

1. Purpose and Need

1.1 Introduction

The South Carolina Department of Transportation (SCDOT), in cooperation with the Federal Highway Administration (FHWA), has prepared this Draft Environmental Impact Statement (DEIS) for the proposed Carolina Crossroads I-20/26/126 Corridor Improvement Project (Carolina Crossroads) to address the existing and anticipated traffic volumes on the I-20/26/126 corridor in the greater Columbia area of Lexington and Richland Counties, South Carolina. This DEIS evaluates current and future (through Year 2040) transportation needs in the project study area while considering community and environmental impacts in order to identify a solution that will benefit the greater Columbia area, as well as the regional mobility of commerce, travelers, and commuters between the Upstate and Lowcountry.

The purpose and need for the proposed Carolina Crossroads project was prepared according to the provisions of the National Environmental Policy Act (NEPA) and corresponding regulations and guidelines of the FHWA, the lead federal agency (23 Code of Federal Regulations [CFR] 771 and 40 CFR 1500–1508). As lead agencies, FHWA and SCDOT are responsible for the DEIS being prepared for the proposed Carolina Crossroads project.

Section 6002 of the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA- LU), as amended by Section 1304 of Fixing America’s Surface Transportation Act (FAST Act), requires lead agencies to identify and involve cooperating and participating agencies, develop coordination plans, provide opportunities for the public and agencies to be involved in defining the purpose and need statement and determining the range of alternatives to be studied in the DEIS. The lead agencies are also responsible for collaborating with cooperating and participating agencies to determine methodologies and the level of detail for analyzing alternatives. Lead agencies must also provide oversight with regard to managing the NEPA process and resolving issues.

The FHWA and SCDOT sent letters to agencies to be either a participating or cooperating agency. The agencies who accepted are listed in Table 1.1. Appendix B includes copies of the agency coordination letters and responses.

What is the purpose and need statement?

The purpose and need statement sets the stage for consideration of the alternatives. It has three parts: The *purpose*, the *need*, and *goals and objectives*. The *purpose* defines the transportation problem to be solved. The *need* provides data to support the purpose. The *goals and objectives* describe other issues that need to be resolved as part of a successful solution to the problem.

Who are the lead agencies for the Carolina Crossroads project?

The Federal Highway Administration (FHWA) is the lead federal agency, and the South Carolina Department of Transportation (SCDOT) is the project sponsor and lead state agency.

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Table 1.1 Cooperating and Participating Agencies for the Carolina Crossroads DEIS*

| Agency or local government | Type of agency involvement |
|---|----------------------------|
| Federal agencies | |
| U.S. Army Corps of Engineers | Cooperating |
| U.S. Environmental Protection Agency | Participating |
| U.S. Fish and Wildlife Service | Participating |
| State agencies | |
| South Carolina Department of Archives and History | Participating |
| South Carolina Department of Health & Environmental Control | Participating |
| South Carolina Department of Natural Resources | Participating |
| South Carolina Department of Public Safety | Participating |
| Local governments or agencies | |
| Central Midlands Council of Governments | Participating |
| Central Midlands Regional Transit Authority | Participating |
| Richland County | Participating |
| Lexington County | Participating |

* Other agencies were invited to be participating agencies but declined.

Input from local communities, stakeholders, and agencies, coupled with field research and traffic analysis, has helped SCDOT and FHWA develop the purpose and need of the proposed Carolina Crossroads project. The purpose and need explains why a project is necessary and what it should achieve. Most importantly, it serves as the criteria for determining and evaluating the range of project alternatives, and ultimately selecting the preferred alternative for the project.

The U.S. Army Corps of Engineers (USACE) will utilize the overall project purpose for permit applications in order to evaluate “practicable” alternatives that may have impacts on wetlands and waters of the U.S. under the Clean Water Act. When considering USACE’s purpose and need for issuing a permit, USACE looks to the need for and purpose of the project in terms of benefits to society based on public interest factors. See Section 1.9.

What are cooperating and participating agencies?

A cooperating agency is any agency, other than a lead agency, that has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposed project or project alternative (40 CFR 1508.5). A participating agency is a federal, state, tribal, regional, or local government agency that might have an interest in the project.

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1.2 What are the project limits and how were they selected?

The I-20/26/126 corridor is located in an urbanized area of the Columbia, South Carolina metropolitan area (Figure 1.1). Specifically, the corridor is located within the city limits of Irmo, Columbia, and West Columbia in both Richland and Lexington Counties (Figure 1.2). Land use within the proposed project area is comprised primarily of commercial development, residential development, industrial development, and sparse undeveloped forestland. Land use directly adjacent to the existing project corridor is primarily comprised of commercial development, roadway and utility rights-of-way (ROWs), and sparse undeveloped forestland in the vicinity of the Saluda and Broad Rivers.

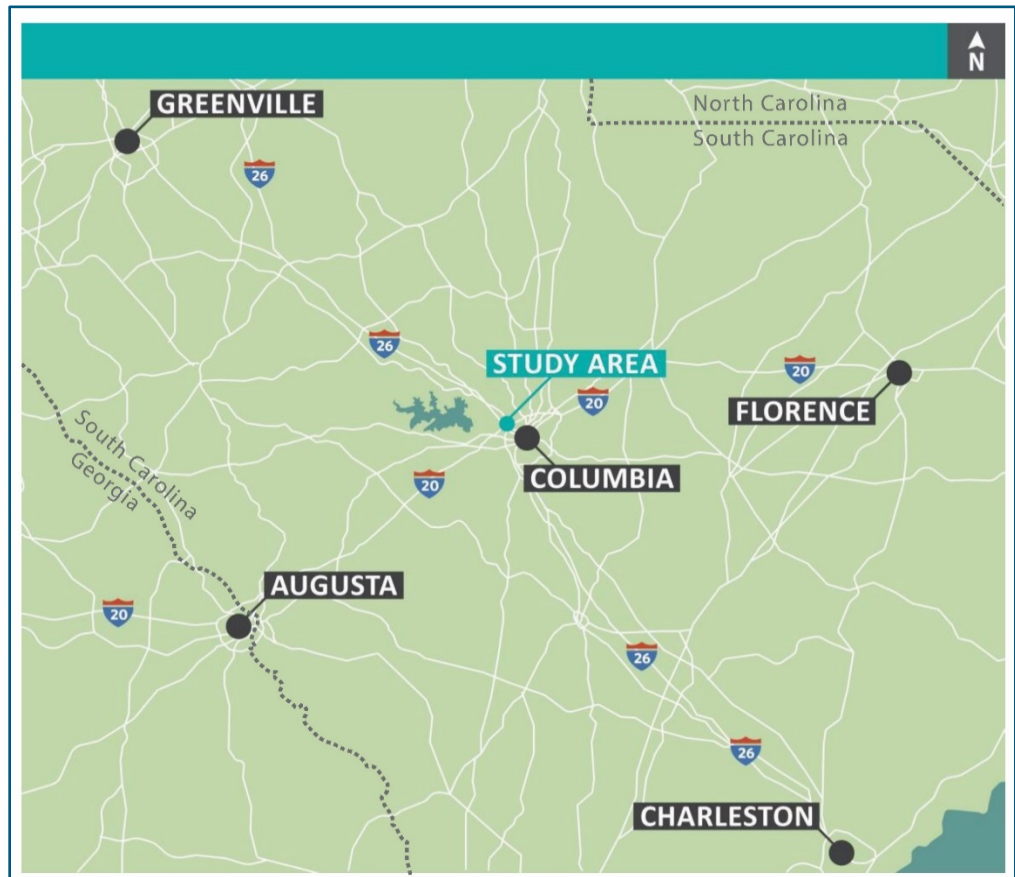


Figure 1.1 Regional overview

The boundaries of the study area, shown in Figure 1.2, are generally:

- I-20 from the Saluda River crossing to the Broad River crossing
- I-26 from Broad River Road to near US-378
- I-126 from I-26 to Colonial Life Boulevard

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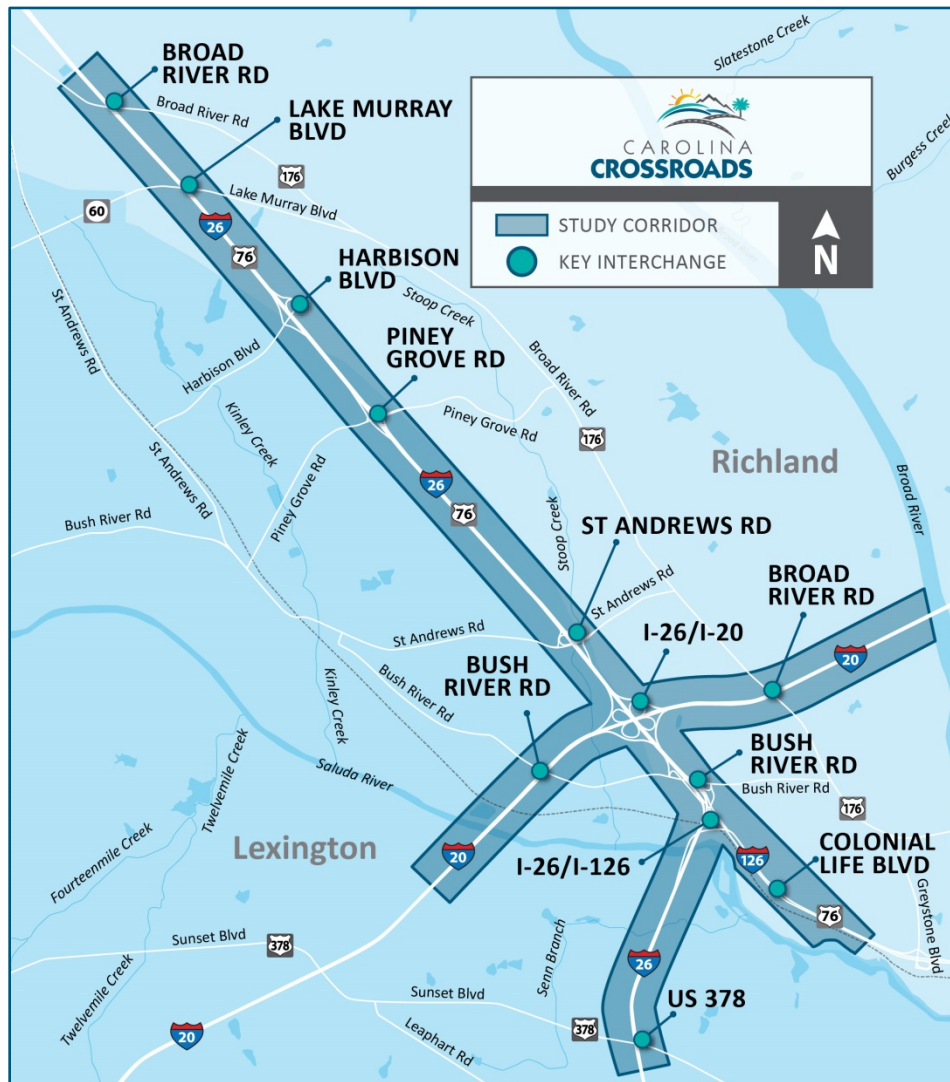


Figure 1.2 Study area limits

A traffic impact study was completed in 2010 to better understand the issues in the corridor that were contributing to congestion and safety concerns.¹ Field observations, historical and real-time traffic conditions, crash data, and lane utilization data collected during that study were the primary factors in determining the project limits, also known as logical termini.

An approximate 500-foot buffer was established along the project limits to define the study area, which formed the initial basis of examining existing conditions.

What are logical termini?

Logical termini are the project limits, which are defined as the rational end points for transportation improvements and for environmental review. Points of major traffic generation and congestion are common termini.

¹SCDOT. 2010. "Traffic Impact Study for the I-26/I-126 Corridor in Columbia South Carolina." Prepared by SCDOT Planning Office.

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1.3 What is the history of the I-20/26/126 corridor?

Construction of I-26 began in the Columbia area in 1957, and the first section opened in 1960. One year later I-126 opened, and the first segment of I-20 followed five years later in 1966. Over the years, many improvements have been made to the I-20/26/126 corridor, including widening and the addition of interchanges to accommodate several decades of growth and development. Figure 1.3 provides a timeline of the history of the corridor.

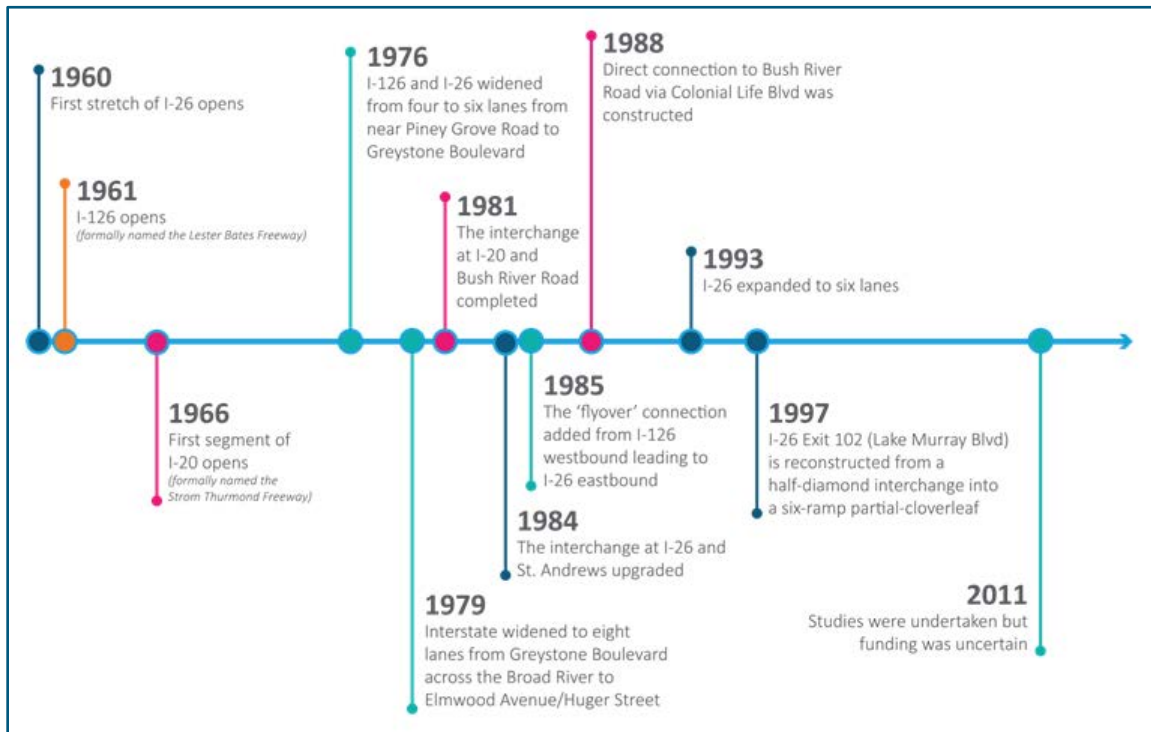


Figure 1.3 History of the I-20/26/126 corridor

1.4 How would the project be funded?

FHWA requires demonstration of fiscal constraint at the NEPA stage of project development. Fiscal constraint is met when the Long Range Transportation Plan (LRTP), Transportation Improvement Program (TIP), and Statewide Transportation Improvement Program (STIP) have sufficient financial information for demonstration that a project in the Multimodal Transportation Plan (MTP), TIP, and STIP can be implemented using committed, available, or reasonably available revenue sources. With the passage of Act 98 in 2013, the proposed Carolina Crossroads project was included in the STIP as an interstate upgrade project with \$10.0 million of State Infrastructure Bank (SIB) funding allocated for engineering and the development of the EIS. The proposed Carolina Crossroads project is expected to cost between \$1.3 and \$1.5 billion. As the number one statewide interstate priority, SCDOT is funding the proposed project through construction using a blended funding approach that combines Federal-Aid Interstate Upgrade program funds and General Obligation Highway bond revenues.

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1.5 What is the purpose of the proposed project?

The primary purpose of a project is the driver of the project. It reflects the fundamental reason why the project is being pursued. The secondary purpose (or other desirable outcome) is an additional purpose(s) that is desirable but not the core purpose of the project.

The primary purpose of the proposed Carolina Crossroads project is to implement a transportation solution(s) that would improve mobility and enhance traffic operations by reducing existing traffic congestion within the I-20/26/126 corridor while accommodating future traffic needs.

The secondary purposes of the proposed Carolina Crossroads project are to enhance safety throughout the corridor, improve freight mobility, and improve system linkages, while minimizing community and environmental impacts.

The I-20/26/126 corridor is listed as one of South Carolina's most congested interstate corridors. The corridor is a major hub for the Midlands' commuters as well as travelers and commerce, serving as a main route in and out of Columbia. It serves a number of important functions locally including regional access to downtown Columbia, adjacent employment areas and neighborhoods, and regional activity centers. With its central location in the state (Figure 1.1), the I-20/26/126 corridor also serves as a primary thoroughfare for travelers going to the coast and mountains for recreation and tourism. Additionally, I-26 in particular also serves as a major cargo route between Lowcountry ports and Upstate manufacturers. I-26 is further elevated in importance by its direct connection with I-20 which connects South Carolina with the rest of the southern states;

I-85 which connects Alabama to Virginia; I-77 which connects South Carolina to the Midwest and north; and I-95 which runs from Florida to Maine.

What is the primary purpose of the project?

The primary purpose of the proposed Carolina Crossroads project: to implement a transportation solution(s) that would improve mobility and enhance traffic operations by reducing existing traffic congestion within the I-20/26/126 corridor while accommodating future traffic needs.

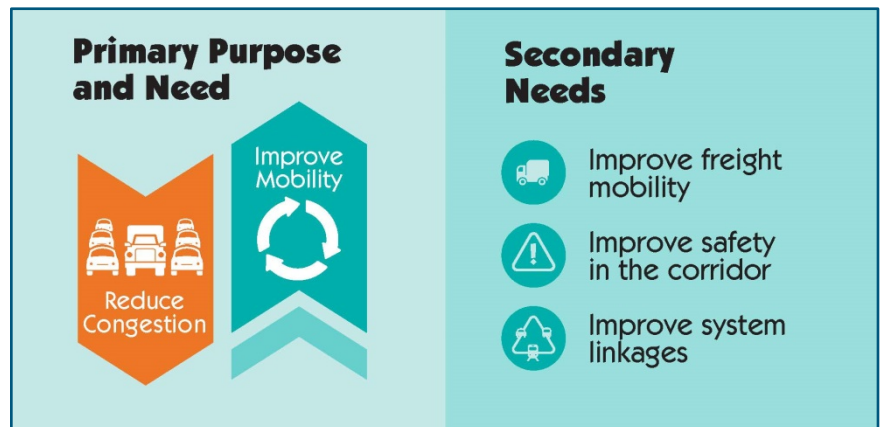


Figure 1.4 Project purposes

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1.6 Why is the project needed?

1.6.1 OUTDATED INFRASTRUCTURE

As an interstate corridor initially developed in the 1950s and 1960s and improved during the 1970s and 1980s, the I-20/26/126 corridor does not meet current vehicular traffic demands. It experiences heavy traffic congestion due to increases in vehicular traffic, vehicle weaving, interchange spacing, above average crash rates, and access ramps to and from each interstate that consistently become congested. Section 1.6.4 further discusses crash rates throughout the study area.

Finding an up-to-date solution has become a statewide priority. The need for this project is a result of the following factors, which are detailed further in the sections below:

- Growth in population and employment
- Decreased mobility and increased traffic congestion in the peak travel hours (inadequate roadway capacity)
- Increased user delay and lost productivity
- Safety concerns (increase in crash and fatality rates)
- Inadequate system linkages (lack of bicycle, pedestrian, and transit infrastructure)

What is vehicle weaving?

When vehicles merge and diverge, sometimes making multiple lane changes, in proximity when entering or exiting the interstate. This is common at interchange locations where multiple corridors intersect, such as at the I-20/26/Bush River Road interchange.

1.6.2 GROWTH IN POPULATION AND EMPLOYMENT

South Carolina as a whole is growing, as is the Columbia metropolitan area. Many areas within the Carolina Crossroads corridor have experienced rapid growth since the development of I-26 and subsequent development of I-20 and I-126. For example, the I-26/Harbison Boulevard interchange has become a major regional retail center housing a large shopping mall, other popular retail venues, restaurants, and hotels. Projections show that this trend will continue through the foreseeable future.

Population in the central-midlands region is projected to increase an average of 70 percent between 2015 and 2040² and employment is expected³ to increase⁴

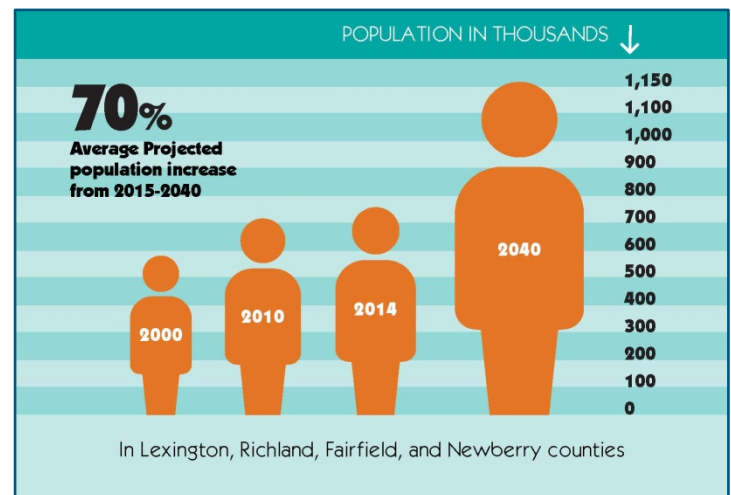


Figure 1.5 Central-Midlands region population increase

²Central-Midlands Council of Governments (CMCOG). 2012. "2010-2040 Population Projections for the Central Midlands Region." Accessed 11/12/2015. https://www.columbiasc.net/depts/city-council/docs/old_downloads/12_4_2012_Agenda_Items/2010-2040_Population.pdf

³ibid

⁴SC Works. "Online Services Community Profiles". Accessed 11/12/2015. <http://lmi.dew.sc.gov/lmi%20site/CommunityProfiles.html>

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Projected population growth in the study area, coupled with increases in development will increase travel demand.

1.6.3 DECREASED MOBILITY AND INCREASED TRAFFIC CONGESTION

Growth in population and employment is very closely related to traffic congestion and mobility. Fewer transportation options and decreased mobility are obstacles to job and population growth, and at the same time, growing populations and changing commuting patterns can also contribute to higher congestion levels.

Level of service (LOS) is a method of measuring the vehicle-carrying capacity of a street or freeway. When the capacity of a road is exceeded, the result is congestion, delay, and a poor level of service. LOS is represented by a letter “grade” ranging from A for excellent conditions – that is, traffic is light and free-flowing –

to F for failure conditions – that is, extremely congested, gridlock traffic. LOS B through LOS E describe progressively worse traffic conditions. Typically, in urban areas, such as Columbia, LOS E and F are considered to be unacceptable operating conditions and LOS D and above are generally considered acceptable.

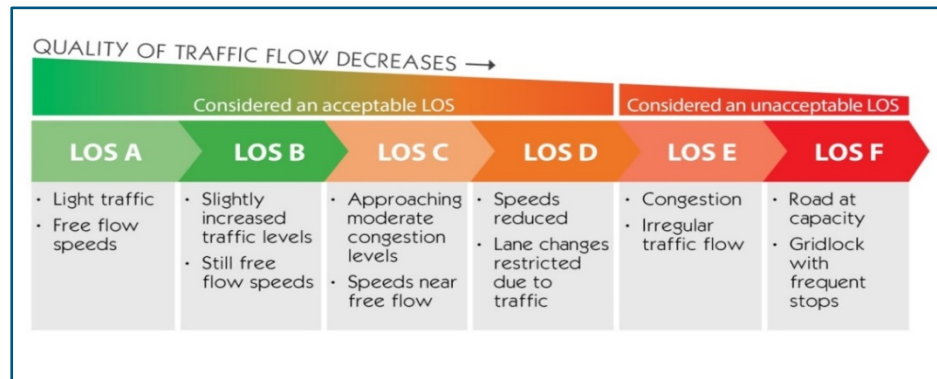


Figure 1.6 Definition of level of service

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1.6.3.1 Existing Traffic Conditions

Traffic models show that certain segments of the corridor currently operate at an unacceptable LOS during peak hours (i.e., 7:30 A.M.–9:00 A.M. and 4:00 P.M. –6:30 P.M.; **Error! Reference source not found.**).

Projected population growth in the study area, coupled with increases in freight travel, will exacerbate congestion.^{5,6}

What are some public comments about corridor congestion?

“In the PM, the source of most of the congestion seems to start just upstream of the St. Andrews Road exit.”

“I look forward to less congestion”

“The traffic entering I-20-E is backed up and congested most of the time in all three lanes.

The other alternative to get on I-20E is to go down Sunset Drive which is congested because people do not want to get on the interstate.”

“SC’s name is out there and we are about to become VERY CROWDED and need roads to accommodate”

“The problem is not the traffic on Broad River but the backup due to access to I-20 and congestion from I-20 to I-26 North”



Figure 1.7 Existing traffic capacity on the I-20/26/126 corridor

⁵SCDOT. 2014. “South Carolina Multimodal Transportation Plan – Interstate Plan.” Prepared by Stantec, in association with CDM Smith.

⁶ ibid

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Existing traffic volumes used in the analysis of the Carolina Crossroads corridors and the potential improvement alternatives were generated based on traffic counts and origin-destination studies for the corridor in the microsimulation models. The process to develop origin-destination traffic volumes is described in detail in the *Alternatives Traffic Analysis Technical Memo for Carolina Crossroads I-20/26/126 Corridor Improvement Project* found in Appendix D. These volumes used in the microsimulation analysis of existing conditions are presented in Table 1.2 as directional morning and evening peak hour volumes for each interstate corridor in the study area.

Table 1.2 Interstate Mainline Existing Peak Hour Traffic Volumes⁷

| I-26 Mainline | Existing peak hour traffic volumes (veh/ hr) | | | |
|--|--|-------|-------|-------|
| | AM | | PM | |
| | EB | WB | EB | WB |
| Location | | | | |
| West of Exit 101 (Broad River Road) | 4,354 | 2,546 | 3,046 | 4,135 |
| Exit 101 to Exit 102 (Lake Murray Boulevard) | 5,199 | 3,101 | 3,650 | 5,034 |
| Exit 102 to Exit 103 (Harbison Boulevard) | 5,147 | 3,586 | 4,064 | 5,696 |
| Exit 103 to Exist 104 (Piney Grove Road) | 5,403 | 4,145 | 4,521 | 5,967 |
| Exit 104 to Exit 106 (St. Andrews Road) | 5,873 | 4,486 | 5,220 | 6,128 |
| Exit 106 to Exit 107 (I-20) | 7,644 | 5,375 | 6,317 | 6,832 |
| I-126 Diverge to I-126 Merge | 2,660 | 2,493 | 2,531 | 2,545 |
| Exit 108 to Exit 110 (Sunset Boulevard) | 3,621 | 3,592 | 3,604 | 3,968 |
| Southeast of Exit 110 | 3,362 | 3,582 | 3,906 | 4,026 |
| I-20 Mainline | Existing peak hour traffic volumes (veh/ hr) | | | |
| | AM | | PM | |
| | EB | WB | EB | WB |
| Location | | | | |
| West of Exit 61 (Sunset Boulevard) | 4,383 | 1,727 | 2,482 | 3,490 |
| Exit 61 to Exit 63 (Bush River Road) | 5,318 | 2,496 | 3,204 | 4,434 |
| Exit 63 to Exit 64 (I-26) | 4,828 | 2,692 | 3,207 | 4,198 |
| Exit 64 to Exit 65 (Broad River Road) | 5,066 | 3,624 | 3,895 | 4,415 |
| Exit 65 to Exit 68 (Monticello Road) | 5,578 | 4,704 | 4,374 | 5,677 |
| East of Exit 68 | 5,226 | 4,688 | 4,439 | 5,389 |

⁷ Carolina Crossroads I-20/26/126 Corridor Project *Traffic Technical Memo* <March 26, 2018>
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| I-126 Mainline | Existing peak hour traffic volumes (veh/ hr) | | | |
|---|--|-------|-------|-------|
| | AM | | PM | |
| | EB | WB | EB | WB |
| Location | | | | |
| I-126/I-26 Split | 4,699 | 1,752 | 2,401 | 3,251 |
| I-126 from I-26 to Colonial Life Boulevard | 5,332 | 2,145 | 2,686 | 3,910 |
| I-126 from Colonial Life Boulevard to Greystone Boulevard | 5,787 | 2,922 | 2,994 | 5,690 |
| I-126 from Greystone Boulevard to Huger Street | 5,747 | 2,961 | 3,121 | 6,054 |

¹ Carolina Crossroads I-20/26/126 Corridor Improvement Project *Alternatives Traffic Analysis Technical Memo*

1.6.3.2 Projected 2040 Traffic Conditions

Two methods were used to project 2040 volumes on the I-20/26/126 corridor. The first method of traffic projections used was based on changes in historical annual average daily traffic (AADT) volumes obtained from SCDOT and from growth forecasts in the South Carolina Statewide Model (SCSWM). For early capacity screenings of the existing system and Representative Alternative (RA) elements called Accessory Options (AO), which are discussed in detail in the *Alternatives Traffic Analysis Technical Memo for Carolina Crossroads I-20/26/126 Corridor Project* found in Appendix D, projected traffic volumes were developed using the existing peak hour volumes along the interstate and at the interchanges and applying a general uniform annual growth rate of 1%, derived from historic AADT growth in the study area, to those volumes to estimate 2040 morning and afternoon peak hour traffic.

The second method was used in the more detailed microsimulation of the existing network, the future no-build network and the RAs. This method involved modifying and using origin-destination trip tables developed as part of the Columbia Corridors project. This information was validated, calibrated, and reduced down to regional trip tables that were used in the Carolina Crossroads Transmodeler simulation model. The process is described in detail in Chapter 4 of the *Alternatives Traffic Analysis Technical Memo*.⁸ The forecasts derived from the SCSWM trip tables and used in the microsimulation of alternatives were generally equivalent to an annual growth rate of about 0.7 %.

Table 1.3 lists the 2040 volumes for the mainline under No-Build conditions derived from the second method that utilized the SCSWM trip tables.

⁸ Carolina Crossroads I-20/26/126 Corridor Project *Traffic Technical Memo* <March 26, 2018>
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Table 1.3 2040 Mainline Traffic Volumes for the No-Build Alternative

| I-26 Mainline | Volume (veh/hr) | | | |
|---|-----------------|-------|-------|-------|
| | AM | | PM | |
| | EB | WB | EB | WB |
| Location | | | | |
| West of Exit 101 (Broad River Road) | 4,387 | 2,950 | 3,628 | 4,399 |
| Exit 101 to Exit 102 (Lake Murray Boulevard) | 4,746 | 3,560 | 4,355 | 5,180 |
| Exit 102 to Exit 103 (Harbison Boulevard) | 4,552 | 4,190 | 4,766 | 5,853 |
| Exit 103 to Exit 104 (Piney Grove Road) | 4,880 | 4,772 | 5,163 | 6,033 |
| Exit 104 to Exit 106 (St. Andrews Road) | 5,447 | 5,148 | 5,350 | 6,114 |
| Exit 106 to Exit 107 (I-20) | 7,405 | 6,216 | 6,245 | 6,739 |
| I-126 Diverge to I-126 Merge | 2,765 | 2,926 | 2,305 | 2,319 |
| Exit 108 to Exit 110 (Sunset Boulevard) | 3,630 | 4,237 | 3,449 | 3,729 |
| Southeast of Exit 110 | 3,657 | 4,262 | 3,962 | 4,174 |
| I-20 Mainline | Volume (veh/hr) | | | |
| | AM | | PM | |
| | EB | WB | EB | WB |
| Location | | | | |
| West of Exit 61 (Sunset Boulevard) | 5,068 | 1,934 | 2,966 | 3,603 |
| Exit 61 to Exit 63 (Bush River Road) | 5,568 | 2,852 | 3,774 | 4,502 |
| Exit 63 to Exit 64 (I-26) | 5,063 | 2,987 | 3,781 | 4,093 |
| Exit 64 to Exit 65 (Broad River Road) | 5,278 | 4,261 | 4,200 | 4,507 |
| Exit 65 to Exit 68 (Monticello Road) | 5,724 | 5,566 | 4,665 | 5,743 |
| east of Exit 68 | 5,413 | 5,599 | 4,797 | 5,501 |
| I-126 Mainline | Volume (veh/hr) | | | |
| | AM | | PM | |
| | EB | WB | EB | WB |
| Location | | | | |
| I-126/I-26 Split | 4,676 | 2,096 | 2,656 | 3,044 |
| I-126 from I-26 to Colonial Life Blvd | 5,384 | 2,561 | 2,944 | 3,585 |
| I-126 from Colonial Life Blvd to Greystone Blvd | 5,913 | 3,361 | 3,313 | 5,464 |
| I-126 from Greystone Blvd to Huger St | 5,897 | 3,566 | 3,384 | 5,972 |

Detailed evaluations of existing traffic conditions within the corridor as well as future traffic conditions with no improvements were undertaken as a part of the efforts to establish a range of alternatives. The findings of this evaluation indicate that the majority of the project area will be experiencing failing LOS as a result of growing traffic demands by 2040.

- Inbound traffic on I-26 in the morning will exceed current freeway capacity.
- The majority of segments of I-20 approaching the I-26/126 interchange will be overcapacity in both directions during AM commutes.

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- In the afternoon, both directions of I-26 between Sunset Boulevard and Piney Grove Road will experience roadway failure, as will I-126 westbound leaving downtown Columbia and I-20 westbound from Monticello Road to the I-26/126 interchange.

This analysis and evaluation is documented in the I-20/26/126 Carolina Crossroads Corridor Project *Alternatives Traffic Analysis Technical Memo*⁹ found in Appendix D of this DEIS. Tables 1.4 – 1.6 summarize this anticipated growth in congested freeway segments by peak hour. Refer to Appendix D for more information regarding the analysis, the data sources, and the methodologies employed to evaluate individual segments of the corridor.

Table 1.4 I-26 Mainline LOS; Existing Conditions and 2040 No-Build Peak Hours¹

| Segment | Existing conditions | | 2040 No-build | |
|------------------------------|----------------------------------|--------------|---------------|--------------|
| | AM peak hour LOS ² | PM peak hour | AM peak hour | PM peak hour |
| I-26 Eastbound | | | | |
| Exit 101 to Exit 102 | C | B | F | C |
| Exit 102 to Exit 103 | F | C | F | D |
| Exit 103 to Exit 104 | F | C | F | D |
| Exit 104 to Exit 106 | F | E | F | F |
| Exit 106 to Exit 107 | F | D | F | F |
| I-126 Diverge to I-126 Merge | D | E | E | F |
| Exit 108 to Exit 110 | D | F | F | F |
| I-26 Westbound | | | | |
| Exit 110 to Exit 108 | C | C | D | F |
| I-126 Diverge to I-126 Merge | D | F | E | F |
| Exit 107 to Exit 106 | D | F | D | F |
| Exit 106 to Exit 104 | D | F | E | F |
| Exit 104 to Exit 103 | D | E | D | E |
| Exit 103 to Exit 102 | C | E | D | E |
| Exit 102 to Exit 101 | B | F | B | C |

¹ Carolina Crossroads I-20/26/126 Corridor Project Traffic Technical Memo
² Per Highway Capacity Manual 2010 criteria.

Table 1.5 I-20 Mainline LOS; Existing Conditions and 2040 No-Build Peak Hours¹

| Segment | Existing conditions | | 2040 No-build | |
|-----------------------|----------------------------------|--------------|---------------|--------------|
| | AM peak hour LOS ² | PM peak hour | AM peak hour | PM peak hour |
| I-20 Eastbound | | | | |
| West of Exit 61 | E | C | F | B |

⁹ Carolina Crossroads I-20/26/126 Corridor Project *Alternatives Traffic Analysis Technical Memo* <March 26, 2018>
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| Segment | Existing conditions | | 2040 No-build | |
|-----------------------|----------------------------------|--------------|---------------|--------------|
| | AM peak hour LOS ² | PM peak hour | AM peak hour | PM peak hour |
| Exit 61 to Exit 63 | D | C | F | C |
| Exit 63 to Exit 64 | C | B | C | B |
| Exit 64 to Exit 65 | C | C | D | C |
| Exit 65 to Exit 68 | E | D | E | D |
| I-20 Westbound | | | | |
| Exit 68 to Exit 65 | D | F | E | F |
| Exit 65 to Exit 64 | E | F | F | F |
| Exit 64 to Exit 63 | B | C | E | C |
| Exit 63 to Exit 61 | B | D | B | E |
| West of Exit 61 | B | D | B | C |

¹ Carolina Crossroads I-20/26/126 Corridor Project Traffic Technical Memo
² Per Highway Capacity Manual 2010 criteria.

Table 1.6 I-126 Mainline LOS; Existing Conditions and 2040 No-Build Peak Hours¹

| Segment | Existing conditions | | 2040 No-build | |
|--------------------------------------|----------------------------------|--------------|---------------|--------------|
| | AM peak hour LOS ² | PM peak hour | AM peak hour | PM peak hour |
| I-126 Eastbound | | | | |
| I-26 to Colonial Life Blvd | D | B | D | B |
| Colonial Life Blvd to Greystone Blvd | B | A | B | A |
| Greystone Blvd to Huger St | D | B | D | B |
| I-126 Westbound | | | | |
| Huger St to Greystone Blvd | B | D | B | F |
| Greystone Blvd to Colonial Life Blvd | B | F | B | F |
| Colonial Life Blvd to I-26 | C | F | C | F |

¹ Carolina Crossroads I-20/26/126 Corridor Project Traffic Technical Memo
² Per Highway Capacity Manual 2010 criteria.

In addition to LOS, travel times through the corridor are expected to increase through the design year due to heightened congestion levels. Travel time savings is one of the principal benefits of a transportation project because of the reduction in travel time they will provide. The value of travel time refers to the cost of time spent on transport. It includes costs to businesses of the time their employees and vehicles spend on travel, and costs to consumers of personal (unpaid) time spent on travel. Travel time savings can also lead to reductions in vehicle operating costs and cost savings due to a reduction in crashes.

Existing year travel times and average speeds on the mainline interstates within the project corridor are shown in Table 1.7. 2040 no-build travel times and average speeds are represented in Table 1.8. The methodology used to derive travel times and average speeds for each roadway segment can be found in the Carolina Crossroads I-20/26/126 Corridor Project *Alternatives Traffic Analysis Technical Memo* in Appendix D.

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Table 1.7 Existing Mainline Travel Times and Average Speeds for Each Corridor¹

| Segments | Eastbound | | | | | Westbound | | | | |
|---------------------------------------|----------------|------------------------|-------|------------------------|------|----------------|------------------------|-------|------------------------|------|
| | Length (mi) | Travel time (mm:ss) | | Average speed (mph) | | Length (mi) | Travel time (mm:ss) | | Average speed (mph) | |
| | | AM | PM | AM | PM | | AM | PM | AM | PM |
| I-26 between Exit 101 and Exit 110 | 8.35 | 14:23 | 10:31 | 34.8 | 47.6 | 8.20 | 09:01 | 15:03 | 54.6 | 32.7 |
| I-20 between Exit 61 and Exit 68 | 6.71 | 07:19 | 06:37 | 55.0 | 60.9 | 6.77 | 06:53 | 08:20 | 59.0 | 48.7 |
| I-126 between I-26 and Greystone Blvd | 1.99 | 02:03 | 01:54 | 58.4 | 62.8 | 2.13 | 02:07 | 04:47 | 60.1 | 26.6 |

¹ Derived from Transmodeler, Carolina Crossroads I-20/26/126 Corridor Project *Traffic Technical Memo*

Table 1.8 2040 No-Build Peak Hour Travel Times and Average Speeds for Each Corridor¹

| Segments | Eastbound | | | | | Westbound | | | | |
|--|----------------|------------------------|-------|------------------------|------|----------------|------------------------|-------|------------------------|------|
| | Length (mi) | Travel time (mm:ss) | | Average speed (mph) | | Length (mi) | Travel time (mm:ss) | | Average speed (mph) | |
| | | AM | PM | AM | PM | | AM | PM | AM | PM |
| I-26 between Exit 101 and Exit 110 | 8.35 | 28:41 | 21:26 | 17.5 | 23.4 | 8.20 | 09:16 | 24:32 | 53.1 | 20.1 |
| I-20 between Exit 61 and Exit 68 | 6.71 | 10:30 | 06:50 | 38.4 | 59.0 | 6.77 | 08:33 | 12:51 | 47.5 | 31.6 |
| I-126 between I-26 and Greystone Blvd | 1.99 | 02:03 | 02:09 | 58.4 | 55.6 | 2.13 | 02:09 | 10:17 | 59.3 | 12.4 |

¹ Derived from Transmodeler, Carolina Crossroads I-20/26/126 Corridor Project *Traffic Technical Memo*

Eastbound AM average speeds on I-26 are modeled as being 17.5 mph and PM average speeds on both directions of I-26, and westbound I-20 and I-126 are all estimated to be significantly lower than posted speed limits, indicating that widespread congestion is taking place in the 2040 no-build traffic model.

1.6.4 INCREASE IN CRASH RATES AND FATALITY RATES

To identify where crashes were more frequent, the project team collected crash data from the SCDOT Office of Traffic Engineering for roadway segments within the study area. In the project corridor, I-26 experiences more traffic crashes than the state average. There were a total of 2,370 crashes reported along I-26 from January 1, 2012 to December 31, 2014 (Figure 1.8). These were split nearly evenly in the eastbound (1,171 crashes) and westbound (1,199 crashes) directions. The most frequent collisions were rear-end collisions (over 60 percent) with same direction sideswipe crashes and “no collision with motor vehicle” accidents making up 18 and 17 percent of the total collisions, respectively. High crash rates are attributed to extended periods of congestion throughout the corridor and abrupt driving maneuvers due to the multiple weaving movements at and adjacent to the system interchange at I-20.¹⁰

¹⁰ SCDOT and FHWA. 2016. Crash Analysis Carolina Crossroads I-20/26/126 Corridor Improvements, Lexington and Richland Counties, South Carolina.

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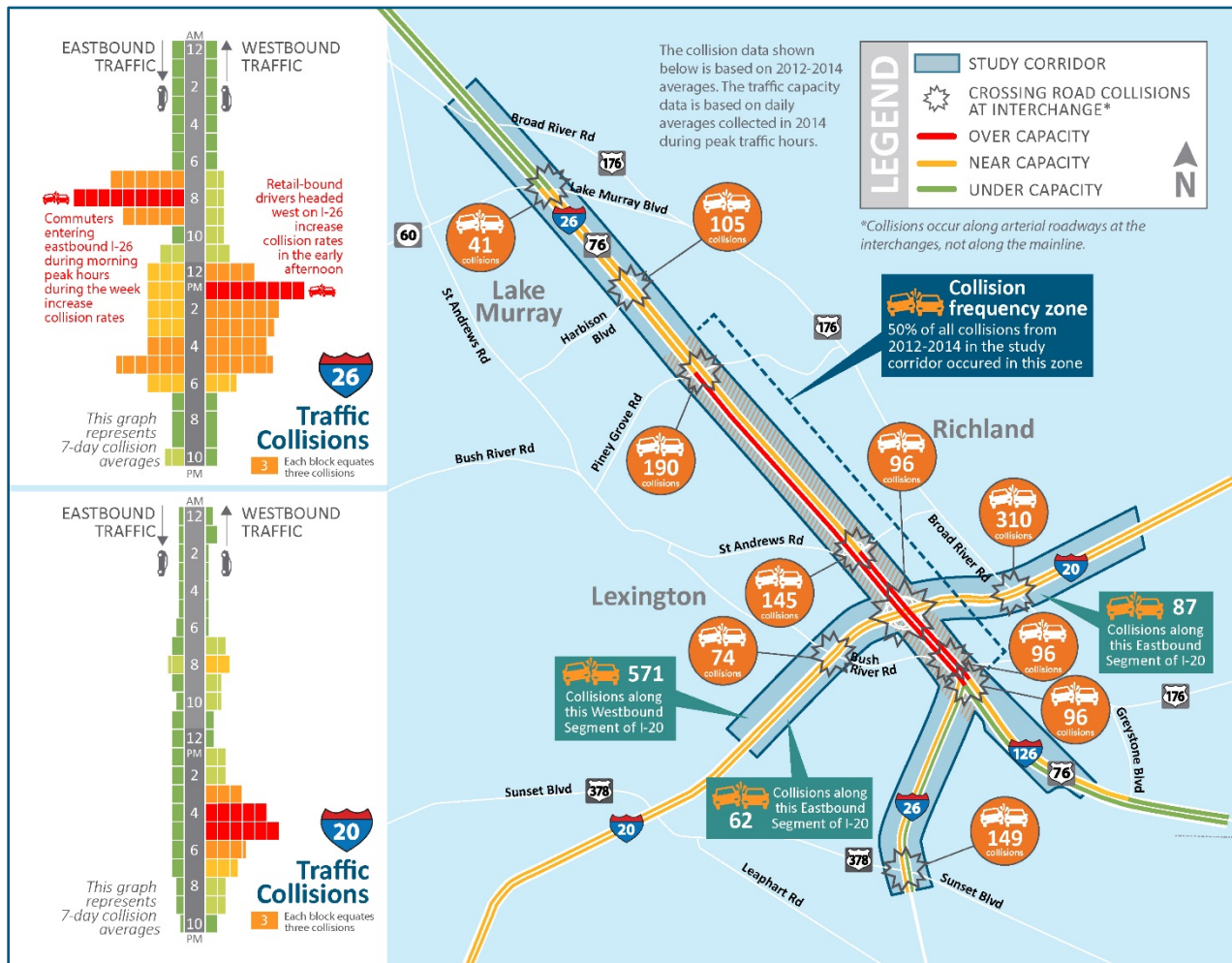


Figure 1.8 I-20/26/126 corridor collision summary

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A comparison of crash rates at the Carolina Crossroads site with similar interchanges between I-26 and I-526 in Charleston County and I-85 and I-385 in Greenville County is summarized in Table 1.9.

Table 1.9 Total Crash Rates and FSI Crash Rates Comparison

| Location | Total crash rate (per 1MVT) | Fatal/severe injury crash rate (per 1MVT) |
|---|-----------------------------|---|
| I-26/I-526 Interchange crash rate (Charleston County)* | 1.748 | |
| I-85/I-385 Interchange crash rate (Greenville County)* | 2.690 | |
| I-26/I-20/I-126 Interchange crash rate (Carolina Crossroads)* | 2.863 | |
| I-20 MP 60.895 – 67.0* | 1.913 | 0.022 |
| I-126 MP 0.0 – 2.1* | 0.766 | 0.033 |
| I-26 MP 99.0 – 109.70* | 2.441 | 0.018 |
| Statewide; urban interstates (2015) | 1.431 | 0.016 |

Source: SCDOT Office of Traffic Engineering

*Crash rates are aggregated over 5 years (2012-2016); Interchange Crash Rates are applicable to referenced interchanges only and do not include freeway approaches. Upgrades at these interchanges are currently in process or under development and screening.

MP – milepost

MVMT – million vehicle miles traveled

The total crash rate at the I-26/I-20/I-126 study area is twice as high as the statewide average for Urban Interstates, which includes data from interchanges and linear freeway sections. The comprehensive study area includes the I-20/26/126 interchange and several miles of freeway sections on I-26, I-20, and I-126 approaching the interchange. On the I-20 and I-26 segments of the study areas, the crash rates exceed the statewide average for total crashes. All freeway approaches to this interchange exceed the average for FSI (Fatal and Severe Injury) crashes. Additionally, the I-20/26/126 interchange crash rate is higher than both comparable freeway-to-freeway interchanges. Much of this crash risk is attributed to the complex weaving maneuvers that take place within a relatively short section of freeway (Figure 1.9). Weaving occurs where multiple corridor intersect and is common at interchange locations such as at the I-26/I-126/Bush River Road interchange (Figure 1.10).

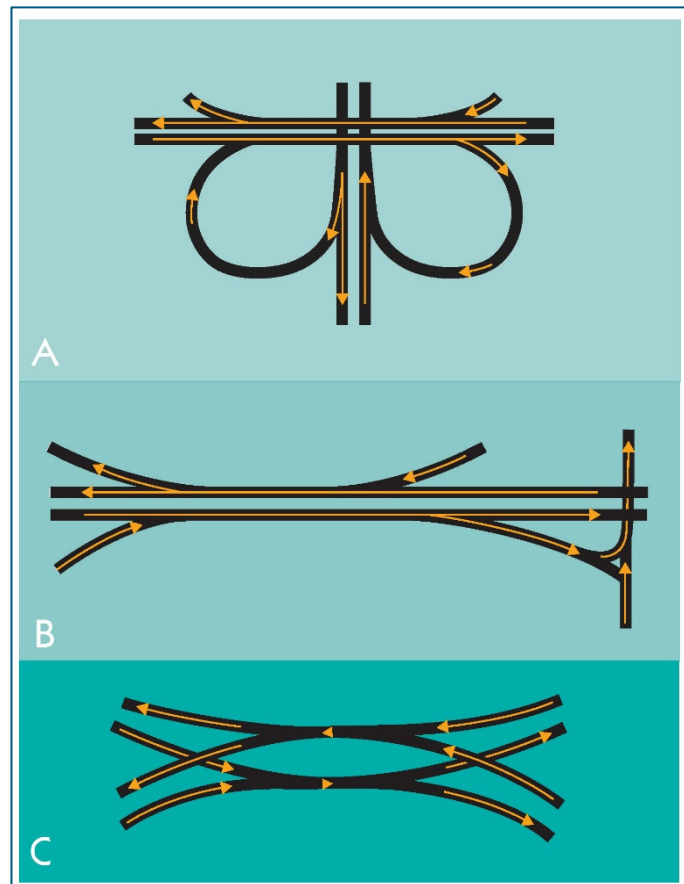


Figure 1.9 Weaving sections

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A crash hotspot analysis¹¹ revealed that there are several hotspot crash locations on the three study area freeway sections of I-26, I-20, and I-126. This analysis identified several safety considerations which would mitigate the high crash risk throughout this interchange. Those considerations include

- Reducing or eliminating the multiple weaving segments on I-26 eastbound in proximity to the off- and on-ramps to I-20 and on I-26 westbound between the I-126/I-26 ramp merge and Exit 103 at Harbison Boulevard
- Improving westbound I-126 between the I-20 ramp diverge and the I-26 merge, where considerable traffic weaves occur between all three freeways
- Reducing or eliminating the weaving segments on I-20 between Exit 64 (I-26) and Exit 63 (Bush River Road)
- Separating system-to-system traffic flow, especially from I-20 westbound to I-26 westbound
- Lengthening merge sections
- Improving interchange ramp termini at arterial and collector roads to reduce crash risk through geometric modifications



Figure 1.10 Area of complex weaving movements

1.6.5 PREPARING FOR GROWTH IN FREIGHT TRAFFIC

With access to major ocean port terminals, inland port terminals, railroad lines, airports, and highways, a substantial amount of freight moves through South Carolina. It is estimated that over 375 million tons of freight moved across South Carolina in 2011,¹² 80 % of which was moved by truck. Freight mobility within the project study area is largely supported by I-20/26/126, which connects major freight destinations. I-26 and I-20 are both major trucking corridors, with several freight shipping centers such as BMW, Continental, Michelin, Bridgestone, and Fort Jackson. I-26 in particular serves as a major cargo route between Lowcountry ports and Upstate manufacturers. I-26 is further elevated in importance by its direct connection with I-20 which connects South Carolina with the rest of the southern states; I-85 which connects Alabama to Virginia; I-77 which connects South Carolina to the Midwest and north; and I-95 which runs from Florida to Maine.

¹¹ SCDOT and FHWA. 2016. Crash Analysis Carolina Crossroads I-20/26/126 Corridor Improvements, Lexington and Richland Counties, South Carolina. Prepared by STV.

¹² SCDOT. 2014. "South Carolina Multimodal Transportation Plan – South Carolina Statewide Freight Plan. Prepared by Stantec in association with CDM Smith.

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The total volume of freight moving through the region is expected to increase 81% by 2040.¹³ For the same time period, truck shipments are forecast to grow by 91% and air shipments by 97%, while rail shipments are projected to increase by 44%. Currently, the primary commodity transported by truck to, through, and from the region is secondary traffic, defined as freight transiting to and from distribution centers or through intermodal facilities. Secondary traffic is projected to have 128.5% additional growth by 2040. Nonmetallic minerals represents the next most voluminous commodity by ton that is hauled by truck in South Carolina. Current estimates state that this commodity accounts for 16.5% of all truck freight as of 2011 and will grow by 76.4% by 2040. Based on statistical projections, trucks will continue to serve as the primary mode of transportation in the region in the future.

The Central Midlands region is a gateway for freight movement throughout the Southeast, and the area also serves as a major hub for consolidation of freight. It is important to note that the types of commodities that are projected to increase are primarily bulk commodities. These commodities are typically used for pure manufacturing purposes and the final products will most likely be consumed outside of the Central Midlands region. From an infrastructure perspective, these commodities dictate mode choice, and are likely to impact roadways in the region by increasing Class 8 truck traffic (large 18 wheelers). Lack of adequate transportation infrastructure could result in reduced efficiencies for the movement of goods through the region. To that end, the Central Midlands Council of Government (CMCOG) is developing numerous strategies for dealing with freight mobility and access. These include, but are not limited to: creating standards for freight infrastructure; preparing a regional truck route plan; improving signage and signalization along key truck routes; and integrating Intelligent Transportation System (ITS) along freight corridors.¹⁴ The 2040 LRTP specifically lists the proposed Carolina Crossroads project as a needed improvement in order to maintain an acceptable level of service on the interstate network.¹⁵

1.6.6 LACK OF PEDESTRIAN AND BICYCLE INFRASTRUCTURE

Currently there are very limited options for pedestrians and bicycles to cross and ride parallel to the interstate systems, but there is popular support for expanding bicycle and pedestrian facilities in the Columbia metropolitan area. Sidewalks are provided along many arterial streets and local streets within the study area, though some arterials and local streets do not have sidewalks on one or both sides of the road.

The Saluda Riverwalk is a multi-use trail currently under construction along the Saluda River adjacent to I-126. The project includes approximately 2.5 miles of concrete trail from I-26 along the Saluda River, and continues past Riverbanks Zoo to the confluence of the Saluda and Broad Rivers.

Additionally, the City of Columbia and the CMCOG have initiated a pedestrian and bicycle master plan and bike share plan called the *Walk Bike Columbia* program. It is currently in the planning phase and upon completion, the City of Columbia anticipates being nationally designated a Bicycle Friendly Community, and could be the first Walk Friendly Community in South Carolina.¹⁶ Recommendations from the *Walk Bike*

¹³ COATS. 2008. "Midlands Tomorrow, 2035 Long Range Transportation Plan." Adopted December 18, 2008; Amended February 26, 2009; April 23, 2009; June 25, 2009; October 22, 2009; December 10, 2009.

¹⁴ COATS. 2015. Long Range Transportation Study – Freight Plan. Last accessed February 20, 2018.

¹⁵ COATS. 2015. 2040 Long Range Transportation Plan – Highway Element. Last accessed February 20, 2018.

¹⁶ Walk Bike Columbia

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Columbia report show that Broad River Road is given the highest priority score for sidewalk necessity and that there should be appropriate crossings of I-26 at St. Andrews Road. The program has mapped out several key intersections and roadways along or across the Carolina Crossroads corridor as particular interest for pedestrian and bicycle infrastructure in addition to providing recommendations for creating safer routes to transit.¹⁷

The *Walk Bike Columbia* plan proposes new bicycle routes and bikeways along the I-26 frontage roads from Burnette Drive, Browning Road, Burning Tree Road and continuing along St. Andrews Road through the I-26 interchange. The plan proposes additional bicycle routes through the interchanges of Lake Murray Boulevard, Harbison Boulevard, Piney Grove Road and Broad River Road. The report also indicates a need for bicycle and pedestrian signals at crossings of Harbison Boulevard and I-26, St. Andrews Road and I-26, Bush River Road and I-20, and Broad River Road and I-20.

1.6.7 LACK OF TRANSIT INFRASTRUCTURE AND ACCESS

The *Regional Transit & Coordination Plan* for the Central Midlands Region, published in 2014, indicates that increasing public transportation and multimodal transit infrastructure is a top concern and should be continuously developed to meet needs as far out as 2040. With the expected increase in travel demand, particularly for work trips, there is a need to improve access to the existing transit system.

1.6.7.1 Fixed-Route Bus Service

The primary transit provider is the Central Midlands Regional Transit Authority (CMRTA), known as the Comet. The CMRTA provides fixed-route bus service in Richland County and portions of Lexington County. CMRTA routes do not travel directly within the I-20/26/126 corridor but they do parallel and/or cross it via major arterials such Broad River Road, Piney Grove Road, and others. CMRTA is currently in the process of developing a plan for a more connected and accessible transit system, including development of high frequency service along high-capacity corridors and limited stop express routes, as well as restructuring of service to lower density routes like neighborhoods.

1.6.7.2 Park-and-Rides

Park-and-ride is a system for reducing congestion by offering a place for drivers to leave their vehicles and travel via express public transportation routes or carpool. SmartRide bus services travel through the project corridor and use several park and ride lots that are located just outside of the study area, along I-26 and I-20. The locations of these lots are

- O’Cain Advertising in Chapin, Exit 91 off of I-26
- The Department of Motor Vehicles Office near Exit 97 off of I-26
- The Harbison branch of the Midlands Technical College in Irmo, near Exit 102
- The Piggly Wiggly grocery store on SC Route 6 in Lexington near Exit 61 on I-20
- The SCDOT Park-and-Ride facility off of US 378 in Lexington, near Exit 55 on I-20

¹⁷Walk Bike Columbia. 2015. “Recommendations: Programs and Policy”. Accessed 11/13/2015. http://www.walkbikecolumbia.org/uploads/1/9/4/6/19463751/150324_wbcolumniafinal_recgs_lrlr.pdf

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CMRTA completed a *Park-and-Ride Study* in 2010 to determine which areas and specific locations would be best suited for such facilities. Many locations were evaluated within the Carolina Crossroads project corridor, including the I-26 and Broad River Road interchange and the I-26 at St. Andrews Road interchange, which were recommended for implementation.

The COATS 2015 *Congestion Management Plan* (CMP) provides information on the performance of the transportation system within the Columbia metropolitan area, and provides strategy recommendations to manage congestion and enhance mobility and safety. While interstates are not included in the CMP, some of the CMP-focused roadways do intersect with the I-20/26/126 corridor. Regional objectives in the CMP include the addition of transit park-and-ride facilities at location(s) on Lake Murray Boulevard between SC 6 and Broad River Road, which crosses I-26; and at Bush River Road in a location(s) between St. Andrews Road and Broad River, which crosses I-20 and I-26.

1.6.7.3 Rail Service

There are currently no premium transit (commuter or light rail) services available in the region. The only regional/interstate passenger rail service in the Central Midlands Region is provided by Amtrak. In 2008, CMCOG updated the *Central Midlands Regional Transit & Coordination Plan*. The Plan identified three rail corridors previously identified in a 2006 *Commuter Rail Feasibility Study*. One of those corridors consisted of a Newberry-to-Columbia proposed line that would have paralleled I-26 through much of its route. The 2008 update concluded that the region should strengthen local transit service, and place focus on implementing interim express bus service as an impetus for future higher-capacity services.

1.7 How were the public and agencies involved?

The development of proposed project's purpose and need incorporated input from the public and various other sources during the DEIS scoping process. Numerous commenters said that roads in the study area are congested and were supportive of roadway improvements to alleviate the congestion. An initial community kickoff meeting was held on May 12, 2015, to introduce the proposed project to the public. Requests for general comments resulted in 158 comments received, covering a variety of topics including alternatives development, cost, environmental impacts, and agency and public involvement. On September 10, 2015, a public scoping meeting was held. During the public scoping meeting (both in-person and online), participants were asked to provide feedback on the purpose and need of the proposed project. Sixty-three comments were received, and feedback received included

- safety as a primary purpose and need;
- accommodating future traffic and population of the region;
- commuting patterns;
- evacuation routes;
- address noise impacts; and
- accommodating increased economic traffic from the Upstate.

FHWA and SCDOT published a draft of the proposed project purpose and need document for review by the cooperating and participating agencies, and subsequently for review by the public. Members of the public

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and agencies were encouraged to provide comments by email, the proposed project website, and U.S. mail within a 30-day time period. A summary of comments can be found in Chapter 4 (Section 4.10) and comments received are located in Appendix N.

1.8 United States Army Corps of Engineers (USACE)

Determination of Purpose and Need

USACE is responsible for ensuring compliance with Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, as well as NEPA.

1.8.1 WHAT IS THE USACE'S PURPOSE OF THE PROPOSED PROJECT?

FHWA and SCDOT invited the USACE and other participating agencies to multiple Agency Coordination Effort (ACE) meetings to participate in the development of the project purpose. Through this coordination, the USACE concurs that the overall project purpose is to implement a transportation solution(s) that would improve mobility and enhance traffic operations by reducing existing traffic within the Carolina Crossroads corridor while accommodating future traffic needs. The USACE concurrence letter is included in Appendix B.

1.8.2 WHY IS THE USACE'S PROJECT PURPOSE IMPORTANT?

Under Section 404(b)(1) of the Clean Water Act, the Environmental Protection Agency, in conjunction with USACE, developed "Guidelines" to ensure compliance with Section 404 of the Clean Water Act when evaluating permit applications.¹⁹ No discharge of dredged or fill material shall be permitted if there is a "practicable" alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem. USACE considers an alternative "practicable" if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purpose (40 CFR 230.10(a)(2)). When reviewing the proposed project, the USACE must evaluate each alternative, always considering whether each of the alternatives really meets the overall project's purpose.

1.8.3 WHAT IS THE RESPONSIBILITY OF USACE TO REVIEW THE STATEMENT OF NEED?

The USACE has general policies that guide the review of Department of the Army permits.²⁰ One such policy is the public interest review. The concept of public and private need for the proposed project is important to the balancing process of USACE's public interest review. 33 CFR 320.4(a)(2) states that part of the public interest review in the evaluation of every application is to consider the relative extent of the public and private need for the proposed structure or work. A public sector applicant's project is presumed to address some public need and USACE can defer to a state or other government entity's decision to spend public money. However, regulations indicate that USACE should make an independent review of the public need for a project from the perspective of the overall public interest. This independent review is relevant to USACE's permit decision. USACE will question the public need for a project if the proposed project appears

¹⁹ 40 CFR 230. https://www.epa.gov/sites/production/files/2015-03/documents/cwa_section404b1_guidelines_40cfr230_july2010.pdf

²⁰ 33 CFR 320. <https://www.gpo.gov/fdsys/pkg/CFR-2012-title33-vol3/pdf/CFR-2012-title33-vol3-part320.pdf>

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to be unduly speculative. In the public interest review, USACE has the responsibility to balance public interest need or benefits against public interest detriments. The decision of whether to authorize the proposed project and the conditions under which it will be allowed are determined by the outcome of the general balancing process.

1.9 How was the purpose and need used to evaluate alternatives?

The primary purpose of the proposed project—to implement a transportation solution(s) that would improve mobility and enhance traffic operations by reducing existing traffic congestion with the I-20/26/126 corridor—was used as criteria to screen or eliminate alternatives that were not reasonable or practicable. In other words, if an alternative did not achieve the project’s primary purpose, it was eliminated from further consideration. The team then used the secondary purposes to further compare alternatives.

First, a range of alternatives was developed that included an initial list of alternatives which were general in nature. The initial range of alternatives was evaluated against the purpose and need under Level 1A screening including qualitative traffic metrics followed by Level 1B screening. Criteria established for metrics in Level 1A screening were essential to meeting the project purpose and need, therefore if an alternative was unable to meet them, it was considered “fatally flawed”. Those alternatives that passed Level 1A screening were moved to Level 1B screening for more detailed traffic analysis to evaluate LOS, travel time, delay, and volume-to-capacity ratio (v/c). Alternatives that advanced to Level 2 screening were evaluated against environmental constraints; construction feasibility, cost, and secondary need components including the ability to improve safety, improve freight mobility, improve system linkages, while minimizing community and environmental impacts. Those alternatives that advanced through Level 2 screening became Reasonable Alternatives which were evaluated in detail in this DEIS under Level 3 screening with the ultimate goal of determining a Recommended Preferred Alternative that would meet the purpose and need of the proposed project.

Chapter 2 of this DEIS discusses the alternatives development and screening process in more detail. Figure 2.1 illustrates the alternatives development and screening process under the purpose and need.

1.10 Conclusion

As an interstate corridor initially developed in the 1950s and 1960s and improved during the 1970s and 1980s, the I-20/26/126 corridor does not meet current vehicular traffic demands. Traffic models show that the corridor operates at an unacceptable LOS currently. It experiences heavy traffic congestion due to increases in vehicular traffic, vehicle weaving, and above average crash rates (I-26 experiences more traffic crashes than the state average), and access ramps to and from each interstate consistently become congested. Finding an up-to-date solution has become a statewide priority. The need for this proposed project is a result of the following:

- Population and employment growth in the Midlands’ region

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- Decreased mobility and increased traffic congestion in the peak travel hours (inadequate roadway capacity)
- Increased user delay and lost productivity
- Inadequate interconnection of transportation modes
- Safety concerns

The primary purpose of the proposed Carolina Crossroads project is to implement a transportation solution(s) that would improve mobility and enhance traffic operations by reducing existing traffic congestion within the I-20/26/126 corridor while accommodating future traffic needs. The secondary purposes of the proposed Carolina Crossroads project are to enhance safety throughout the corridor and improve freight mobility, while minimizing environmental impacts.