

4: ROADWAY

INTRODUCTION

The Upstate's transportation system must strike a balance between serving the current mobility needs of existing residents, businesses and visitors and planning for the region's growth and economic wellbeing. The GPATS area will face increased travel demand, placing pressure on the roadway network to accommodate more trips each year. The program should plan for the future with capacity improvements, access management, active transportation, and operational improvements that increase safety and travel efficiency for all users.

The *Horizon 2040* roadway recommendations are crucial to building and maintaining a safe, efficient, and accessible transportation network that accommodates all users. The project team completed an existing network assessment to fully understand the region's profile and challenges and be better stewards of limited resources.

This chapter describes the region's existing roadway network, the planning process that led to the prioritized roadway improvement recommendations, and general planning recommendations that can be incorporated into future efforts so GPATS can plan for future growth efficiently.

The Horizon 2040 Roadway Recommendations

- Corridor Improvements
- Intersection and Interchange Improvements
- Safety, Access, and Connectivity Toolkits
- Congestion Management Process

RELEVANCE TO THE GUIDING PRINCIPLES

Throughout the *Horizon 2040* planning process, the guiding principles acted as checks and balances to ensure the resulting recommendations reflected community values and the region's best interests. In particular, the roadway recommendations reflect the following guiding principles:



Culture and Environment

The roadway planning process ensures sustainable growth and environmental preservation. Long-range planning encourages thoughtful consumption of scarce resources and open space.



Economic Vitality

Maintaining and improving efficient connections between regional destinations keeps the region an attractive place to live, work, and do business.



Growth and Development

It is crucial that roadway recommendations follow the region's development goals and guidelines so the transportation network facilitates long-term economic growth for the region.



Mobility and Accessibility

The inclusion of wide shoulders or bike lanes in a roadway cross-section can facilitate multimodal integration where strategically implemented throughout the roadway network.



Safety and Security

Improving safety is an important regional goal and the driving force behind many projects. Certain improvements, such as access management, intersection realignments, and multimodal enhancements, have a major effect on safety at these locations.



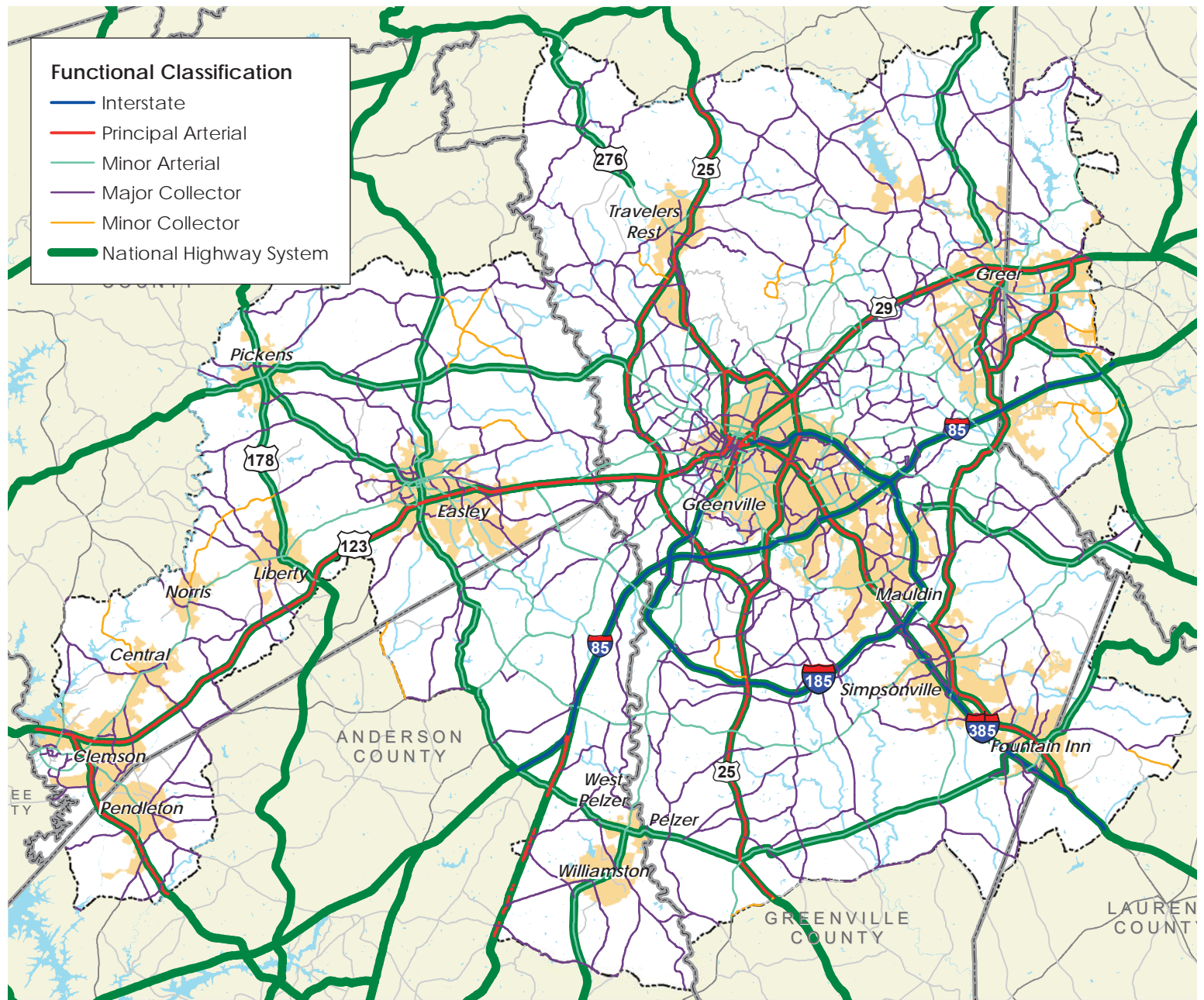
System Preservation and Efficiency

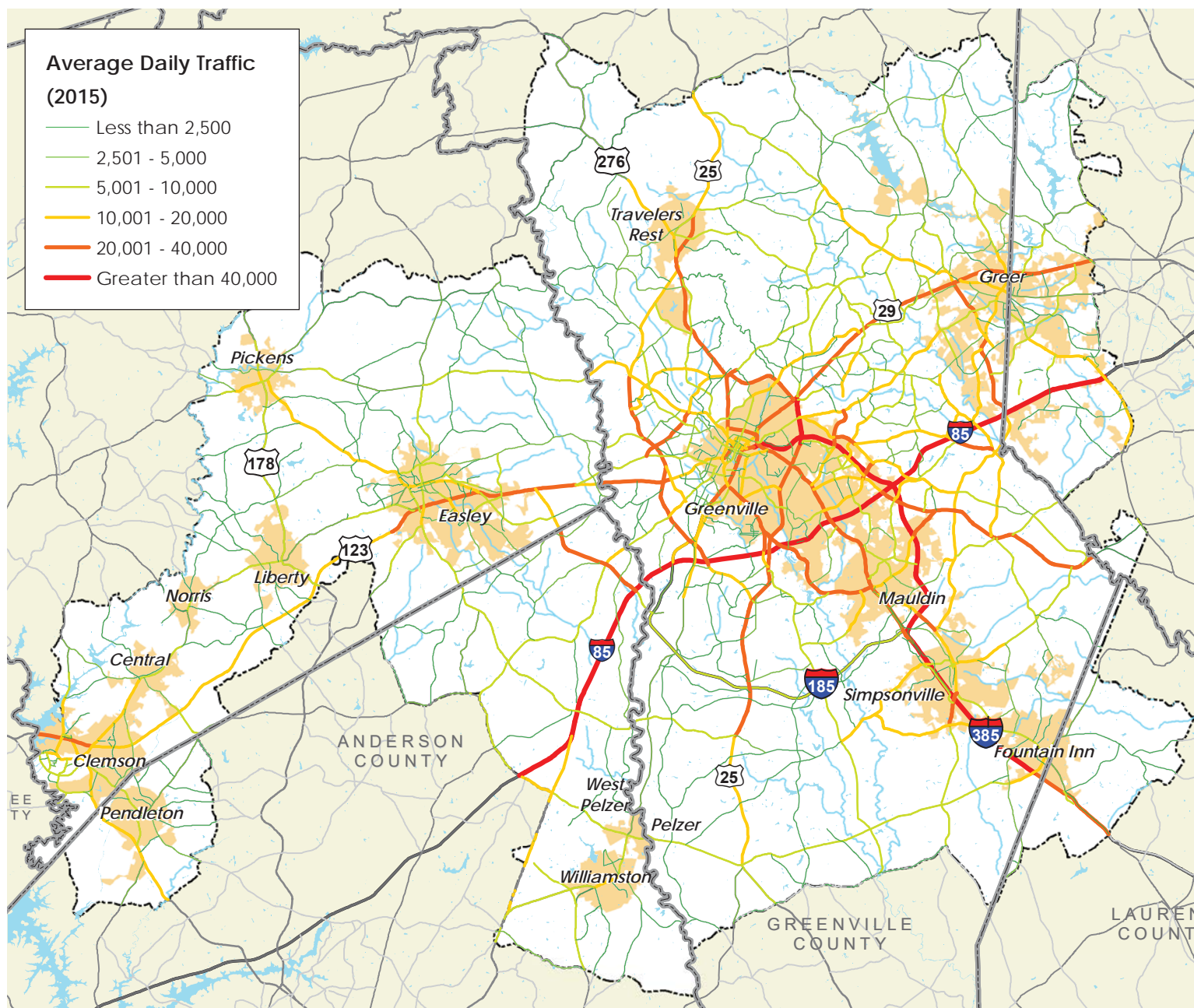
The region's roadway network requires frequent improvement and maintenance as the region grows and travel demand increases. The LRTP plans for these improvements so that the system remains functional and efficient long into the future.

NETWORK ASSESSMENT

Functional Classification

Functional classifications are defined by the FHWA and used by policy makers, planners, engineers, and citizens to designate the characteristics and purposes of a system's roadways. The functional classification system categorizes streets in a general hierarchy to identify each roadway's importance to the overall transportation system for planning purposes. The study area has 5,955 center-line miles of functionally-classified public roads.





Annual Average Daily Traffic

Traffic volumes typically correlate with the purpose and function of each roadway's design and location. The map at the right shows annual average daily traffic (AADT) for each corridor in 2015 based on information provided by SCDOT. AADT is one way to identify the region's most heavily traveled roadways and less congested local thoroughfares.

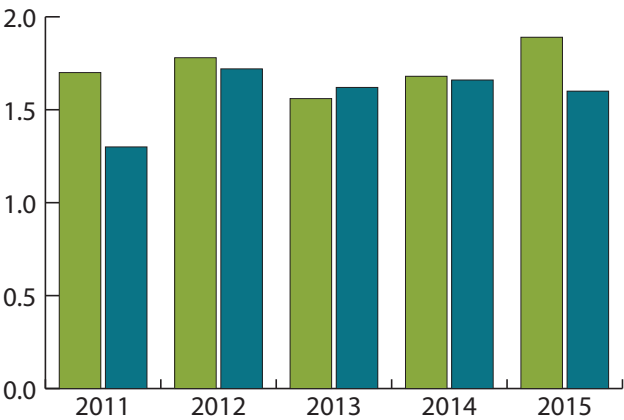
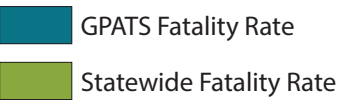
Safety

According to information provided by SCDOT, South Carolina had the highest fatality rate in the nation at 1.89 per 100 million vehicle miles of travel in 2015, while the GPATS area had a fatality rate of 1.60. Based on this data, it is essential to consider potential solutions to improve the safety of the overall GPATS transportation system.

According to SCDOT data, the region’s urbanized areas are also the most dangerous. Eighty percent of fatal and severe-injury crashes occur in urban areas, with primary arterials being the most dangerous (47% of crashes occur on primary arterials despite being only 11% of mileage).

The GPATS region performed worse than the South Carolina state average on the rate of fatal and injury crashes related to young drivers (ages 15-24), intersections, motorcyclists, older drivers (age 65+), and moped riders. Overall, however, the region performed better than the statewide average, with fewer fatal and severe injury crashes related to roadway departures, unrestrained occupants, speed, heavy trucks, and bicycles.

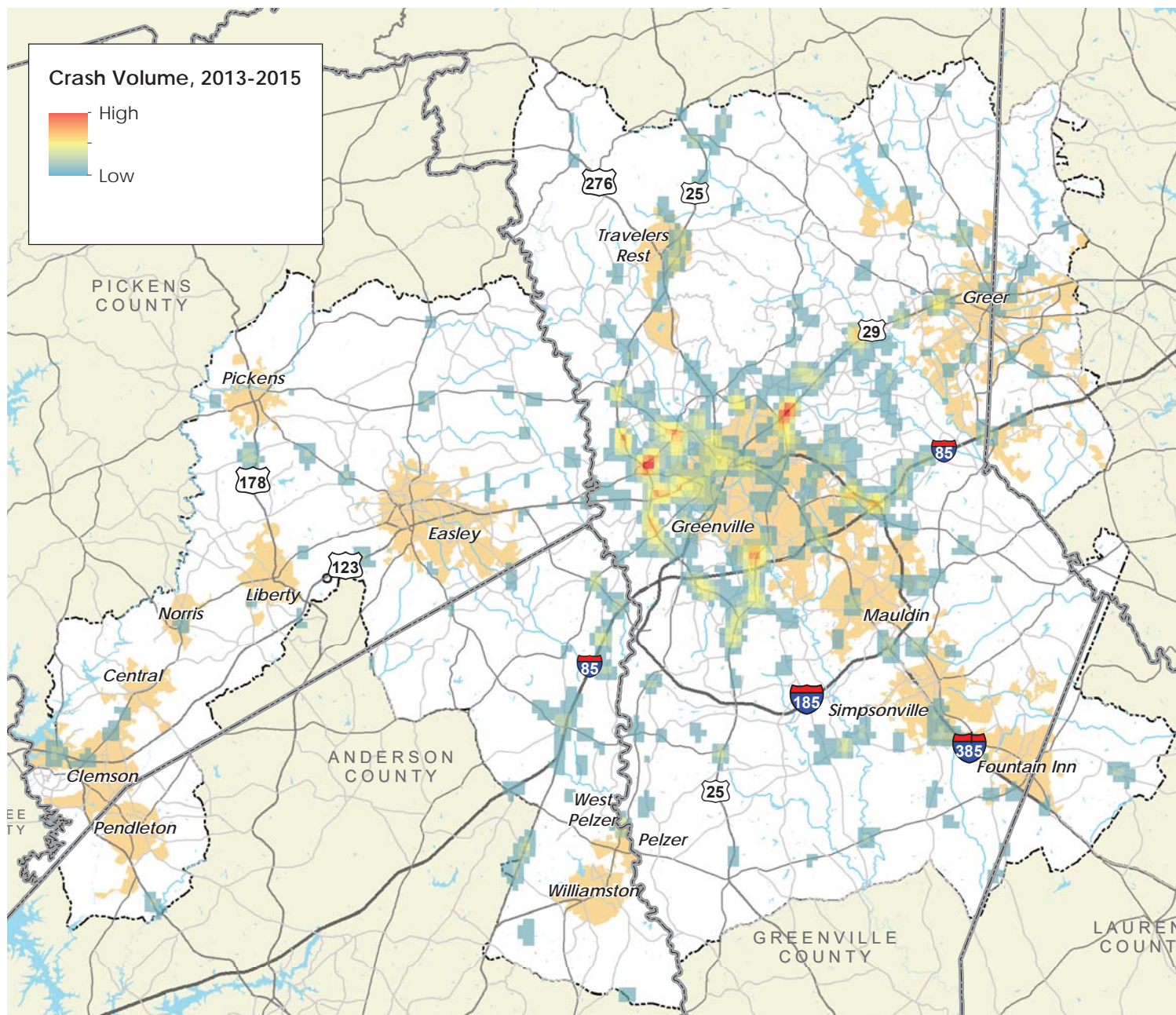
Overall Fatality Rate, 2011–2015



Six corridors comprise 36% of all intersection crashes:

- White Horse Road in Greenville
- Wade Hampton Boulevard/US 29
- Pointsett Highway/Laurens Road
- Farrs Bridge Road
- SC Highway 14
- Pleasantburg Drive

Type of Crash	Percent of Fatal or Severe Injury Crashes (2011–2015)	
	GPATS	Statewide
Roadway Departure	41%	42%
Young Drivers	35%	24%
Unrestrained Occupants	30%	41%
Intersection	27%	25%
Impaired Driving	27%	26%
Speed Related	25%	35%
Motorcyclists	16%	14%
Old Drivers	15%	12%
Pedestrians	10%	7%
Mopeds	7%	4%
Heavy Trucks	3%	6%
Bicyclists	1%	2%

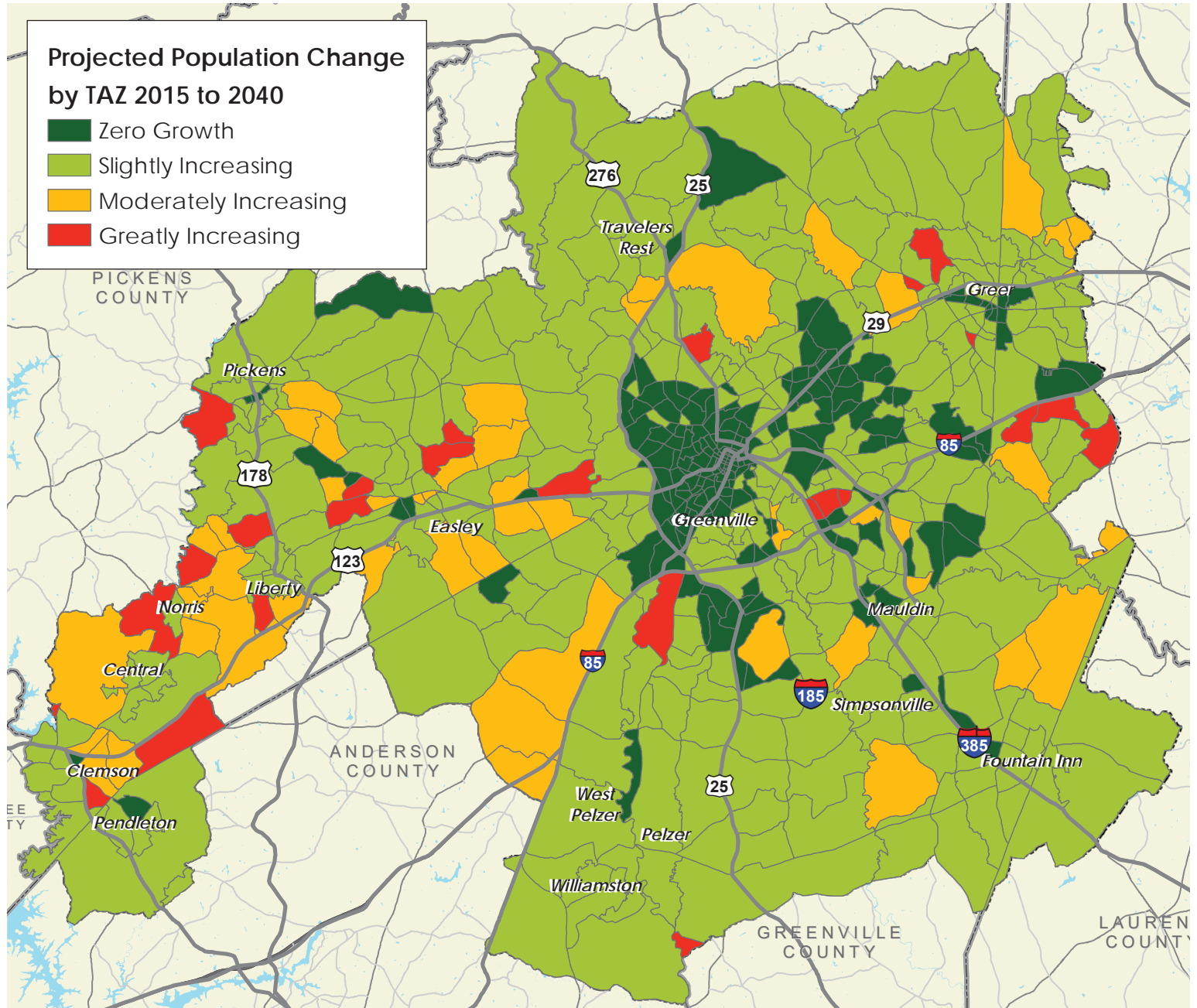


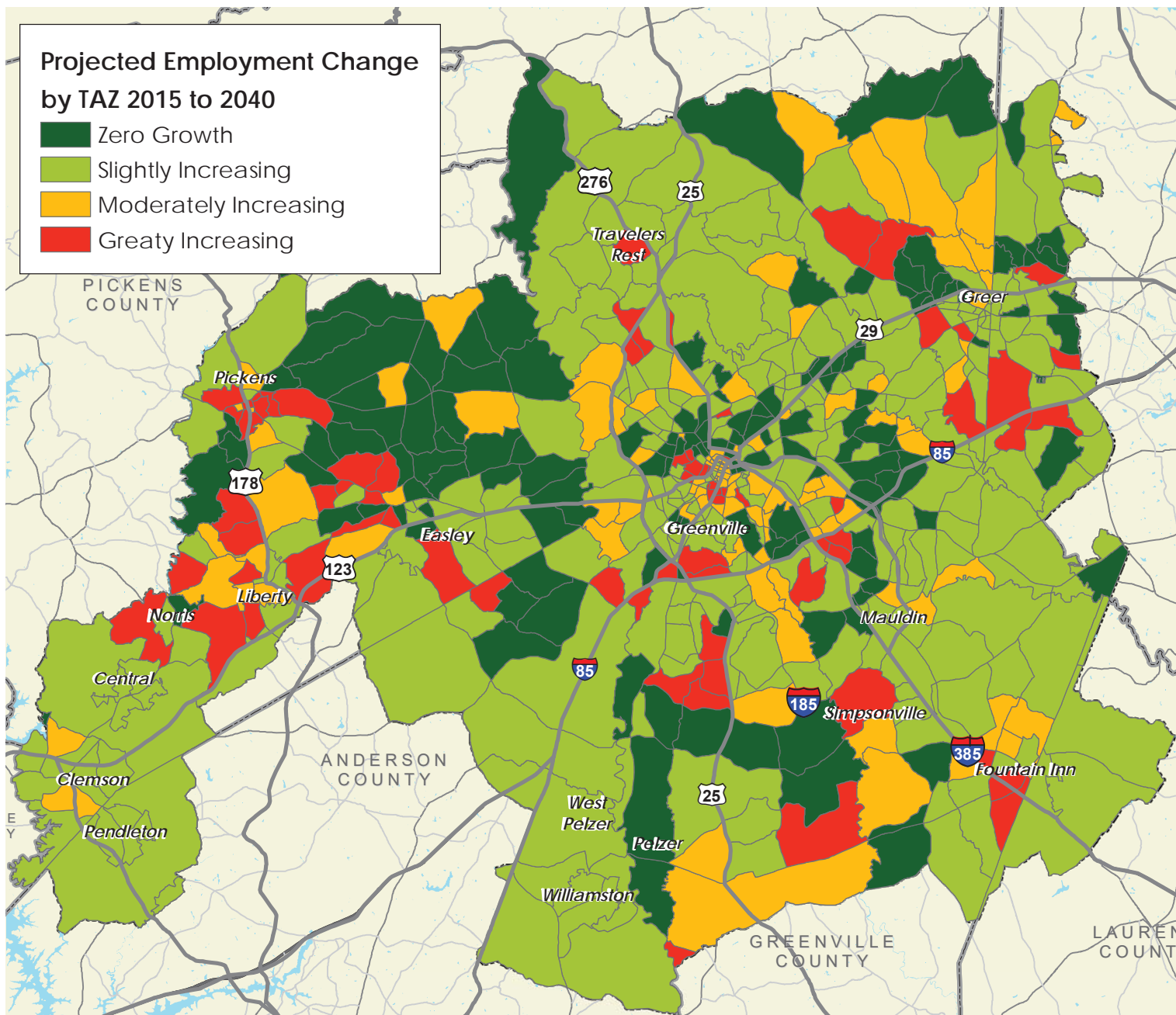
Crash History

The map to the left shows the occurrences of fatal and severe injury crashes from 2013 to 2015. The majority of serious crashes in the region occur on the major roadways near Greenville, with hot spots near the intersections of White Horse Road and Blue Ridge Drive, the intersections of Wade Hampton Boulevard and Pine Knoll Drive, the intersection of Blue Ridge Drive and Cedar Lane Road, and near the intersection of Mauldin Road and Pleasantburg Drive. Other hot spots occur throughout the study area, but the major volume of severe accidents occurs within the Greenville City limits.

Projected Population Growth

The map to the right shows projected population growth by transportation analysis zones (TAZ) from 2015 to 2040. TAZs projected to grow are illustrated as slightly increasing (1-50%), moderately increasing (51-100%), and greatly increasing (>100%). The region's population growth ranges from none to more than 7,000% in areas with existing low population.



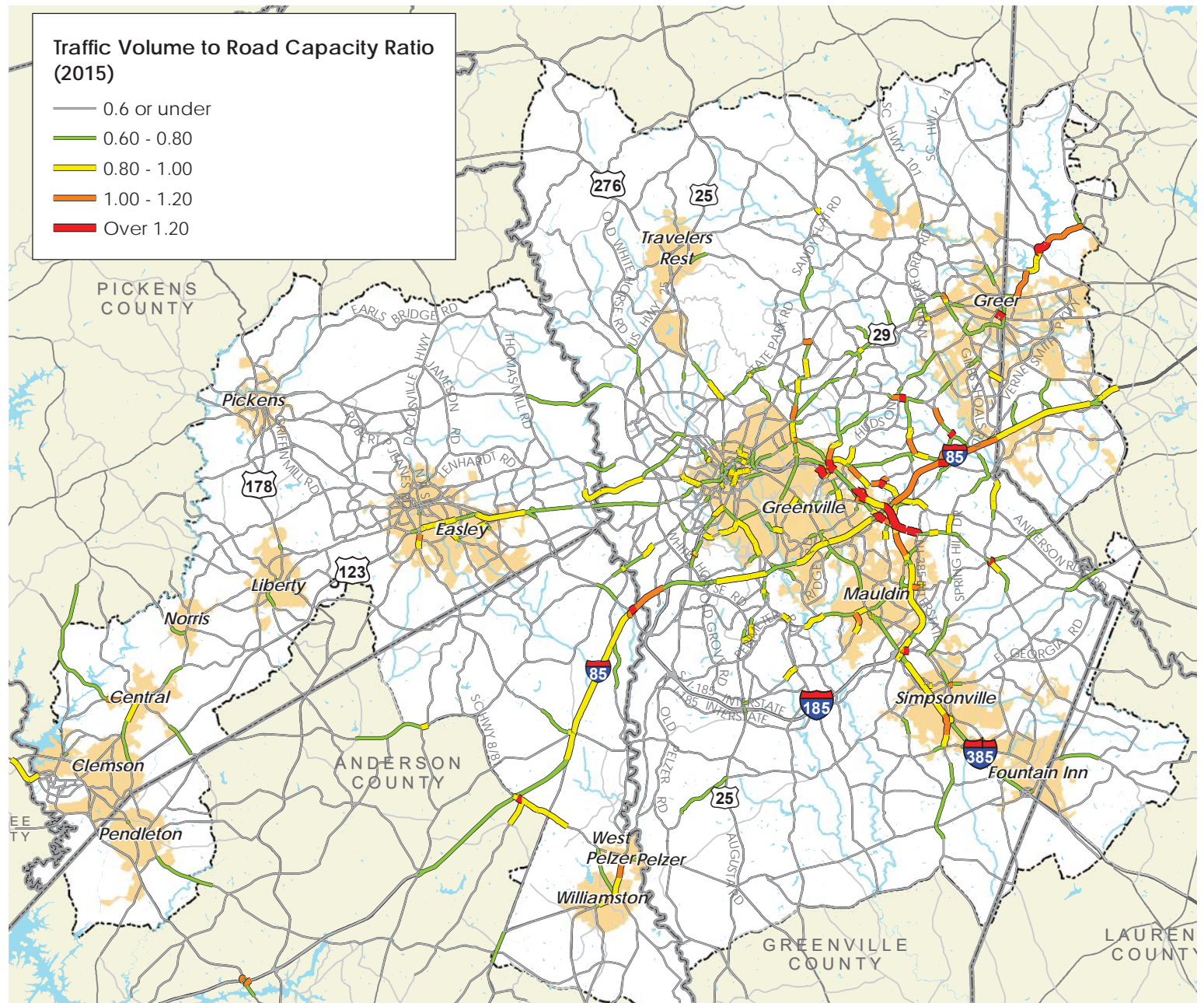


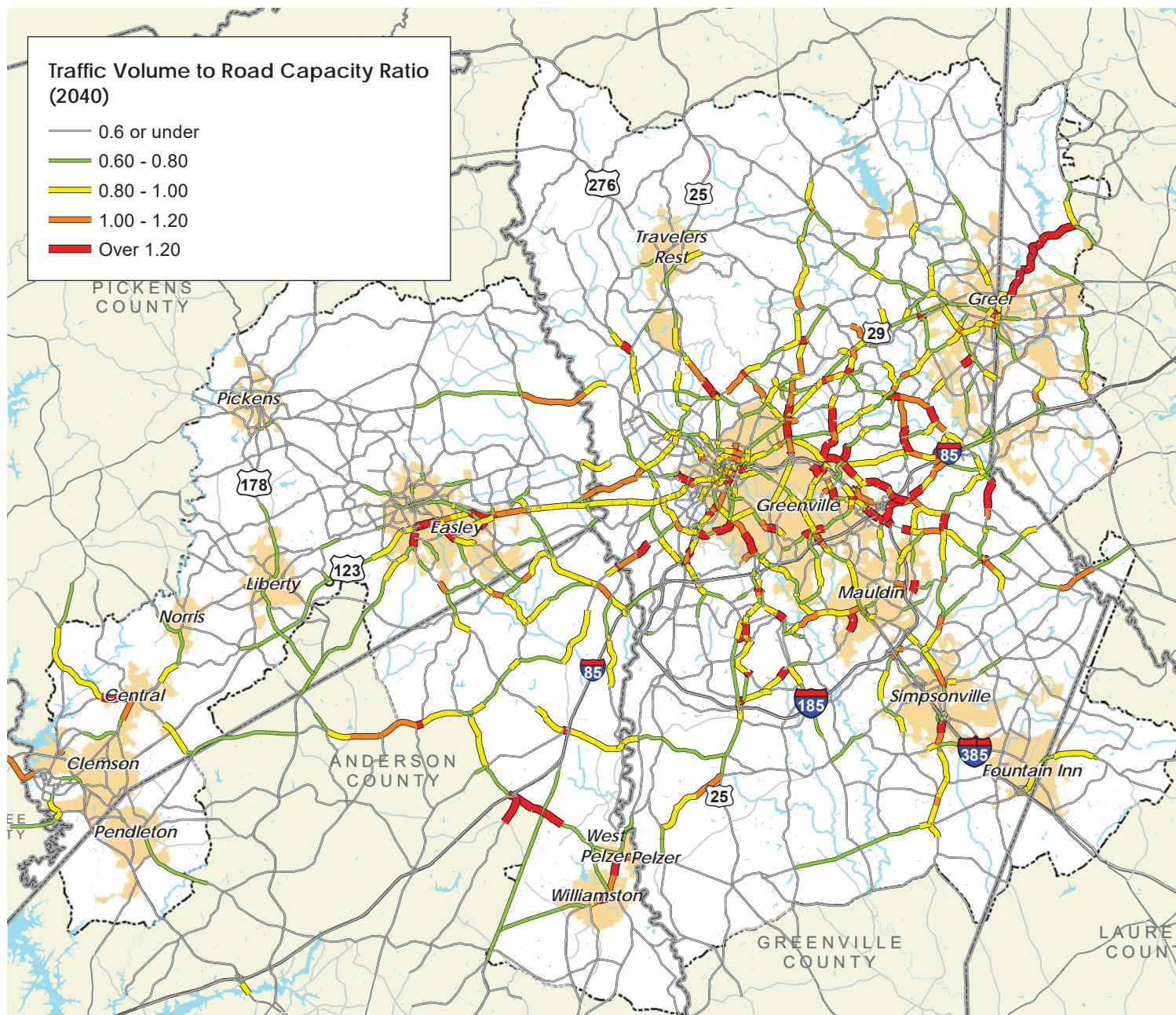
Projected Employment Growth

The map to the left shows projected employment growth in TAZs from 2015 to 2040. TAZs projected to grow are illustrated as slightly increasing (1-50%), moderately increasing (51-100%), and greatly increasing (>100%). Employment growth in the region ranges from none to more than 7,000% in areas with existing low employment.

2015 Congestion Model

The map to the right shows 2015 congestion in the GPATS area, based on current data. This data gives us a good baseline when comparing to future years.





2040 Congestion Model

The map to the left shows how the regional network is expected to perform in the year 2040 if the currently committed and funded roadway improvements are completed. Even with committed and funded projects, regional growth is projected to lead to more congestion.

ROADWAY RECOMMENDATIONS PROCESS

The *Horizon 2040* process brought the public's priorities to the forefront as the project team determined the final set of recommended projects.

The *Horizon 2040* Vision Plan—the full set of unconstrained transportation recommendations—contains input from a diversity of stakeholders, ranging from Upstate residents, technical planning staff, and local leaders, as well as from previous plans. A thorough 15-month process of review, analysis, and community engagement ensured that the full vision plan reflects the community's priorities and goals and the best practices in transportation planning.

1

Public Outreach

Project suggestions were solicited from the public, city and county staff, and elected officials through meetings and online surveys. Over 4,000 project ideas were collected.

2

Analysis and Recommendations

Projects were analyzed and selected based on their feasibility and need, and draft recommendations were created. The list was finalized after a second round of feedback.

3

Prioritization

Projects were scored based on SCDOT's process to determine their relative regional impacts and decide which projects should be made priorities.

4

Final Plan

Ultimately, the final list of funded projects was adopted as the *Horizon 2040* plan and will move in order to the GPATS Transportation Improvement Plan (TIP) and finally to the State TIP to be implemented with Guideshare funding.

Corridor Recommendations

The roadway improvement projects recommended in *Horizon 2040* take several forms. The diagrams below explain some of the most common project types. While widenings and new roadways increase capacity, congestion may still worsen over time as travel demand increases.

New Roadway

Constructing new roadways to improve the region's connectivity.

Before



After



Widening

Adding travel lanes to increase capacity.

Before



After



Access Management

Restricting turns and consolidating driveways to improve safety.

Before



After



Corridor Improvements

Repaving, adding pedestrian infrastructure, improving intersections, and streetscaping.

Before



After



Road Diet

Widening travel lanes, improving safety, and adding bicycle or pedestrian infrastructure where appropriate.

Before



After

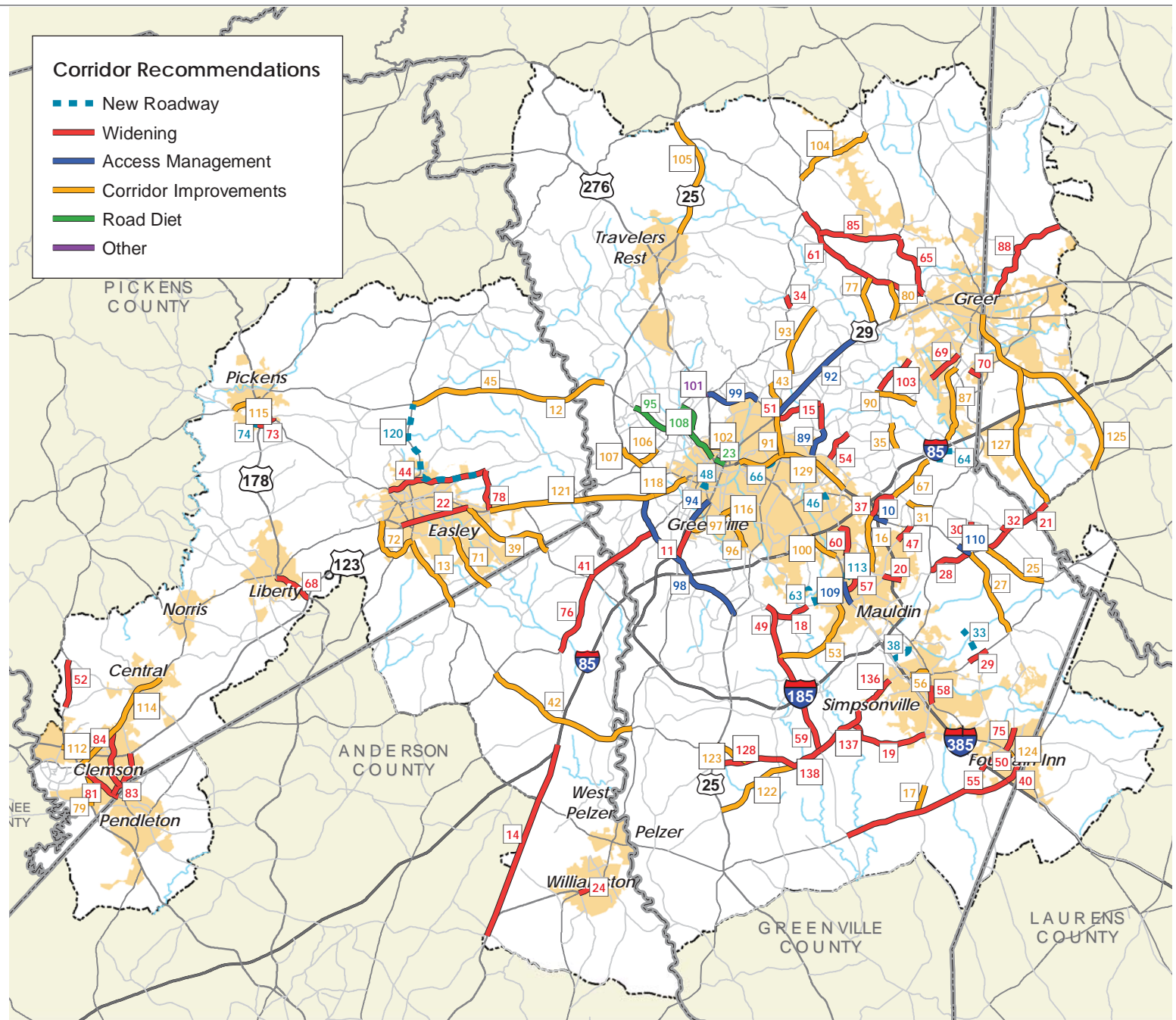


Other

- Bridge improvements
- Partial closure

Corridor Recommendations

In total, *Horizon 2040* recommends 123 corridor improvements throughout the region. These are detailed in the map shown to the right, along with their project ID numbers and the improvement type. Further project details are provided in the tables on the following pages and in the project sheets in Appendix G (<http://www.gpats.org/plans/horizon2040>).



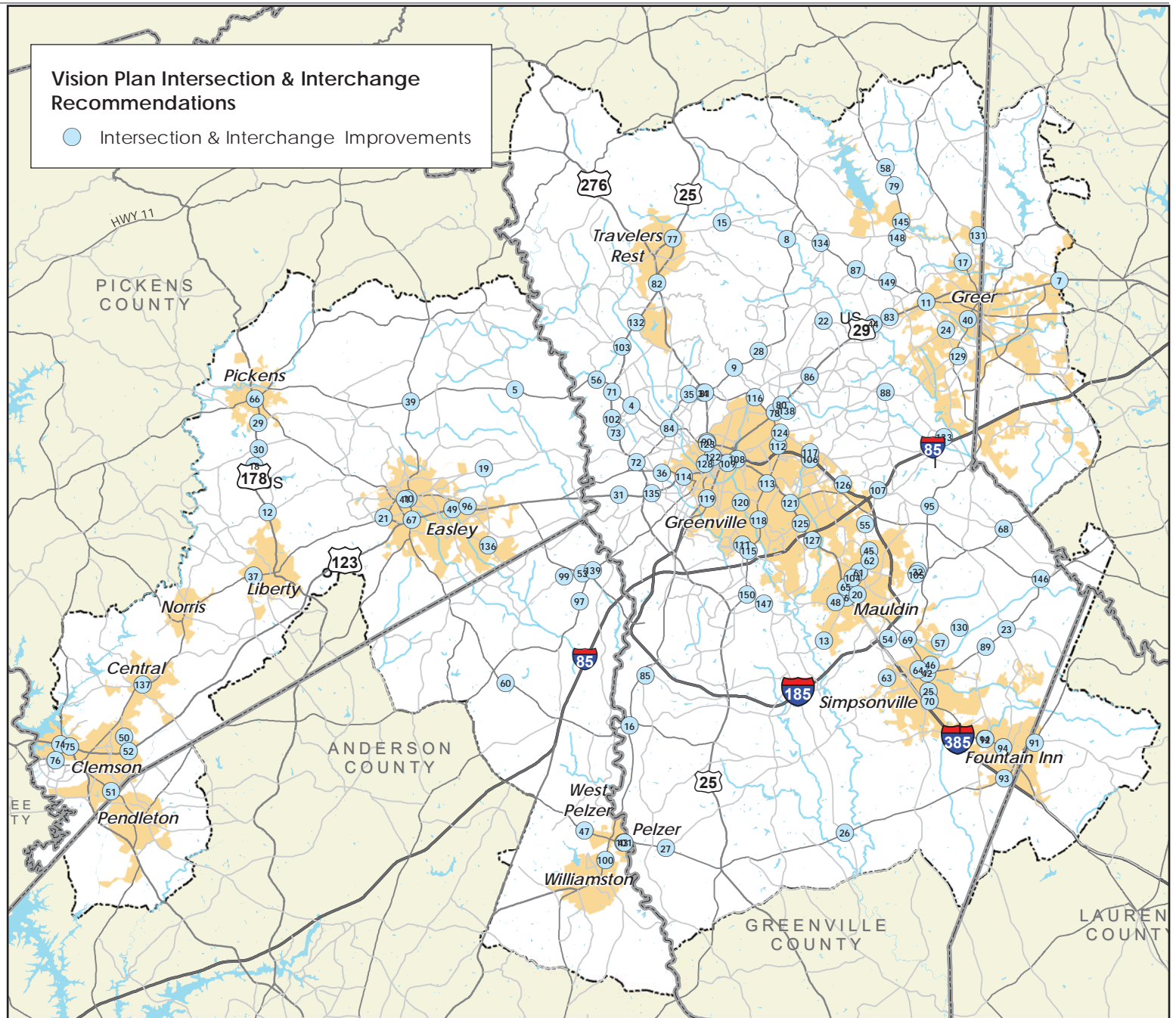
ID	Road Name	From	To
Access Management			
89	Haywood Rd	Pelham Rd	E North St
92	Wade Hampton Blvd	Pine Knoll Dr	Reid School Rd
98	White Horse Rd	US 123	Augusta Rd
99	N Pleasantburg Dr	Poinsett Hwy	Rutherford Rd
109	US 276 (N Main St)	Knollwood Dr	Owens Ln
110	Woodruff Rd	Woodruff Lake Way	Scuffletown Rd
Corridor Improvements			
12	Farrs Bridge Rd	Hamburg Rd	Groce Rd
13	SC-8	St. Paul Rd	Anderson Hwy
16	Miller Rd	Woodruff Rd	Corn Rd
17	Fairview Rd	SC 418	New Harrison Bridge Rd
25	Woodruff Rd	S Bennets Bridge Rd	Lee Vaughn Rd
27	Scuffletown Rd	Woodruff Rd	Lee Vaughn Rd
31	Roper Mountain Rd	SC 14	Feaster Rd
35	Boiling Springs Rd	Philips Road	Pelham Rd
39	Powdersville Rd/Old Pendleton Rd	US 123	SC 153
42	SC-86	SC 81	Piedmont Hwy
43	Pine Knoll	Wade Hampton Blvd	Rutherford Rd
45	Farrs Bridge Rd	SC-135	Hamburg Rd
53	Ashmore Bridge Rd	Fork Shoals Rd	Butler Rd
56	West Georgia Rd	Kemet Way	College St
67	Garlington Rd	Roper Mountain Rd	Pelham Rd
71	Brushy Creek Rd	Crestview Rd	St. Paul Rd
72	Black Snake/Adger/135	Liberty Dr	SC 8
77	St. Mark Rd	Wade Hampton Blvd	Locust Hill Rd
79	US-76	Pendleton Rd	S-39-343
80	N. Rutherford Rd/Fairview Rd	Wade Hampton Blvd	Locust Hill Rd
87	Gibbs Shoals Rd	S Batesville Rd	SC 14
90	Old Spartanburg Rd/Enoree Rd	Brushy Creek Rd	S Batesville Rd
91	N Pleasantburg Dr/Pine Knoll Dr	I-385	Wade Hampton Blvd
93	Stallings Road	Rutherford Rd	Reid School Rd
94	US 29/Mills Ave	Augusta St	Stevens St
96	Augusta St	Mauldin Rd	Faris Rd
97	W Faris Rd	Augusta Rd	Grove Rd
100	Laurens Rd	I-85	Innovation Dr
102	Stone Ave	Rutherford St	N Church St
104	Fews Bridge Rd	Mountain View Rd	N Highway 101
105	US-25	N study area boundary	Tigerville Rd
106	W Blue Ridge Dr	White Horse Rd	Agnew Rd
107	White Horse Rd	Broadway Dr	Pendleton Rd
112	US-123	College Ave	US 76

ID	Road Name	From	To
114	Main St	Clayton St	US 76
115	Main St	Secore Rd	Hampton Ave
116	E Faris Rd	Augusta St	Cleveland St
118	Academy St/US 123	Pendleton St	Washington Ave
121	US-123	Rock Springs Rd/Prince Perry	Washington Ave
122	Garrison Rd	West Georgia Rd	US-25
123	Sandy Springs Rd	West Georgia Rd	US-25
124	Main Street	Hellam St	Gulliver St
125	SC-101	SC-290	SC-296
127	Brockman McClimon Rd	SC-101	SC-296
129	I-385	Laurens Rd	Roper Mountain Rd
New Roadways			
33	Howard Drive Ext	Jonesville Rd	Johnson Drive
38	Pelham St Extension	Old Stage Rd	Kemet Way
46	Salters Rd (realignment)	Salters Rd	Mall Connector Rd
48	University Ridge Extension	Howe St	Main St
63	Holly Ridge Rd	Ridge Rd	W Butler Rd
64	Ben Hamby Ext	Ben Hamby Dr	S Batesville Rd
66	East Washington St. Ext	Woodlark St	Lowndes Hill Rd
74	LEC Road Ext.	S Catherine Ave	McDaniel Ave
113	Miller Rd Connector	Edgewood Dr	Miller Rd/Oak Park Dr
120	SC-153 Extension Phase 3	SC-183	Saluda Dam Rd
Widenings			
10	Woodruff Rd	Miller Rd	Smith Hines Rd
11	Grove Rd	US 25	W. Faris Rd
14	Us 29	Cheddar Rd	I-85
15	Howell Rd	E North St	Edwards Rd
18	Conestee Rd	Mauldin Rd	Fork Shoals Rd
19	Harrison Bridge Rd/Rocky Creek Rd	W Georgia Rd	Fairview Rd
20	Bridges Rd	E Butler Rd	Holland Rd
21	Bennetts Bridge Rd	Woodruff Rd	Brockman McClimon Rd
22	US 123	Jasper St	Powdersville Rd
24	W. Main St	Academy St	Hamilton St
28	Five Forks Rd	SC 14	Woodruff Rd
29	E. Georgia Rd	Hunter Rd	Lee Vaughn Rd
30	Batesville Rd	Woodruff Rd	Roper Mountain Rd
32	Anderson Ridge Rd	Roper Mountain Rd	S Bennets Bridge Rd
34	SC-253	Reid School Rd	Sandy Flat Rd
37	Garlington Rd	SC-146	Roper Mountain Rd
40	SC-418	Durbin Rd	I-385
41	Anderson Rd	SC-153	White Horse Road
44	Saluda Dam Rd/Olive St/Fleetwood Dr	W Main St	Prince Perry Dr

ID	Road Name	From	To
47	E. Butler Rd	Woodruff Rd	Verdin Rd
49	Fork Shoals Rd	White Horse Rd Ext	Ashmore Bridge Rd
50	Fairview St	N Nelson Dr	N Main St
51	Edwards Rd	Wade Hampton Blvd	Howell Rd
52	SC-133	Six Mile Hwy	Pike Rd
54	Hudson Rd	Devenger Rd	Pelham Rd
55	SC-418	I-385	Fork Shoals
57	Miller Rd	Corn Rd	Murray Dr
58	SE Main St	W Fernwood Dr	Fairview Rd
59	Fork Shoals Rd	Ashmore Bridge Rd	W Georgia Rd
60	Forrester Dr/Old Sulphur Springs Rd	Bi-Lo Blvd	Millennium Blvd
61	SC-290	Hwy 101	Sandy Flat Rd
65	SC-101	Milford Church Rd	Locust Hill Rd
68	US-178	Carolina Dr	US 123
69	Hammett Bridge Rd	E Suber Rd	S Buncombe Rd
70	S. Buncombe Rd	Pleasant Dr	SC 80
73	David Stone Road	US 178	SC 8
75	Quillen Ave	N Main St	Speedway Dr
76	SC-81	SC-153	Old Williamston Rd
78	Prince Perry Rd	Saluda Dam Rd	Rolling Hill Circle
81	Pendleton Rd	SC 76	Issaqueena Trail
83	Issaqueena Trail	US 123	Pendleton Rd
84	Berkley Dr	W Main St	Issaqueena Trail
85	Milford Church Rd	Locust Hill Rd	N Hwy 101
88	SC 357/Arlington Rd	Study area boundary	E Wade Hampton Blvd
103	Brushy Creek Rd	Hudson Rd	Alexander Rd
128	West Georgia Rd	US 25	Reedy Fork Rd
136	West Georgia Rd	E Standing Springs Rd	Neely Ferry Rd
137	West Georgia Rd	Fork Shoals Road	E. Standing Springs
138	West Georgia Rd	Fork Shoals Road	Reedy Fork Rd
Road Diets			
23	Beattie/College Corridor	N Academy St	Church St
95	Cedar Lane/Pete Hollis Blvd	W Parker Rd	Buncombe St
108	Old Buncombe Rd	E Blue Ridge Dr	Pete Hollis Blvd
Other			
101	E Perry Rd	Poinsett Highway	E Blue Ridge Dr

Intersection and Interchange Recommendations

In total, *Horizon 2040* recommends 137 intersection and interchange improvements throughout the region. Their locations are shown in the map to the right, along with their project ID numbers. Exact locations are shown in the table on the following page. These projects were identified based on safety, operational, or congestion issues. The exact scope of improvements determined here will be identified as projects move forward in the funding cycle.



ID	Road 1	Road 2
Greenville County		
4	Farrs Bridge Rd/ Cedar Lane Rd	Hunts Bridge Rd/ W Parker Rd
6	Butler Rd	Main St
8	Sandy Flat Rd	Jackson Grove Rd
9	State Park Rd	Altamont Rd/Piney Mountain Rd
11	Wade Hampton Blvd	Buncombe Rd
13	Ashmore Bridge Rd	Fowler Cir
14	Main St	Howard Dr
15	Tigerville Rd	Jackson Grove Rd
16	Main St/Bessie Rd	Piedmont Hwy
17	SC 14	Taylor Rd/CCC Camp Rd
20	E Butler Rd	Murray Dr
22	Reid School Rd	Edwards Mill Rd
23	Lee Vaughn Rd	Scuffletown Rd
24	S Buncombe Rd	Brushy Creek Rd
25	SE Main St	Loma St
26	SC 418	Fork Shoals Rd
27	Pelzer Hwy	Garrison Rd
28	State Park Rd	E Mountain Creek
31	New Easley Hwy	Rison Rd
32	Bethel Rd	Tanner Rd
34	E Blue Ridge Dr	Perry Rd
35	Blue Ridge Dr	N Franklin Rd
36	Old Easley Hwy/ Pendleton St	Bryant St
40	S Main St	Brushy Creek Rd/Cannon Ave
42	Main St	Curtis St
44	Wade Hampton Blvd	St Mark Rd
45	Miller Rd	Hamby Dr
46	Jonesville Rd	Academy St
48	W Butler Rd	Ashmore Bridge Rd
54	Old Stage Rd	Old Laurens Rd
55	Miller Rd	S Oak Forest Dr
56	Farrs Bridge Rd	Old Farrs Bridge Rd
57	Jonesville Rd	Stokes Rd
58	SC 101	Pennington Rd
61	Miller Rd	Old Mill Rd
62	Miller Rd	Burning Bush Ln/Burning Bush Rd
63	W Georgia Rd	Neely Ferry

ID	Road 1	Road 2
64	W Georgia Rd	N Maple St
65	Miller Rd	Murray Dr
68	S Bennetts Bridge Rd	Anderson Ridge Rd
69	NE Main St	Pelham Rd
70	Fairview Rd	I-385
71	Farrs Bridge Rd	White Horse Rd
72	White Horse Rd	W Blue Ridge Rd
73	White Horse Rd	Lily St
77	US 25	N Poinsett Hwy
78	Wade Hampton Blvd	Pine Knoll Dr
79	SC 101	Berry Mill Rd
80	Wade Hampton Blvd	Rushmore Dr/Balfer Dr
81	E Blue Ridge Dr/State Park Rd	Poinsett Hwy
82	US 276	Poinsett Hwy
84	W Blue Ridge Dr	Cedar Lane Rd
85	Old Pelzer Rd	Piedmont Golf Course Rd
86	Elizabeth Dr	E Lee Rd
87	Old Rutherford Rd/W McElhaney Rd	Locust Hill Rd
88	Old Spartanburg Rd	Boiling Springs Rd
89	E Georgia Rd/Lee Vaughn Rd	E Georgia Rd
90	Rutherford St	James St/W Earle St
92	Valley View Rd	Howard Dr
83	Wade Hampton Blvd	Fairview Rd/Old Rutherford Rd
93	I-385	McCarter Rd
94	Main St	Quillen Ave
95	SC 14	Roper Mountain Rd
102	White Horse Rd	Berea Dr
103	White Horse Rd	Old White Horse Rd
104	Oak Park Dr	Miller Rd
105	Bridges Rd	Bethel Rd
106	Haywood Rd	I-385
107	Roper Mountain Rd	I-385
108	Stone Ave	I-385
109	Academy St	North St
111	Mauldin Rd	Augusta St
112	Pleasantburg Dr	Century Dr/Villa Rd
113	Pleasantburg Dr	Antrim Dr
114	Academy St	Pendleton St
115	Pleasantburg Dr	Mauldin Rd

ID	Road 1	Road 2
116	Pleasantburg Dr	Rutherford Rd
117	Haywood Rd	Pelham Rd
118	Pleasantburg Dr	Cleveland St
119	Augusta St	Church st
120	Faris Rd	Cleveland St
121	Laurens Rd	Woodruff Rd
122	Academy St	College St
123	Rutherford St	W Stone Ave
124	Pelham Rd	E North St
125	Laurens Rd	Verdae Blvd
126	Roper Mountain Rd	Independence Blvd
127	Laurens Rd	Millennium Blvd
128	Westfield St	West Broad St
129	SC 14	S Buncombe Rd
130	Harts Ln	Jonesville Rd
131	Gap Creek Rd	Country Club Rd
132	W Duncan Rd	Duncan Chapel Rd
133	Batesville Rd	Dry Pocket Rd
134	Lynn Rd	Waters Rd
135	US 123	Washington Ave
138	Edwards Rd	Rushmore Dr
145	SC-101	S-135
147	White Horse Rd Ext	Fork Shoals Rd
148	SC 101	Milford Church Rd
149	Locust Hill Rd	N. Rutherford Rd
150	Augusta Rd	Old Augusta Rd
Pickens County		
5	Farrs Bridge Rd	Thomas Mill Rd/Hamburg Rd
10	Main St	Pendleton St
12	Moorefield Memorial Hwy	Rices Creek Rd/Breazeale Rd
18	Moorefield Memorial Hwy/Liberty Pickens Rd	Mauldin Lake Rd
19	Saluda Dam Rd	Prince Perry Rd/ Ridgeway Ct
21	Liberty Dr	Ross Ave
29	Moorefield Memorial Hwy	C. David Stone Rd
30	Moorefield Memorial Hwy	Belle Shoals Rd/ Bethlehem Ridge Rd
39	Farrs Bridge Rd	Dacusville Hwy
41	W Main St	S 1st St

ID	Road 1	Road 2
49	Calhoun Memorial Hwy	Pilgrim Dr/Dogwood Ln
50	Issaqueena Trail	Cambridge Dr/Old Shirley Rd
51	Issaqueena Trail	Pendleton Rd
52	Issaqueena Trail	US 123
66	Main St	Ann St
67	Calhoun Memorial Hwy	S Pendleton St
74	Tiger Blvd	College Ave
75	Tiger Blvd (US 123)	Anderson Hwy (US 76)
76	Old Greenville Hwy	College Ave
96	Hwy 93	Hwy 123
136	Crestview Rd	Sheffield Rd
137	E Main St	Pepper St
Anderson County		
47	Main St/Easley Hwy	Palmetto Rd
53	Three Bridges Rd/ Hood Rd	SC 153
60	SC 86	Wigington Rd
97	Hwy 81	Circle Rd
99	Powdersville Rd	3 Bridges Rd
100	Hwy 20	Courtney St
101	SC 8	Murray St/Courtney St/ Smythe St
139	SC 81	Old Anderson Rd
Spartanburg County		
7	Wade Hampton Blvd	Gap Creek Rd
Laurens County		
91	Durbin Rd	Hwy 418

Safety, Access, and Connectivity

The region has expressed a growing concern for key corridors experiencing congestion, travel delay, and safety issues. To preserve mobility and protect the overall efficiency of the network, the project team developed a toolbox of “best practices” so the region can respond to changing developmental pressures.

Rather than specific project recommendations, this toolbox allows the region to remain flexible when calling upon evidence-based procedures to make the best planning decisions for the region’s future. On the following pages, a set of tools and guidelines for intersection safety improvements, access management, and connectivity provide guidance to and demonstrate examples of how GPATS can apply these strategies moving forward.

In this section, the following are included:

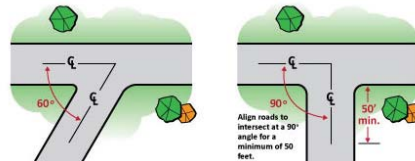
- Safety Improvements Toolbox
- Access Management Toolbox
- Connectivity Best Practices

Safety Improvements Toolbox

An outcome of any LRTP should be enhanced travel safety. Through consultation with local officials, residents, and planning staff, the project team identified dozens of intersections needing safety improvements. Intersection redesigns must be coordinated with SCDOT; however, there are several countermeasures to consider first that can improve safety and intersection operations. These options are listed below. Ten demonstration intersections have been selected to show how these options can be applied in the GPATS region.

Realignment

Roadways are realigned to meet at as close to a 90-degree angle as possible. This improves visibility and turning radius.



Signalization

Based on their traffic counts, some unsignalized intersections may be eligible for a traffic signal. SCDOT must perform a study to determine if an intersection is eligible.

Connectivity

Improving connectivity throughout the area provides alternate routing options to destinations and reduces some of the traffic at key intersections.

Improved Crossings

Often the danger to pedestrians and bicycles can be reduced by providing improved crossing facilities, such as painted crosswalks, median refuges, or flashing beacons.

Roundabouts



Replacing a traditional signalized intersection with a roundabout reduces the number of serious crashes while improving traffic flow.

Turn Lanes



Turn lanes allow space for vehicles waiting to turn, and reduces the risk of rear-end crashes.

Driveway Consolidation

Curb cuts that are too close to an intersection are consolidated or relocated, reducing the number of turning movements or potential crashes.

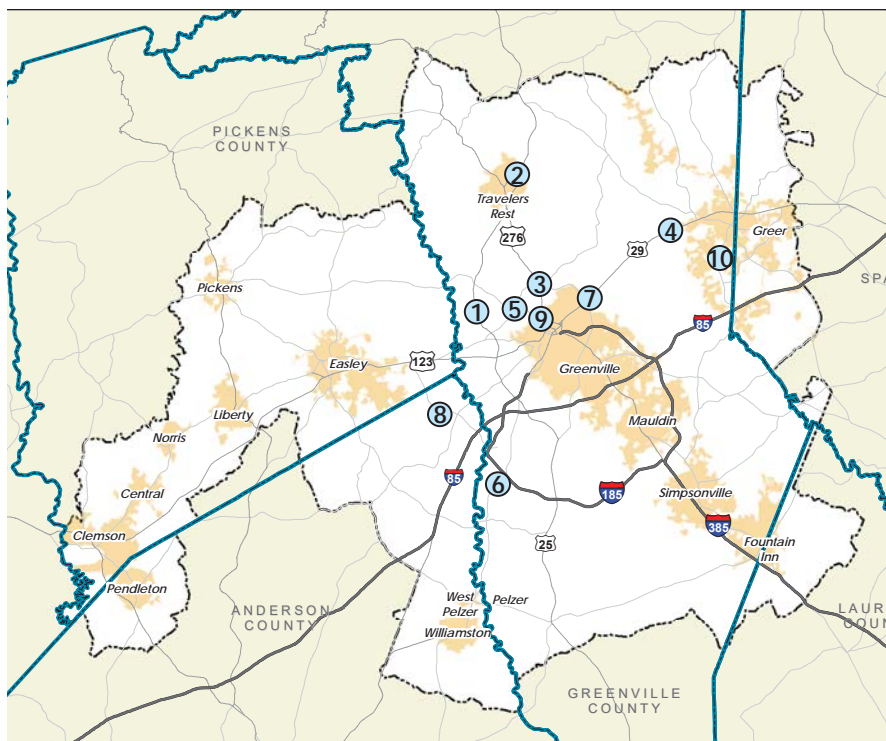
Improved Signage



Providing advanced warning signs or installing reflective backplates on traffic signals can reduce crashes caused by poor visibility.

Demonstration Intersections

Collaborating with local officials, residents, and crash data, the project team identified ten intersections as demonstration intersections to show how safety improvements could be widely applied across the GPATS region. While any intersection improvements ultimately are identified through state safety studies and analysis, some general recommendations have been identified in the table to the right to improve safety conditions at these geographically diverse locations. Though not all improvements are recommended—for example, none of these intersections are recommended to be converted to a roundabout—these are important safety tools to keep in mind as the region improves safety in other locations.



	Safety Improvements						
	Realignment	Signalization	Connectivity	Improved Crossings	Roundabouts	Turn Lanes	Driveway Consolidation
1. White Horse RD at Lily Street			X			X	X
2. US 25 at N Poinsett Highway	X						X
3. E Blue Ridge Dr at Poinsett Highway			X	X			X
4. Wade Hampton Blvd at Fairview Rd	X						X
5. W Blue Ridge Dr at Cedar Lane Rd			X	X			X
6. Old Pelzer Rd at Piedmont Golf Course Rd	X						X
7. Wade Hampton Blvd at Pine Knolls Dr			X	X			X
8. Powdersville Rd at Three Bridges Rd	X						X
9. Earle St at Rutherford St				X			X
10. SC-14 at S Buncombe Rd	X			X			X

Access Management Toolbox

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

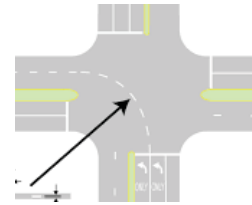
Access management strategies control the location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway. Areas with poor access management, which can include unprotected left turns and curb cuts within a short distance, often have higher crash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

Recipe for Success

Access management should never be considered a one-size-fits-all solution. Successful implementation will include a diversity of strategies that respond to the specific land use and travel context surrounding the corridor.

Dotted Line Markings

These pavement markings reduce driver confusion and increase safety by guiding drivers through complex intersections.



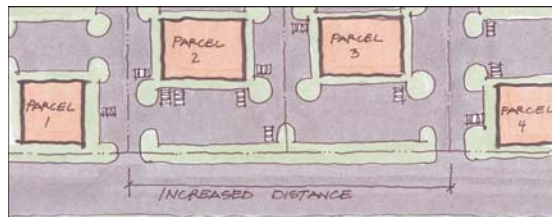
Driveway Length

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



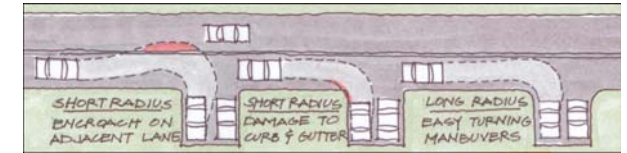
Driveway Consolidation or Relocation

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



Intersection and Driveway Curb Radii

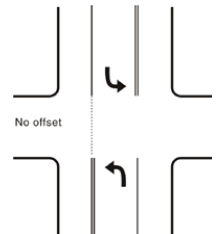
Curb radii sized for area context and vehicle use limits occurrences of vehicles using opposing travel lanes or mounting the curb when turning, resulting in less damage to infrastructure and enhanced pedestrian



safety results.

Left-Turn Storage Lanes

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



Minor Street Approach Improvements

Adding left- and right-turn lanes on minor street approaches allocates more green time to the major street.

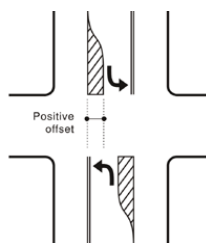
Non-Traversable Median

Medians separate opposing vehicle flows and provide refuge for pedestrians. Carefully planned access points and median U-turn access are critical considerations.



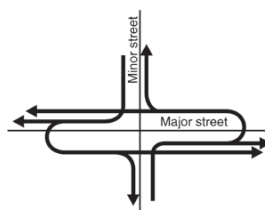
Offset Left-Turn Treatment

Offset turn lanes shift the left-turn lanes to the left, which reduces crossing and exposure time and improves sight distance and gap recognition.



Superstreet

A superstreet, also known as a restricted crossing U-turn or R-CUT, restricts traffic on minor streets from proceeding straight across or turning left onto major streets. Drivers wishing to turn left or go straight must turn right onto the major street, then make a U-turn before turning right on the minor street or continuing straight on the major street.



Access Management at Work

In total, *Horizon 2040* recommends access management improvements for six corridors. To show how options in the access management toolbox can be applied, the project team selected four demonstration corridors. These corridors have congestion, safety, access, and land development conditions found on similar corridors throughout the region. The table below shows how the toolkit can be applied to these locations.

	Access Management Strategies							
	Dotted Line Markings	Driveway Length	Driveway Consolidation or Relocation	Intersection and Driveway Curb Radii	Left-Turn Storage Lanes	Minor Street Approach Improvements	Non-Traversable Median	Offset Left-Turn Treatment
West Main St in Williamston (Academy St to Hamilton St)		X	X	X	X			
White Horse Rd in Greenville (Broadway Dr to Pendleton Rd)	X	X	X	X		X	X	X
US 276 in Mauldin (Knollwood Dr to Owens Rd)		X	X	X			X	X
US 123 in Easley (Brushy Creek Rd to Main St)	X	X	X	X		X	X	X

Best Practices: Connectivity

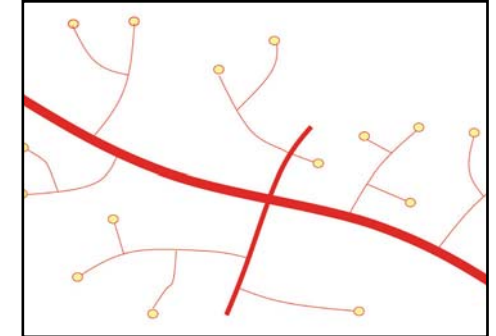
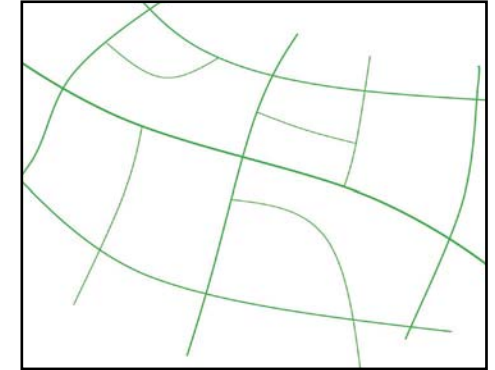
The way a road network is designed can have a tremendous impact on system-wide congestion, travel-delay, and overall travel efficiency. A traditional grid system provides routing options and a resilient network in the face of traffic incidents and congestion. By contrast, a disconnected curvilinear system funnels traffic to a few designated arterial roadways, increasing congestion and travel times by limiting routing options.

To promote a more resilient network, GPATS will promote a policy of connectivity, sponsor local collector street plans, and adopt general connectivity guidelines for local projects.

Case Study: Wilmington, NC

A similar approach has been followed in Wilmington, NC. Wilmington MPO has completed several collector street plans for different geographies within the metro area during the last few years. Each plan includes proposed connections, policy guidelines, and design recommendations that enhance safety, aesthetics, and connectivity. A set of general connectivity guidelines and a regulatory toolbox in each plan guides policy in the region so plans are implemented and best practices are followed as new development puts pressure on the area's transportation network.

Though each plan was intended to serve local goals, they also enhance regional mobility. Each plan has been adopted by the Wilmington MPO upon completion. Therefore, the plans serve as a guidebook for region-wide coordination. A prioritized action plan identifies where specified agencies should take the lead and where various parties and entities need to work together toward success.



Prioritization

After the full list of projects was drafted and vetted, the project team scored each project using SCDOT's prioritization process, which ranks according to relative benefits and effects on the larger region. Each criteria was weighted differently, and the projects' final weighted scores were used to develop the list of improvements in the financially-constrained plan (more information is available in Chapter 9). Projects were scored based on 11 categories that were based on the plan's guiding principles:

Culture and Environment

Environmental Impacts

Based on an assessment of potential impacts to natural, social, and cultural resources.

Growth and Development

Location on a Priority Network

Based on a project's location in relation to defined priority networks, which include freight routes, National Highway System Routes, and SCDOT priority network roadways.

Consistency with Local Land Use Plans

Based on consistency with local land use plans confirmed during the STIP process. During the prioritization process, all projects are assumed to be consistent with local land use plans so their numeric ranking is not affected.

Mobility and Accessibility

Traffic Volume and Congestion

Based on current and future traffic volumes.

Alternative Transportation Solutions

Based on the project's provision of bicycle, pedestrian, and transit infrastructure. This is confirmed during the NEPA process and does not affect the project's numeric ranking.

Economic Vitality

Economic Development Potential

Based on a tool developed to assess the economic development impact of transportation infrastructure projects.

Truck Traffic

Based on current truck percentages.

System Preservation and Efficiency

Financial Viability

Based on the estimated project cost compared to the six-year STIP budget. Additional consideration is given to projects supplemented with local project funding and/or other federal and state funding.

Pavement Quality Index

Based on pavement condition assessments.

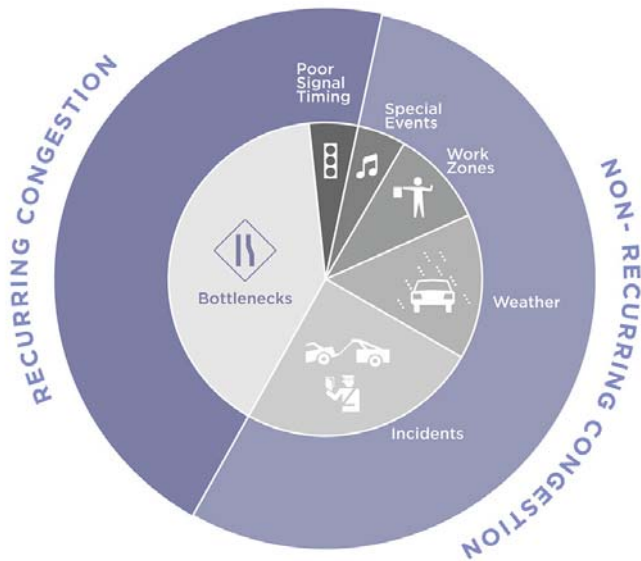
Safety and Security

Safety and Crash Data

Based on an accident rate calculated by the total number of crashes within a given road segment, divided by the traffic volume, and multiplied by the number of years.

Intersection Geometric Alignment

Based on an assessment of the intersection's functionality and operational characteristics.



The causes of congestion (Source: FHWA)

Congestion Management Process

The Congestion Management Process (CMP) is a management system and process conducted by MPOs, such as GPATS, to improve traffic operations and safety through use of either strategies that reduce travel demand, or implementation of operational improvements. As an urbanized area with a population greater than 200,000, GPATS is required by federal law to implement a CMP for its entire planning area; therefore, the MPO has chosen to incorporate a CMP into their planning efforts. The public typically benefits from having a functional CMP in place because it can improve travel conditions through low cost improvements or strategies. The improvements can be implemented in a relatively short timeframe (within 5-10 years) compared to more traditional capacity improvements, such as adding additional travel lanes, which can take more than 10 years to implement and cost significantly more. Projects identified through the CMP may also be added to future updates of the regional transportation plan should they require additional funding or a longer timeframe for implementation.

Causes of Congestion

The process of congestion management begins by understanding the problem's cause. The figure to the left illustrates the results of a national study presented by FHWA on the sources of congestion. Six major causes of congestion are identified:

- **Bottlenecks**—points where the roadway narrows or regular traffic demands (typically at traffic signals) cause traffic to back up. These are the largest sources of congestion and typically cause a roadway to operate below its adopted level of service standards.

- **Traffic Incidents**—crashes, stalled vehicles, debris on the road. These incidents cause about one quarter of congestion problems.
- **Work Zones**—for new road building and maintenance activities, such as filling potholes. While caused by necessary activities, but the amount of congestion caused by these actions can be reduced with various strategies.
- **Bad Weather**—cannot be controlled, but travelers can be notified of potentially increased congestion and signal systems can adapt to improve safety.
- **Poor Traffic Signal Timing**—the faulty operation of traffic signals or green/red lights where the time allocation for a road does not match the volume on that road. Poor signal timings are a source of congestion on major and minor streets.
- **Special Events**—cause “spikes” in traffic volumes and changes in traffic patterns. These irregularities either cause or increase delay on days, times, or locations where there usually is none.

As the CMP is updated in the future, the GPATS Study Team will be engaged in CMP-related matters. This ensures that CMP issues are addressed routinely as an ongoing planning activity. Identifying, tracking, and evaluating potential congestion- or safety-related issues on the CMP roadway network will be key.

The full regional CMP is included in Appendix E (<http://www.gpats.org/plans/horizon2040>).