improvements. Following the process outlined in other modes, these projects were financially constrained and checked against SCDOT Standards for Guideshare eligibility.

ID	County	Extents	Planning Level Cost Estimate	Rank
3165	Kershaw	Sidewalk on York St from Mill St to Church St	\$394,782	1
3031	Clarendon	On-Street Bicycle Lane on US-521 from Tobias Rd to Bicycle Way	\$367,581	2
3107	Sumter	Sidewalk on W. Fulton St from E. Fulton St to Sumter County Line	\$420,990	3
3051	Clarendon	On-Street Bicycle Lane on Old Georgetown Rd from Fox Brook Rd to McCrays Mill Rd	\$1,124,106	4
3101	Kershaw	On-Street Bicycle Lane on US-1 from Springdale Dr to Bishopville Hwy	\$231,428	5
3102	Kershaw	On-Street Bicycle Lane on US-521 from US-1 to I-20	\$294,005	6
3149	Kershaw	Sidewalk on Lyttleton St from US-521 to Bull St	\$1,489,434	7
3153	Kershaw	Sidewalk on Mill St from Chesnut St to King St	\$800,378	8
3162	Kershaw	Sidewalk on US-1 from Springdale Dr to Mill St	\$1,825,311	9

Table 15: Top 9 Bike and Pedestrian Projects List
Source: Santee-Lynches COG



Figure 89: City of Camden Fiscally Constrained Bike and Pedestrian Project
Source: Santee-Lynches COG

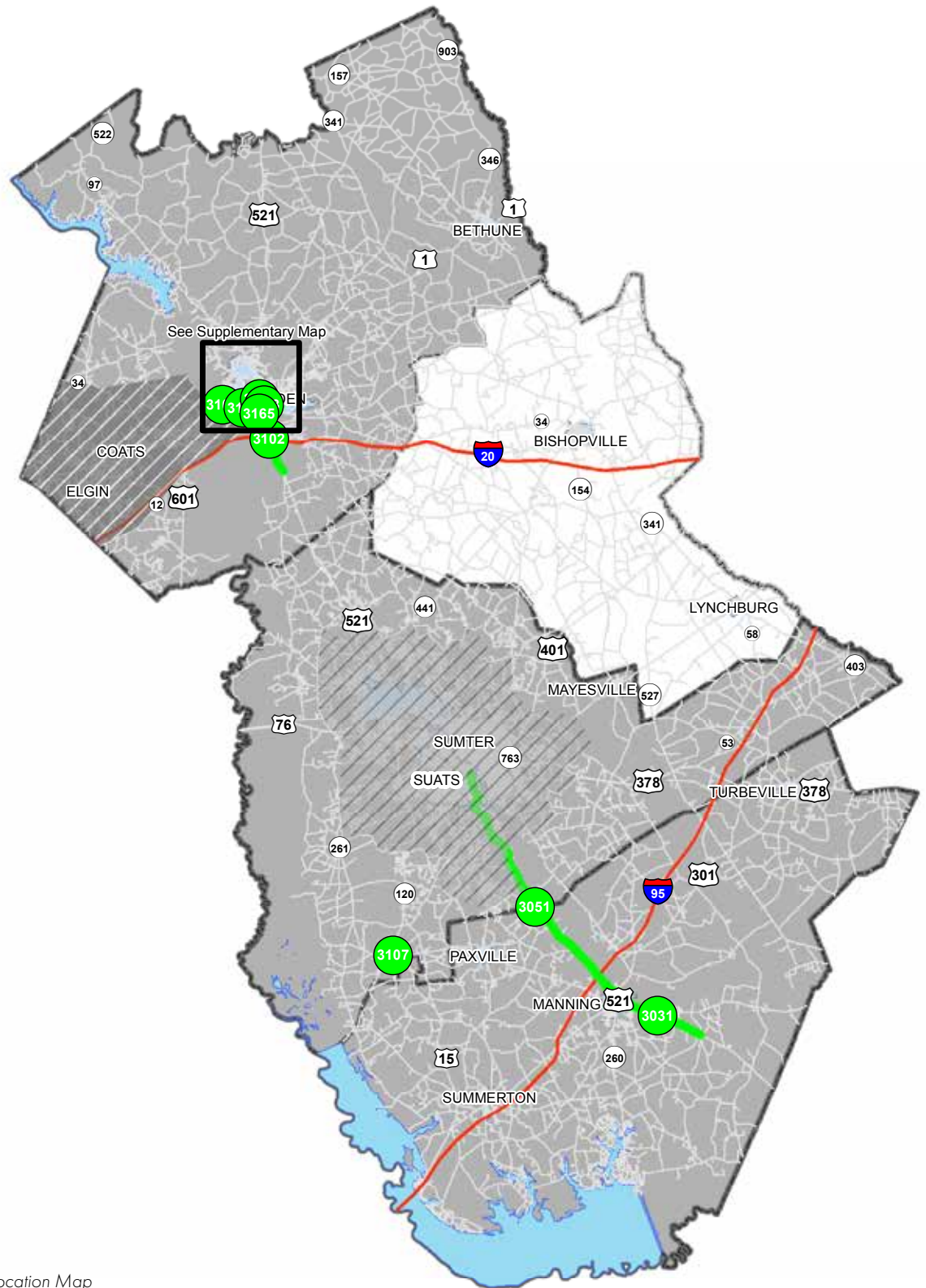


Figure 90: All Fiscally Final Projects Geo-location Map
 Source: Santee-Lynches COG

Transit

The Santee-Lynches Transportation Planning Region’s public transportation needs and recommendations are discussed generally in Chapter 8. Based on feedback from the public, the plan allocates additional Guideshare monies to fund capital improvements. Santee-Lynches will coordinate with Santee-Wateree Regional Transportation Authority (SWRTA) to determine how best to apply this additional capital funding, and has initiated development of a separate Public Transportation Needs Assessment, with results to be incorporated into this plan via amendment. Some project possibilities that may be proposed include bus replacement, expansion of the current bus system, and facility improvements or addition of new facilities (including depots, transportation centers, and shelters).

ID	County	Extents	Planning Level Cost Estimate	Rank
TBD	TBD	TBD	TBD	TBD

Table 16: Fiscally Constrained Transit Projects List
Source: Santee-Lynches COG

Planning

The Santee-Lynches Transportation Planning Region’s planning-specific needs are derived from a holistic analysis of the key transportation corridors of the region. Based on feedback from the public, this plan allocates Guideshare monies to fund corridor studies and other feasibility analysis for areas of the region where a single traditional solution may not be feasible, reasonable, or clear.

ID	County	Extents	Planning Level Cost Estimate	Rank
4001	Kershaw	US-1 from SC-34 to Chesnut Ferry Rd	\$173,490	TBD
4002	Kershaw	US-1 from Baldwin Ave to Pine Mark Ln	\$173,490	TBD
4003	Clarendon	US-521/SC-261 from US-301 to split	\$173,490	TBD
4004	Clarendon	SC-260 from SC-301 to Lake Marion	\$173,490	TBD
4005	Clarendon	US-301 from US-15 to SC-261	\$173,490	TBD
4006	Kershaw	US-601 from COATS boundary to Richland County Line	\$173,490	TBD

4007	Kershaw	US-521 from Payne Pond Rd to Lancaster County Line	\$173,490	TBD
4008	Kershaw	SC-34 from Precipice Rd to US-1	\$173,490	TBD
4009	Sumter	US-521 from Spencer Rd to Pisgah Rd	\$173,490	TBD
4010	Kershaw	US-521 from Pisgah Rd to Century Blvd	\$173,490	TBD
4011	Kershaw	SC-97 from Dolan Ln to US-521	\$173,490	TBD
4012	Lee/Sumter	US-15 from SUATS Boundary to I-20	\$173,490	TBD

Table 17: Fiscally Constrained Planning Projects List
Source: Santee-Lynches COG

Alternative Funding Strategies

Based on the revenue assumptions developed in this financial plan, the total projected cost for all highway capital projects within the Santee-Lynches Transportation Planning Region is approximately \$993 million. Of this total, approximately \$920 million is expected to remain unfunded at the 2045 horizon year. Unmet transit needs also exist in both capital and operational categories, though these amounts are not yet reflected in this plan, as a detailed transit study is in progress. As a result, it is important to identify potential funding sources for these projects as well as for projects from other modes.

State revenues alone will not sufficiently fund a systematic program of constructing transportation projects in the Santee-Lynches Transportation Planning Region. Therefore, the Municipalities and Counties in the region must consider alternative funding measures that could allow for the implementation of this plan. Several alternative funding measures under consideration in other areas follow.

Impact Fees

Developer impact fees and system development charges provide another funding option for communities looking for ways to fund collector streets and associated infrastructure. They are most commonly used for water and wastewater system connections or police and fire protection services, but recently they have been used to fund school systems and pay

for the impacts of increased traffic on existing roads. Impact fees place the costs of new development directly on developers and indirectly on those who buy property in the new developments. Impact fees free other taxpayers from the obligation to fund costly new public services that do not directly benefit them. The use of impact fees requires special authorization by the General Assembly. However, the value of impact fees generated in most cases are too small to make enough impact in transportation infrastructure to satisfy the legal requirements governing Impact Fees.

Transportation Bonds

Transportation bonds have been instrumental in the strategic implementation of local roadways and non-motorized travel throughout South Carolina. Voters in communities both large and small regularly approve the use of bonds in order to improve their transportation system. Projects that historically have been funded through transportation bonds include sidewalks, road extensions, new road construction, and streetscape enhancements.

Developer Contributions

Through diligent planning and earlier project identification, regulations, policies, and procedures could be developed to protect future arterial corridors and require contributions from developers when the property is subdivided. These measures would reduce the cost of right-of-way and would in some cases require the developer to make improvements to the roadway that would result in a lower cost when the improvement is actually constructed. To accomplish this will take a cooperative effort between local planning staff, SCDOT planning staff, and the development community. One area where developers can be expected to assist in the implementation of transportation improvements is for new collector streets. Collector streets support the traffic impacts associated with local development. For this reason, developer contributions should be responsible sharing the cost of these improvements.

Oversize Agreement

An oversize agreement provides cost sharing between a city/county and a developer to compensate a developer for constructing a collector street instead of a local street. For example, instead of a developer constructing a 28-foot back-to-back local street, additional funding would be provided by the locality to upgrade the particular cross-section to a 34-foot back-to-back cross section to accommodate bike lanes.

Grant Anticipation Revenue Vehicles (GARVEE) Bonds

GARVEE Bonds can be utilized by a community to implement a desired project more quickly than if they waited to receive state or federal funds. These bonds are let with the anticipation that federal or state funding will be forthcoming. In this manner, the community pays for the project up front, and then receives debt service from the state. GARVEE bonds also are an excellent way to capitalize on lower present-day construction and design costs, thereby finishing a project more quickly and economically than if it was delayed to meet state timelines.

Better Utilizing Investments to Leverage Development (BUILD) Transportation Program

BUILD Transportation grants will replace the existing Transportation Investment Generating Economic Recovery (TIGER) grant program beginning FY 2018. The grants are to be used for “investments in surface transportation infrastructure and are to be awarded on a competitive basis for projects that will have a significant local or regional impact.” (USDOT) Additionally, funding from these grants can help to support bridges, transit, rail, intermodal transportation, and ports in addition to roads.

Aesthetic Enhancement Funding

In order to create a more pleasing transportation system, small aesthetic improvements often have a large impact. Sumter already has local businesses adopt decorative signs that serve as a gateway to the community. SCDOT has two formal programs to help provide an avenue for community involvement in the transportation system. The Adopt-A-Highway program allows individuals or groups to help maintain a part of the highway system. SCDOT’s Adopt-An-Interchange program provides 80% funding towards landscaping and beautifying an interchange, with only a 20% local match. This initiative is a part of the state’s enhancement funding program.

Transportation Alternatives Program Grants

State and federal grants can play an important role in implementing strategic elements of the transportation network. Several grants have multiple applications, including Transportation Alternatives Program (TAP) Grants as well as state and federal transit grants. TAP, established by Congress through MAP-21, combines the Enhancement Grant program, Recreational Trails program, and Safe Routes to School (SRTS)

program into one competitive funding source. TAP ensures the implementation of projects not typically associated with the road-building mindset. While the construction of roads is not the intent of the grant, the construction of bicycle and pedestrian facilities is one of many enhancements that the grant targets and could play an important role in enhancing the bicycle and pedestrian safety and connectivity in the region.

Conclusion

Forward 2045 envisions a region that ensures access to reliable transportation and provides a variety of transportation options to increase mobility for residents and thus promote a high quality of life. This plan is a regional vision for mobility that supports communities and the economy and complements the natural assets of the region.

Included in *Forward 2045* are transportation system recommendations that consider the existing and future multimodal needs of users across the spectrum. Creation of this financially-constrained plan ensures that the identified projects can reasonably be funded and implemented during the life of the plan and that the priorities expressed via the public participation process will influence all regional transportation planning decisions.

Forward 2045 is more than just a plan and financing method. With this process, the citizens of Santee-Lynches can set the stage for the region's development, and find effective ways to address needs in the coming decades.

Among other accomplishments, *Forward 2045*

- Funds 10 roadway corridor projects and 14 intersection improvement projects
- Invests a total of \$58.45 million in roadway infrastructure
- Includes 9 funded bicycle and pedestrian investments, for a total of more than \$7.3 million in active transportation invested, the first time such modes of travel have been directly funded within the Santee-Lynches LRTP process.
- Defines community expectations as leaders move forward with major capital investments
- Considers emerging technologies and trends and how Santee-Lynches can be a leader in utilizing and responding to such changes.

Like all places, Santee-Lynches has many identified transportation needs, not all of which can be funded using projected revenue streams. As the region moves forward and projects advance toward formal funding and implementation, Santee-Lynches will work with SCDOT, FHWA, and FTA to determine how best to advance recommended projects and will continue to engage the public to adjust future planning efforts and project lists as necessary.

In addition, the world is rapidly changing and evolving. Santee-Lynches will continue to monitor changes in how projects can be funded, such as new public/private initiatives, additional federal, state, and local revenue sources. Transportation technology will be vastly different in 2045, when this LRTP will be fully refreshed, and with this document, Santee-Lynches has made a commitment to pursue partnerships that will place the region at the national forefront.

Chapter 10 Performance Measures

PERFORMANCE MEASURES

Introduction

National Goal Areas and Measurement

Federal Requirements

Safety

Transit Asset Management (TAM)

Infrastructure Condition

System and Freight Reliability

Chapter

10

Performance management utilizes system information to make investment and policy decisions to achieve goals for the multimodal transportation systems in the study area. Performance-Based Planning and Programming (PBPP) refers to the methods transportation planning and project delivery agencies use to apply performance management as a standard practice in planning and programming.

The goal of PBPP is to ensure that transportation investment decisions – both long-term planning and short-term programming – depend on the ability to meet established goals.

As a federal requirement, states must invest resources in projects to achieve individual targets that make collective progress toward statewide and national goals. Santee-Lynches partners with SCDOT to ensure that for this region, a performance-driven, outcome-based approach to planning is used to inform policy decisions found in *Forward 2045*.

Santee-Lynches is now developing its PBPP process to meet federal requirements – including requirements to track specific measures and set targets – and to meet the unique transportation planning needs of the region. This chapter describes:

- National goal areas and measures
- Federal Requirements
- Safety goal areas and targets
- The region's next steps

National Goal Areas and Measures

Highway Performance

Through the federal rulemaking process, the Federal Highways Administration (FHWA) requires state DOTs and MPOs (and Rural planning regions by extension), to monitor the transportation system using specific performance measures associated with the national goal areas prescribed in MAP-21 and the FAST Act. The following list describes these national goal areas for highway performance as well as per-

formance measures. However, Santee-Lynches can take on additional measures beyond those outlined by federal legislation.

Safety

- Measure: Injuries and Fatalities

Infrastructure Condition

- Measure: Pavement Condition
- Measure: Bridge Condition

System Reliability

- Measure: Performance of National Highway System

Freight Movement and Economic Vitality

- Measure: Movement on Interstate System

Congestion Reduction

- Measure: Traffic Congestion

Environmental Stability

- Measure: On-Road Mobile Sources Emissions

Reduced Project Delivery Delay

Note: for Santee-Lynches, targets for these measures will be set based on those adopted by the state, and performance reports will be added as data becomes available.

Transit Performance

Public transit fund recipients – which can include states, local authorities, and public transportation operators – are required to establish performance targets for safety and state of good repair, to develop transit asset management and safety plans, and to report their progress toward achieving targets. Public transportation operators must share information with transportation planning districts and states so that all plans and performance reports are coordinated. The list below identifies performance measure goals outlined in the

National Public Safety Transportation Plan¹. And in the final rule for transit asset management. Santee-Lynches will coordinate with Santee-Wateree Regional Transportation Authority (SWRTA) to evaluate targets for these measures.

Safety

- Measure: Fatalities
- Measure: Injuries
- Measure: Safety Events
- Measure: System Reliability

Infrastructure Condition

- Measure: Equipment
- Measure: Rolling Stock
- Measure: Facilities

Note: for Santee-Lynches, targets for these measures will be set based on those adopted by the state, and performance reports will be added as data becomes available.

Federal Requirements

Targets

Santee-Lynches is required by SCDOT to establish performance targets no less than 180 days after SCDOT or a public transportation operator sets performance targets. For each performance measure, the Santee-Lynches Council of Governments Board of Directors will either decide to support a statewide target or establish a quantifiable target specific to the planning area. SCDOT, Santee-Lynches, area MPOs, and public transportation operators must coordinate performance measure targets to ensure consistency to the greatest extent practicable.

Reporting

Forward 2045 must describe the performance measures and targets, evaluate the performance of the transportation system, and report on progress made. The TIP must link investment priorities to the targets in **Forward 2045** and describe, to the greatest extent practicable, the anticipated effect of the

program on achieving established targets. Santee-Lynches must report to SCDOT on progress toward achieving targets.

Assessments

Neither FHWA nor the Federal Transit Administration (FTA) will directly evaluate Santee-Lynches' progress toward meeting performance measure targets. Instead, Santee-Lynches' performance will be assessed as part of regular cyclical planning process reviews with SCDOT. FHWA will determine if SCDOT has met or made significant progress toward selected targets for the highway system.

¹ <https://www.transit.dot.gov/regulations-and-guidance/safety/national-public-transportation-safety-plan>

Safety

South Carolina has the highest traffic fatality rate in the United States. It is 67% higher than the national rate and 40% higher than other states in the Southeast. Reducing the number of transportation-related collisions, injuries, and fatalities is SCDOT's highest priority. In 2011, the South Carolina Department of Public Safety (SCDPS) announced the Agency's goal of zero traffic-related deaths for the State. This goal, strongly supported by SCDOT and SCDMV, became the starting point for the State's update of the Strategic Highway Safety Plan (SHSP), entitled "Target Zero". Target Zero is an aspirational goal for South Carolina and is based on the philosophy that no fatalities are acceptable. The state sets targets advancing this goal during the next 20 years.²

Safety Needs within the Santee-Lynches Region

SCDOT provided a safety workshop for Santee-Lynches with data specific to the study area boundary. The workshop examined crash data within the region to provide some perspective on what safety problems the region experiences. Potential focus areas include:

- Roadway departure
- Intersections
- Access management
- Bicycle and Pedestrian user safety

These areas could be influenced by Santee-Lynches as a project moves through the planning, programming, and delivery process. Because safety is related to any and all projects that come out of *Forward 2045*, it is embedded into each project category and is not separately referenced as a category. Please refer to the thematic chapters of this document for more details on engineering countermeasures for safety on roadways.

Safety Targets

SCDOT evaluated and was required to report safety targets for the five safety measures (traffic fatalities, fatality rate, severe injuries, severe injury rate, and non-motorized). When setting safety performance targets for the state, statisticians performed extensive analysis of the data related to each

measure and used a seven data-point graphical analysis with a five-year rolling average. After data points were plotted and graphical representations of the data were created, trend lines were added to predicted future values. The trend lines were based on linear and non-linear equations with R-squared (i.e. best fit measure) values.

Using the models, statisticians predicted the values for the current year. Examining current and planned education and engineering safety initiatives, they estimated reductions in fatalities and severe injuries to calculate the state's safety performance targets. Staff from the SCDOT Traffic Engineering Office also reviewed the Santee-Lynches region's portion of those statistics to show a localized snapshot of the target numbers.

With Adoption of *Forward 2045*, for the 2019 performance period, Santee-Lynches has elected to accept and support the state's safety targets for all five safety performance measures. This means that Santee-Lynches will:

- Address areas of concern for fatalities or serious injuries within the region, coordinating with SCDOT and incorporating safety considerations on all projects.
- Integrate safety goals, objectives, performance measures, and targets into the planning process.
- Include the anticipated effect on achieving the targets noted above within the TIP, linking investment priorities to safety target achievement.

	Deaths/100 million vehicle miles traveled (VMT)
National	1.16
South Carolina	1.80
Santee-Lynches Transportation Planning Area	2.38

Table 18: Deaths/100 million vehicle miles travel
Source: SCDOT

Transit Asset Management(TAM)

Transit Asset Management plans have been employed to inform the distribution of Transit Funds based on the condition of transit assets, with a goal of achieving and maintaining a state of good repair for agency assets. USDOT has found that nationwide, an estimated 40% of busses and 23% of rail transit is considered to be in poor or marginal condition, with a \$90 billion backlog in deferred maintenance and replacement. TAM Plans allow transit agencies to monitor and manage their assets over time. They can help improve safety and increase performance and reliability. South Carolina has created a Group TAM Plan for rural transit agencies in the state.

South Carolina has a population of approximately 4.5 million, roughly split between rural and urbanized areas, and public transit is a core component of South Carolina’s multi-modal transportation network. 40 of the state’s 46 counties have public transit service to varying degrees, providing over 12 million passenger trips statewide annually. Establishing, financing, and sustaining effective, statewide, publicly-operated transit service in urban and rural areas continues to be a major challenge.³

Transit Asset Management within the Santee-Lynches Region

Santee-Lynches has one transit agency within its boundaries: Santee Wateree Regional Transportation Authority (SWRTA), which has adopted the state’s TAM Plan for its performance targets. SWRTA’s rolling stock includes:

- 9 non-revenue/service vehicles
- 19 buses (BU)
- 27 cutaway buses (CU)
- 4 vans (VN)⁴

Santee-Lynches is not required to create a TAM plan of its own, as the Council of Governments is only a designated recipient of FTA funds and not a transit agency.

Transit Asset Management Process

Transit Asset Management involves setting performance measures for different asset classes. Agency assets are sep-

arated into four different asset categories with established performance measures. These asset categories are:

- Rolling Stock
- Equipment
- Facilities
- Infrastructure

Agencies then assign each of their assets to one of these categories and begin measuring which have met or exceeded their useful life benchmarks. In other words, agencies are determining which assets are not in a state of good repair. This means that transit agencies are striving for low percentages.

As assets age and their conditions deteriorate., performance measure values will go up due to the increased percentage of assets that have met or passed their useful life benchmark. Federal regulations require transit agencies to establish and report yearly targets, at least 5 years into the future, as an attempt to inform funding decisions.

Transit Asset Management Targets

Generally, each asset category is split into different asset classes. For example, buses can be a general asset class under rolling stock but can be broken into different types of busses such as articulated buses and cutaway busses. The table below summarizes all asset classes, and their associated targets, listed in the SC Group TAM Plan.

With adoption of Forward 2045, Santee-Lynches elects to adopt and support the State TAM Targets.

³ SC Group Transit Asset Management Plan

⁴ SC Group Transit Asset Management Plan



Transit Asset Management Targets

Asset Type	SC Group TAM Plan 2020 Target	SC Group TAM Plan 2021 Target	SC Group TAM Plan 2022 Target	SC Group TAM Plan 2023 Target	SC Group TAM Plan 2024 Target
BR – Over-the-road Bus	15%	15%	15%	15%	15%
BU – Bus	15%	15%	15%	15%	15%
CU – Cutaway Bus	30%	30%	30%	30%	30%
MV – Mini-Van	20%	20%	20%	20%	20%
VN - Van	20%	20%	20%	20%	20%
Non Revenue/Service Automobile	30%	30%	30%	30%	30%
Terminal/Administration	0%	0%	0%	0%	0%
Maintenance	0%	0%	0%	0%	0%
Parking Structures	0%	0%	0%	0%	0%

Table portrays the percentage of each asset class that has met or exceeded its useful life benchmark, per the SC Group TAM Plan

Table 19: Transit Asset Management Targets
Source: Santee-Lynches COG

Infrastructure Condition

South Carolina has one of the largest state-owned and maintained roadway systems in the United States. The State is also in need of extensive infrastructure repair and replacement. When a proposed increase to the State Gas Tax was approved in 2018, 80% of state roads needed repair and 750 bridges in the SCDOT inventory were considered structurally deficient. This is an \$11 billion problem that will not be solved overnight. The state has formed a plan to address as much infrastructure condition as possible over the next 10 years using additional revenue derived from phased increases to the gas tax. This process will work in tandem with infrastructure performance measures and will be monitored over time to assess success.

Infrastructure Needs in the Santee-Lynches Region

South Carolina has varying needs depending on the region in question. The Santee-Lynches region needs extensive repairs to its non-interstate National Highway System as that system is responsible for much of the VMT in the region. However, the entire region's pavement quality and bridge condition is poor, and improvements can be made in multiple locations. The Santee-Lynches region's interstates and bridges are (above/below) the State baseline conditions. Santee-Lynches bridge conditions are (above/below) the State's 2-year and 4-year targets

Infrastructure Strategies

Santee-Lynches Guideshare funding does not typically cover resurfacing efforts, as that is handled by a series of other SCDOT programs funded both through FHWA and through state appropriations. However, any Santee-Lynches project programmed and completed will improve the infrastructure in that project area.

If coordinated well, Santee-Lynches-funded projects can help cover more ground than the SCOT resurfacing program can alone. Opportunities include looking for overlaps between areas in need of infrastructure repair as a maintenance focus and areas in need of infrastructure improvement consistent with Santee-Lynches funding policies such as:

- Access management projects

- Widening projects (both to increase travel lanes as well as to widen current travel lanes to meet current highway design standards)
- Intersection and general improvement projects

Infrastructure Condition Targets

Federal Regulations require SCDOT to establish and report quadrennial (4-year) targets for six (6) infrastructure condition performance measures:

- % of Interstate pavements in Good condition
- % of Interstate pavements in Poor condition
- % of non-Interstate National Highway System (NHS) pavements in Good condition
- % of non-Interstate National Highway System (NHS) pavements in Poor condition
- % of NHS bridges by deck area in Good condition
- % of NHS bridges by deck area in Poor condition

SCDOT created 4-year targets for Interstate pavement condition and 2- and 4-year targets for non-Interstate pavement condition and bridge conditions. Like the other National Goal areas, Santee-Lynches is required to adopt the State targets or create its own targets days after the State announces its targets.

With adoption of Forward 2045, Santee-Lynches elects to adopt and support the State Infrastructure Condition Targets.

Pavement

Pavement condition was calculated using multiple thresholds, including the International Roughness Index (IRI), percent cracking, rutting, and faulting. A determination of Good, Fair, or Poor condition depends on where 0.1 mile segments fall along the thresholds. If all metrics rated "Good", a segment is considered to be in good condition. If 2 or more metrics rated "Poor", the segment was considered poor condition. Any combination in between is considered "Fair" condition. These segment rankings were used to calculate the percentage of pavements in good and poor condition across the State and used to generate the State's targets. The

targets are the median projected conditions based on the average deterioration rates of the system and planned construct projects that will be finished within the timeframe.

Bridges

Bridge condition was calculated using the following thresholds: deck condition, superstructure condition, substructure condition, and culvert condition on a scale of 0 – 9. Scores 4 or below on a bridge feature were considered “Poor”. A score of 5 – 6 was considered “Fair” and a score of 7 – 9 was considered “Good”. These bridge component scores were then used to determine the percentage of NHS bridges in good and poor condition throughout the system. The State selected its targets using average bridge deterioration rates along with construction projects expected to be finished within the target timeframe.

Infrastructure Condition Targets Baseline (2016 Average)

	Pavement (Interstate)	Pavement (Non-Interstate NHS)	Bridges
SC Baseline	61.4% Good 1.7% Poor	10% Good 2.6% Poor	41.6% Good 4.2% Poor
SC 2-Year Targets	N/A	14.9% Good 4.3% Poor	42.2% Good 4.0% Poor
SC 4-Year Targets	71% Good 3% Poor	21.1% Good 4.6% Poor	42.7% Good 6.0% Poor
Santee-Lynches Baseline	TBD	TBD	TBD

Table 20: Infrastructure Condition Target Baseline 2016 Average
Source: Santee-Lynches COG



Figure 91: US-378/76 Bridge over the Wateree River

Santee-Lynches Staff Photo

System and Freight Reliability

System reliability refers to the amount of time a user spends traveling through a roadway and whether that time is consistent with the travel time the road is expected to produce under normal conditions. This directly impacts the daily lives of those living and working within a region and regional economic well-being as a whole. The State as a whole, and the Santee-Lynches Region in particular is home to a number of large-scale manufacturing facilities which produce goods for both domestic and international use, as well as several distribution centers strategically situated to provide goods to the local market as well as to nearby markets. As a result, ensuring a reliable transportation network is a high priority for both the State and Santee-Lynches.

System Reliability within the Santee-Lynches Region

The Santee-Lynches Region (excluding COATS and SUATS MPOs) does not have a large number of unreliable roadways, due to the rural context of the region and relatively low population per square mile density. The system reliability focus of Santee-Lynches, through *Forward 2045*, is to identify those areas that may become unreliable in the future as growth occurs, and reduce instances where reliability is present in a micro context (such as due to a particular intersection or lane configuration, rather than on a systemic level). In addition, there are long stretches of two-lane roadway that are critical for connecting population centers and commercial hubs (including US-521, US-15, US-301, US-76, and SC-261 and SC-97) where travel times can be impacted by slower moving freight trucks, logging trucks, and farm equipment. These areas will be emphasized for identification of solutions to improve city-to-city travel reliability where full length lane widening may be cost prohibitive or where AADT does not alone support such investment.

System Reliability Strategies

There are numerous strategies that can be utilized to improve system reliability. A few examples are:

- Improved emergency response times to crashes
- Widening and other capacity improvements
- Interchange and intersection improvements
- Improved signal timings
- Implementing rural road passing lanes

System and Freight Reliability Targets

Federal regulations require SCDOT to establish and report 4-year targets for three system and truck travel time reliability performance measures.

- % of reliable person-miles traveled on the Interstate
- % of Reliable person-miles traveled on the non-Interstate National Highway System (NHS)
- % of Interstate system mileage providing for reliable truck travel time

SCDOT created 4-year targets for non-Interstate NHS travel time reliability and 2- and 4-year targets for Interstate travel time reliability and truck travel time reliability. Like the other National Goal areas, Santee-Lynches is required to adopt the State targets or create its own targets days after the State announces its targets.

With adoption of *Forward 2045*, Santee-Lynches elects to adopt and support the State System and Freight Reliability Targets.

Travel Time Reliability

Road segments were measured based on four different time categories: 6am–10am (morning), 10am–4pm (day), 4pm–8pm (evening) for weekdays, and weekends generally. Travel time measurements were collected and sorted into their corresponding time categories. Once complete, the 80th percentile was divided by the 50th percentile to create a ratio. A value of 1 meant the segment was reliable, while a value of 0 meant the segment was unreliable. The percentage of segments that are reliable was then calculated and split into Interstate and non-Interstate NHS segments. Targets were then selected with careful consideration of ongoing and expanded construction projects in the state. The state gas tax will be generating many active construction projects over the next ten years, which are expected to reduce travel reliably in the short-term. This explains why the targets get lower vs. higher.

Truck Travel Time Reliability

Truck travel time reliability was calculated similarly but used the Truck Travel Time Reliability (TTTR) Index. After splitting the travel time measurements into their different time categories, travel time ratios were calculated by dividing the 95th percentile by the 50th percentile for each segment. These were sorted to get the maximum TTTR ratio per segment for each time period. This involved taking the largest ratio for each segment and multiplying it by the segment length. The



sum of all the length-weighted segments was then divided by the total length of the Interstate to get the TTTR Index number. Future targets were selected with consideration of ongoing and expected construction projects in the state.

System & Freight Reliability Targets Baseline

	Travel Time Reliability (Interstate)	Travel-Time Reliability (Non-Interstate NHS)	Truck Travel Time Reliability
SC Baseline	94.8% person-miles traveled that are reliable	89.9% person-miles traveled that are reliable	1.34 on TTTR Index
SC 2-Year Targets	91% person-miles traveled that are reliable	N/A	1.36 on TTTR Index
SC 4-Year Targets	90% person-miles traveled that are reliable	81% person-miles traveled that are reliable	1.45 on TTTR Index
Santee-Lynches Baseline	TBD	TBD	TBD

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Source: Santee-Lynches COG

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