The purpose of the project is to increase capacity at the I-26/I-526 interchange and along the I-526 mainline, thereby relieving traffic congestion and improving operations at the I-26/I-526 interchange and along the I-526 mainline from Paul Cantrell Boulevard to Virginia Avenue.

South Carolina Department of Transportation (SCDOT) currently ranks the segment of I-526 between I-26 and Virginia Avenue as the most congested segment of interstate highway in the State. The remainder of the I-526 Lowcountry Corridor WEST (I-526 LCC WEST) project, from I-26 to Paul Cantrell Boulevard, ranks among the top ten of the state's most congested corridors. Forecasts show that segments of that corridor will continue to be among the state's most congested in 2040. Due to Geometric Deficiencies, the interchange of I-526 and I-26 is the major source of the congestion (refer to Section 2.1.5 for additional information). The provisions of the 2014 South Carolina Multimodal Transportation Plan, Interstate Plan are incorporated by reference.

2.1 Project Need

The I-526/I-26 interchange is listed as the #2 project in the 2035 Charleston Area Transportation Study (CHATS) Long Range Transportation Plan (LRTP) Ranked List of Candidate Transportation Projects, is the #6 project on SCDOT's Act 114 Interstate Capacity List, and is listed in SCDOT's State Transportation Improvement Plan (STIP) 2017-2022. Congestion was detailed in SCDOT's Corridor Analysis for I-526 Between North Charleston and West Ashley and in the Interstate Plan portion of SCDOT's 2014 Multimodal Transportation Plan, which lists four segments within this project corridor among the top 20 most congested interstate segments.

Act 114 requires the SCDOT to establish specific criteria to be used in prioritizing projects.

The need of this project is derived from the following factors, which are detailed further in the sections below:

- Growth in population and employment
- Decreased mobility and increased traffic congestion
- Base year traffic conditions
- Projected traffic conditions
- Geometric Deficiencies
- Pedestrian and bicycle connectivity

2.1.1 Growth in Population and Employment

Population size in the Charleston Metropolitan Statistical Area (MSA) is growing three times faster than the US average.[1] Population growth for the Charleston MSA was 18.5%, while growth in South Carolina generally was 6.6%, and the US average was 6%, between 2010 and 2018.[2] Based on U.S. Census data, Charleston County's population is expected to increase 17.05% by 2030.[3] The increase in population has been accompanied by strong growth in employment.

1 https://www.crda.org/local-data/population-demographics/
2 Ibid.
3 abstract.sc.gov/chapter14/pop5.html

2.1.2 Decreased Mobility and Increased Traffic Congestion

Current traffic volumes result in congestion during peak travel times.[4] Deficiencies in the current interchange designs, including inadequate ramp lengths and low design speeds on the ramps, contribute to congestion, longer travel times, and an increased rate of vehicular collisions. Future large-scale developments along the I-526 corridor are projected to further increase traffic.[5]

Congestion in the I-526 corridor is not caused by an increase in volume alone. The closely spaced interchanges, coupled with the travel paths (origin-destination patterns), generate substantial numbers of vehicles weaving between lanes to either enter or exit the freeway. This weaving, and the conflicts that it creates between vehicles, contributes to the level of congestion.

One way to measure the congestion of a roadway is the Level of Service (LOS). LOS is an industry standard measurement that is based on either time of delay (for intersections) or traffic density (for freeway segments), which is measured in passenger cars per lane per mile (pc/ln/mi) for freeway segments. Poor LOS ratings are caused by a high density of traffic on the freeway or excessive delay at the intersections. The LOS range is from A to F, with free flow conditions represented by LOS A, and LOS F representing congested conditions with slower speeds and severely restricted ability to change lanes, refer to Figure 2.1.

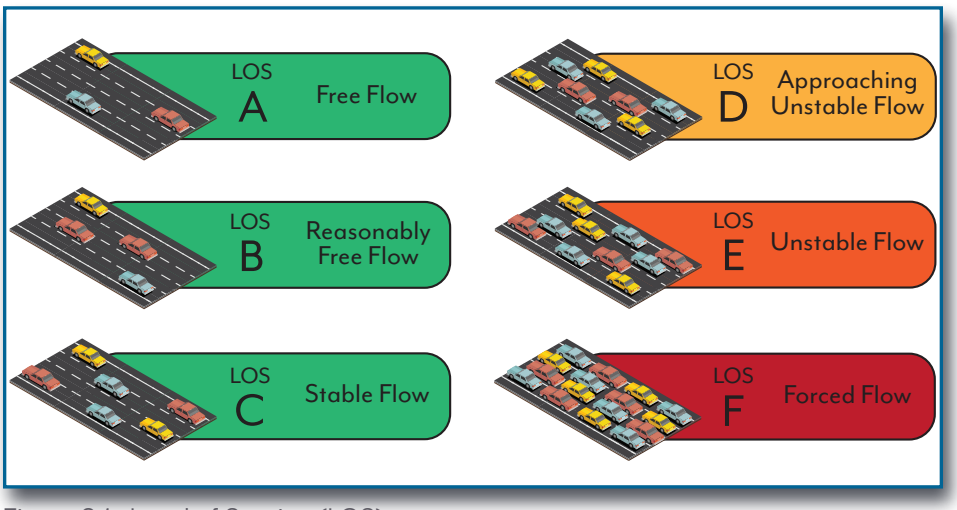

Figure 2.1 Level of Service (LOS)

A second way to analyze traffic congestion on roadways is the volume to capacity ratio (v/c ratio). The v/c ratio is a measure which compares roadway demand (vehicle volumes) with roadway supply (carrying capacity). Simply stated, the v/c ratio measures the number of vehicles a roadway can accommodate. For more detailed traffic information refer to the Alternatives Development Traffic Analysis Report in Appendix B.

- AADT - Annual Average Daily Traffic
- v/c ratio - a measure which compares actual or forecast traffic to the available roadway capacity (vehicles per hour)
- A v/c ratio of 1.0 indicates that the roadway is at 100% capacity
- Travel Demand Management - Strategies to reduce the overall travel demand or shift demand out of peak travel periods

Source: Highway Capacity Manual

4 Population Projections 2000-2035. South Carolina Revenue and Fiscal Affairs Office. November 2019. abstract.sc.gov/chapter14/pop5.html

5 Stantec Consulting Services, Inc. 2013. Corridor Analysis for I-526 Between North Charleston and West Ashley.

2.1.3 Base Year Traffic Conditions

Traffic models show that current traffic volumes result in congestion along the I-526 corridor. These models measure the congestion along the corridor in terms of v/c Ratio and LOS.

Multiple segments along I-526 currently experience undesirable levels of service of E and F (indicating unstable or forced flow) and which are approaching or beyond capacity, as shown in Table 2.1. These segments include those between Paul Cantrell Boulevard and Leeds Avenue, between International Boulevard and I-26, as well as those segments east of Rivers Avenue, refer to Appendix B the Alternatives Development Traffic Analysis Report.

Table 2.1 I-526 LCC WEST Base Year Traffic Volumes and Levels of Service by Segment

Segment		2015 AADT	AM Peak					
			Eastbound			Westbound		
			Available Capacity (%)	v/c ratio	LOS	Available Capacity (%)	v/c ratio	LOS
1	SC 7 (Sam Rittenberg Blvd) to Paul Cantrell Blvd	39,400	78%	0.22	A	47%	0.53	C
2	Paul Cantrell Blvd to Leeds Ave	79,200	18%	0.82	E	47%	0.53	C
3	Leeds Ave to Dorchester Rd	78,800	52%	0.48	C	56%	0.44	B
4	Dorchester Rd to Montague Ave	80,700	54%	0.46	C	48%	0.52	C
5	Montague Ave to International Blvd	67,400	62%	0.38	B	37%	0.63	D
6	International Blvd to I-26	89,000	54%	0.46	C	52%	0.48	C
7	I-26 to Rivers Ave	77,200	26%	0.74	D	31%	0.69	D
8	Rivers Ave to N Rhett Ave	75,600	0%	2.09	F	23%	0.77	D
9	N Rhett Ave to Virginia Ave	80,500	0%	1.90	F	0%	1.61	F

Segment		2015 AADT	PM Peak					
			Eastbound			Westbound		
			Available Capacity (%)	v/c ratio	LOS	Available Capacity (%)	v/c ratio	LOS
1	SC 7 (Sam Rittenberg Blvd) to Paul Cantrell Blvd	39,400	73%	0.27	B	78%	0.22	A
2	Paul Cantrell Blvd to Leeds Ave	79,200	45%	0.55	C	0%	1.07	F
3	Leeds Ave to Dorchester Rd	78,800	47%	0.53	C	0%	1.57	F
4	Dorchester Rd to Montague Ave	80,700	52%	0.48	C	32%	0.68	D
5	Montague Ave to International Blvd	67,400	46%	0.54	C	56%	0.44	C
6	International Blvd to I-26	89,000	14%	0.86	E	61%	0.39	B
7	I-26 to Rivers Ave	77,200	34%	0.66	D	49%	0.51	C
8	Rivers Ave to N Rhett Ave	75,600	12%	0.88	E	0%	2.08	F
9	N Rhett Ave to Virginia Ave	80,500	22%	0.78	E	0%	2.02	F

Source: Stantec, December 2019

2.1.4 Projected Traffic Conditions

The I-526 LCC WEST carries large volumes of traffic each day, and those volumes are expected to increase substantially through the design horizon year of 2050, refer to Figure 2.2.

The growth in AADT over the next 28 years is shown on a segment by segment basis in Table 2.2. Methods used to project the 2050 AADT Traffic were derived from two sources: historical growth in daily traffic volumes, and the Berkeley-Charleston-Dorchester Council of Governments (BCDCOG) travel demand model. Travel demand in this corridor is related to 1) expected growth in the commercial aviation industry around the Charleston International Airport, 2) expected growth in residential and commercial development on the Glenn McConnell Parkway corridor, 3) expected growth at the Charleston area port terminals 4) expected growth in rail-based freight volumes, and 5) general growth in the region.

Table 2.2 shows the projected v/c ratios for traffic in 2050 for the no build alternative, which assumes no improvements are made. Future traffic analyses indicate that if no improvements are made to the existing corridor, then traffic operations will continue to deteriorate and will cause most of the project corridor to function at an unacceptable LOS F in the design year 2050, confirmed by a v/c ratio greater than 1.0. Figure 2.3 shows the corridor segments referred to in Table 2.1 and Table 2.2. For more detailed traffic information refer to Appendix B the Alternatives Development Traffic Analysis Report.

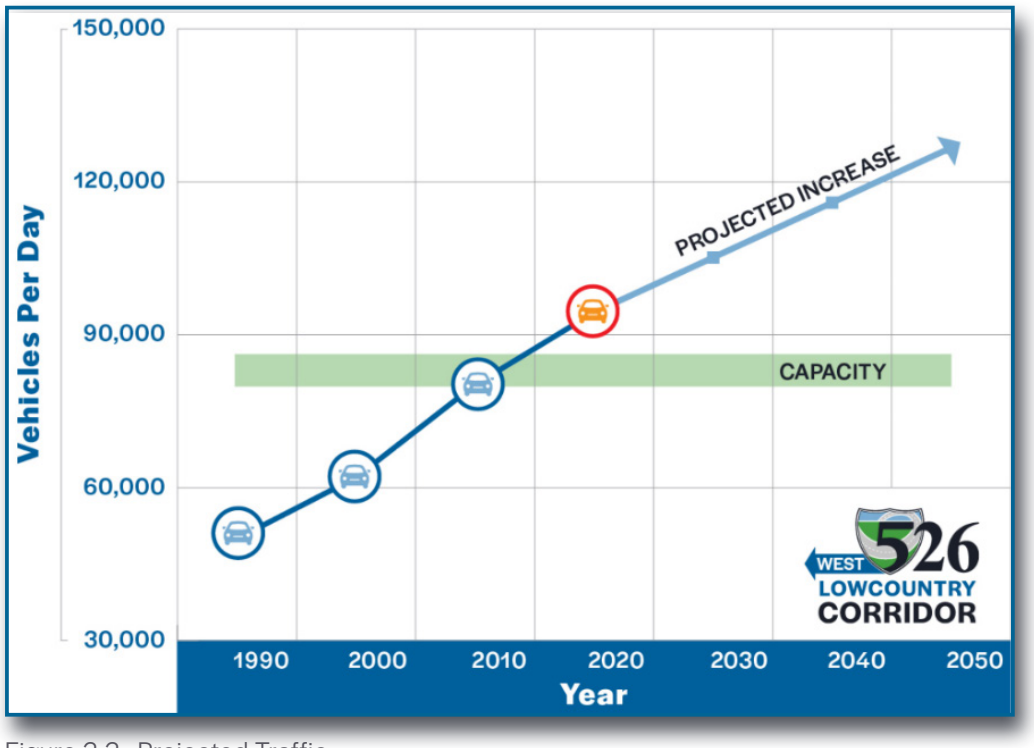

Figure 2.2 Projected Traffic

Figure 2.3 I-526 LCC WEST Segments

Table 2.2 I-526 LCC WEST 2050 No-Build Traffic Volumes and Levels of Service by Segment

Segment		No Build 2050 AADT	AM Peak					
			Eastbound			Westbound		
			Available Capacity (%)	v/c ratio	LOS	Available Capacity (%)	v/c ratio	LOS
1	SC 7 (Sam Rittenberg Blvd) to Paul Cantrell Blvd	59,800	67%	0.33	B	43%	0.57	D
2	Paul Cantrell Blvd to Leeds Ave	106,900	16%	0.84	E	0%	1.50	F
3	Leeds Ave to Dorchester Rd	106,400	46%	0.54	C	0%	1.11	F
4	Dorchester Rd to Montague Ave	108,900	56%	0.44	B	39%	0.61	D
5	Montague Ave to International Blvd	91,000	18%	0.82	E	12%	0.88	E
6	International Blvd to I-26	120,200	31%	0.69	D	15%	0.85	E
7	I-26 to Rivers Ave	104,200	0%	1.92	F	36%	0.64	D
8	Rivers Ave to N Rhett Ave	104,400	0%	2.33	F	34%	0.66	D
9	N Rhett Ave to Virginia Ave	122,200	0%	2.00	F	0%	2.28	F

Segment		No Build 2050 AADT	PM Peak					
			Eastbound			Westbound		
			Available Capacity (%)	v/c ratio	LOS	Available Capacity (%)	v/c ratio	LOS
1	SC 7 (Sam Rittenberg Blvd) to Paul Cantrell Blvd	59,800	58%	0.42	B	48%	0.52	C
2	Paul Cantrell Blvd to Leeds Ave	106,900	0%	1.52	F	0%	1.74	F
3	Leeds Ave to Dorchester Rd	106,400	0%	2.42	F	0%	2.50	F
4	Dorchester Rd to Montague Ave	108,900	33%	0.67	D	0%	2.90	F
5	Montague Ave to International Blvd	91,000	0%	1.42	F	0%	3.11	F
6	International Blvd to I-26	120,200	0%	1.46	F	0%	2.21	F
7	I-26 to Rivers Ave	104,200	0%	1.19	F	0%	1.78	F
8	Rivers Ave to N Rhett Ave	104,400	0%	1.21	F	0%	2.17	F
9	N Rhett Ave to Virginia Ave	122,200	0%	2.14	F	0%	2.46	F

Source: Stantec, February 2020

2.1.5 Geometric Deficiencies

Geometric Deficiency is the consideration of the inadequacies of roadway design

The 2017 SCDOT Roadway Design Manual provides guidance on geometric design based on the American Association of State Highway and Transportation Officials (AASHTO) A Policy on Geometric Design of Highways and Streets (SCDOT Roadway Design Manual).[6] There are elements of the existing I-526 LCC WEST that are geometrically deficient, which result in congestion and poor safety conditions. These elements include: the acceleration and deceleration lanes that are not long enough, short distances between entrance and exit ramps that result in tight vehicle merging, tight curves on loop ramps, and poor sight distance that a driver needs to see ahead to react to traffic conditions and come to a stop if necessary. These deficiencies are described for each of the following interchanges.

2.1.5.1 I-526 at Paul Cantrell Boulevard

The I-526 & Paul Cantrell Boulevard interchange is the western terminus of the I-526 LCC WEST project. I-526 passes over Paul Cantrell Boulevard at Exit 11, where the partial cloverleaf interchange uses a combination of ramps and loops to provide connections between the two highways. Refer to Figure 2.4. Geometric deficiencies at the existing interchange include:

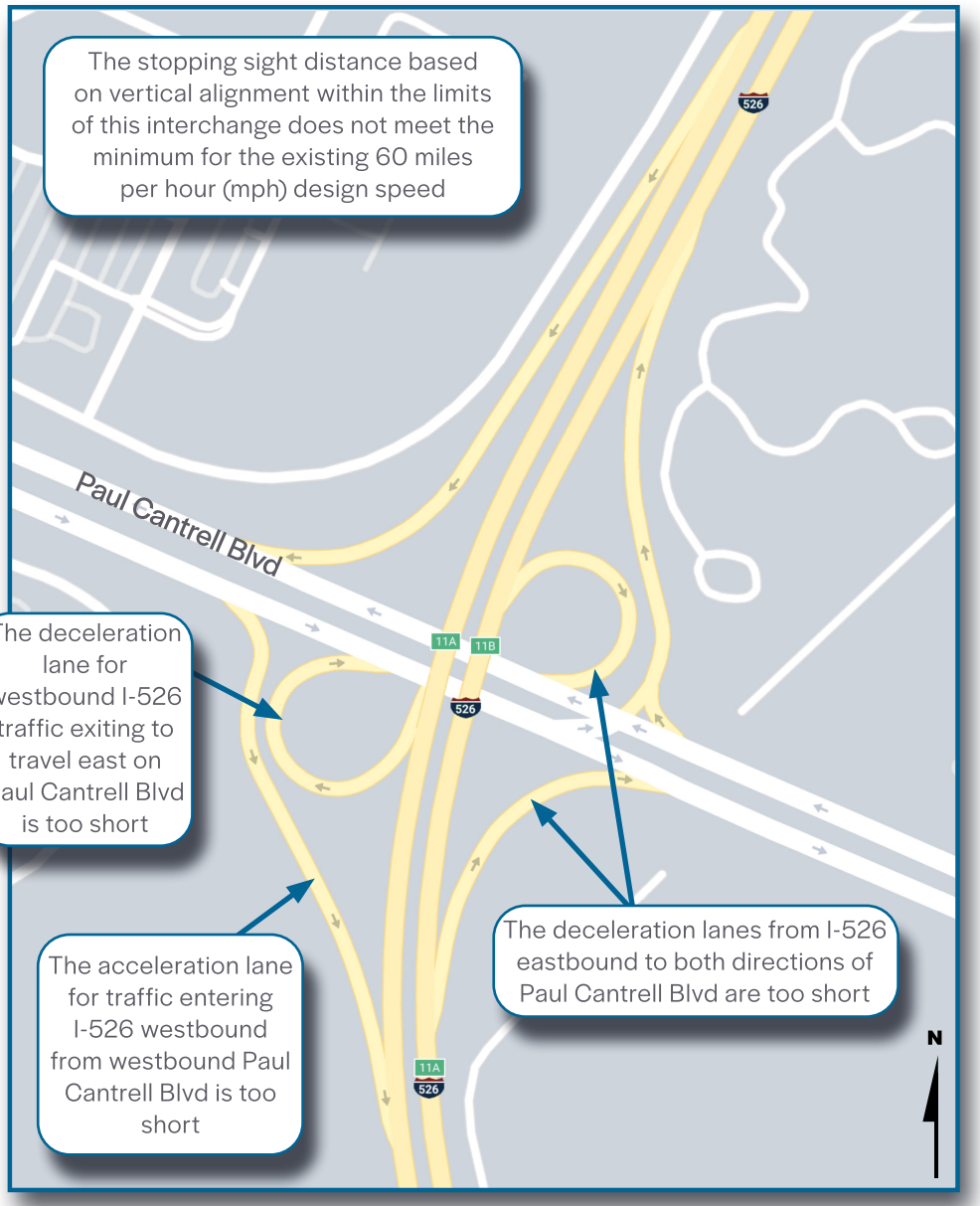

Figure 2.4 I-526 at Paul Cantrell Boulevard

6 Roadway Design Manual. SCDOT. March 2017. https://www.scdot.org/business/pdf/roadway/2017_SCDOT_Roadway_Design_Manual.pdf

2.1.5.2 I-26/I-526 System Interchange

The I-26/I-526 interchange is a partial cloverleaf interchange that includes loop ramps in three quadrants, a fly-over ramp that connects I-526 East to I-26 West, a ramp connection between I-526 West and I-26 East, and a collector-distributor (C-D) road in the northwest and southwest quadrants, refer to Figure 2.5. Geometric deficiencies throughout this interchange system include:

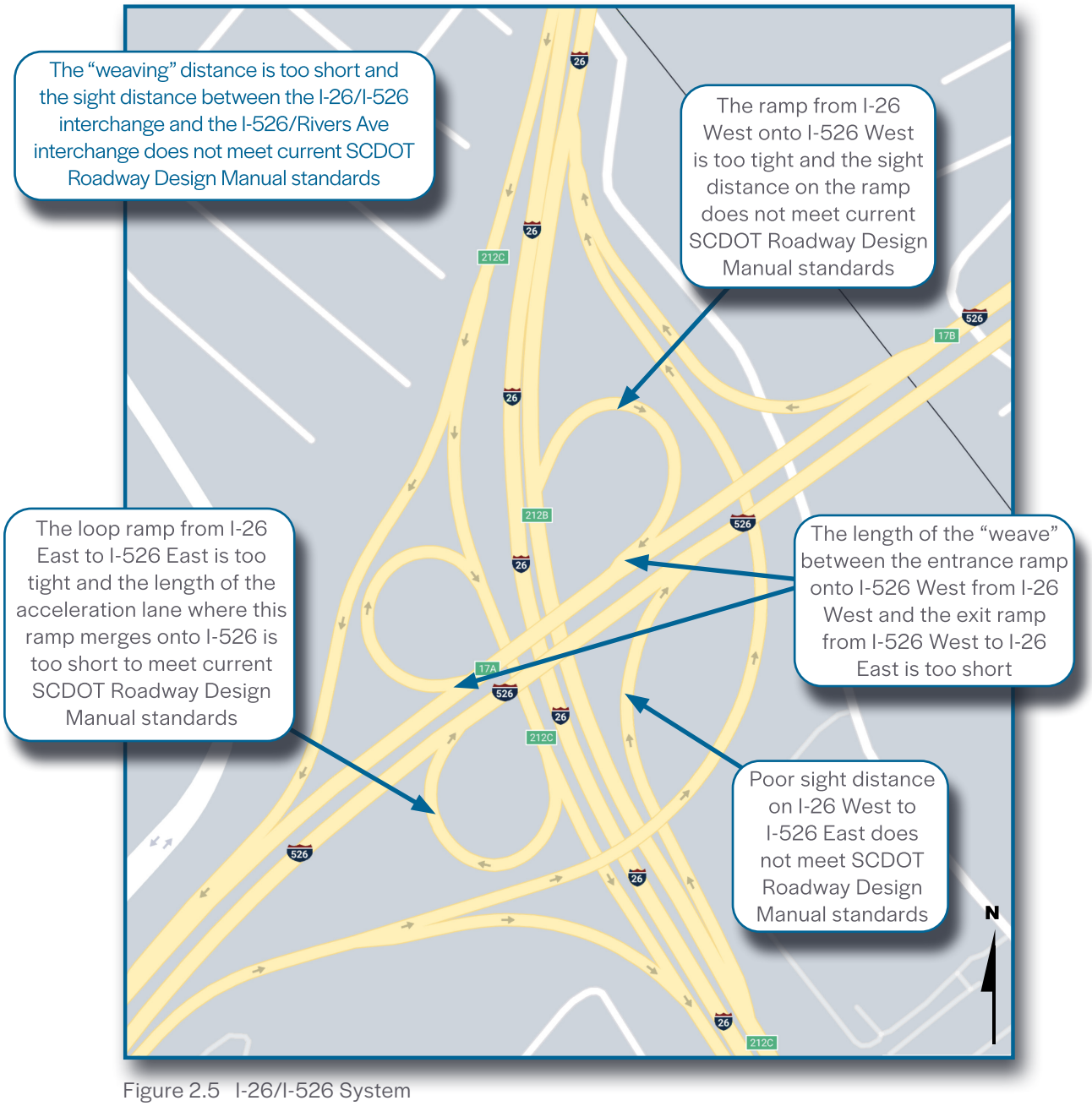

Figure 2.5 I-26/I-526 System

2.1.5.3 I-526 at Rivers Avenue

I-526 at Rivers Avenue is a partial cloverleaf interchange, refer to Figure 2.6. Geometric deficiencies noted at this interchange include:

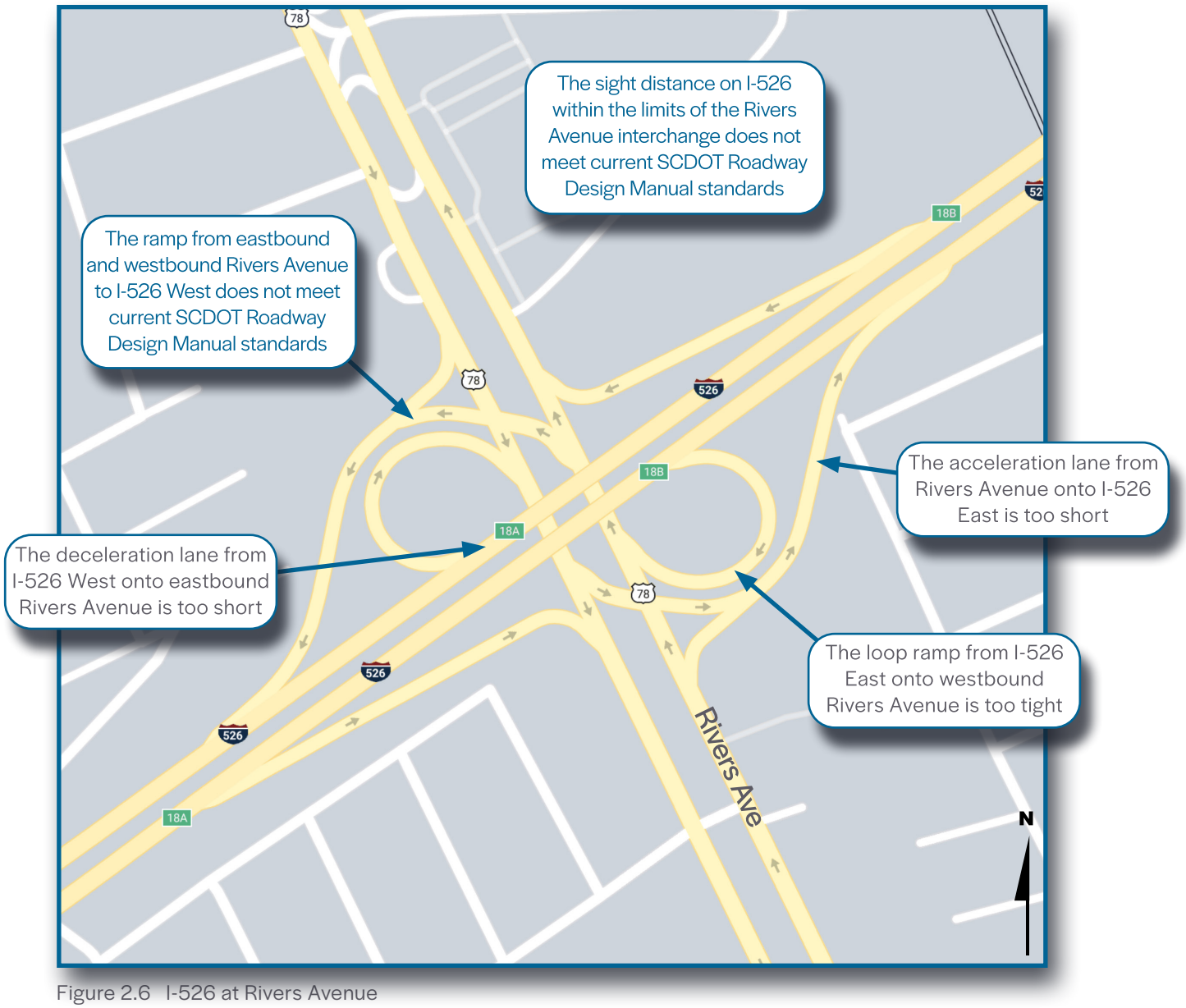

Figure 2.6 I-526 at Rivers Avenue

2.1.5.4 I-526 at N Rhett/Virginia Avenue

The I-526 at N Rhett/Virginia Avenue interchange is the eastern terminus of the I-526 LCC WEST project with loop ramps to provide access in each direction, refer to Figure 2.7. The geometric deficiencies of the existing loop ramps of this interchange consist of:

Figure 2.7 I-526 at N Rhett/Virginia Avenue

2.1.6 Pedestrian and Bicycle Connectivity

Pedestrian and bicycle connectivity and mobility needs within the I-526 LCC WEST Project corridor are documented in local and regional transportation plans. The BCDCOG 2040 LRTP[7] collected public input on the pedestrian and bicycle mobility needs of the region and referenced previous studies, including the WalkBike BCD[8] (BCD Plan).

The BCDCOG LRTP classifies the projects recommended by the WalkBike BCD and People Pedal plans as "Priority" or "Complimentary." Priority projects were determined to be independently eligible for one of several federal funding sources and were not necessarily associated with a separate road project. Complimentary projects were determined to be pedestrian and bicycle needs that coincide with LRTP roadway projects. All LRTP pedestrian and bicycle improvements that fall within the I-526 LCC WEST project are in the Complimentary Project category. These projects are described in Table 2.3. The termini shown for each pedestrian or bicycle improvement may be beyond the limits of the project, and the project response description applies only to that portion of the improvement within the project limits.

Table 2.3 BCDCOG 2040 LRTP Pedestrian & Bicycle Improvements within the I-526 LCC WEST Corridor

Roadway Corridor	From	To	Improvement Type
I-526 (Parallel)	Paul Cantrell Blvd	3,350 ft east of Virginia Ave	Shared Use Path
Glenn McConnell Pkwy	I-526	Magwood Dr	Paved Shoulder
Glenn McConnell Pkwy	Mary Ader Ave	Magwood Dr	Paved Shoulder
Glenn McConnell Pkwy	W Wildcat Blvd	Henry Tecklenburg Dr	Shared Use Path
Ashley River Rd	Frontage Rd	Tobias Gadson Blvd	Shared Use Path
			Paved Shoulder
N Rhett Ave	Remount Rd	Exit 19 Ramp	Shared Use Path
			Paved Shoulder
US Hwy 52	I-526	Goodmall Dr/Hwy 52 Ramp	Improve Existing Sidewalk
			Separated Bike Lane
US Hwy 52	I-526	Rebecca St	Paved Shoulder
US Hwy 52	Taylor St/Harley St	Exit 18B	Improve Existing Sidewalk
			Separated Bike Lane

7 "CHATS 2040 LRTP-Pedestrian & Bicycle Mobility," Berkeley-Charleston-Dorchester Council of Governments, January 2019.

8 "Walk+Bike BCD, Planning for a Walkable & Bikeable Region," Berkeley-Charleston-Dorchester Council of Governments, May 2017.

2.2 USACE Purpose and Need

US Army Corps of Engineers (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 National Environmental Policy Act (NEPA).

2.2.1 USACE's Purpose of the Proposed Project

Through careful evaluation, the USACE concurs that the overall project purpose is to increase capacity and improve operations at the I-26 and I-526 interchange and along the I-526 mainline from Paul Cantrell Boulevard to Virginia Avenue. The USACE concurrence letter is included in Appendix A.

USACE was invited by Federal Highway Administration (FHWA) and SCDOT to act as a cooperating agency throughout the entire NEPA process.

2.2.2 Why the USACE's Project Purpose is Important

The US Environmental Protection Agency (USEPA), in conjunction with the USACE, developed guidelines under Section 404(b)(1) of the Clean Water Act, to ensure compliance with Section 404 of the Clean Water Act when evaluating permit applications. These guidelines prohibit the discharge of dredged or fill material unless it can be shown that there is no practicable alternative which would have less adverse impact on the aquatic ecosystem.[9] A practicable alternative is one that is "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purpose." (40 Code of Federal Regulations [CFR] 230.10(a)(2)). The USACE must evaluate the full range of practicable alternatives to determine whether the overall project purpose is met by each alternative, and whether the applicant's proposed alternative represents the least environmentally damaging practicable alternative.

2.2.3 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.[10] The public interest policy is a component of the overall permit evaluation that takes into consideration both public and private need for the proposed project. 33 CFR 320.4(a)(2) states that the public interest review must balance the reasonably expected benefits from the proposed project against its reasonably foreseeable detriments. The outcome of the general balancing process determines the decision whether to authorize a project proposal, and if so, the conditions under which it will be allowed to occur.

2.3 Public and Agency Involvement in the Purpose and Need

Input on the purpose and need for the I-526 LCC WEST project was obtained through a variety of methods.

State and Federal agencies discussed the draft purpose and need during a project scoping meeting held on March 14, 2019. A Community Advisory

9 Section 404 of the Clean Water Act - CWA Section 404(b)(1) Guidelines (40 CFR 230). USEPA. 2010. https://www.epa.gov/cwa-404/cwa-section-404b1-guidelines-40-cfr-230

10 Corps of Engineers, Dept. of the Army 33 CFR Part 320. Federal Register. https://www.govinfo.gov/content/pkg/CFR-2012-title33-vol3/pdf/CFR-2012-title33-vol3-part320.pdf

Council (CAC) was established for the I-526 LCC WEST project to ensure community engagement. At the first CAC meeting on September 30, 2019 the proposed purpose and need was discussed and general comments were received in support of reducing congestion, but minimizing impacts to the neighboring communities. A Public Involvement Plan (PIP) was developed to outline and ensure public involvement at various stages of the project and to include review and comment on the proposed purpose and need. During the November 21, 2019 in person Public Information Meeting and the Virtual Public Information Meeting (VPIM), the public was encouraged to provide feedback on the proposed purpose and need of the project. 553 comments were received from the Public Information Meeting.

2.4 Public Interest Review Factors

The USACE's Public Interest Factors were also used to evaluate the potential impacts upon wetlands/streams and how this impact would affect the interests of the public. Many of the USACE's Public Interest Factors were quantified and compared during the designation of the reasonable alternatives, including: land use; consideration of property ownership; wetlands; fish and wildlife; water quality; floodplains; historic properties; and recreation, Table 2.4. Some factors, such as mineral needs and shore erosion and accretion would not be impacted by the project.

Table 2.4 USACE Public Interest Review Factors

Public Interest Review Factor	Reference
Conservation	Chapter 4 - Section 4.1.5, 4.1.6
Economics	Chapter 4 - Section 4.4
Aesthetics	Chapter 4 - Section 4.3, 4.5; Appendix E
General environmental concerns	Chapter 4
Wetlands	Chapter 4 - Section 4.11
Historic properties	Chapter 4 - Section 4.14; Appendix P
Fish and wildlife	Chapter 4 - Section 4.13
Flood hazards	Chapter 4 - Section 4.12
Floodplains	Chapter 4 - Section 4.12; Appendix N
Land use	Chapter 4 - Section 4.1
Navigation	Chapter 5
Recreation	Chapter 4 - Section 4.1, 4.3, 4.5, 4.6, 4.7, 4.15, 4.16
Water supply	Chapter 4 - Section 4.10, 4.11
Water quality	Chapter 4 - Section 4.10
Energy needs	Chapter 4 - Section 4.19
Safety	Chapter 2 - Section 2.1; Chapter 3
Food and fiber production	Chapter 4 - Section 4.2
Consideration of property ownership	Chapter 4 - Section 4.3, 4.6