

K

ERSHAW COUNTY

WEST WATREEE TRANSPORTATION STUDY

FINAL REPORT

APRIL 2017



in conjunction with



TooleDesignGroup

AECOM



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**Kershaw County
West Wateree Transportation Study**

April 2017

**Central Midlands
Council of Governments**

Reginald Simmons, Director of Transportation
Gregory Sprouse, AICP, Planning Director

Kershaw County

Julian Burns, County Council Chair
Vic Carpenter, County Administrator
Russ VanPatten, PE, Director Engineering Services
Michael Conley, Senior Planner

South Carolina Department of Transportation

Jennifer Necker, PE, Program Manager

Community Representative

John Murdock

Consultant Team

Toole Design Group

Ernie Boughman, AICP, Regional Director
Jared Draper, AICP, Transportation Planner
Blake Loudermilk, PE, Senior Engineer
Seth Kiser, EIT, Engineer

AECOM

Emily Swearingen, PE, SC Transportation Leader
Ryan Eckenrode, PE, PTOE, Traffic Engineer
Michael Davis, PE, Project Engineer



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1. Introduction

The West Wateree area of Kershaw County is experiencing the pressures of growth that are facing the entire Central Midlands region. Both transportation and land use are impacted by this growth, with new challenges to overcome but also opportunities to embrace. The Central Midlands Council of Governments (CMCOG), in cooperation with Kershaw County, has completed the West Wateree Transportation Study, a multimodal transportation plan that analyzes existing conditions and makes recommendations based upon best practices, existing plans, and citizen input for the vision and goals of the area. Recommendations address both transportation and land use concerns for the study area. The Study also emphasizes connectivity between transportation facilities and land use. This process was driven by public participation to accomplish a plan that is comprehensive and collaborative.

The West Wateree Transportation Study followed a systematic planning process:

1. Executed a continuous public participation process throughout the entire study process to develop guiding principles to direct the study and instill ownership in final recommendations;
2. Inventoried existing conditions to gain an understanding of the study area and establish a baseline for analysis;
3. Performed technical analyses to determine study area needs;
4. Developed a broad series of alternative strategies, vetted them based on stakeholder input, and refined them into recommendations; and
5. Crafted an implementation plan to provide a roadmap for moving recommendations to reality, including an Action Plan with project phasing, cost estimates, and responsible parties.



US 1/US 601 is one of the many roadways considered as part of this study.



1.1 Guiding Principles

The guiding principles presented below were crafted through feedback received during stakeholder and public meetings conducted early in the planning process. These principles, along with technical analyses, directed the development of recommendations presented in this final report.

Safe and Accessible

- Provide safe opportunities for all modes of transportation
- Relieve congestion while providing adequate service to local, commuter, and commercial traffic
- Maximize efficiency of existing transportation network
- Improve access to key regional corridors and the interstates

Conserve and Appreciate

- Protect the Wateree as a natural amenity
- Provide access to recreational areas for community and visitors
- Celebrate the rural and natural character of the area
- Promote the Wateree as regional destination

Attractive and Inviting

- Embrace community values for transportation and thoughtful development
- Preserve the small town character of the area
- Improve opportunities to attract new residents and businesses
- Enhance quality of place through attractive and efficient streetscapes and land development



1.2 Study Area

The West Wateree study area is approximately 90 square miles in the southwestern corner of Kershaw County. The area is bounded by Richland County along the west while also extending from Fort Jackson Road north to SC 34. The communities of Elgin and Lugoff are included in the study area with the eastern boundary running along the Wateree River. There are several major roadways within the study area, including US 1, US 601, and a portion of I-20. **Figure 1.1-1** graphically depicts the study area.

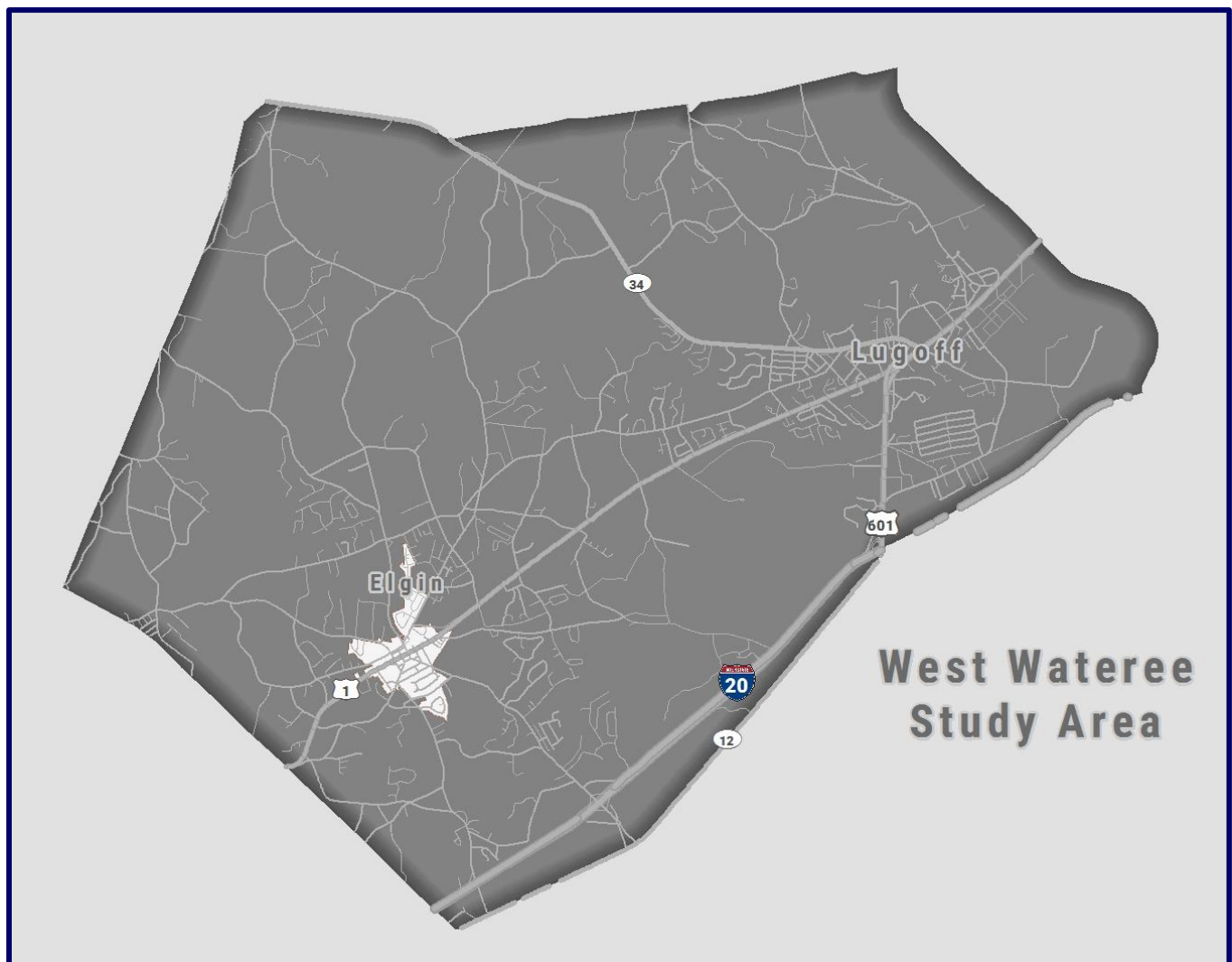


Figure 1.1-1 | Study Area



1.3 Planning Context

A number of planning reports and studies have been conducted in recent years that have relevance to the West Wateree Transportation Study. Recommendations and supporting documentation from these documents were reviewed to understand their relationship to the study area. Documents reviewed are listed below; summaries are included in **Appendix A**.

- Columbia Area Transportation Study (COATS) 2040 Long Range Transportation Plan
- COATS 2013-2019 Transportation Improvement Program
- COATS Bike and Pedestrian Pathways Plan
- Central Midlands Commuter Rail Feasibility Study
- Santee-Lynches Regional Council of Governments (SLRCOG) Long Range Transportation Plan 2040
- SLRCOG 2014-2019 Transportation Improvement Program
- Santee-Lynches Hazard Mitigation Plan
- VisionKershaw 2030
- Recreational Master Plan for Kershaw County
- Kershaw County Bicycle, Pedestrian and Greenways Plan
- Camden to Columbia Land Use & Transit Oriented Development Plan
- State of the Workforce 2011
- Elgin/Richland Northeast Sub-Area Plan
- Facing Facts: A Study of Issues Shaping Kershaw County
- Kershaw County Commuting Patterns
- Kershaw County Comprehensive Plan 2006-2016



1.4 Public Participation

Public participation was critical to informing the development of the West Wateree Transportation Study and fostering community support of recommendations. The public was engaged early and often through multiple avenues for participation, which encouraged a broad cross-section of the public and key stakeholders to be involved in determining needs and barriers, weighing alternative solutions, and vetting recommendations. Opportunities for participation are outlined below.

Steering Committee

A project steering committee was formed to guide the overall development of the study and ground truth recommendations as the project progressed. The steering committee was comprised of key individuals bringing a broad range of perspectives, from CMCOG representatives, County staff and elected officials, South Carolina Department of Transportation (SCDOT) personnel, residents, and business owners. The steering committee met throughout the study process as major milestone deliverables were ready for review and discussion.

Stakeholder Meetings

Several small group stakeholder meetings were conducted on May 4, 2016 at the Kershaw County Administration Building. Key stakeholders who have vested interests in the study and its outcomes were invited to participate, including emergency services, SCDOT personnel, Santee-Wateree Transportation Authority leadership, Chamber of Commerce representatives, and municipal and County staff. Stakeholders provided key insight into strengths, challenges, and a preferred vision for the future of the West Wateree area. Stakeholder input directly influenced the development of the recommendations presented in this final report.

Public Meetings

Four public meetings were conducted for the study to solicit input and present project information. The first was a public open house which was held at Elgin Town Hall on the evening of May 4, 2016. The open house gave residents, business owners, and anyone interested in the project the opportunity to ask questions and provide input to shape the guiding principles for the study. During the public open house, participants were offered several interactive activities, including a visual preference survey, priority origins and destinations identification, and mapping exercise to communicate areas of concern as they relate to transportation and land use in West Wateree.

A second public meeting was held on the evening of May 19, 2016 to present the draft guiding principles for the project. These principles were derived from the input provided at the public open house and stakeholder meetings held earlier in the



month. In addition to the guiding principles, the public meeting presented information on the next steps in the planning process and how the guiding principles would be used to balance core community values with technical analyses, ensuring that recommendations provided solutions that are technically sound and responsive to community desires.

To ensure that ample opportunity was provided for public input prior to the development of recommendations, a third public meeting was held at Lugoff-Elgin High School on the evening of July 25, 2016. This meeting was conducted in an open house format with the same activities that were provided at the May 4th public meeting.

A fourth and final public meeting was held on the evening of February 13, 2017 at Lugoff-Elgin High School. This meeting was also conducted in an open house, drop-in format. Draft recommendations were presented and participants were given the opportunity to provide feedback. Comments received at the final public meeting influenced the refinement of recommendations prior to their inclusion in this final report.



Public input was critical in the development of the West Wateree Transportation Study.

WikiMap

An online interactive map, or WikiMap, was created to collect public input about existing transportation conditions, travel concerns, and locations where users would like to see transportation improvements in the future. The map was opened for input on May 4, 2016, coinciding with the first public meeting. The map was closed on August 15, 2016. The WikiMap was promoted to the community through a variety of means, including links from websites, during public meetings, and promotional fliers. WikiMap input was integrated into the broader public input and helped to develop the draft recommendations presented in this document.

A total of 124 people participated in the WikiMap, contributing 209 individual comments. The graphics below present the key information gathered through the WikiMap.

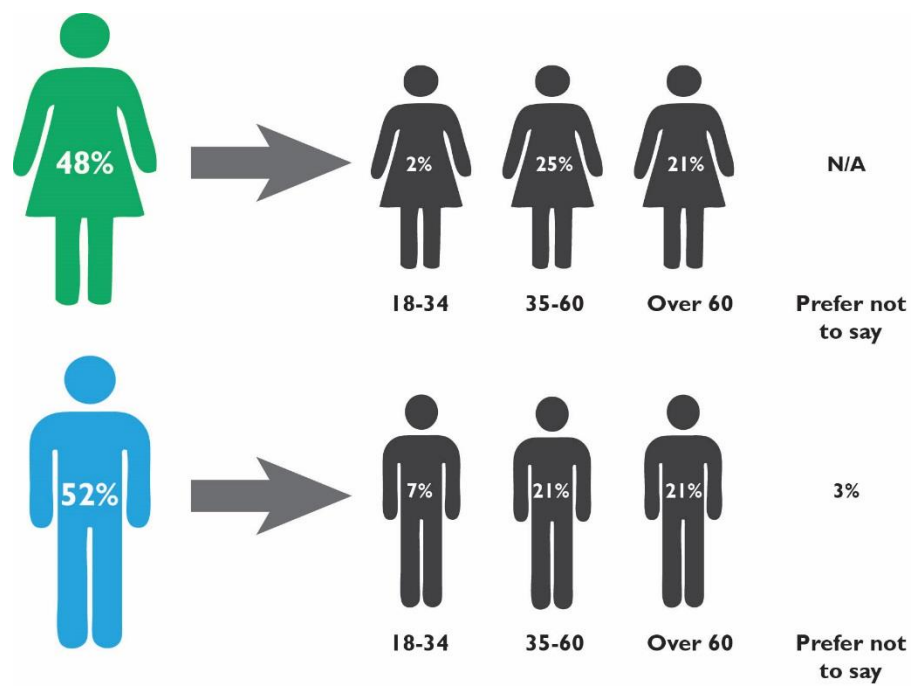


Figure 1.4-1 | WikiMap Participants – Gender/Age

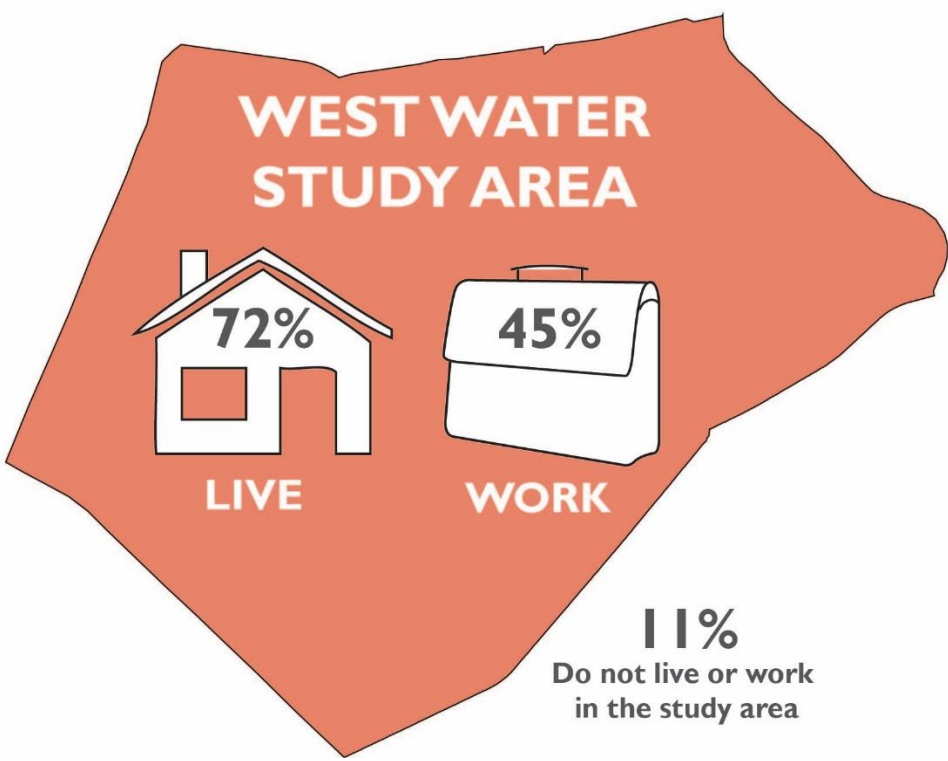


Figure 1.4-2 | WikiMap Participants – Live/Work in Study Area

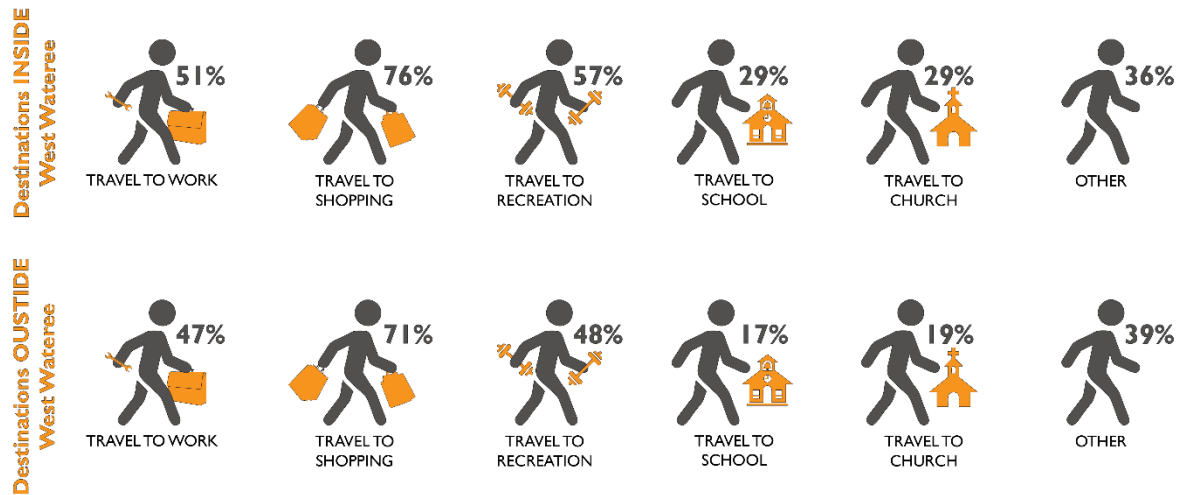


Figure 1.4-3 | WikiMap – Travel to Destinations

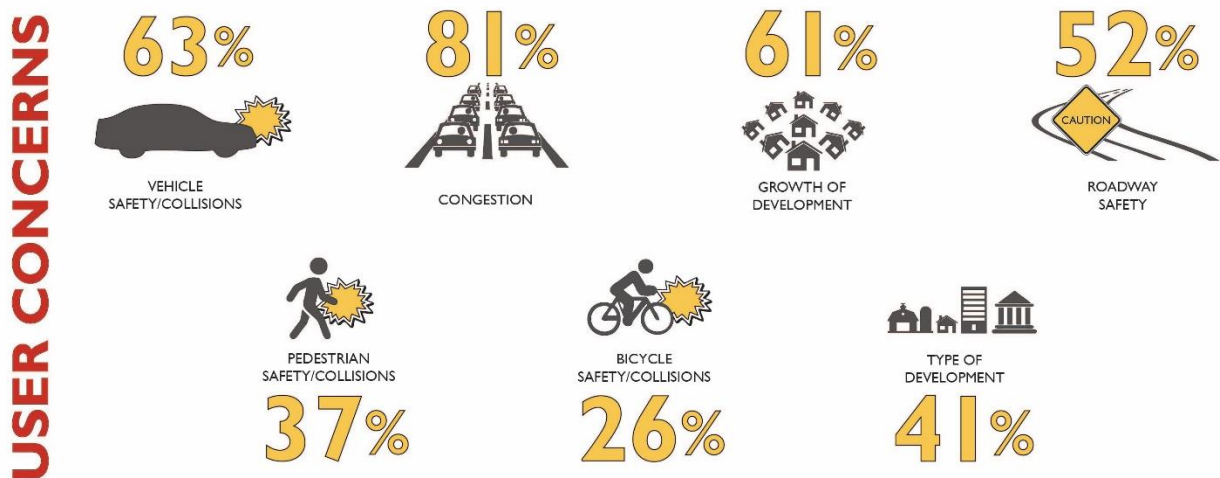


Figure 1.4-4 | WikiMap – User Concerns



2. Baseline Review

2.1 Land Use Context

Land Use Patterns

Existing land use within the sub-area is characteristic of the rural nature of this part of Kershaw County. Larger rural residential/agricultural properties make up a majority of the land uses with non-residential, such as commercial, institutional, or industrial uses concentrated along major corridors. Land uses along US 1 within the Town of Elgin and community of Lugoff are dominated by commercial and institutional use types. Commercial and industrial uses along corridors that intersect with I-20 are a key pattern of land use throughout Kershaw County. Within the sub-area these include both White Pond Road and US 601 where a number of commercial and industrial uses currently exist. Multi-family land uses are not common within the study area; however, there are several properties comprised of manufactured housing types (i.e., mobile home parks).

Zoning

The study area is governed by two jurisdictions with zoning authority: Kershaw County and the Town of Elgin; Lugoff is an unincorporated community within Kershaw County. Zoning ordinances for Kershaw County and the Town of Elgin identify distinct zone districts. In order to convey the purpose and intent of the zoning districts across the entire study area, districts were organized into categories and summarized in **Table 2.1-1**. A map illustrating the zoning districts for the sub-area is depicted in **Figure 2.1-1**. The Town of Elgin zoning is classified by a majority of residential zone districts with non-residential districts along Main Street (US 1). Non-residential zone district categories for Elgin align with the descriptions for Commercial/Office and Industrial outlined in Table 2.1-1.

Rural residential zoning can clearly be seen throughout the study area and is the most prevalent zoning pattern in this part of Kershaw County. Residential zones are the second most common zoning districts in the sub-area. Although there is a heavy rural influence in the area, small concentrated pockets of Business/Office/Industrial districts are located along US 1. In addition, similar districts are in close proximity to the I-20 corridor on the eastern boundary of the study area. Light Industrial and General Development districts are clustered adjacent to the I-20 exits, allowing these uses to easily gain interstate access. This zoning pattern of placing more intense commercial and industrial uses along well-traveled corridors is consistent with the intent of the Kershaw County Zoning and Land Development Regulations (ZLDR) to separate incompatible uses and to preserve the character of existing land and resources.



Table 2.1-1 | Zoning District Categories

Zoning Category	Description	Zone Districts Included
Rural Resource	Rural residential land uses. This zoning category emphasizes the protection of resources including but not limited to agricultural lands, woodlands, and wetlands. These properties characterize the rural nature of Kershaw County and are zoned to protect these valuable resources.	Kershaw: RD-1, RD-2, MRD-1
Residential	Residential land uses that vary in density. A majority of the residential zoning districts accommodate single-family detached housing on larger lots. However, this zoning category does include higher density districts that typically have smaller lots and more compact residential development. Areas that are identified with higher density residential are most often located along major streets in closer proximity to non-residential uses (e.g., commercial, office, or industrial).	Kershaw: R-8, R-10, R-15, MULTI, PDD Elgin: RS-1, RS-2, RS-3, RG
Commercial/Office	Primarily non-residential uses including commercial, office, and institutional.	Kershaw: O-1, B-2, B-3, GD Elgin: OC, GC-1, GC-2
Industrial	Properties used for manufacturing and warehousing. Both heavy and light manufacturing uses are present in these zoning districts.	Kershaw: I-I Elgin: LI

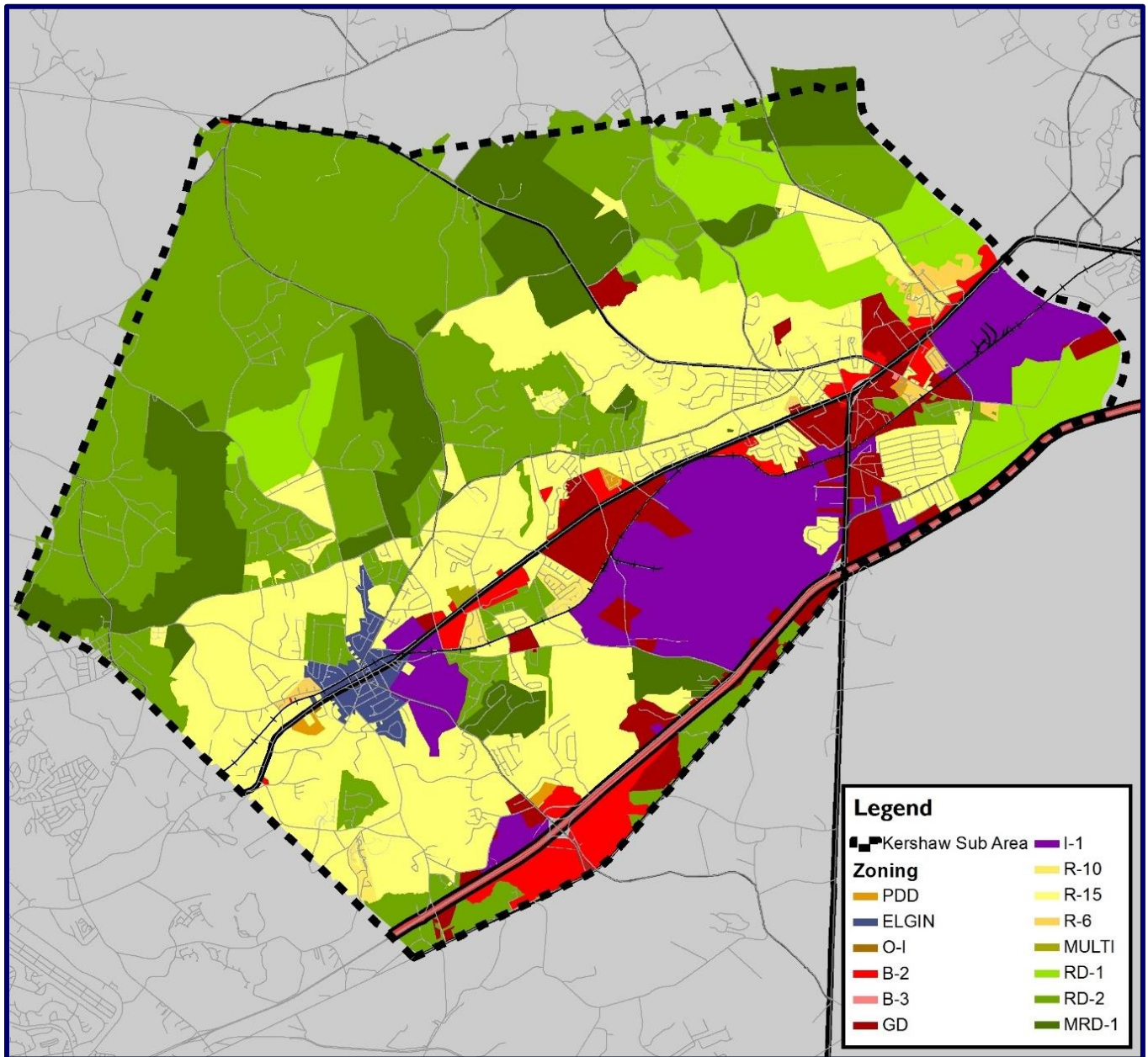


Figure 2.1-1 | Sub-Area Zoning Categories



Land Development Regulations

Kershaw County's ZLDR identifies specifications for new development and redevelopment within the study area. The Town of Elgin has its own zoning districts with a majority of residentially zoned properties with commercial districts located in close proximity to the US 1 corridor. General site design and analysis are discussed within the development regulations and identify several factors that should be considered for planning, design, and construction on property within Kershaw County. Among the components to be considered are:

- Adequate access to lots and sites;
- Avoiding unnecessary impervious cover; and
- Existing or planned road networks.

Each of these components are identified to shape the safety and efficiency of the transportation network within Kershaw County. Criteria for street and access design are detailed within the County's regulations. Design standards include language that promotes attractive streetscape design as well as the implementation of roadways that facilitate non-motorized transportation, such as pedestrians and bicycles. Facilities to accommodate non-motorized transportation are required for a variety of large scale new projects. Kershaw County has stressed the importance of connectivity for new development with nearby schools, businesses, institutions, and other local destinations. Although existing conditions for lot access may not be ideal for non-motorized users, the development regulations mandate spacing between driveways for individual properties based upon posted speed limits and roadway classification. This spacing standard, along with the design considerations and street regulations, demonstrate that Kershaw County has placed a greater emphasis on enhancing the existing transportation network for a variety of users, both motorized and non-motorized.

Future Land Use Patterns

Future land use patterns were analyzed through the use of future land use maps from Kershaw County's Comprehensive Plan 2006-2016. The study area is part of the West Wateree planning area of the County's future land use map, as seen in **Figure 2.1-2**. While the future land use map categorizes a large portion of the county as "Residential Development Areas," the map also labels the land in the vicinity of US 1 and I-20 as "Economic Development Areas." Existing roadways and services in these areas increase opportunities for a variety of uses without burdening the existing infrastructure system. According to this map, both the Town of Elgin and community of Lugoff would include development for a variety of non-residential uses. **Table 2.1-2** summarizes each of the future land use classifications that appear in the sub-area.

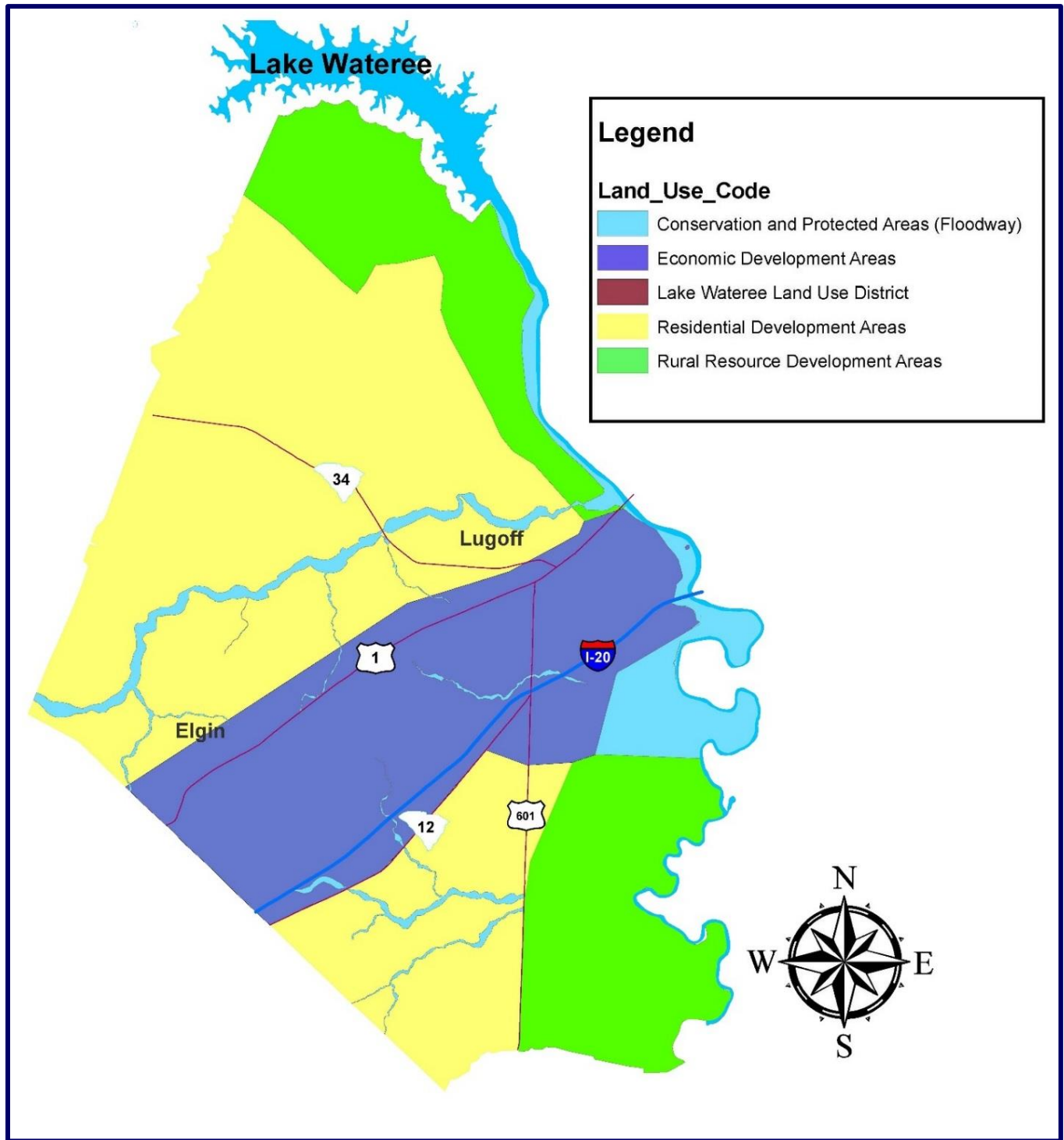


Figure 2.1-2 | West Wateree Future Land Use



Table 2.1-2 | Future Land Use Categories*

Land Use Code	Land Use Classifications
Economic Development Areas	ED: The Economic Development Areas designation is intended to serve the needs of business, commercial employment, industrial, institutional, and service uses. Residential uses are not excluded from the Economic Development Areas, however, higher density residential uses would be best suited for the area to shorten travel to places of employment. There are several existing residential developments in the ED designated areas. Treatment of these enclave residential developments is equal to that of properties in the RD designated areas.
Residential Development Areas	RD: Residential Development Areas are typically characterized by suburban developments beginning on the periphery of the urban core and spreading outward into the incorporated areas of the county, although some suburban areas are under the Town of Elgin jurisdiction. This land use classification includes those uses that support residents such as institutional, retail and office commercial, and service businesses. This area would not typically include regional commercial centers or industrial development.
Rural Resource Development Areas	RR: Rural Resource Development Areas are generally outside the path of projected development, characteristically rural and predominantly undeveloped at this time. Areas with this designation are not anticipated to experience drastic change over the next several years. In addition, these areas have great environmental significance due to the existence of large tracts of open land, woodlands, and wetlands that are essential to clean air and water, as well as supporting a variety of wildlife. Therefore, these areas should be protected from encroachment or misuse as other lands within the sub-area are developed over time. This also includes the retention of agricultural lands, equine farm lands, water resources, and historical places, many of which are located in the RR area shown on the Future Land Use Map.
Conservation and Protected Areas (Floodway)	CP: Conservation and Protected Areas include existing public parks and preserves and land under private conservation easements. Conservation areas also include jurisdictional wetlands, floodplains, and protected species habitats. These CP areas can be located within ED, RD, and RR future land use areas and should be protected regardless of their delineation on the Future Land Use Map. Other no-growth areas include lands that are undevelopable because of unstable and/or highly erodible topography such as steep slopes and soil types unsuitable for construction. Development on these lands will be restricted regardless of their delineation on the Future Land Use Map.

**Based on categories from Kershaw County Comprehensive Plan*



2.2 Transportation Network

Roadways

Roadway Classification

There are several major roadways within the study area, including an Interstate, two US Highways, and two state highways. Each of these roadways is classified based upon criteria set forth by the Federal Highway Administration (FHWA). **Table 2..2-1** describes each roadway functional classification criteria in more detail.

Table 2.2-1 | Roadway Functional Classification Criteria*

Classification	Descriptions	West Wateree Representative Roadways**
Interstate	<ul style="list-style-type: none"> Limited access and high speeds Accommodates a variety of traffic types, including passenger vehicles and trucks 	<ul style="list-style-type: none"> I-20
Arterial	<ul style="list-style-type: none"> Serves major activity centers with the highest traffic volume and the longest trip demands. Typically connects all or nearly all Urbanized Areas and provides an integrated network of continuous routes. Limited land access. 	<ul style="list-style-type: none"> US 1/Jefferson Davis Highway US 601 SC 34/Ridgeway Road
Collector	<ul style="list-style-type: none"> Serves a critical role in the roadway network by gathering traffic from Local Roads and funneling then to the Arterial network. Typically used for trips of moderate length and can link smaller cities and towns. Provides moderate land access. 	<ul style="list-style-type: none"> SC 12/Fort Jackson Road White Pond Road
Local	<ul style="list-style-type: none"> Primarily provides access to adjacent land. Accounts for the largest percentage of all roadways in terms of mileage. Typically does not carry through traffic and provides access to Collectors. 	<ul style="list-style-type: none"> Watts Hill Road Standard Warehouse Road Richardson Boulevard Whiting Way

*Classification is based upon the FHWA criteria

**Not all roadways within the sub-area are listed



Traffic Volumes

Roadways throughout the study area are traversed multiple times each day by residents, visitors, and commuters. One way to understand the demand for the network is to review traffic counts for specific roadways. **Table 2.2-2** presents Average Daily Traffic (ADT) for major roads within the West Wateree study area. Based on traffic volumes between 2009 and 2014, many roadway segments have experienced a decline in ADT. Such a decline may be the result of a variety of factors, including location of residential development that allows commuters to avoid these specific roadways to get to and from work. Lower traffic volumes may be indicative of higher home occupation rates or traffic generators such as large employers, schools, grocery stores, or civic spaces being accessed from alternative routes. The US 1 corridor from Richland County to White Pond Road in the Town of Elgin has experienced an increase in traffic volume which may be the result of commuter traffic between Kershaw and Richland Counties.

Table 2.2-2 | Traffic Volumes on Major Roadways

Roadway	Section	ADT						% Change 09-14
		2009	2010	2011	2012	2013	2014	
US 1	Richland County to White Pond Road	11,300	11,300	10,800	11,900	11,500	11,700	3.5%
	White Pond Road to US 601	11,667	11,533	10,967	11,633	11,200	10,230	-12.3%
	US 601 to Ridgeway Road	24,000	21,900	22,100	22,000	22,000	22,000	-8.3%
US 601	I-20 to US 1	16,500	16,300	16,050	16,300	16,150	14,900	-9.7%
SC 34	S-318 to US 1	6,600	6,100	6,700	6,300	6,300	5,900	-10.6%



Intersection Existing Capacity Analysis

Through discussion with Kershaw County staff, field observation, and desktop research, critical intersections in the study area were identified for capacity analysis. Intersections vary based upon roadway classification of the intersecting roads, number of lanes, presence of turn lanes, and signalization. Critical intersections within the study area identified for capacity analysis are:

- US 1 at Richardson Boulevard (S-368) - Signalized
- US 1 at Oak Ridge Drive (S-870) - Unsignalized
- US 1 at Standard Warehouse Road (S-916) - Unsignalized
- US 1 at Magnolia Lane (S-36) / Business Drive - Unsignalized
- US 1 at Baldwin Avenue (S-318) / US 601 SB On Ramp - Unsignalized
- US 1 at US 601 NB Off Ramp - Unsignalized
- US 1 at Townlee Lane - Unsignalized
- US 1 at Ridgeway Road (SC 34) / Ward Road (SC 34) - Signalized
- Ridgeway Road (SC 34) at Boulware Road (S-910) - Unsignalized
- US 601 at Standard Warehouse Road (S-916) - Unsignalized
- US 601 at Lachicotte Road (S-133) - Unsignalized
- US 601 at Fredericksburg Drive (S-854) - Unsignalized
- US 601 at Whiting Way (S-993) - Unsignalized
- US 1 at Watts Hill Road (S-757) - Unsignalized
- White Pond Road (S-47) at Heath Pond Road (S-336) - Unsignalized

Existing (2016) level of service and delay for each intersection was determined based on the Highway Capacity Manual 2010. The traffic carrying ability of a roadway is described by level of service (LOS) (i.e., as defined by the Highway Capacity Manual (HCM) 2010), with letter grades ranging from A to F:

- LOS A represents unrestricted maneuverability and operating speeds.
- LOS B represents reduced maneuverability and operating speeds.
- LOS C represents restricted maneuverability and operating speeds closer to the speed limit.
- LOS D represents severely restricted maneuverability and unstable, low operating speeds; LOS D is considered acceptable in developed urban areas.



- LOS E represents operating conditions at or near the capacity level.
- LOS F represents breakdown conditions characterized by stop and go travel.

Table 2.2-3 and **Table 2.2-4** define the traffic flow conditions and approximate driver comfort level at each LOS.

Table 2.2-3 | LOS Thresholds for Unsignalized Intersections

Level of Service	Average Control Delay (sec/veh)
A	≤ 10.0
B	> 10.0 and ≤ 15.0
C	> 15.0 and ≤ 25.0
D	> 25.0 and ≤ 35.0
E	> 35.0 and ≤ 50.0
F	> 50.0

Table 2.2-4 | LOS Thresholds for Signalized Intersections

Level of Service	Average Control Delay (sec/veh)
A	≤ 10.0
B	> 10.0 and ≤ 20.0
C	> 20.0 and ≤ 35.0
D	> 35.0 and ≤ 55.0
E	> 55.0 and ≤ 80.0
F	> 80.0



Note that the delays associated with LOS for signalized intersections are different from those associated with unsignalized intersections. The HCM explains that drivers perceive that a signalized intersection is designed to carry higher traffic volumes and therefore expect to experience greater delays at signalized intersections. A signalized intersection is described by a single LOS. Unsignalized intersections are assigned a LOS for each minor movement. LOS D is considered acceptable for signalized intersections and LOS E can be acceptable for brief times during peak travel periods. During peak periods, LOS F on select minor movements of an unsignalized intersection can be acceptable.

The analysis was performed using Synchro 9.1 (build 903, Rev 76) for the unsignalized and signalized study intersections. The analyses were conducted in accordance with the latest SCDOT signal design guidelines in regards to the Synchro inputs. Sim Traffic was used to identify 95th percentile queuing.

Table 2.2-5 focuses on the intersections that are operating at LOS E or F. LOS information for intersections operating at LOS D or better is included in **Appendix B**.

Table 2.2-5 | Existing 2016 Summary of LOS E/F and Delay

Intersection	Level of Service (Delay in Seconds)		
	Approach	Existing 2016	
		AM	PM
US 1 at Magnolia Lane (S-36) / Business Dr	SB Left	F (531.4)	F (58.4)
US 1 at US 601 NB Off Ramp	NB Left	F (391.6)	F (133.8)
US 1 at Townlee Lane	NB Left	D (31.5)	F (64.3)
US 601 at Standard Warehouse Road (S-916)	EB Left	E (49.9)	C (23.5)
	WB Left	F (61.2)	D (25.3)
US 601 at Lachicotte Road (S-133)	WB Left	E (49.3)	F (69.6)
US 601 at Fredericksburg Drive (S-854)	EB Left	E (37.3)	C (24.5)
US 601 at Whiting Way (S-993)	EB Left	F (165.9)	F (78.0)
US 1 at Watts Hill Road (S-757)	SB Left	B (11.6)	E (39.9)



Historical Crashes

Crash data was obtained from SCDOT for 12 of the 15 study intersections for the five-year period of 2010-2014. The signalized intersection of US 1 at Ridgeway Road (SC 34)/Ward Road (SC 34) had the most crashes with 152 (i.e., 59 angle and 59 rear-end collisions resulting in 31 injuries). Other highlights include:

- One fatality at the intersection of US 601 at Lachicotte Road (S-133)/Fredericksburg Drive (S-854).
- 21 of 33 total crashes at the intersection of US 1 at Richardson Boulevard were rear-end collisions, where no exclusive turn lanes exist on US 1.

Based on crash history, access management should be considered for the following:

- 22 of 53 total crashes at the intersection of US 1 at Baldwin Avenue (S-318)/US 601 SB On Ramp resulted in angle collisions with 11 injuries.
- 15 of 42 total crashes at the intersection of US 1 at US 601 NB Off Ramp resulted in angle collisions with 9 injuries.
- 28 out of 52 total crashes at the intersection of US 601 at Whiting Way (S-993) resulted in angle collisions with 17 injuries.
- 14 of 33 total crashes at the intersection of US 1 at Watts Hill Road (S-757) resulted in angle collisions with 13 injuries.

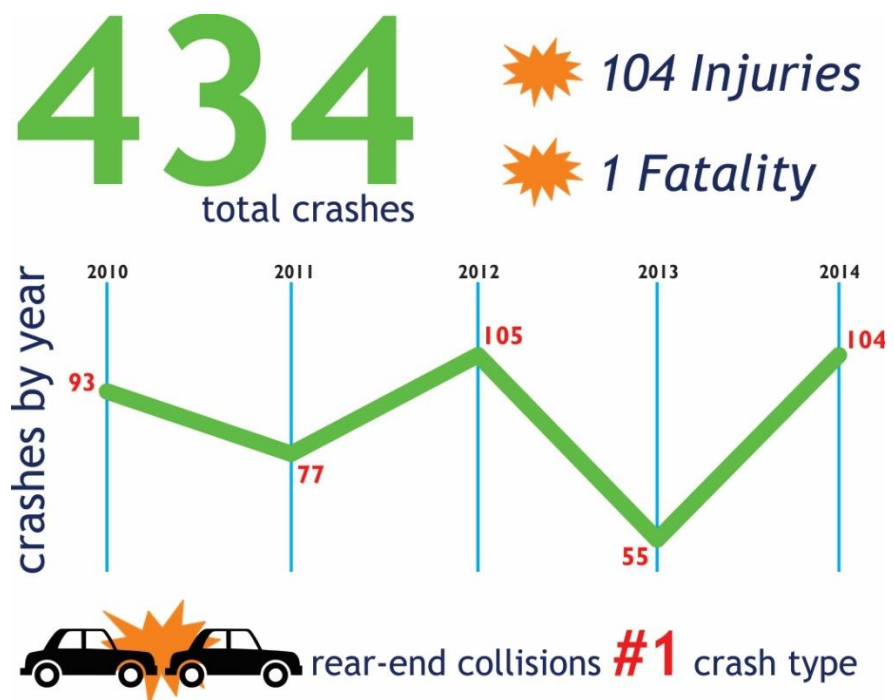


Figure 2.2-1 | Summary of Historical Crashes



Planned Roadway Improvements

There are no roadway improvements identified in the COATS Transportation Improvement Program 2013-2019 for the study area. However, the COATS 2040 Long Range Transportation Plan (LRTP), approved in August of 2015, identifies several roads and intersections in need of improvement. **Table 2.2-6** and **Table 2.2-7** present the road widening and intersection improvement projects.

Table 2.2-6 | LRTP Road Widening Projects

Roadway	Project Limits	Length (miles)
US 1/Jefferson Davis Highway	Steven Campbell Road to Sessions Road	1.96
US 1/Jefferson Davis Highway	Sessions Road to Watts Hill Road	1.76
White Pond Road	US 1 to Heath Pond Road	2.10

Table 2.2-7 | LRTP Intersection Improvement Projects

Major Route	Minor Route	Project Description
Church Street/Sessions Road	Smyrna Road	Traffic signal and/or possible redesign
Main Street/US 1	Pine Street	Left Turn lane on US 1
Blaney Road	Forest Drive/Highway Church Road/Dogwood Avenue	Traffic signal and/or possible redesign



Active Transportation

Designated facilities, topography, existing and future development, and roadway design can greatly impact the bicycle and pedestrian environment within a specific community or region. While there are some roadways within the study area that have sidewalks, a connected network of sidewalks does not yet exist. However, Kershaw County's development regulations make it clear that improving the pedestrian environment is one of the key components to site design and analysis for new developments. Pedestrian crossings are also a need throughout the study area to ensure safety at intersections. Most intersections are not signalized, increasing the difficulty for pedestrians and cyclists to cross safely.

Many of the roads in this part of Kershaw County have little or no shoulder along either side of the roadway. Paved shoulders provide refuge for cyclists and pedestrians that may choose to travel these routes. Without this space, trips along these roads are uncomfortable at best but dangerous at worst for people riding bikes, walking, and jogging. In addition, the geometry of some roads and intersections create blind spots and corners that make bicycle and pedestrian travel more hazardous. The lack of designated facilities within the West Wateree study area also may create an assumption by drivers that active transportation users will not be traveling along these routes. This assumption may cause drivers to travel at higher speeds and with little to no regard for non-motorized users; further increasing the danger for people cycling or walking.

There are no existing designated bicycle facilities within the study area; there is a bike route that is identified along Ridgeway Road going west from Lugoff. In addition, the Kershaw County Bicycle, Pedestrian, and Greenways Plan identifies previously proposed bike facilities as well as an extensive network of bicycle and pedestrian facilities within the study area and throughout the county. Several destinations within the area such as schools, commercial developments, major employment areas, and transit stops are opportunities for priority active transportation routes.



Narrow shoulders along rural roads, like White Pond Road, make travel difficult for bicyclists and pedestrians.



Public Transit

Santee Wateree Regional Transportation Authority (SWRTA), located in Sumter, SC, currently provides limited public transportation options in Kershaw County. Through a partnership with SCDOT, SWRTA offers two commuter express bus routes from Camden to Columbia called SmartRide. Although the routes were initially designed for work related purposes, citizens can take advantage of this service for medical, shopping, training, and recreation. This service is a park-and-ride model that enhances regional mobility for Kershaw County commuters.



SWRTA, in partnership with SCDOT, provides SmartRide, a commuter bus service between Kershaw County and Downtown Columbia.

SmartRide express service leaves from the United Way/One Stop location at 116 E. DeKalb Street in Camden and picks up passengers at the Camden Post Office, Springdale Plaza, and the Sunrise Inn in Lugoff. The bus travels I-20 to downtown Columbia. The service then makes a loop in downtown Columbia and stops at some major trip generator locations such as Richland Hospital, the Fontaine Business Center, the CMRTA Bus Transfer Station, and State Government offices, including the SCDOT and SCDNR Headquarter locations. The reverse trip is made during the evening peak travel time and commuters are brought back to Kershaw County. Fares for this service range from \$2.00 one way, \$4.00 roundtrip, and \$20.00 for a weekly pass.

As a result of the significant population growth in the West Wateree area of Kershaw County, the urbanized area of the COATS Metropolitan Planning Organization (MPO) was expanded to include the Town of Elgin and Lugoff communities. This resulted in the re-classification for a portion of Kershaw County as a large urbanized area instead of a rural district. The SWRTA has been planning to continue to provide needed connective transit service to promote job access, access to healthcare facilities, and coordinated service to other community trip generators in Kershaw County. It should also be noted that the Central Midlands Regional Transportation Authority (dba The



Comet) provides transit service in Northeast Richland County and could expand those services into the portion of Kershaw County that is in the Columbia urbanized area.

Prior to the decline in the economy, SWRTA offered Medicaid, Disability, and Special Needs Board (DSNB), Council on Aging (COA) contracted transportation service, and a paratransit (dial-a-ride) service. Residents who lived in the areas where the contractual service was offered could utilize the curb-to-curb advance reservation paratransit services. Trips were scheduled on a time and space availability basis. Unfortunately, SWRTA was forced to end the Medicaid contract because they were operating it at a loss. Other local not-for-profit agencies also ended their contracts because of the reduction in state and federal funds.

Due to the cutbacks in transit funding to support Medicaid, Workforce Investment Act (WIA), and Kershaw County Council on Aging (KCCOA) and other Human Service agency transportation needs, there is an effort to improve mobility options for these constituencies. For example, the Vocational Rehabilitation clients need to have alternatives to improve mobility for both 2nd and 3rd shift work trips. Kershaw County has limited access to both public transportation in the rural areas and reliable and affordable taxi services.

SWRTA's plans for the future are to establish more public transit routes in the rural area and install bus stop signs/shelters based on the funding levels received from the Federal Transit Administration (FTA), the SCDOT Office of Public Transit, and local governments. SWRTA also has plans to reestablish relationships/partnerships with agencies to provide affordable transportation services for their agencies in an effort to be able to serve more citizens.

Table 2.2-8 presents ridership information for transit services that have been recently provided in Kershaw County.



Table 2.2-8 | 5-Year Transit Service Ridership in Kershaw County*

Agencies	2010/2011 Trips	2011/2012 Trips	2012/2013 Trips	2013/2014 Trips	2014/2015 Trips
SmartRide	13,122	13,923	12,210	10,686	9,811
Demand Response	1,697	1,368	723	115	0
Kershaw County Disability & Special Needs Board	19,092	13,043	10,636	7,233	916
Medicaid	10,504	7,500	3,711	0	0
Workforce Investment Act	114	110	209	0	0
Kershaw County Council on Aging	2686	0	0	0	0
Total	47,215	35,944	27,489	18,034	10,727

*Information provided by SWRTA Operating Statistical Reports

Railroad

A single railroad spans the entirety of the study area and is operated by CSX Transportation. This Class I railroad runs in close proximity to the US 1 corridor and only crosses the corridor once on the north side of the Town of Elgin. The railroad line continues southwest to Columbia and northeast into North Carolina. Major commodity shipments include petroleum/coal products and lumber/wood products. The crossing of US 1 is a grade separated crossing and therefore does not impact travel on US 1. However, there are several at-grade crossings of local roadways throughout the study area.

Intercity passenger rail service in Kershaw County is currently served daily by Amtrak. This train service provides linkages between New York and Florida on its Silver Service/Palmetto line. The Amtrak train travels through the study area but arrives and departs just outside the study area from the City of Camden at 4:49 a.m. for northbound trains and 12:50 a.m. for southbound trains. Passengers can board the train at the historic Camden depot located at 1060 West Dekalb Street.



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3. Technical Analyses

Following the establishment of baseline conditions, as presented in Section 2 of this document, technical analyses were conducted to identify issues that pertain specifically to the study area. The technical analyses further clarify current issues and identify potential future concerns. The outcomes of these analyses were thoughtfully considered when developing the recommendations presented in Section 4 of this final report.

3.1 Motor Vehicular Transportation Facilities

Similar to the existing traffic conditions analysis summarized in Section 2.2, a Future 2040 (No-Build) traffic capacity analysis was conducted for the West Wateree Transportation Study to understand the impact on the transportation network without improvements. The intersections that were analyzed for existing conditions were also analyzed for future traffic conditions.

Future Traffic Projections

To establish future conditions, growth rates were calculated using files from SCDOT's statewide travel demand model for the COATS study area, as shown in **Figure 3.1-1**. Volumes from 2010 and 2040 networks were converted to an annual compound growth rate and applied to the appropriate turning movement counts conducted in December 2015. This procedure helped to minimize the model's tendency to over- or underestimate model volumes at the sub-regional level. This typically happens when a model is only validated at the regional scale and therefore is not as precise for smaller scales such as the West Wateree study area. **Table 3.1-1** summarizes the annual growth rate used for each intersection approach. To be conservative, each growth rate obtained from the model has been rounded up to the nearest 0.50%.

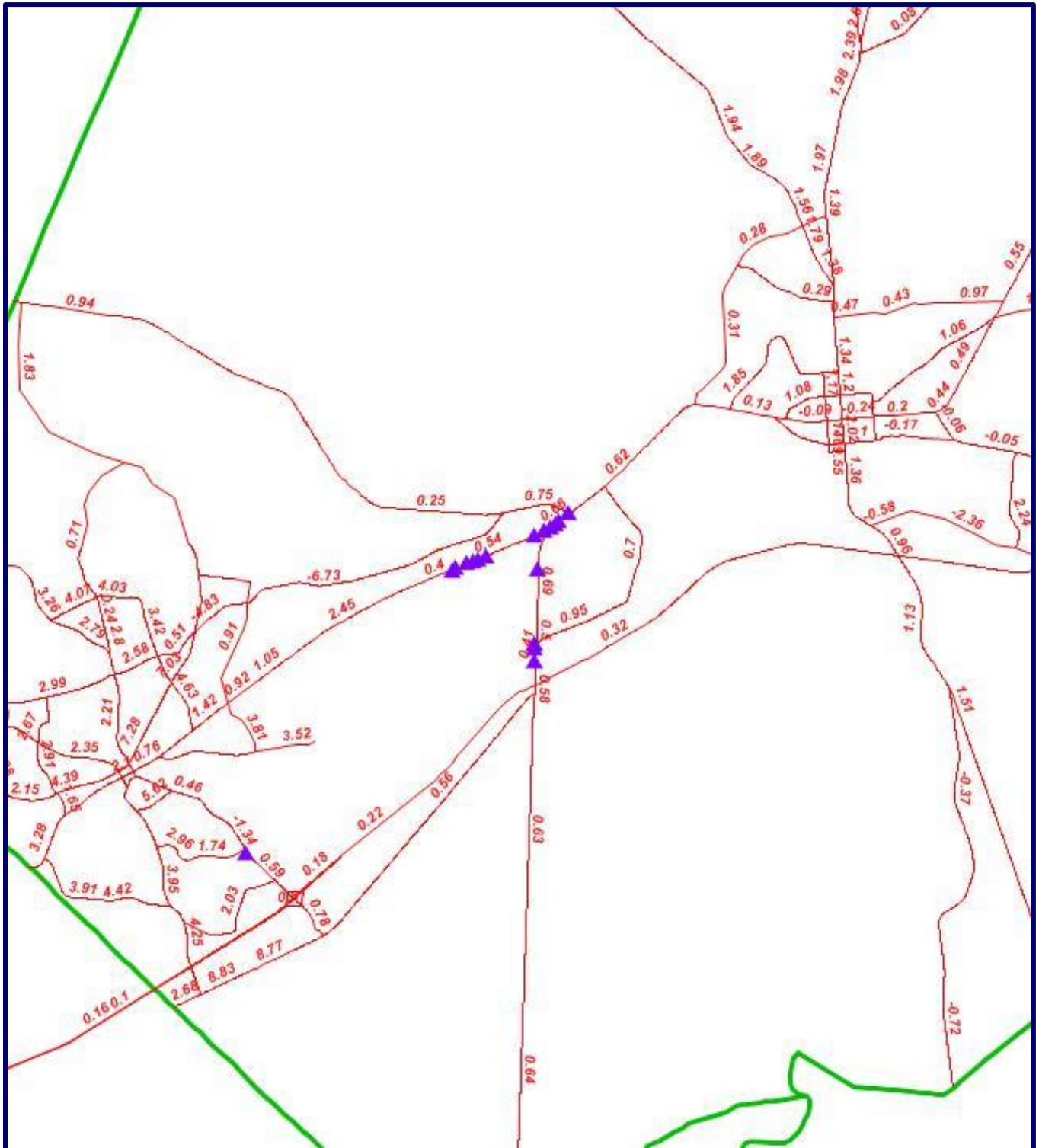


Figure 3.1-1 | Inset of COATS Travel Demand Model



Table 3.1-1 | Future Growth Rates by Intersection

ID#	Intersection	Annual Growth Rate			
		Major Approach	Growth Rate	Minor Approach	Growth Rate
1	US 1 at Richardson Boulevard (S-368)	US 1	0.50%	Richardson Boulevard	0.50%
2	US 1 at Oak Ridge Drive (S-870)	US 1	1.00%	Oak Ridge Drive	0.50%
3	US 1 at Standard Warehouse Road (S-916)	US 1	1.00%	Standard Warehouse Road	0.50%
4	US 1 at Magnolia Lane (S-36)/ Business Drive	US 1	1.00%	Magnolia Lane	0.50%
5	US 1 at Baldwin Avenue (S-318)/US 601 SB On Ramp	US 1	1.00%	Baldwin Avenue / US 601	0.50%
6	US 1 at US 601 NB Off Ramp	US 1	1.00%	US 601	0.50%
7	US 1 at Townlee Lane	US 1	1.00%	Townlee Lane	0.50%
8	US 1 at Ridgeway Road (SC 34)/Ward Road (SC 34)	US 1	1.00%	Ridgeway Road / Ward Road	1.00% / 0.50%
9	Ridgeway Road (SC 34) at Boulware Road (S-910)	SC 34	1.00%	Boulware Road	0.50%
10	US 601 at Standard Warehouse Road (S-916)	US 601	0.50% NB / 1.00% SB	Standard Warehouse Road	0.50%
11	US 601 at Lachicotte Road (S-133)	US 601	0.50%	Lachicotte Road	0.50%
12	US 601 at Fredericksburg Drive (S-854)	US 601	0.50%	Fredericksburg Drive	1.00 %
13	US 601 at Whiting Way (S-993)	US 601	0.50%	Whiting Way	0.50%
14	US 1 at Watts Hill Road (S-757)	US 1	1.00% WB / 1.50% EB	Watts Hill Road	4.00% NB / 1.00% SB
15	White Pond Road (S-47) at Heath Pond Road (S-336)	White Pond Road	0.50%	Heath Pond Road	2.00%



Based on the proposed growth rates previously presented in Table 3.1-1, 2040 ADTs can be projected and are summarized in **Table 3.1-2**. While the historic traffic volumes on these corridors have fluctuated, and even declined at times, future traffic volumes are anticipated to increase over time at a percent change ranging from 14% to 30% across the network.

Table 3.1-2 | 2040 Projected ADTs

Location	2014 ADT	2040 ADT	Percent Change
US 1 west of US 601	8,800 to 10,400	11,400 to 13,500	30%
US 1 east of US 601	22,800	29,500	30%
US 601	14,600 to 15,200	16,600 to 17,800	14% to 17%
Ridgeway Road	5,900	7,600	29%
White Pond Road	6,600	7,500	14%

Future (No-Build) Capacity Analysis

To establish a baseline for determining system needs and developing recommended improvements to address those needs, it is important to look at the impact of future traffic growth on intersections if no improvements were made; this is referred to as the “no build” condition.

The future 2040 no build conditions were analyzed and LOS and delay for each intersection in the network was determined. The future conditions no build analysis was performed using Synchro 9.1 (build 903, Rev 76) for the unsignalized and signalized study intersections. The analyses were conducted in accordance with the latest SCDOT signal design guidelines in regards to the Synchro inputs. Sim Traffic was used to identify 95th percentile queuing.

Table 3.1-3 focuses on the intersections that are operating at LOS E or F, as these intersections will require improvements to function at an acceptable LOS in the future. A table showing all 15 intersections LOS and delay is presented in **Appendix B**.



Table 3.1-3 | Future No Build 2040 Summary of LOS E/F and Delay

ID#	Intersection	HCM 2010 Level of Service (Delay)		
		Approach	2040 Future No Build)	
			AM	PM
2	US 1 at Oak Ridge Drive	NB Left	F (71.3)	D (28.9)
3	US 1 at Standard Warehouse Road (S-916)	NB Left	E (40.1)	D (31.4)
4	US 1 at Magnolia Land (S-36)/Business Drive	SB Left	F (1596.2)	F (170.1)
5	US 1 at Baldwin Avenue (S-318)/US 601 SB On Ramp	SB Left	D (30.0)	F (543.6)
6	US 1 at US 601 NB Off Ramp	NB Left	F (1556.7)	F (484.3)
7	US 1 at Townlee Lane	NB Left	F (61.1)	F (437.5)
10	US 601 at Standard Warehouse Road (S-916)	EB Left	E (242.7)	E (45.9)
		WB Left	F (132.7)	E (39.5)
11	US 601 at Lachicotte Road (S-133)	WB Left	E (40.3)	F (55.0)
12	US 601 at Fredericksburg Drive (S-854)	EB Left	F (56.2)	D (31.3)
13	US 601 at Whiting Way (S-993)	EB Left	F (425.0)	F (192.7)
14	US 1 at Watts Hill Road	NB Left	C (18.7)	F (376.3)
		SB Left	C (17.9)	F (778.6)
15	White Pond Road (S-47) at Heath Pond Road (S-336)	EB Left	F (50.2)	C (17.8)

Based on Table 3.1-3, 12 of 15 intersections will operate at an LOS E or LOS F in 2040, if no improvements are made. Intersections exceeding over 100 seconds of delay for an approach include the following:

- US 1 at Magnolia Ln (S-36)/Business Dr (SB Approach)
- US 1 at Baldwin Ave (S-318)/US 601 SB On Ramp (SB Approach)
- US 1 at US 601 NB Ramp (NB Approach)
- US 1 at Townlee Ln (NB Approach)
- US 601 at Standard Warehouse Rd (S-916) (EB and WB approaches)
- US 601 at Whiting Way (S-993)
- US 1 at Watts Hill Rd (S-757) (NB and SB approaches)



Due to complexity and the public repeatedly identifying the US 1 at US 601 interchange as an issue, the following two merge movements were also analyzed:

- US 601 Northbound onto US 1/US 601 Eastbound
- US 1 Eastbound onto US 601 Southbound

LOS for limited access highways, like US 601, are evaluated using different metrics than intersections. The density of traffic is the deciding factor for LOS. In this case, the number of passenger cars per lane-miles (pc/mi/ln) is used to determine LOS.

Table 3.1-4 defines the traffic density conditions for each LOS.

Table 3.1-4 | LOS Thresholds for Merge Segments

Level of Service	Density Range (pc/mi/ln)
A	≤ 10.0
B	> 10.0 and ≤ 20.0
C	> 20.0 and ≤ 28.0
D	> 28.0 and ≤ 35.0
E	> 35.0
F	$>$ Demand Exceeds Capacity

Analysis indicated that both merge movements will operate at an LOS C or better for both peak hours. While traffic flow may be acceptable for these two merge movements, the public has indicated this interchange can be confusing and dangerous. Additionally, the analysis presented in Table 3.1-3 demonstrates that the US 601 northbound off-ramp will experience unacceptable delays in the future. Therefore, operational and geometric improvements were considered for this interchange as part of the recommendations process.



3.2 Bicycle and Pedestrian Facilities

Importance of Bike and Pedestrian Facilities

Comprehensive analysis of the transportation network within the study area goes beyond a focus on motor vehicles and must include a variety of transportation modes. Specifically, analysis of existing and potential for bicycling and walking as modes of transportation have been conducted. Improvements to bicycle and pedestrian infrastructure within the study area not only benefits those using these facilities for transportation, it also enhances the non-motorized network for recreational users that desire to explore the study area and its amenities.

Currently, the study area lacks sufficient bicycle and pedestrian facilities to connect users to key destinations. The Kershaw County Bicycle, Pedestrian, and Greenways Plan was created in 2012 to identify opportunities for bike and pedestrian facilities that would enhance connectivity within Kershaw County. Recommendations included an extensive network of bike and pedestrian facilities throughout the County. Priority projects were classified into four unique categories:

- Regional Trails & Heritage Tourism
- Community Connectors
- Safe Routes to Schools & Parks
- Safe Routes to Healthy Foods

Several priority project recommendations fell within the study area of the current West Wateree Transportation Study, as seen in **Table 3.2-1**; however, none of the recommended projects have been constructed to date.

Table 3.2-1 | Proposed Bicycle/Pedestrian Improvements within the Study Area

Project	Facility Type	Length (miles)	Jurisdiction
Bowen Street	Sidewalk	0.7 mile	Town of Elgin
Walnut Street	Sidewalk	0.2 mile	Town of Elgin
Lugoff-Elgin Connector	Multi-use trail	4.4 miles	Unincorporated Kershaw County
Smyrna Road	Bike lane	1.4 miles	Town of Elgin and Unincorporated Kershaw County
Ridgeway Road	Sidewalk	1.1 miles	Unincorporated Kershaw County
US 1	Sidewalk	1.4 miles	Unincorporated Kershaw County



Each of the project categories within the previously approved bike and pedestrian plan indicates that connectivity within the county as a whole (i.e., which is equally true for the West Wateree study area) to key destinations will enhance the quality of life and health of citizens while highlighting the unique character and history of the community. These categories represent themes that have been included as part of the demand analysis for bicycle and pedestrian infrastructure within the study area.

Analysis Approach

Analysis of the quality and potential of the bicycling and walking environment was conducted through the creation of a demand analysis map or “heat map,” showing potential demand for traveling by bike or on foot. The heat map is a tool that displays “heat” in areas where the demand for biking and walking are highest based upon several weighting factors. A description of each of the factors and their corresponding weights is provided below in **Table 3.2-2**. Table 3.2-2 is not an exhaustive list of attractors and generators; however, the factors used do highlight locations where bike and pedestrian activity might concentrate (i.e., latent demand) if adequate facilities were provided. Therefore, the heat map (see **Figure 3.2-1**) illustrates generalized locations within the study area that would benefit from new or improved bike and pedestrian facilities.



Table 3.2-2 | Demand Analysis Factors and Weighting

Input Data	Description	Weight	Rationale for Weighting
Schools	Each school property within the study area	25	Schools inherently have a large population (students) that are not of driving age and can take advantage of walking and/or biking as modes of transportation. This factor receives the highest weight due to the number of users and the number of trips that are generated by educational facilities.
Kershaw County Commercial	All properties within a Kershaw County commercial zone district designation (O-1, B-2, B-3, GD)	20	Commercial properties have a number of potential uses that provide opportunities to walk and/or ride a bike. Although the current use of the property may not be commercial in nature, the entitled use of the property as commercial generates a higher pedestrian or bicyclist demand for the location.
Elgin along US 1	Properties in the Town of Elgin that are within 350 feet of US 1	20	Several of the commercial uses within the Town of Elgin that are along US 1 may be destinations for pedestrians and bicyclists. Zoning for the Town of Elgin is separate from Kershaw County and therefore, properties within the town limits and within 350 feet of US 1 were selected and given the same weighting as the Kershaw County commercial zone districts due to similar uses and entitlements.
Transit Stop	SmartRide stop at the Sunrise Inn in Lugoff along US 601	15	Transit stops are probable destinations for pedestrians and often bicyclists. Transit users may not own or frequently use a vehicle and therefore select other modes of transportation. The weighting assigned to the transit stop reflects importance of this location as a multimodal destination.
Population Density	Based on 2010 Census data, density was organized by census blocks	10	Population density can often impact the mode of transportation used by residents within a respective area. More dense areas may provide easier navigation by walking or biking rather than a personal vehicle. Although the density within the study area is not that reflected in a more urban environment, the assigned weighting illustrates potential bike and pedestrian demand in the densest census blocks within the study area.
Grocery Stores	Local grocery providers in the Town of Elgin and Lugoff	5	Although grocery stores are assigned a lower weight, these locations within the study area are zoned commercial by Kershaw County or within 350 feet of US 1 in the Town of Elgin. Therefore, each grocery store location is weighted equivalent to a school due to the number of trips that are generated at these locations and the opportunity to make trips by bike or on foot.
Industrial Parks	Identified industrial parks within the study area, each with easy access to the interstate	5	Industrial parks have been assigned a lower weighting but are included in the factors for the demand analysis due to the number of existing or potential jobs at these locations. Additionally, many employees at industrial parks, even if they drive to work, desire opportunities to walk during lunch and breaks.

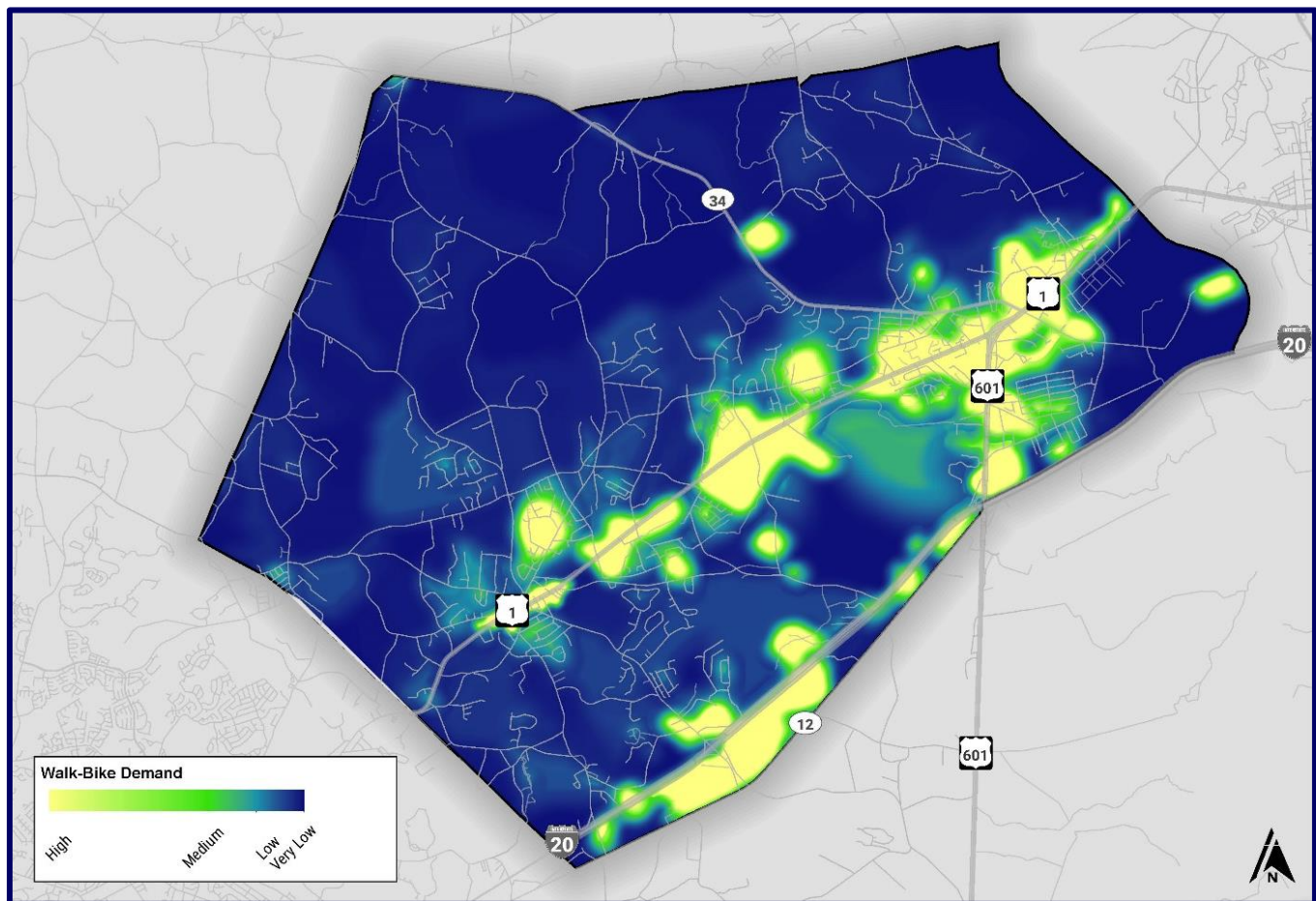


Figure 3.2-1 | Bicycle and Pedestrian Demand Analysis Map

Conclusions from Mapping

Results from mapping the demand for bicyclists and pedestrians illustrates the locations within the study area that have the highest potential for bike and pedestrian use, a need for enhanced infrastructure, and should be prioritize for funding when identifying non-motorized projects. Areas identified by the map with a high demand for bicyclists and pedestrians are discussed in greater detail below.

US 1 Corridor

As the main commercial corridor within the study area, it is no surprise that the US 1 corridor is identified for bike and pedestrian improvements. Connecting the Town of Elgin and Lugoff, the corridor contains a number of commercial properties, grocery stores, and general destinations for bicyclists and pedestrians to enjoy. In addition to the commercial character of the corridor, Lugoff-Elgin High School is located along US 1 as well as a number of residential subdivisions with high population density in comparison to more rural parts of the study area. High demand along US 1



demonstrates the opportunity for bike and pedestrian enhancements to benefit both the recreational user and those walking and biking for transportation. Commercial businesses are both destinations for a resident walking or riding a bike for exercise as well as places of employment that can be accessed on bike or foot. Recommendations for improvements along the US 1 corridor should embrace a multimodal cross section to provide safety for all users.

US 601 Corridor

US 601 connects I-20 to US 1 through the study area and is used by local, commercial, and commuter traffic. High demand along this corridor is due to the number of places of employment, population density, and the location of the SmartRide commuter transit stop. The corridor does not currently have bike and pedestrian facilities; however, the demand is not based upon existing facilities, but rather likely destinations or generators of bike and pedestrian activity. This corridor is the home of a number of large employers as well as a residential subdivision at Fredericksburg Drive that is more densely populated in comparison to a majority of the study area. Lastly, the SmartRide stop along US 601 generates high demand for bike and pedestrian users to increase connectivity between transit and other modes.

I-20/White Pond Road Interchange

The areas surrounding the I-20/White Pond Road interchange resulted in a high demand for bicyclists and pedestrians due to the population density along White Pond Road. There are a number of residential subdivisions between the interstate and the Town of Elgin that contribute to the map showing a high demand. In addition, Doby's Mill Elementary School is located along SC 12, contributing to the demand by non-motorized users. A major employer and commercial property such as Kershaw Health Primary Care adds to the need for enhanced bike and pedestrian facilities, including but not limited to sidewalks, ADA curb ramps, bike parking, and wider paved shoulders.



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4. Recommendations

Considering both the technical analyses that were performed and presented in Section 3 of this document and the guiding principles that were crafted by the public and included in Section 1, a series of transportation and land use solutions were developed. The intent is to provide recommendations that meet the needs of the study area while also adhering to the desires of the community.

Recommendations were initially presented to the steering committee as a series of alternative solutions at a sketch plan level of detail. Based on steering committee feedback, those alternative solutions were further refined and fashioned into the recommendations presented here.

Earlier recommendations made as part of the Elgin/Richland Northeast (ERNE) Sub-Area Plan were also considered, and were largely ratified as part of this study; exceptions to this have been noted as appropriate. The ERNE Sub-Area Plan espoused an integrated approach to transportation and land use recommendations and that same approach has been adopted for the West Wateree Transportation Study.

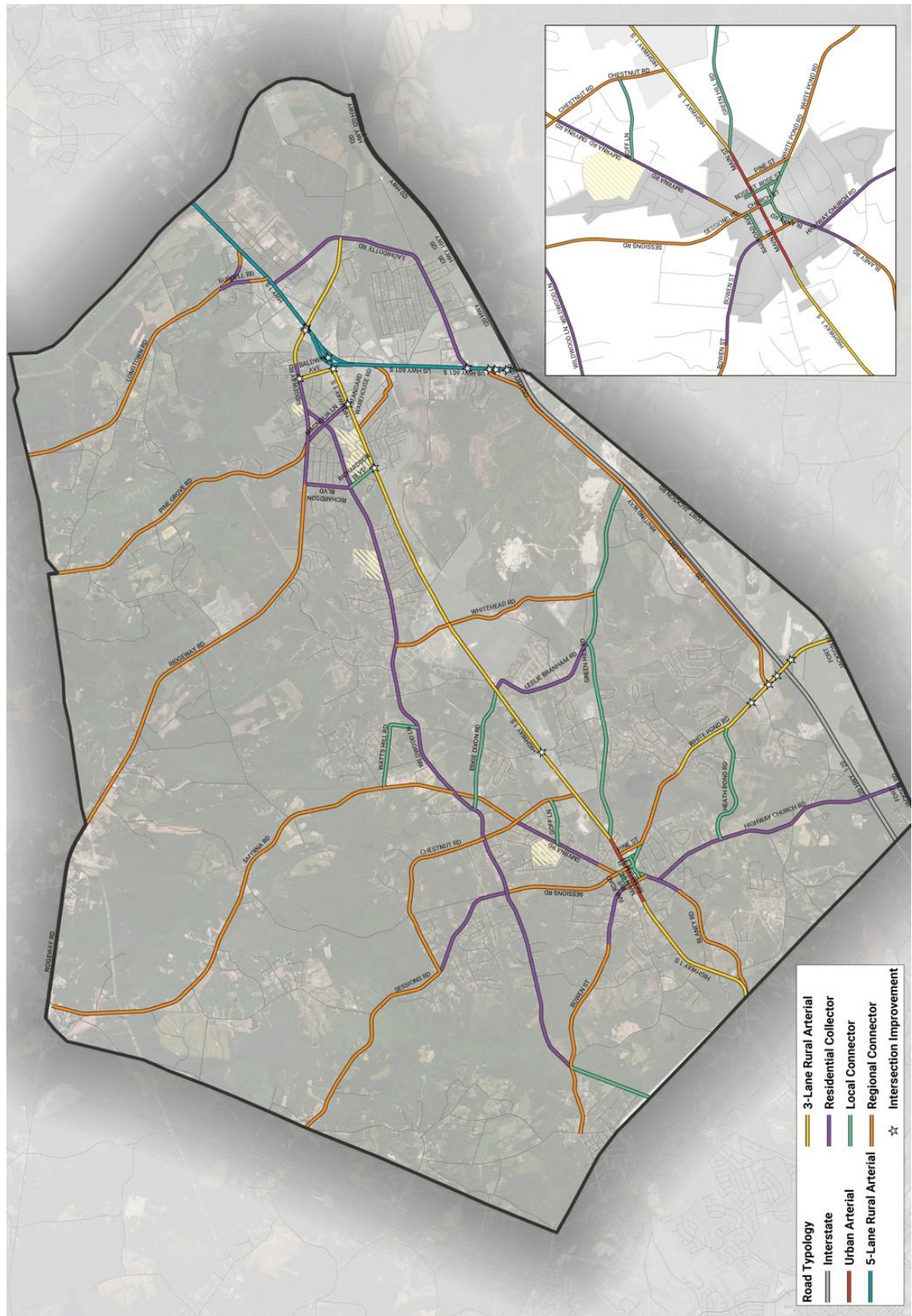
4.1 Street Typologies

To assist in developing roadway corridors that support a unified character for the study area, street typologies have been created and recommended for major roadways throughout West Wateree (see **Figure 4.1-1**). Similar to the roadway character types recommended in the ERNE Sub-Area Plan, these recommended street typologies provide a defined cross section for the infrastructure of the street itself, along with complementary land use controls that support the community's vision for the future of development. In all cases, street typologies have been designed to provide for all modes of travel, but they are not uniform in how this provision is made; context sensitivity was applied based on the existing and desired long-term character of the immediate surroundings. Although the street typologies have only been recommended for major roadways within the study area, specified multimodal treatments may be appropriate for other roads within West Wateree based upon future development or community desires. The following sections provide a description of each street typology along with associated land use controls.¹

¹ It is important to realize that recommendations to amend existing or create new land use regulations may require action by more than one jurisdiction. Additionally, changes to Kershaw County's land use regulations may not only affect the West Wateree study area but the entire County as a whole. Therefore, changes to land use regulations may require a larger, more comprehensive approach through a County-wide initiative.



Figure 4.1-1 | Street Typologies





Urban Arterial

Urban Arterial streets are located in the traditional downtown environment. They carry a moderate to high volume of vehicles at lower speeds, while providing safe, comfortable, and convenient facilities for those choosing to walk or ride a bike. The Urban Arterial is recommended in only one location in West Wateree, along Main Street (US 1) in Elgin from Surrey Lane to Green Hill Road.

Figure 4.1-2 presents the proposed cross section for the Urban Arterial. This is similar to the Urban Arterial cross section recommended in the ERNE Sub-Area Plan with one exception – the ERNE Sub-Area Plan recommended a five-lane cross section, while the current recommendation is for a three-lane cross section. In 2010, when the ERNE Sub-Area Plan was completed, projected traffic appeared to support a five-lane cross section; however, analysis performed as part of the West Wateree Transportation Study indicates that a three-lane cross section with targeted intersection improvements will meet the needs of future travel demand. Should traffic demand increase at a higher growth rate than anticipated, a five-lane cross section could be reconsidered; however, with limited resources available to implement recommendations, proper stewardship of those resources is critical.

The Urban Arterial provides a context sensitive, multimodal solution, complete with the following features:

- Two travel lanes (i.e., one in each direction). It is recommended that lanes be 11 feet wide to encourage slower vehicular speeds.
- Continuous center turn lane that can serve as a landscaped median where appropriate.
- Six-foot dedicated bicycle lane in each direction.
- Closed drainage with concrete curb and gutter.
- Ten-foot sidewalks with pedestrian scale decorative lighting, landscaping, and street furniture, as appropriate.
- Posted speed limit of 30 mph; design speed of 40 mph.

A zoning overlay district should accompany the Urban Arterial street typology.² The ERNE Sub-Area Plan stated, “To achieve walkability and bikeability, the overlay district should encourage denser development with a mix of uses in close proximity to one

² An overlay district places additional requirements on or may relax existing requirements to the underlying zoning district. An overlay district is not a separate zoning classification; rather, it superimposes regulations on an area that is already zoned. Applying an overlay district to a transportation corridor to achieve a desired development character is a common practice throughout the state of South Carolina and the United States as a whole.



another. This will be especially important along Main Street [in Elgin] where a vibrant, walkable, 24-hour, 7-day-a-week downtown identity is desired. Additional requirements of the overlay district could include signage regulations, landscaping requirements, architectural design guidelines, and maximum setback or build-to standards.”³ The West Wateree Transportation Study ratifies this recommendation for the Urban Arterial street typology.

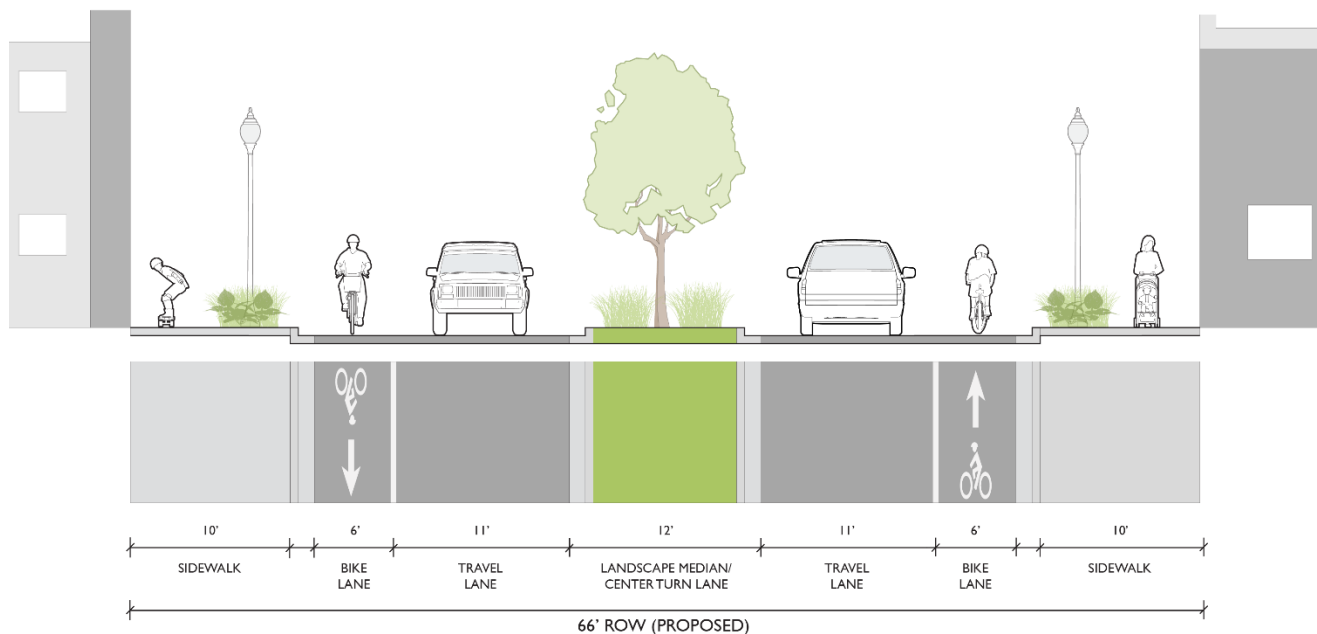


Figure 4.1-2 | Urban Arterial Cross Section

Rural Arterial

Rural Arterial streets serve longer trips, have higher posted speed limits, and experience some of the highest traffic volumes in the study area. Similar to the Rural Arterial road character type recommended in the ERNE Sub-Area Plan, this Rural Arterial street typology has been applied to streets that are expected to have increased traffic demand in the future. Depending on the severity of that anticipated increased traffic, either a three-lane or five-lane cross section has been applied.

The Rural Arterial typology is designed to move vehicular traffic between destinations while retaining a rural character. These corridors are not viewed as principle bicycle

³ Elgin/Richland Northeast Sub-Area Plan, CMCOC, 2010.



and pedestrian streets, but wide outside lanes provide some degree of refuge for bikers and walkers that must use these streets for transportation purposes.

The Three-Lane Rural Arterial street typology is depicted in **Figure 4.1-3** and is comprised of the following:

- Two 14-foot travel lanes (i.e., one in each direction).
- Continuous 15-foot grass median dividing opposing travel lanes that can serve as a targeted center turn lane where appropriate.
- Open drainage.
- Posted speed limit of 40-45 mph (i.e., depending on context); design speed of 50-55 mph.

The Five-Lane Rural Arterial is shown in **Figure 4.1-4** and has the following features:

- Four travel lanes (i.e., two in each direction). The inside travel lanes are recommended to be 11 to 12 feet in width, while the outside travel lanes would be 14 feet wide.
- Continuous 15-foot grass median dividing opposing travel lanes that can serve as a targeted center turn lane where appropriate.
- Open drainage.
- Posted speed limit of 45-55 mph (i.e., depending on context); design speed of 55-60 mph.

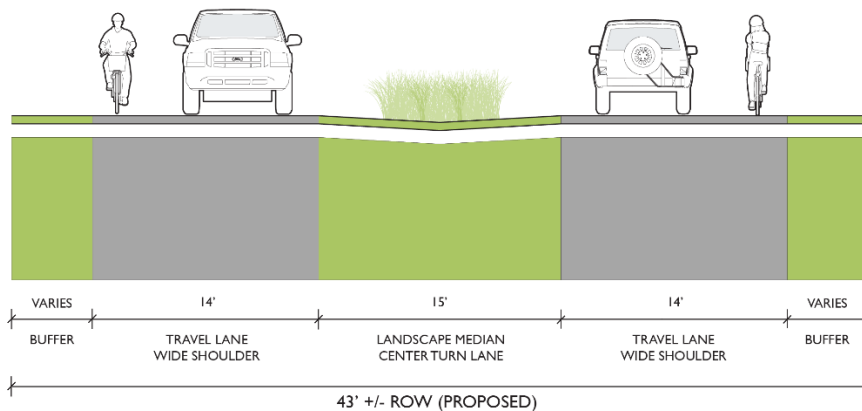


Figure 4.1-3 | Three-Lane Rural Arterial Cross Section

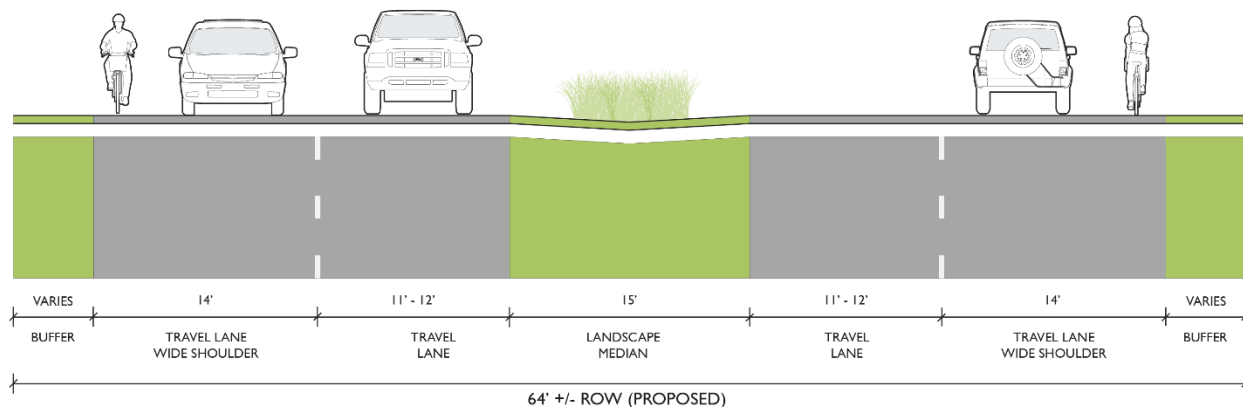


Figure 4.1-4 | Five-Lane Rural Arterial Cross Section

The West Wateree Transportation Study supports the land use regulations recommended in the ERNE Sub-Area Plan for Rural Arterials. That plan stated, “Along Rural Arterials development controls should be considered to limit the size and scale of development. The desire of the community is to keep these areas from becoming an extension of the big-box retail seen along Two Notch Road in Northeast Columbia. Regulations should focus on providing opportunities for pockets of commercial development on interconnected parcels so as to efficiently limit the number and frequency of access points (i.e., curb cuts) to/from [Rural Arterials]. Other regulations that should be incorporated include frontage improvement standards (e.g., trails, landscaping, etc.), buffer yards between incompatible land uses, and dedicated open space requirements to encourage a level of rural conservation.”⁴

⁴ Elgin/Richland Northeast Sub-Area Plan, CMCOG, 2010.



Residential Collector

The Residential Collector was a roadway character type introduced in the ERNE Sub-Area Plan to provide streets that support residential land uses by collecting traffic from neighborhoods and connecting them to higher volume roads. These streets would provide both property access and traffic circulation, have lower speeds, and provide a high degree of comfort for bicyclists and pedestrians through the use of separated active transportation facilities. The Residential Collector has been adopted as one of the recommended street typologies for the West Wateree Transportation Study and has been applied to additional streets throughout the study area.

The ERNE Sub-Area Plan cross section for the Residential Collector has been refined slightly based on current best practices and is depicted in **Figure 4.1-5**. Major components include the following:

- Two 11- to 12-foot travel lanes (i.e., one in each direction).
- Continuous landscaped median that can serve as a targeted left-turn lane, when needed.
- Closed drainage with concrete curb and gutter.
- Landscaped buffer behind curb on both sides of the street.
- Twelve-foot shared-use path for bicycle and pedestrian travel on one side of the street and a five-foot sidewalk on the opposite side of the street.
- Posted speed limit of 35-40 mph; design speed of 45-50 mph.

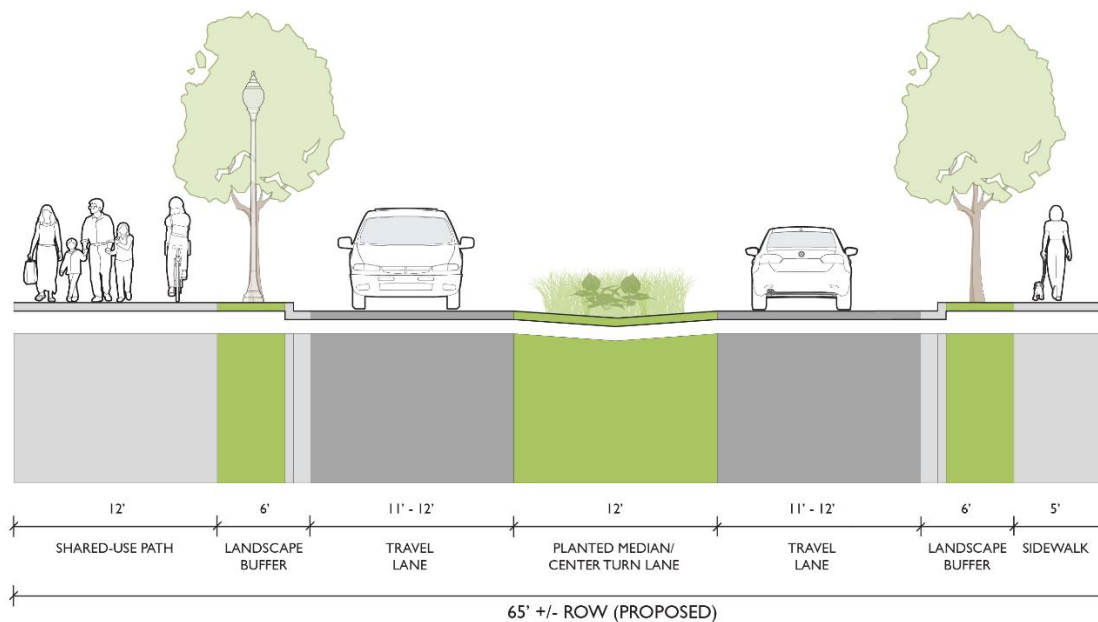


Figure 4.1-5 | Residential Collector Cross Section



With regard to development controls along Residential Collectors, the ERNE Sub-Area Plan provided guidance that the West Wateree Transportation Study fully supports. “It is of paramount importance that overlay districts be put in place to limit the type, size, and scale of development along Residential Collector corridors. Without such, these scenic corridors will quickly devolve into big-box, strip shopping center type development, as they will be in close proximity to the “rooftops” that commercial developers crave. This is not to say that some level of limited commercial is not appropriate; however, larger commercial developments should be directed to the primary arterial system. Pockets of neighborhood commercial (e.g., pharmacies, convenience stores, etc.) uses should be allowed at major intersections along the corridors, but the “spilling out” of this development to the entire corridor should be discouraged. Additionally, performance standards should be adopted that will create a partnership between local governments and developers. Such should include frontage improvement standards that would require developers to assist in the realization of the landscaping, sidewalk, and pathway components of the Residential Collector cross section.”⁵

⁵ Elgin/Richland Northeast Sub-Area Plan, CMCOG, 2010.



Local Connector

To assist in offering quality connections for both vehicular traffic and active transportation, two new “connector” street typologies are recommended. The first is the Local Connector. As its name implies, the primary purpose of these streets is to provide connectivity to more localized trips. These are shorter segments of roads that are currently not only uncomfortable for walking and biking, but, in many cases, dangerous for non-motorized modes. Local Connectors have lower speeds, experience moderate traffic volumes, provide key connections that enhance the local network, and have appropriate active transportation facilities that make them bicycle and pedestrian friendly.

As depicted in **Figure 4.1-6**, key components of the Local Connector street typology are:

- Two 11- to 12-foot travel lanes (i.e., one in each direction).
- Four-foot dedicated bicycle lane in each direction.
- Open drainage.
- Five-foot sidewalks behind swale buffer on either side of the street.
- Posted speed limit of 35 mph; design speed of 45 mph.

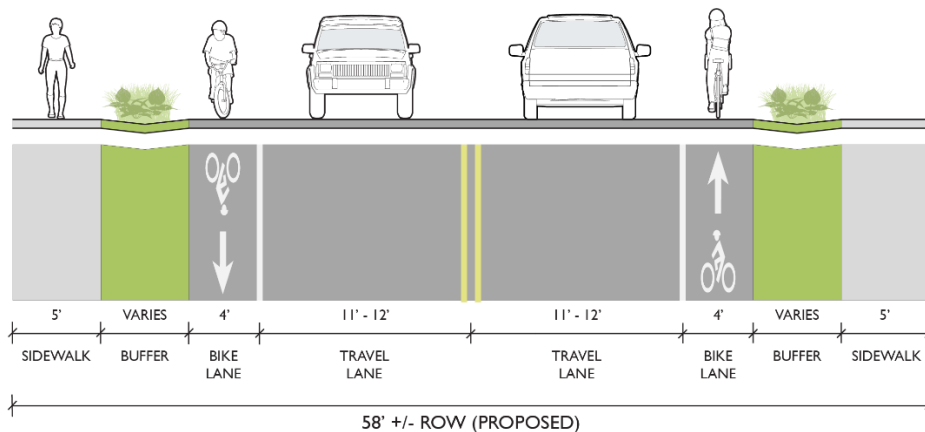


Figure 4.1-6 | Local Connector Cross Section



Regional Connector

The second type of connector is the Regional Connector. As suggested by its name, Regional Connectors provide connectivity over longer trip lengths throughout the study area. This street typology has a more rural character. Rather than having dedicated active transportation facilities, the Regional Connector has a paved and striped shoulder that provides a degree of refuge for walkers and bicyclists. This shoulder also results in additional safety for motorists, as it provides room for correction when inevitable lane departures occur.

As shown in **Figure 4.1-7**, the Regional Connector street typology has the following features:

- Two 12-foot travel lanes (i.e., one in each direction).
- Four-foot paved and striped shoulder on each side of the street.
- Open drainage.
- Posted speed limit of 40-45 mph (i.e., depending on context); design speed of 50-55 mph.

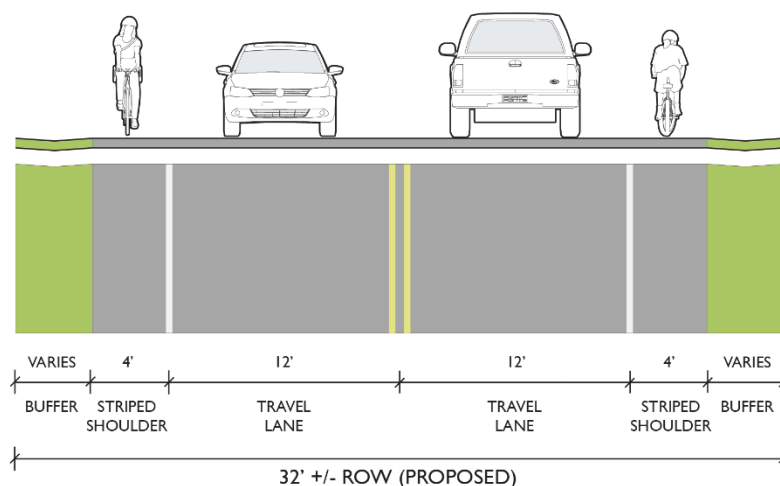


Figure 4.1-7 | Regional Connector Cross Section



4.2 Active Transportation

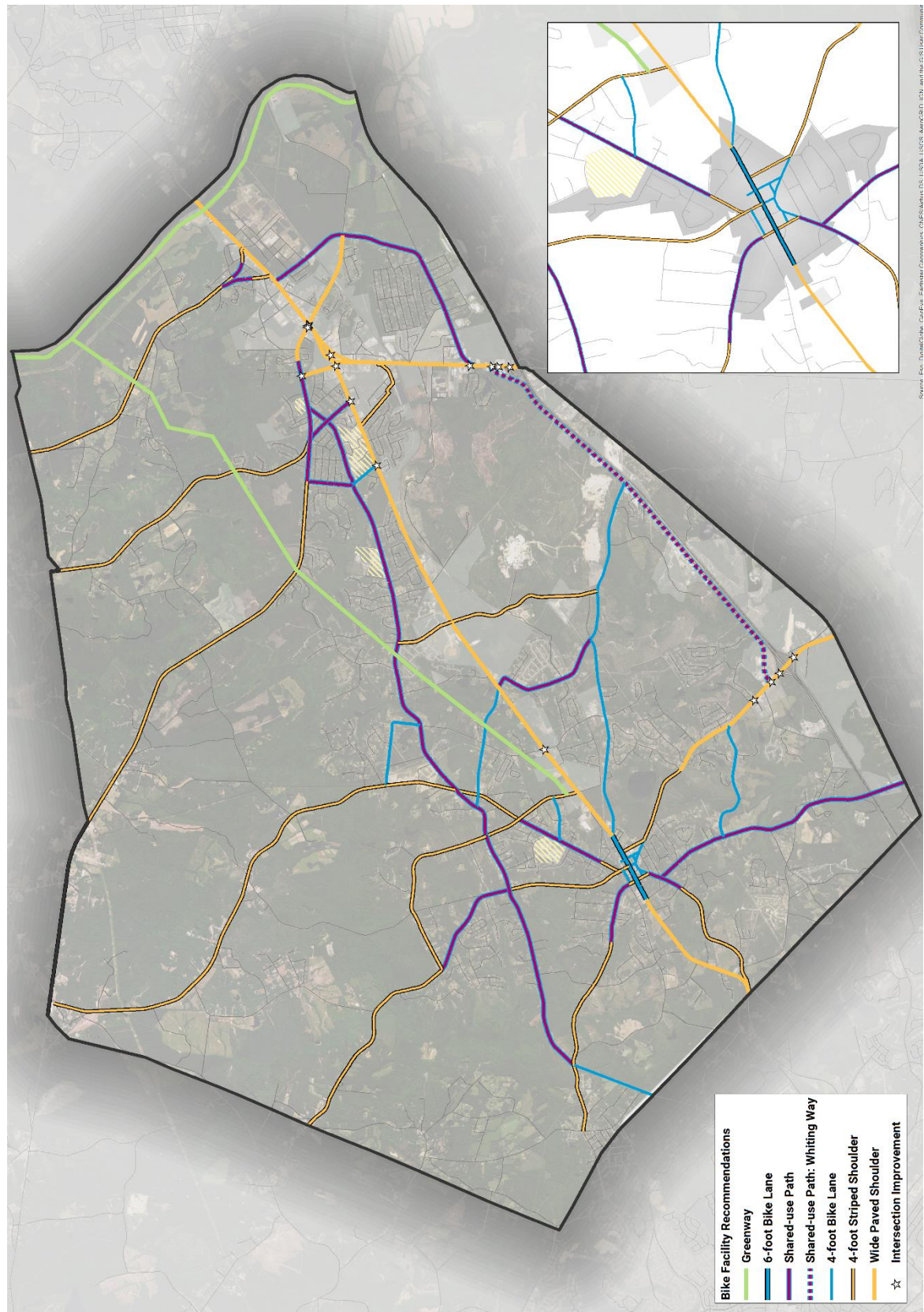
To truly provide a comprehensive transportation system in West Wateree, it is essential to go beyond just addressing the needs of motorists. Many people in the study area walk and bicycle on a regular basis, either because these are their only modes of transportation or because they choose to walk and bike. Providing safe, comfortable, and convenient non-motorized facilities will improve the quality of life of the study area and the health of citizens.

Active Transportation Network

Figure 4.2-1 presents the recommended active transportation network. This network directly correlates to the street typologies that were presented in the previous section of this technical memorandum. For specifics regarding the physical design of these facilities, please reference the street typology cross sections previously presented. Through a unified network of bicycle and pedestrian facilities, key origins and destinations will be connected. People can choose to walk or bike for transportation and/or recreation.



Figure 4.2-1 | Active Transportation Network





Active Transportation Countermeasures

While creating an active transportation network is important, providing a safe environment for pedestrians and bicyclists is often contingent on the smaller details rather than the broader vision. Non-motorized users are more vulnerable in the transportation environment, and in the event of a crash suffer far greater injuries. Therefore, the following countermeasures are recommended to be applied throughout the study area. Careful review should be given to individual applications to ensure that the most appropriate countermeasures are employed and in the correct context.

- **Buffers:** Both bicyclist and pedestrian safety and comfort in the roadway environment is significantly affected by the width and quality of the buffer between non-motorized facilities and vehicular travel lanes. Buffers such as medians, on-street parking, street trees, bike racks, landscaping, and painted buffers can enhance the active transportation experience by providing some level of separation for pedestrians and bicyclists from vehicular travel lanes. In contrast, when sidewalks are placed directly behind curbs or bicyclists must ride in the same lane as cars, comfort and safety are dramatically reduced.
- **Bicycle Friendly Rumble Strips:** While popular on rural roads for vehicular safety, rumble strips create hazards for people riding bikes. When rumble strips are necessary, their design and placement are critical to safe bicycle travel. If rumble strips consume the entirety of the shoulder, or leave little to no shoulder passable, bicyclists are forced to ride in the travel lane, increasing the potential for automobile/bicycle conflicts. Additionally, periodic breaks in the rumble strips allow bicyclists to enter and exit the shoulder area when needed.
- **Crosswalks:** Crosswalk markings are used to alert motorists to locations where they should expect pedestrians and to identify a designated crossing location for pedestrians. Enhanced crosswalks with broader stripes are recommended for higher visibility. In more urban environments, some type of texture, color, and/or patterns in the crosswalk can contribute to visibility and the urban design character of the area.
- **Curb Ramps:** ADA-compliant curb ramps between grade changes ensure the pedestrian network is accessible for all users, including those utilizing wheelchairs, mobility scooters, or rollators (i.e., wheeled walkers), and creates a more useful network for pedestrians traveling with strollers or carts.
- **Pedestrian Crossing Islands:** In locations with longer crossing distances (i.e., more than two lanes) and/or higher vehicle speeds, pedestrian crossing islands benefit pedestrians by providing a refuge. In particular, pedestrian



crossing islands have been shown to increase safety for pedestrians crossing multi-lane roadways at un-signalized crossings.

- **Curb Extensions:** Curb extensions (i.e., or curb bump outs) shorten the distance pedestrians and bicyclists must cross, while at the same time increasing their visibility to motorists. By narrowing the curb-to-curb width of a roadway, curb extensions help reduce motor vehicle speeds and improve pedestrian and bicycle safety.
- **Pedestrian Signals:** Actuated pedestrian countdown signals provide a clear indication of when to walk and not walk, as well as knowledge of how much time is left to cross the street. All signalized intersections should have pedestrian countdown signals. In more rural areas, push button actuation of the signals may be appropriate, but in urban environments, where pedestrian travel is more frequent, signals should be automatically timed with the traffic signals.
- **Signal Timing:** It is essential to provide signals that are phased and timed to allow bicyclists and pedestrians of all abilities to cross the roadway, including those who are typically slower (e.g., children, senior citizens, people with limited mobility). At the same time, signal delay must be minimized in order to reduce the amount of illegal and unsafe crossing that occurs when bicyclists and pedestrians get impatient waiting for the signal to change.

4.3 Intersection Improvements

To meet the transportation demands of the study area, a number of intersection improvements have been identified. These include minor improvements, like adding a simple turn lane, to broader, more comprehensive improvements. The following sections outline recommended intersection improvements.

ERNE Sub-Area Plan Intersection Improvements

The ERNE Sub-Area Plan recommended improvements for 14 intersections that are included in the study area for the West Wateree Transportation Study. Based on the analyses conducted as part of the West Wateree Transportation Study, these recommendations remain valid and should still be pursued.⁶

⁶ For detailed information regarding these intersection recommendations, please see Section 4.3 of the Elgin/Northeast Richland Sub-Area Plan.



White Pond Road/I-20

The off-ramps of I-20 at White Pond Road are currently stop sign controlled. The westbound off-ramp of I-20 is experiencing delays due to left-turning vehicles queuing down the ramp and blocking right-turning vehicles from proceeding. Installation of a dedicated left-turn lane on this ramp is recommended in the near-term (i.e., 0-2 years). This recommendation is shown graphically in **Figure 4.3-1**.



Figure 4.3-1 | Near-term Proposed Improvements for White Pond Road/I-20

The functionality of the on- and off-ramps for eastbound and westbound I-20 will diminish in the future. While these two intersections at this interchange will most likely meet signal warrants in the future, a dual roundabout, as depicted in **Figure 4.3-2**, may function better than signals, as the roundabouts would allow all movements to continuously flow, reducing delay. Roundabouts would be especially appropriate if the nearby intersection of White Pond Road and Whiting Way is signalized in the future. While the dual roundabouts are being recommended for the long-term (i.e., 10-20 years), a more comprehensive analysis of this interchange should be performed prior to this long-term improvement being pursued.



Figure 4.3-2 | Long-term Proposed Improvements for White Pond Road/I-20

White Pond Road/Whiting Way

The intersection of White Pond Road at Whiting Way was addressed in the ERNE Sub-Area Plan and it was recommended that a left-turn lane be installed on White Pond Road to keep through-traffic from being delayed behind queuing left-turning traffic onto Whiting Way. This was a near-term (i.e., 0-2 years) recommendation made in 2010, but it has not yet been implemented. Left-turns at this location have only increased in the last seven years and the West Wateree Transportation Study also recommends that a left-turn lane be added to White Pond Road at its intersection with Whiting Way. This is not a complex or expensive solution and it should be implemented as soon as possible. **Figure 4.3-3** depicts this recommendation graphically.

The ERNE Sub-Area Plan also recommended a more robust solution in the long-term (i.e., 10-20 years), including signalization, widening of White Pond Road, paved shoulders, crosswalks, and pedestrian signals. For the West Wateree Transportation Study, a conceptual design was developed for these improvements (see **Figure 4.3-4**), which helped in refining them further. Access management has been included to prevent dangerous, conflicting turning movements to/from adjacent properties in close proximity to the intersection. These improvements could be implemented independently, or as part of the conversion of White Pond Road to a Three-Lane Rural Arterial, but should occur in the mid-term (i.e., 5-10 years).



Figure 4.3-3 | Near-term Proposed Improvements for White Pond Road/Whiting Way



Figure 4.3-3 | Mid-term Proposed Improvements for White Pond Road/Whiting Way



White Pond Road/Haigs Creek Drive

Haigs Creek Drive is the principle access point to the Haigs Creek subdivision (i.e., Ole Still Lane provides secondary access to Whiting Way). During peak periods, it can be difficult to make left turns onto White Pond Road from Haigs Creek Drive; additionally, right- and left-turning traffic from White Pond Road onto Haigs Creek Drive causes congestion issues on White Pond Road in the morning and evening peaks. With the addition of more homes in this neighborhood, these issues will only be exacerbated.

As part of the most recent phase of the subdivision, the developer is installing a northbound right-turn lane on White Pond Road and a westbound right-turn lane on Haigs Creek Drive. In addition, it is recommended that a center turn lane be added to White Pond Road as part of its conversion to a Three-Lane Rural Arterial and that the southernmost driveway of the gas station be closed to prevent overlapping left turns. The gas station would continue to have access through its northern driveway on White Pond Road and via Kirkland Circle. These improvements are depicted in **Figure 4.3-5**.



Figure 4.3-5 | Proposed Improvement for White Pond Road/Haigs Creek Drive



US 1/Watts Hill Road

In the future, the intersection of US 1 and Watts Hill Road is projected to meet signal warrants. However, with the skewed nature of the intersection, sight lines already prove challenging. Therefore, it is recommended that this intersection be converted into a rural roundabout in the long-term (i.e., 10-20 years) to increase safety and reduce delay. Additional analysis should be performed and SCDOT standards and guidelines would need to be followed for the design, including lighting, signing, and pavement marking requirements. **Figure 4.3-6** depicts the roundabout, complete with a truck apron to accommodate larger vehicles.



Figure 4.3-6 | Proposed Improvement for US 1/Watts Hill Road



US 1/Richardson Boulevard

Richardson Boulevard is the principle connection between US 1 and Lugoff-Elgin High School. This intersection has already been improved with left-turn lanes on both US 1 and Richardson Boulevard. To further improve traffic flow on US 1, a southbound right-turn lane on US 1 is recommended for the short-term (i.e., 2-5 years) (see **Figure 4.3-7**).



Figure 4.3-7 | Proposed Improvement for US 1/Richardson Boulevard



US 1/Magnolia Lane

Magnolia Lane provides connectivity to the residential area surrounding Lugoff-Elgin High School and serves as a secondary connection to the high school itself. A right-turn lane is recommended on southbound US 1. Additionally, the center turn lane that already exists south of this intersection should be extended up to Magnolia Lane to serve as a dedicated left-turn lane for northbound US 1 traffic. While relatively inexpensive, both improvements would provide additional relief to congestion surrounding the high school and should be implemented in the short-term (i.e., 2-5 years).



Figure 4.3-8 | Proposed Improvements for US 1/Magnolia Lane

US 1/US 601/SC 34

The intersection of US 1, US 601, and SC 34 is a major crossroads for motorized traffic in West Wateree. It is also a crossroads for non-motorized travelers as well. Currently, the intersection is designed relatively well for moving vehicles at high speeds, but there are some improvements that can be made to reduce delay and improve the flow of traffic while actually slowing speeds. A comprehensive intersection improvement project is recommended in the long-term (i.e., 10-20 years) and is shown in **Figure 4.3-9**.



Several geometric improvements are recommended. Channelizing the left-turn lanes on US 1/US 601 and shifting them toward the center of the intersection will better align them, resulting in improved sight lines and less potential for crashes. Another geometric improvement is the reduction of the turning radii of the free-flow right-turn lane from southbound US 1/US 601 to westbound SC 34. Currently, vehicles can make this turn at high speeds; with no receiving lane on SC 34, this presents a crash potential with through-traffic from Ward Road. Slowing this traffic would also better protect pedestrians crossing SC 34.

A new right-turn lane is recommended on eastbound SC 34. Presently, the through and left-turning queue length is often quite long, preventing right-turning traffic from reaching the free-flow right at the intersection. To accomplish this new right-turn lane, the easternmost driveway at Shoney's would need to be closed, but additional driveway access to this property is available on both SC 34 and US 1/US 601.

The previously mentioned channelization of the left-turn lanes on US 1/US 601 allows for the provision of pedestrian refuge areas at a relative midpoint in the intersection. Further pedestrian improvements include sidewalks in proximity to the intersection, crosswalks, refuge islands, and pedestrian countdown signals.



Figure 4.3-9 | Proposed Improvements for US 1/US 601/SC 34



US 1/US 601/ Townlee Lane

The intersection of US 1, US 601, and Townlee Lane presents a number of safety concerns. To address these issues, several recommendations are discussed below and graphically presented in **Figure 4.3-10**.

Traffic traveling northbound on US 601 must merge with US 1 traffic directly at the intersection. To accomplish this, US 601 through-traffic must accelerate to meet the speed of continuous US 1 traffic. At the same time, motorists wishing to turn right onto Townlee Lane are braking to make the turn. Accelerating traffic on US 601 combined with slowing traffic turning onto Townlee Lane results in conditions that increase the potential for rear-end collisions. To assist in remedying this, a right-turn lane is proposed to allow turning traffic to move out of the flow of traffic. Additionally, it is recommended that the US 601 merge lane be extended through the intersection to allow additional time for traffic to merge; this would also allow right-turning traffic from Townlee Lane onto US 1/US 601 to safely merge into through-traffic.

Left-turning traffic to/from US 1/US 601 is also of concern. The small break in the median on US 1/US 601 does not provide adequate space for opposing left-turning vehicles. There is no left-turn lane from southbound US 1/US 601 to Townlee Lane, so drivers wanting to make this turn must sit in the small median break to wait for an opportunity to cross the northbound lanes. Similarly, left-turning traffic from Townlee Lane often needs to utilize the median break as a refuge while waiting to merge into southbound traffic on US 1/US 601. It is recommended that the median break be expanded and a left-turn lane and acceleration lane be added to southbound US 1/US 601. Additionally, a short, designated left-turn lane on Townlee Lane will help to further formalize this intersection.

US 601/Lachicotte Road

Along its entire length between I-20 and US 1, US 601 has numerous modal conflict points that increase the risk of crashes. Side streets have been connected into US 601 in a haphazard manner, sacrificing good geometric design for expediency. In addition, where streets do intersect, they are rarely aligned with streets on the opposite side of the highway and have been designed to maintain high speeds, even though the side streets themselves are not design for or intended to have high speeds.

Therefore, several improvements are recommended along US 601. The first of these is with regard to US 601's intersection with Lachicotte Road. Presently, interstate-style slip lanes are used to move traffic between US 601 and Lachicotte Road. This results in dangerous crossover movements at high speeds. It is recommended that Lachicotte Road be relocated to intersect US 601 across from Fredricksburg Road, forming a 90-degree intersection that would be signalized (see **Figure 4.3-11**). A byproduct of this relocation would be the creation of a new developable parcel at the intersection.



Figure 4.3-10 | Proposed Improvements for US 1/US 601/Townlee Lane



Figure 4.3-11 | Proposed Improvement for US 601/Lachicotte Road



US 601/I-20/Whiting Way

Another area on US 601 that could benefit from additional organization and access management, is between Whiting Way and Exit 92 of I-20. With hotels, gas stations, travel plazas, and fast food restaurants, this exit is a popular stop for travelers, including tractor trailer truck drivers. It is also an area that experiences some of the highest number of crashes in West Wateree, and was identified as a problem intersection by several community members as part of public participation.

Several improvements are proposed for this stretch of US 601, as depicted in **Figure 4.3-12**. To begin, the I-20 westbound on-ramp and eastbound off-ramp should be realigned to form an intersection with US 601 that would be signalized. This will allow for dedicated phases for each movement and reduce the potential for crashes. In the vicinity of the Pilot Travel Center, access management improvements would be made to improve safety and reduce congestion; these would include closing the median to prevent left turns. In conjunction with this, a connection would be made from the Pilot Travel Center to the intersection of Whiting Way, which would be signalized. This would allow trucks to exit the Pilot and go to the signalized intersection to make safer left turns. Properties west of US 601 would also be able to access the signalized intersection for left turns via Whiting Way.



Figure 4.3-12 | Proposed Improvements for US 601/I-20/Whiting Way





4.4 New Location Connectors

Beyond improvement of existing facilities, two new location connections were identified that will help to meet travel demand and promote economic development in West Wateree. These are described below.

US 601/US 1 Connector

The intersection of US 601 and US 1 is half interchange (i.e., flyover from southbound US 1/US 601 to southbound US 601) and half at-grade intersection. Three out of four movements have been designed as free-flow movements, but the fourth movement from northbound US 601 to southbound US 1 has been almost forgotten, even though a large demand for this movement exists. This movement is currently accommodated through a small slip lane that exits to the left and squeezes behind a gas station. Then, drivers must make a left turn across US 1, crossing high speed traffic that does not stop. Historical crash data and anecdotal information from the public support the fact that a better solution is needed for drivers wishing to go from northbound US 601 to southbound US 1.

Figure 4.4-1 presents an overview of a new connector road that is recommended. This connector would provide a safer, more organized movement for drivers traveling northbound US 601 to southbound US 1 and from northbound US 1 to southbound US 601. The new connector road would intersect US 601 directly across from Richardson Circle. It would travel to the northwest and intersect US 1 across from Truesdale Avenue. Each of these would be signalized intersections.

Figure 4.4-2 and **Figure 4.4-3** provide greater detail of the connector road's intersection with US 601 and US 1 respectively. The connector road was modeled for future traffic conditions and each intersection performs at a level of service of A or B in both the afternoon and evening peak periods.

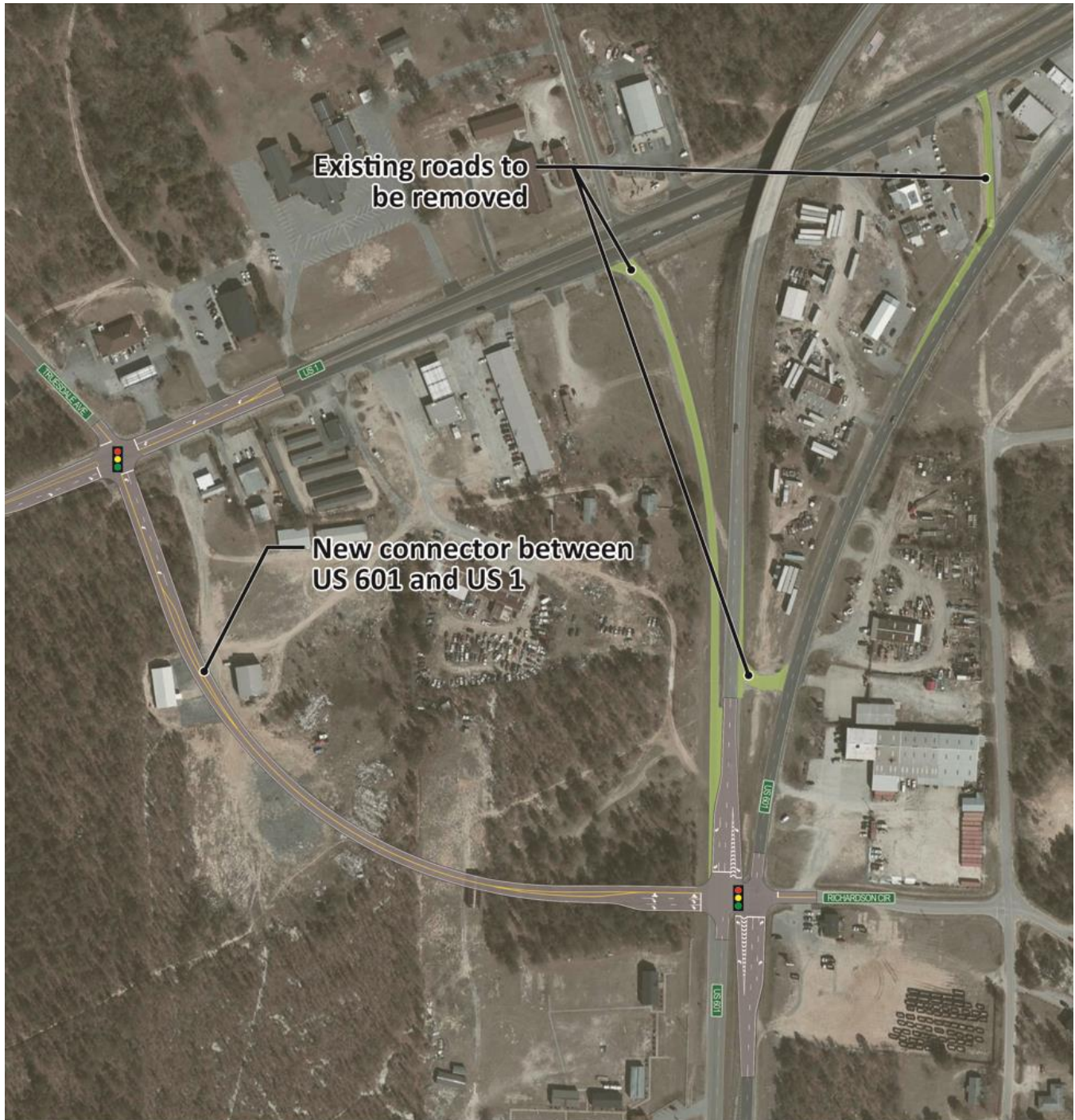


Figure 4.4-1 | Proposed US 601/US 1 Connector



Figure 4.4-2 | US 601/US 1 Connector Intersection with US 601



Figure 4.4-3 | US 601/US 1 Connector Intersection with US 1

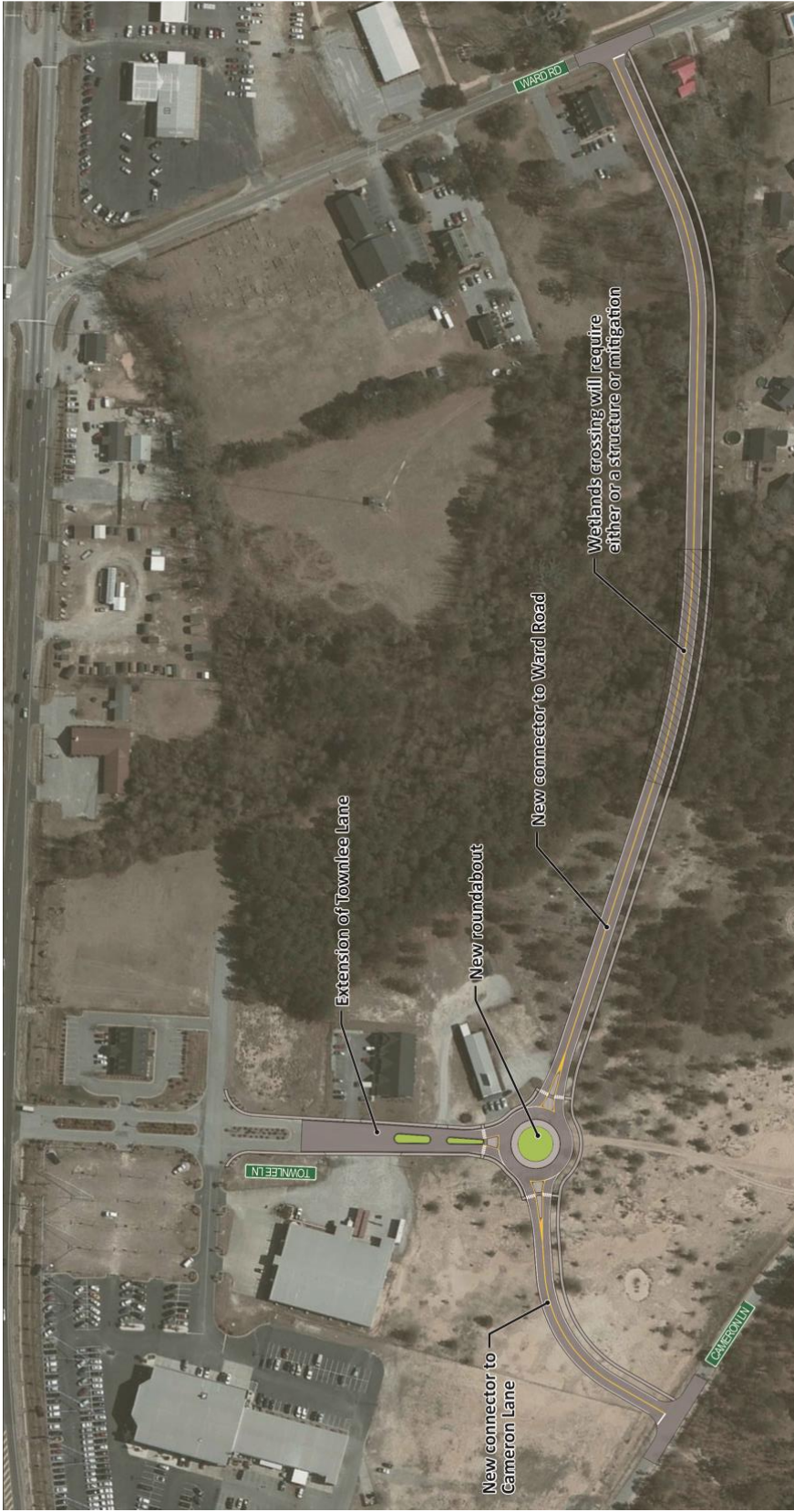


Townlee Lane Connectors

Townlee Lane is currently a dead-end boulevard street that provides access to an automobile dealership and office buildings. Kershaw County is considering this area for economic development opportunities and desires to provide greater connectivity through the site. To facilitate this, it is recommended that Townlee Lane be extended and two connectors be built, one to Ward Road and the other to Cameron Lane (see **Figure 4.4-4**). All three streets would meet at a new roundabout. The connection to Ward Road would provide access to the signalized intersection at US 1 and SC 34, while the connection to Cameron Lane would provide ultimate access to the new signalized intersection with US 601 and the previously recommended US 601/US 1 Connector. The connection to Ward Road would traverse wetlands, so either a structure or mitigation would be needed.

It should be noted that it is doubtful that SCDOT would take ownership of these new streets. Further, because they are mainly driven by economic development desires, rather than transportation needs, these connectors would most likely be less competitive for federal funding. For these reasons, it is recommended that Kershaw County pursue the Townlee Lane Connectors as a local project. The County's C Funds (i.e., portion of the state gas tax that is controlled by the County Transportation Committee (CTC)) would be one method for financing these improvements. This would also result in a faster design and construction process. All property needed for the Townlee Lane Connectors is owned by a single property owner who has indicated that they support the recommended project.

Figure 4.4-4 | Proposed Townlee Lane Connectors





4.5 Transit Recommendations

No transit improvements are recommended as part of the West Wateree Transportation Study. However, it is recommended that a Transit Feasibility Study be completed for Kershaw County as a whole. Through the public participation process for this study, it was apparent that the public desires transit. Additionally, in discussions with the SWRTA, there is an interest by SWRTA to provide route-based service in Kershaw County, if it is needed. The demand analysis that was conducted for active transportation produced a heat map (see Section 3.2 of this document) that could be used as a starting point for discussions of where transit routes may be supported by demand.



5. Implementation

The West Wateree Transportation Study is a critical step in advancing a more connected, safe, and efficient multimodal transportation network in the West Wateree area of Kershaw County. However, the process which crafted this document is only the beginning; the conversation must continue and lead to real projects being implemented.

While completing this study was important and necessary, implementation of recommendations identified in this document is the real desired outcome of the West Wateree Transportation Study. To this end, a framework for implementation has been devised and is presented on the pages that follow. Like the Elgin/Richland Northeast Sub-Area Plan that proceeded it, the implementation strategy for the West Wateree Transportation Study provides:

- Understanding of the purpose and place of the West Wateree Transportation Study in the overall planning, design, and implementation process;
- Guidance on the role and responsibility of local governments in helping to make recommendations a reality; and
- Action Plan summarizing recommendations, anticipated implementation period, order-of-magnitude opinions of probable cost, potential responsible parties, and general notes regarding implementation.



5.1 Role of the West Wateree Transportation Study

The West Wateree Transportation Study is classified as a sub-area plan, a product that fulfills a critical role in the overall transportation planning process. It is important to recognize the merits and limitations of the sub-area planning process to appropriately understand the next steps that must be taken to achieve the recommendations of this plan.

Relationship to the Project Delivery Process

Metropolitan Planning Organizations (MPOs) are mandated by the federal government to oversee transportation policy and planning for urbanized areas with populations greater than 50,000.⁷ The Central Midlands Council of Governments (CMCOG), serving as the Columbia Area Transportation Study (COATS), is the designated MPO for the Columbia region, which includes the West Wateree portion of Kershaw County. The MPO project delivery process is composed of three basic elements⁸:



- The **Long Range Transportation Plan (LRTP)** identifies critical transportation needs of the region over a 20-30 year period and establishes a broad vision for meeting these needs. Potential projects are ranked according to criteria established at the state and/or local level and are financially constrained based on anticipated funding.
- Based on the vision established in the LRTP, more focused planning projects are developed to assist in refining that vision and provide additional details on the nature of future recommendations. These planning projects are executed through the MPO's annual **Unified Planning Work Program (UPWP)**; the West Wateree Transportation Study is one of these projects. Upon adoption, recommendations from the West Wateree Transportation Study will cycle back into the LRTP for competitive ranking against the other projects already included in the LRTP; in this regard, there is a cyclical and symbiotic relationship between the LRTP and the UPWP.
- Projects that have actual federal funding assigned to them are included in the **Transportation Improvement Program (TIP)**. The TIP is predominately composed of projects that make their way onto the LRTP's fiscally constrained lists and then graduate to the TIP once actual funding is allocated; however, some projects are added to the TIP without being on the LRTP, if dedicated federal funding sources are assigned to them. The local TIP

⁷ For more information about MPOs, please visit: <https://www.planning.dot.gov/mpo.asp>.

⁸ For more information on each of these elements, please visit: <http://centralmidlands.org/about/transportation-planning.html>.



becomes part of the larger Statewide Transportation Improvement Program (STIP) for implementation by the South Carolina Department of Transportation (SCDOT). SCDOT will then move projects through its Project Development Process, which includes detailed study and analysis, public participation, environmental documentation, design, permitting, right-of-way acquisition, and construction.⁹

A sub-area plan like the West Wateree Transportation Study is not designed to provide definitive answers to all questions that may arise, but rather is a bridge between the extremely broad nature of the initial analyses conducted as part of the LRTP and the site-specific investigations of an actual design/construction project. The West Wateree Transportation Study can be thought of as a view from 50,000 feet, while the LRTP's view is taken from 100,000 feet and a design/construction project is at "ground level."¹⁰

Competitive Project Prioritization

In 2007, the South Carolina Legislature passed Act 114¹¹ requiring SCDOT to follow a new project selection process. The SCDOT then passed that process down to the MPOs and COGs through its issuance of Engineering Directive 60 (ED-60).

ED-60 established weighted ranking criteria for three categories of project lists:

- Widening;
- Intersection improvement; and
- New-location roadway.

Individual MPOs and COGs may use the standard ranking criteria as established within ED-60 or may develop additional and/or modified criteria for approval by the South Carolina Transportation Commission. Although the widening and new-location roadway lists are statewide compilations, individual projects only compete with similar projects within each respective urban or rural region. The ranking criteria of Act 114 are utilized to develop the widening, intersection, and new-location lists contained in the LRTP. Those projects ranking highest on each of these lists become part of the financially constrained portion of the LRTP and have the greatest opportunity for advancement to the TIP and actual implementation.

⁹ For more information on SCDOT's Project Development Process, please visit:
http://www.scdot.org/doing/road_projects.aspx.

¹⁰ For more information on the federal transportation planning process, please visit:
https://www.fhwa.dot.gov/planning/publications/transportation_decision_making/index.cfm.

¹¹ SC Code of Laws Sections 57-1-370 and 57-1-460.



As mentioned previously, the sub-area planning process is taken from a 50,000-foot vantage. At this level of planning it is challenging to measure the merits of individual recommendations based on the ranking criteria of Act 114 because numerous project details have yet to be considered. However, it is still important to acknowledge that once the recommendations of the West Wateree Transportation Study are adopted, they will most likely find their way into the LRTP and must compete against other projects based on how well they satisfy the various ranking criteria. Kershaw County and the Town of Elgin should begin to determine now methods for bolstering the competitive nature of recommendations coming out of the West Wateree Transportation Study.

Environmental Review Process

Per the National Environmental Policy Act (NEPA) of 1970, all federally funded projects, and those seeking federal permits, must consider impacts to the natural, built, and social environment as part of their project development process.¹² Therefore, any projects that advance from the West Wateree Transportation Study to the LRTP, TIP, and ultimately construction must go through a level of environmental review. The specifics of this review are based on the magnitude of the project, but generally will include consideration of a broad number of areas, including but not limited to wetlands, endangered species, noise, visual quality, environmental justice, and cultural and historic resources.

The type of documentation required is also determined by the type and number of impacts anticipated; the lowest type of documentation is a Categorical Exclusion (CE), next is the Environmental Assessment (EA), and an Environmental Impact Statement (EIS) is the highest form. Not surprisingly, as the complexity of the document increases, the time and resources needed to complete the documentation also increases and this has a direct effect on the budget and implementation schedule of a project.

Based on the 50,000-foot view of the West Wateree Transportation Study, enough detail is not known now to attempt to determine what type of NEPA document would be required for each project, should federal funding or permitting be required. Similarly, the exact impacts of individual recommendations cannot currently be quantified, as recommendations were crafted at a planning level of detail based on the scope and budget constraints of the Study.

What is known is that recommendations included here will be subjected to a more comprehensive review as concepts are taken through the design and environmental

¹² For more information on how NEPA affects the transportation decision-making process, please visit: <https://www.environment.fhwa.dot.gov/projdev/index.asp>.



review processes. Therefore, it should be noted that the recommendations of the West Wateree Transportation Study may experience changes to accommodate the findings of the NEPA process; these changes may be minor or they could significantly alter a recommendation based on issues that cannot be currently assessed in the scope of a sub-area plan document like the West Wateree Transportation Study. Therefore, Kershaw County, the Town of Elgin, property owners, development professionals, and the general public should utilize the West Wateree Transportation Study as the planning document it is intended to be; no guarantees are made or implied.

5.2 Role of Local Governments

Historically, it has been the perspective of local governments that it is SCDOT's responsibility to handle all transportation improvements. However, in recent years it has become apparent that SCDOT's perceived responsibilities far outweigh their available resources. More and more, local communities are realizing that for transportation improvements to keep up with transportation demand, they must become involved in not only the transportation planning process, but implementation as well. Additionally, local governments must adopt land use regulations that support a healthy transportation-land use balance.

To advance the recommendations of this plan, four key points of guidance are offered to Kershaw County and the Town of Elgin. These are by no means exhaustive of the methods available, but rather basic building blocks that will serve as a starting point for ensuring that the West Wateree Transportation Study's recommendations continue to be part of the regional transportation discussion.

- The first and most basic action local governments should take is to continuously educate themselves on the transportation planning process to gain a more complete understanding of how projects are conceived and advanced through local, state, and federal processes. Understanding the individual milestones of project development as outlined in Section 5.1 is essential to being able to influence such projects.
- Next, local government representatives should regularly attend meetings of the COATS Technical Committee, Transportation Subcommittee, and Policy Committee. Kershaw County has seats on each of these committees and should regularly utilize these positions of influence to champion projects important to their constituents. These meetings are open to the public and the Town of Elgin should also regularly attend to keep abreast of current transportation thought in the region and potential projects that may emerge in the immediate and distant future. An additional advantage of attending these meetings is the ability to network with key transportation decision-makers in the region.



- Third, local governments should implement development regulations to support the various transportation recommendations included in this plan. Kershaw County and the Town of Elgin should incorporate the recommendations of the West Wateree Transportation Study into both the land use and transportation elements of their comprehensive plans. The institution of appropriate setbacks along improvement corridors will ensure that adequate right-of-way is available in the future; this will not only reduce conflicts between the built environment and roadway improvements, but will also reduce the purchase price for right-of-way because such will not involve the acquisition/demolition of existing structures. Establishing the land use context along important corridors through zoning overlay districts will assist in achieving desired characters through the control of the type, size, and scale of development. Additionally, putting performance standards in place will shift some of the financial burden for facilities to adjacent developers, as they will construct sidewalks and shared-use paths (or provide fees in lieu) as part of required frontage improvements.
- Finally, Kershaw County and the Town of Elgin should explore methods for funding transportation projects on the local level. This may be as simple as utilizing County-controlled C Funds or completing transportation enhancement projects such as sidewalk improvements or streetscape projects. It could also entail more comprehensive programs like the implementation of a vehicle fee or local option sales tax to finance more complex transportation improvements.



5.3 Action Plan

Table 5.3-3 located at the end of this section presents the Action Plan for implementation of recommended improvements presented in Section 4 of this document. It should be noted that while the majority of the recommendations made in the Elgin/Richland Northeast Sub-Area Plan remain valid, they are not included in the Action Plan for the West Wateree Transportation Study; please refer to the Elgin/Richland Northeast Sub-Area Plan's Action Plan for guidance on the implementation of those projects.

Opinions of Probable Cost

Where applicable, an estimated order-of-magnitude opinion of probable cost is presented for each recommendation in the Action Plan (i.e., detailed opinions of probable cost are included in **Appendix D**); these costs include a 30% contingency. Costs were developed for the recommendations by identifying pay items and establishing rough quantities. Unit costs are based on 2017 dollars and were assigned based on historical cost data from SCDOT and other sources. Please note that the estimates do not include any costs for engineering analysis and design, easement or right-of-way acquisition, or the cost for ongoing maintenance. Also, note that rough costs have been assigned to some general categories such as utility relocations, however these costs can vary widely depending on the exact details and nature of the work. The overall estimates are intended to be general and used for planning purposes. Construction costs will vary based on the ultimate project scope (i.e., potential combination of projects) and economic conditions at the time of construction.

With specific regard to the street typologies discussed in Section 4.1 of this report, costs were developed on a per-mile basis as shown in **Table 5.3-1**. The purpose of the street typologies is to provide a transportation and land use vision for how each of these roads should develop over time if improvements are made, not to suggest that all of these roads should be improved. With street typologies recommended for more than 140 miles of roads in the study area, it would be impractical to program the entire network into the Action Plan. However, as opportunities arise for improvements, Kershaw County and/or SCDOT should follow the recommended typology for that specific road, and can utilize the per-mile costs presented below as a planning tool for estimating costs as street improvements become a reality.

Based on projected demand and public comments, four roadway corridors have been programmed into the Action Plan, as they are anticipated to be needed in the implementation period where they are assigned:

- US 1 from the western boundary of the study area to Green Hill Road;
- US 1 from Green Hill Road to US 601;



- White Pond Road from Fort Jackson Road to Pine Street and Pine Street from White Pond Road to US 1; and
- Whiting Way from White Pond Road to US 601.

Table 5.3-1 | Cost Per Mile by Street Typology

Street Typology	Cost Per Mile
Urban Arterial	\$2,970,000 ^a
Rural Arterial (Three Lane)	\$2,557,000 ^a
Rural Arterial (Five Lane)	\$1,739,000 ^b
Residential Collector	\$3,287,000 ^a
Local Connector	\$2,755,000 ^a
Regional Connector	\$1,365,000 ^a

^a Assumes existing road width consists of 24 feet of pavement.

^b Assumes existing road width consists of 60 feet of pavement.

Implementation Periods

Actions have been categorized by implementation period:

- **Near-term (0-2 years)** – These are actions that should occur immediately. They are critical to establishing early momentum, resolving urgent issues, and setting the foundation for the success of future improvements.
- **Short-term (0-5 years)** – Although not as urgent as near-term recommendations, these improvements are considered “low hanging fruit” or are tied to economic development initiatives. They can be implemented through a variety of means and are not singularly dependent on one source of funding or agency.
- **Mid-term (5-10 years)** – These improvements are not needed immediately. Planning, establishment of support, and identification of funding sources should begin now for these projects so they are on track for implementation within this period.
- **Long-term (10-20 years)** – Long-term projects are part of a vision to meet the needs of the design year 2040. These improvements will require a level of planning and funding that must be formulated over a number of years. Additionally, these projects will most likely be accomplished using funding sources that require a competitive ranking process.



Although implementation periods have been established, these designations are for planning purposes only; actions should be implemented as soon as opportunities arise. For example, if circumstances provide an opportunity to complete a mid-term project two years after the West Wateree Transportation Study is adopted, the improvement should be made, regardless of its designation as “mid-term.”

Capital Cost Breakdown

Breakdown of capital cost by implementation period and project type are presented in **Table 5.3-2**.

Table 5.3-2 | Capital Cost by Implementation Period and Project Type

Project Type	Implementation Period				Total Capital Costs
	Near-term (0-2 years)	Short-term (0-5 years)	Mid-term (5-10 years)	Long-term (10-20 years)	
Planning Studies	\$100,000	\$0	\$0	\$0	\$100,000
Widening	\$0	\$0	\$15,301,000	\$24,065,000	\$39,366,000
Intersection/Safety	\$861,000	\$1,159,000	\$4,338,000	\$8,676,000	\$15,034,000
New Location	\$0	\$4,944,000	\$1,446,000	\$0	\$6,390,000
TOTAL	\$961,000	\$6,103,000	\$21,085,000	\$32,741,000	\$60,890,000



Table 5.3-3 | Action Plan

Recommended Action	Estimated Cost ^a	Potential Responsible Parties	Notes
Near-term (0-2 years) \$961,000			
Overlay zoning districts for street typologies	n/a	Kershaw County; Town of Elgin; CMCOG	<ul style="list-style-type: none"> Overlay districts will be critical to achieving the desired characters along each of the street typologies Institution of setbacks at intersections and along streets will ensure right-of-way preservation Coordination with affected property owners will be necessary May require assistance from CMCOG or consultant
Conduct Transit Feasibility Study for Kershaw County	\$100,000 ^b	CMCOG	<ul style="list-style-type: none"> Determine if transit service is warranted throughout Kershaw County If so, determine strategy for providing service
White Pond Road/I-20 Left-turn Lane Addition	\$279,000	SCDOT	<ul style="list-style-type: none"> Install dedicated left-turn lane on westbound off-ramp of I-20
White Pond Road/Whiting Way Left-turn Lane Addition	\$383,000	Kershaw County; SCDOT	<ul style="list-style-type: none"> Install dedicated southbound left-turn lane
US 1/US 601/Townlee Lane Intersection Improvements	\$199,000	SCDOT	<ul style="list-style-type: none"> Install dedicated left-turn lane on southbound US 1/US 601 Install dedicated right-turn lane on northbound US 1/US 601
Short-term (2-5 years) \$3,853,000 - \$6,103,000			
US 1/Richardson Boulevard Intersection Improvement	\$575,000	Kershaw County; SCDOT	<ul style="list-style-type: none"> Install dedicated right-turn lane on southbound US 1
US 1/Magnolia Lane Intersection Improvement	\$584,000	Kershaw County; SCDOT	<ul style="list-style-type: none"> Install dedicated right-turn lane on southbound US 1 Extend left-turn lane on northbound US 1
Townlee Lane Connectors	\$2,694,000 - \$4,944,000	Kershaw County	<ul style="list-style-type: none"> Extend Townlee Lane south Create roundabout with new connectors to Ward Road and Cameron Lane Range of cost is based on undetermined impact of crossing wetlands; type of structure required is unknown at this time Based on economic development nexus, Kershaw County should implement and maintain



Recommended Action	Estimated Cost ^a	Potential Responsible Parties	Notes
Mid-term (5-10 years)	\$21,085,000		
US 601/US 1 Connector	\$1,446,000	SCDOT	<ul style="list-style-type: none"> Implement new connector road from US 1 to US 601 Signalize intersections at both ends of the connector
White Pond Road/Whiting Way Intersection Improvement	\$505,000	SCDOT	<ul style="list-style-type: none"> Signalize intersection Implement access management Install pedestrian improvements Implement independently or as part of White Pond Road Three-Lane Rural Arterial
US 601/I-20/Whiting Way Improvements	\$3,833,000	Kershaw County; SCDOT	<ul style="list-style-type: none"> Realign I-20 ramps to form signalized intersection Implement access management on US 601 Install truck access road from Pilot Travel Center to form signalized intersection with US 601 across from Whiting Way Kershaw County will need to partner with SCDOT to acquire property for and build truck access road from Pilot Travel Center
White Pond Road/Pine Street Improvements	\$8,242,000 ^c	SCDOT	<ul style="list-style-type: none"> Implement Three-Lane Rural Arterial on White Pond Road from Fort Jackson Road to Garlits Drive Implement Regional Connector on White Pond Road from Garlits Drive to Pine Street Implement Regional Connector on Pine Street from White Pond Road to US 1
US 1 Improvements (Kershaw County Line to Green Hill Road)	\$7,059,000 ^c	SCDOT	<ul style="list-style-type: none"> Implement Three-Lane Rural Arterial on US 1 from Kershaw County Line to Surrey Lane Implement Urban Arterial on US 1 from Surrey Lane to Green Hill Road



Recommended Action	Estimated Cost ^a	Potential Responsible Parties	Notes
Long-term (10-20 years)	\$32,741,000		
US 1/US 601/SC 34 Intersection Improvement	\$1,284,000	SCDOT	<ul style="list-style-type: none"> Channelize left-turn lanes on US 1/US 601 Reduce turning radii of southbound right-turn lane on US 1/US 601 Install dedicated right-turn lane on eastbound SC 34 Implement pedestrian improvements
White Pond Road/I-20 Interchange Improvements	\$2,027,000	SCDOT	<ul style="list-style-type: none"> Implement dual roundabouts at this interchange A more comprehensive traffic analysis should be performed to validate this recommendation Implement independently or as part of White Pond Road Three-Lane Rural Arterial
US 1/Watts Hill Road Intersection Improvement	\$1,002,000	Kershaw County; SCDOT	<ul style="list-style-type: none"> Convert intersection to roundabout A more comprehensive traffic analysis should be performed to validate this recommendation Implement independently or as part of US 1 Three-Lane Rural Arterial
Whiting Way Improvements	\$7,112,000 ^c	Kershaw County; SCDOT	<ul style="list-style-type: none"> Implement Regional Connector on Whiting Way from White Pond Road to US 601
US 1 Improvements (Green Hill Road to US 601)	\$16,953,000 ^c	SCDOT	<ul style="list-style-type: none"> Implement Three-Lane Rural Arterial on US 1 from Green Hill Road to US 601
White Pond Road/Haigs Creek Drive Intersection Improvements	\$881,000	Kershaw County; SCDOT	<ul style="list-style-type: none"> Install continuous center turn lane on White Pond Road in vicinity of intersection If White Pond Road Three-Lane Rural Arterial is previously implemented, this recommendation will not be required
US 601/Lachicotte Road Intersection Improvements	\$3,482,000	SCDOT	<ul style="list-style-type: none"> Relocate Lachicotte Road to intersect with US 601 across from Fredricksburg Road Signalize intersection

^a Itemized opinions of probable cost are located in Appendix D.

^b Based on prior experience performing similar feasibility studies.

^c Based on per-mile costs by street typology presented in Table 5.3-1.