CONGESTION MANAGEMENT PROCESS

GREENVILLE-PICKENS
AREA TRANSPORTATION STUDY

SEPTEMBER 2024

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01

OVERVIEW

PURPOSE AND FEDERAL REQUIREMENTS

Purpose

The Congestion Management Process (CMP) is a federally-required document prepared by a Metropolitan Planning Organization (MPO) to improve transportation system reliability by mitigating the impacts of congestion on the movement of people and goods. The CMP identifies and assesses strategies for addressing recurring and nonrecurring congestion issues to improve travel-related safety concerns and system reliability. A CMP is required for metropolitan areas with more than 200,000 people. These areas are also known as Transportation Management Areas (TMAs).

Federal Requirements

According to the Federal Highway Administration (FHWA) the CMP is a systematic approach collaboratively developed and implemented across a metropolitan region to facilitate safe and efficient management of existing transportation facilities through the application of travel demand reduction and operational strategies. The CMP is intended to work in tandem with the MPO's Long Range Transportation Plan (LRTP), Transportation Improvement Program (TIP), and Unified Planning Work Program (UPWP) through a continuous feedback loop and leveraging performance-based planning. The CMP identifies strategies for managing congestion that may be implemented more quickly or at a lower cost than large-scale capacity improvements such as adding travel lanes or creating new roadway facilities.

The initial federal requirements for congestion management were introduced by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and were continued under the successor law, the Transportation Equity Act for the 21st Century (TEA-21). The Safe Accountable Flexible Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU) was passed into law in August 2005. The requirements further evolved under Moving Ahead for Progress in the 21st Century Act (MAP-21) and signed into law on July 6, 2012. The Fixing America's Surface Transportation (FAST) Act of 2015 retained these requirements and provided the guidelines and subsequent rule-making for this document. The Infrastructure Investment and Jobs Act (IIJA), signed into law in November 2021, carries forward the CMP requirements set forth in the FAST Act.

Federal Guidance

FHWA has released two primary guidance documents to aid MPOs in developing a CMP:

- Congestion Management Process: A Guidebook (2011)
- Incorporating Travel-Time Reliability into the Congestion Management Process: A Primer (2015)

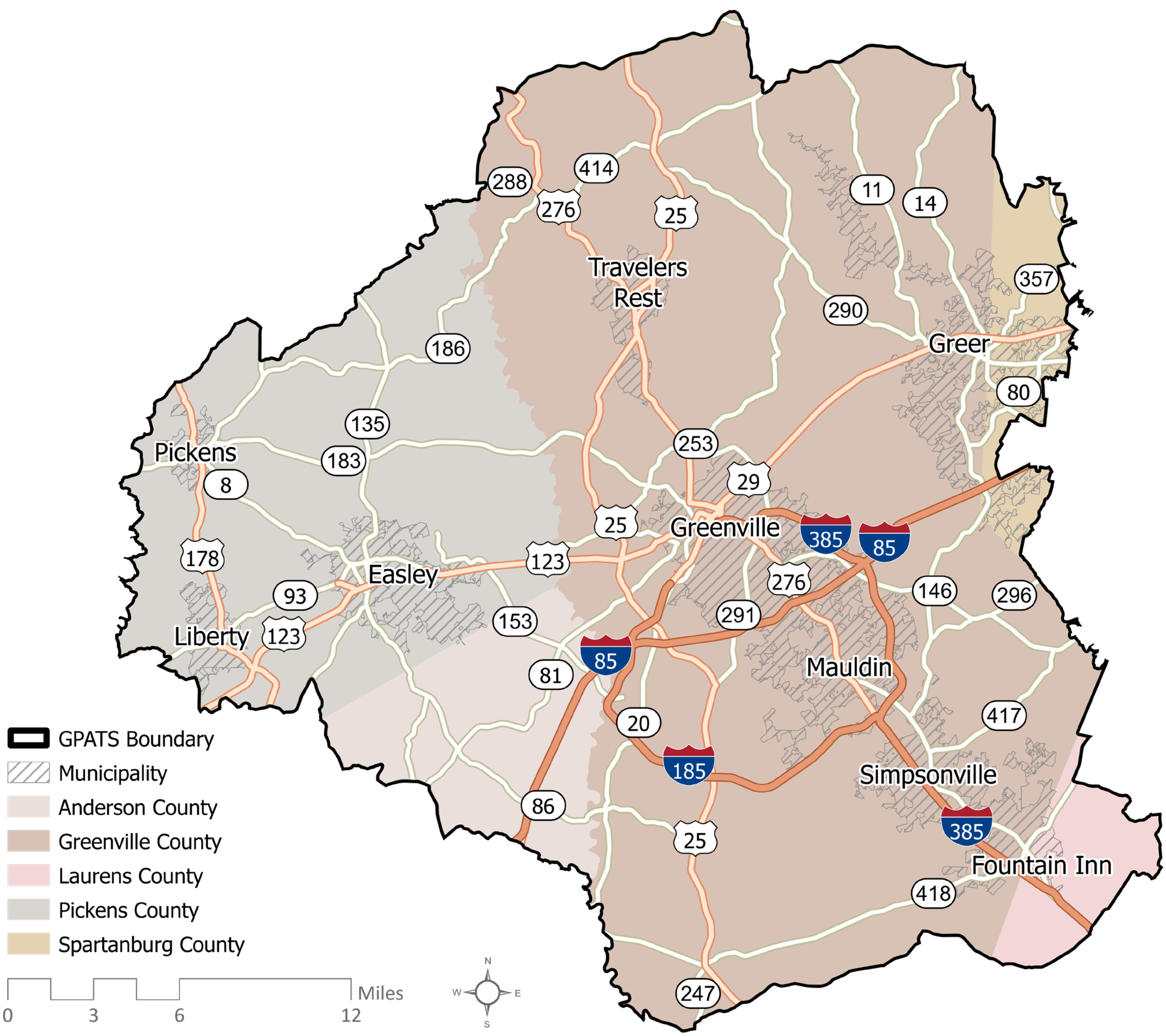
These two documents were utilized in the preparation of the Greenville-Pickens Area Transportation Study (GPATS) CMP. Elements from each document are referenced throughout the remaining sections of this report.

CHAPTER 1

GPATS ROLE

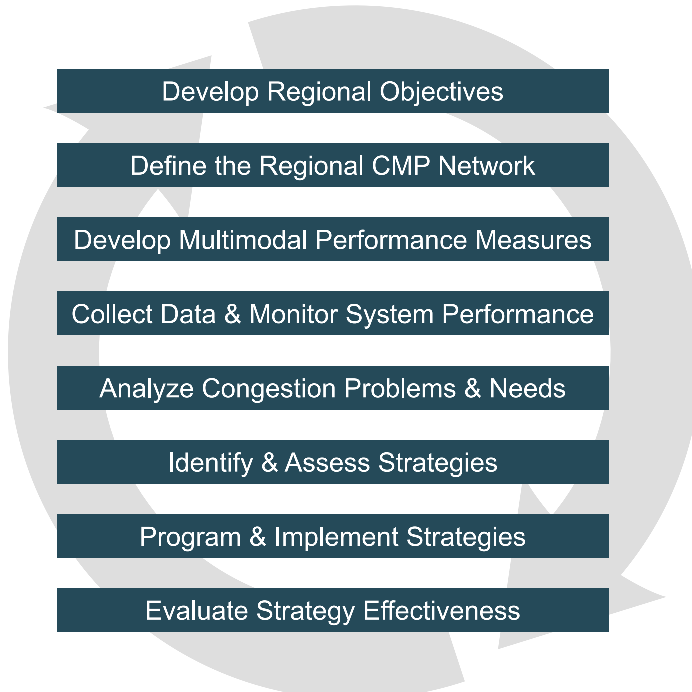
The Greenville-Pickens Area Transportation Study, or GPATS, is the MPO representing the Greenville Urbanized Area. MPOs are responsible for ensuring a continuous,cooperative, and comprehensive transportation planning process. GPATS helps guide the development of transportation projects including roads and highways, transit, bicycle and pedestrian facilities, freight, and even intersection improvements. Figure 1 shows the GPATS planning area and the municipalities contained within the boundary.

Figure 1. GPATS Map



THE PROCESS MODEL

The process encompasses activities of a CMP that comply with federal standards. It includes the following eight key steps to identify and mitigate congestion:



01. Develop Regional Objectives

Objectives were identified to assist in accomplishing the CMP goals, which were tied back to Horizon 2045, the region's long range transportation plan.

02. Define the Regional CMP Network

The study network was defined in terms of both geographic scope as well as system elements. It covers the GPATS MPO planning area and includes all roadways classified as major collector and above.

03. Develop Multimodal Performance Measures

The CMP reinforces federally-required performance measures that are outlined beginning on Page 24.

04. Collect Data & Monitor System Performance

Datasets to assess preliminary system performance were obtained from third-party sources such as Iteris' ClearGuide tool. SCDOT is anticipated to identify additional sources and facilitate procurement for GPATS to actively monitor system performance moving forward.

05. Analyze Congestion Problems & Needs

Congestion-related issues were analyzed based on recurrence of congestion and reliability of travel along corridors.

06. Identify & Assess Strategies

A toolbox of congestion mitigation strategies was identified within the CMP. These strategies were guided by the region's adopted planning documents and processes, with their potential benefits and successes substantiated by relevant case studies.

07. Program & Implement Strategies

The steps needed for GPATS to engage and partner with its member jurisdictions to identify, prioritize, and integrate congestion management strategies into local projects were identified, ranging from planning through design and implementation.

08. Evaluate Strategy Effectiveness

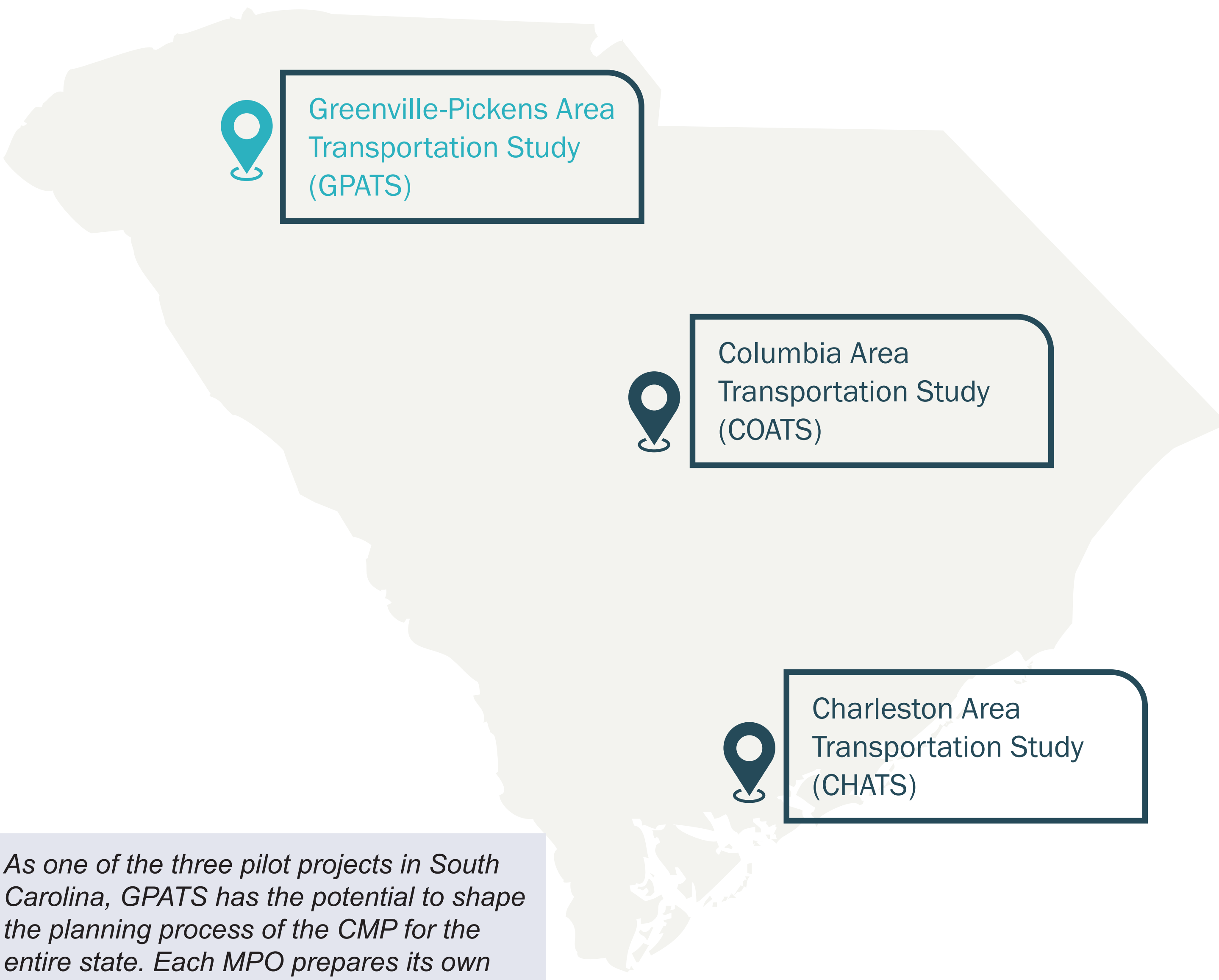
The performance and effectiveness of strategies identified within Step 6 were evaluated to facilitate the implementation and monitoring of the CMP.

CHAPTER 1

SCDOT PILOT PROCESS

The South Carolina Department of Transportation (SCDOT) is spearheading an objective-focused and performance-based CMP pilot effort that can serve as a model process for all MPOs within South Carolina. The GPATS MPO was selected as one of the three areas to pilot the process in collaboration with FHWA. The three pilot areas are shown in Figure 2 below.

Figure 2. SCDOT CMP Pilot Studies



As one of the three pilot projects in South Carolina, GPATS has the potential to shape the planning process of the CMP for the entire state. Each MPO prepares its own CMP that documents the region's unique challenges and considerations.

ENGAGEMENT ACTIVITIES

Steering Committee

The project's Steering Committee consisted of ten representatives of municipal and agency partners. The committee met three times over the course of the planning process.

- October 11, 2023
- January 30, 2024
- April 24, 2024

The Steering Committee provided direction, shared local knowledge, and discussed strategies and public engagement.

Policy Committee

The Policy Committee consists of elected representatives from local governments and is the official decision-making body that oversees transportation planning activities. The committee is also responsible for adopting the plans and programs of the MPO.

The project team met with the Policy Committee on October 11, 2023 to review the purpose of the plan, define congestion, and discuss congestion principles and performance measures.

What We Heard

Call outs from public engagement can be found throughout the plan, marked by the listening icon, as shown here. A more detailed summary of public engagement can be found in the Appendix.

Public Engagement

Public involvement is a crucial element to successful planning processes. Strategic engagement involves identifying community members and leaders to provide meaningful input and insight. A collaborative approach is essential for understanding the experiences of community members and to gain a cohesive and comprehensive congestion management vision. As a result, local staff and the project team reached out to residents, stakeholders, elected officials, and other community representatives throughout the planning process.

In-Person Engagement

The planning process also engaged the general public in numerous ways. To better understand community concerns and desires, the project team held two public workshops. The public workshops were held:

- November 28, 2023
- April 23, 2024

Online Engagement

The engagement activities for the GPATS CMP also incorporated virtual or online participation. The online engagement mirrored the content and questions discussed during in-person sessions, ensuring consistency and inclusivity.

To gather valuable input from stakeholders, two online surveys were launched at critical junctures of the planning process:

- The first survey took place from November 28, 2023, to January 8, 2024, providing an opportunity for early input on the objectives of the CMP and personal experiences with congestion.
- The second survey was conducted from April 24, 2024, to June 18, 2024, allowing stakeholders to provide additional insights and perspectives on potential solutions for mitigating congestion.

CHAPTER 1

Engagement Phase 1

This page summarizes the key statistics and highlights from the first phase of engagement. A more robust summary can be found in Appendix C.

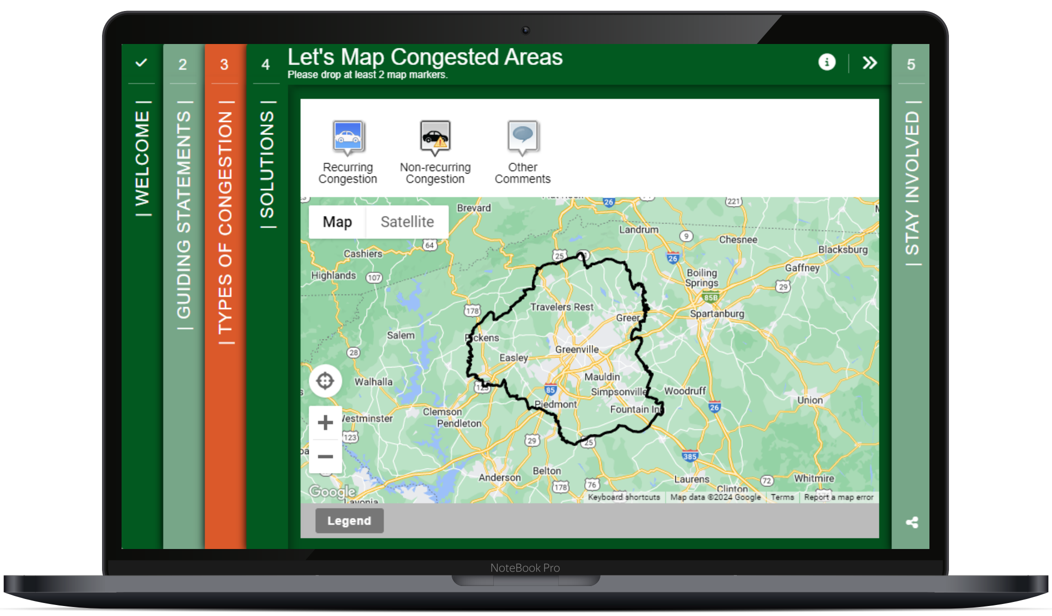
What We Heard

The first phase of public engagement focused on educating the public about the congestion management process and getting feedback—both in-person and online—about the types of congestion that they experience. Participants were asked to provide feedback on the CMP's guiding statements, existing congestion, and potential solutions to mitigate congestion.

790+
Participants

9,000+
Individual Data Points

450+
Written Comments



Engagement Phase 2

This page summarizes the key statistics and highlights from the second phase of engagement. A more robust summary can be found in Appendix C.

What We Heard

For the second phase of engagement, participants were asked about the applicability of specific strategies in the region. Participants were also asked to identify specific locations that strategies might be more applicable for. This balance of local and technical analysis helped to create a robust set of strategies.

140+

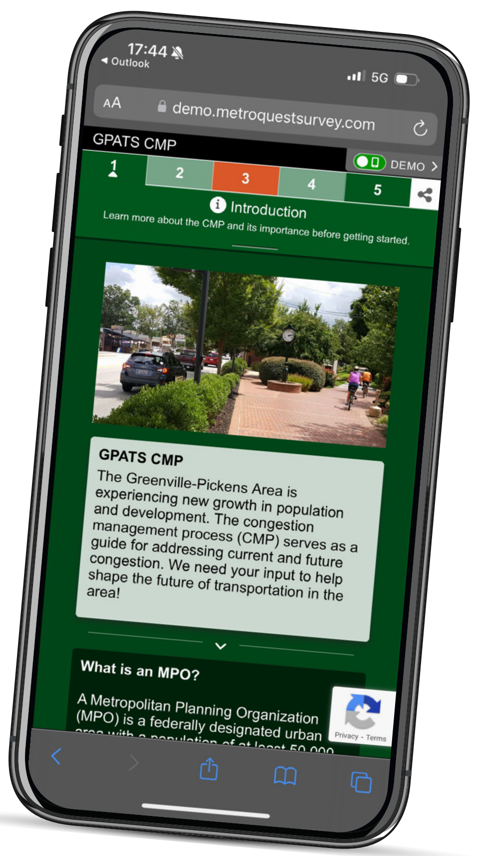
Participants

4,500+

Individual Data Points

450+

Written Comments



02

FRAMEWORK

LRTP RELATIONSHIP

The planning process used to develop the CMP was created to reflect regional transportation aspirations and integrates the vision of the region's LRTP. The goals and objectives, laid out in the next section, were created with strong consideration to the goals of the Horizon 2045 LRTP. As the GPATS region moves towards the future, the CMP will become a core part of project identification, representing one of the starting points for the MPO's updated project list.

CHAPTER 2

GOALS AND OBJECTIVES

The goals and objectives of the GPATS CMP reflect the desired outcomes of the region and provide a basis for identifying congestion mitigation strategies. These goals came from the Horizon 2045 LRTP highlighting the interconnected nature of the CMP with long range planning in GPATS.

Each goal listed below is supplemented with a guiding statement and objectives.

Culture and Environment

Enhance the region's quality of life by preserving and promoting its valued places and natural assets.

- Protect and enhance the natural and social environment by considering a variety of congestion management strategies other than capacity-enhancing strategies.
- Support congestion mitigation strategies to reduce air quality pollutants and greenhouse gases.

Economic Vitality

Support regional economic vitality by making it easier to move people and freight within and through the region.

- Improve accessibility and mobility of options for the regions workforce.
- Increase the mobility of freight in the region.
- Provide a regional transportation system that enables efficiency and minimizes congestion.

Growth and Development

Making traveling more efficient by coordinating transportation investments with land use decisions.

- Prepare for continued regional growth by coordinating transportation strategies to mitigate congestion.
- Connect people to jobs and education opportunities through a multimodal network that provides choices to alleviate congestion.

Mobility and Accessibility

Provide a balanced transportation system that makes it easier to bike, walk, and take transit.

- Support an integrated multimodal network that provides a blend of mobility choices to relieve congested corridors.
- Integrate a multimodal network that advances the concept of complete streets.
- Expand and maintain an active transportation network that connects residential, employment, and regional activity areas.

Safety and Security

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

- Improve safety by mitigating potential conflicts and delays at high-crash locations or highly-congested corridors.
- Increase the reliability of the transportation system through intelligent transportation system (ITS) solutions.
- Mobilize emergency response groups to efficiently manage and clear crashes throughout the region.

System Preservation and Efficiency

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

- Increase the use of innovative transportation technology to reduce congestion.
- Enhance the efficiency of the existing transportation network to better leverage emerging technologies.

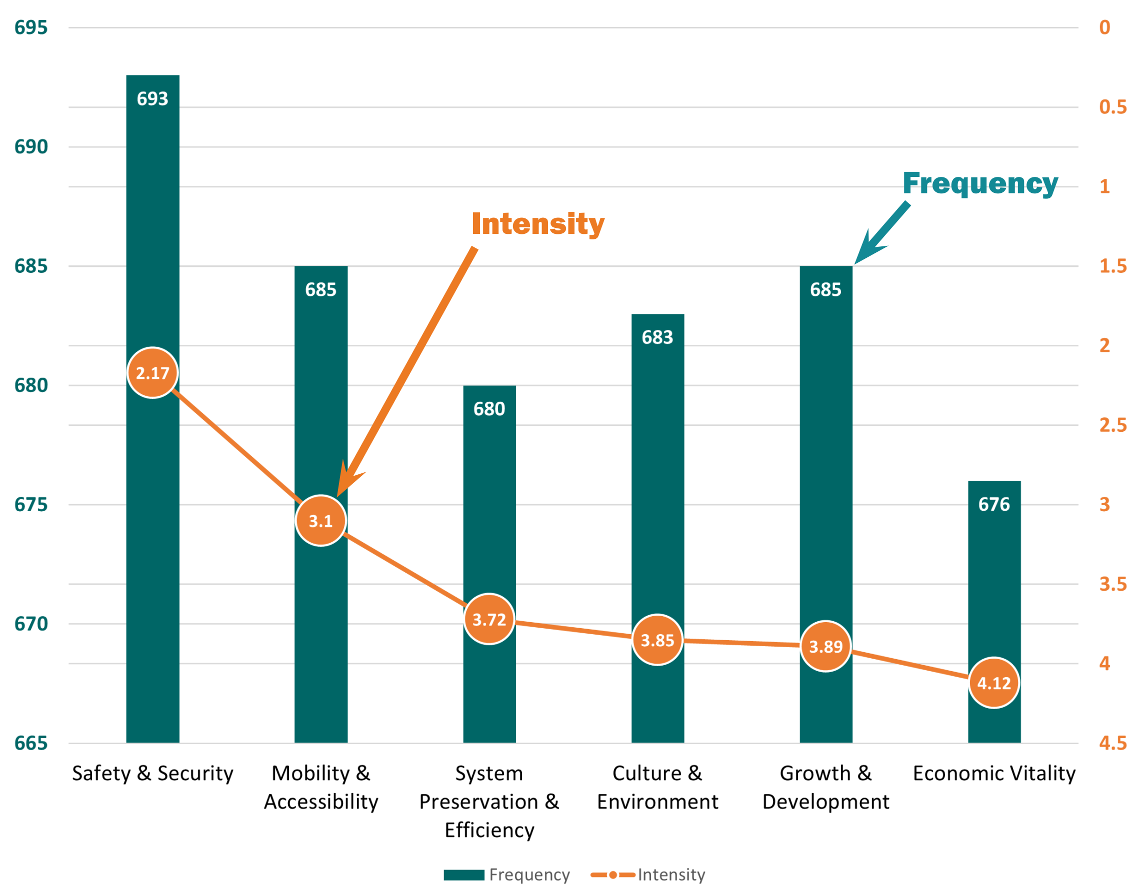
CHAPTER 2

What We Heard

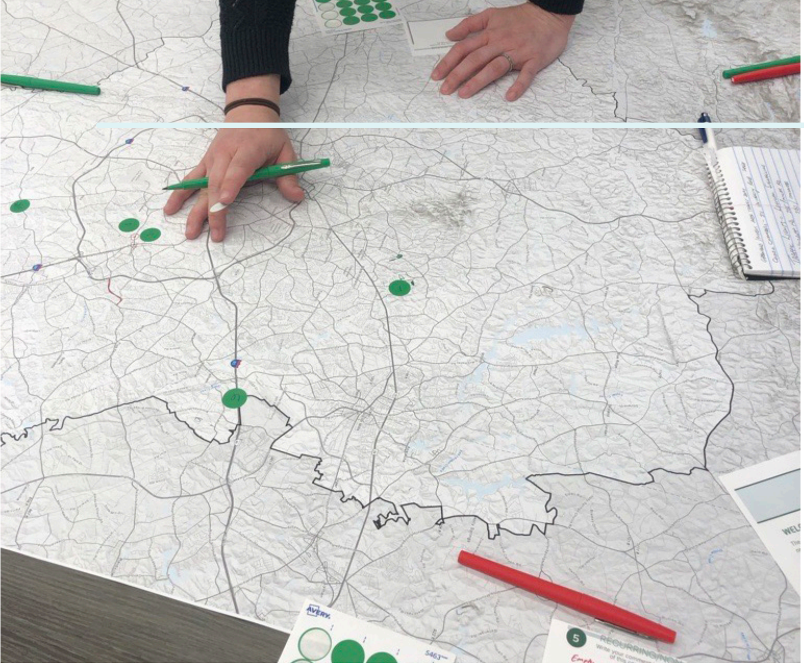
The data below shows the community responses regarding the preliminary goals of the CMP. Conducted using MetroQuest from November 2023 to January 2024, participants were asked to rank the congestion management objectives within each goal to determine what the community identifies as important. The response data shows both intensity and frequency of responses. The icons on the right show the ranking of community priorities with an intensity score closer to one, representing the most important goal according to the data collected.

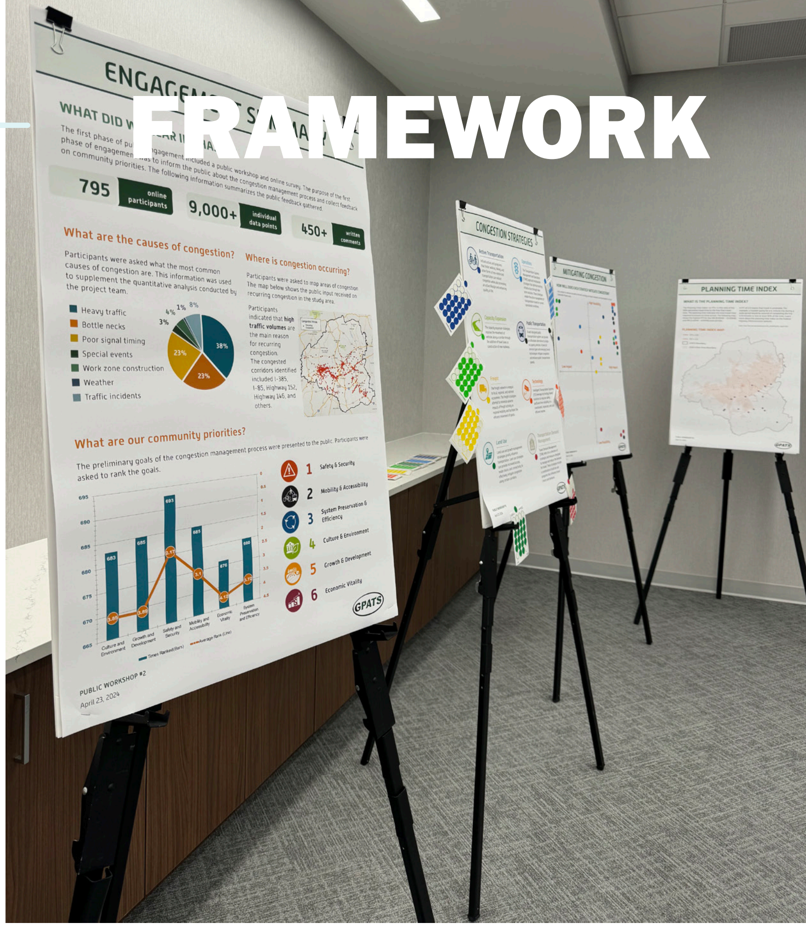
In Figure 3, the “frequency” represents the number of times that each objective was identified. The “intensity” represents the average rank of importance; an intensity number closer to one signifies that the goal is more important to the community on average.

Figure 3. Community Priorities

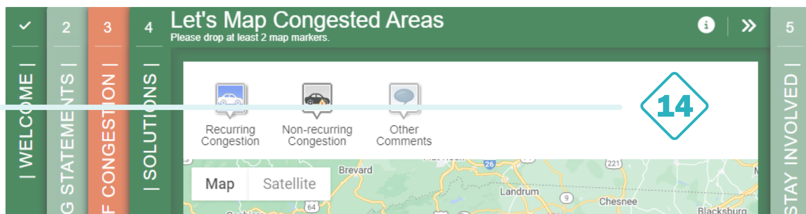


FRAMEWORK





GPATS Congestion Management Process



03

ANALYSIS

CONGESTION DEFINED

The Federal Highway Administration (FHWA) defines **congestion** as the excess of vehicles on a portion of roadway at a particular time resulting in speeds that are slower than normal. Mobility and accessibility are closely related to congestion as they both play significant roles in the movement of people and goods within the regional network.

Mobility is the ability to move people and goods quickly and easily to a destination. Mobility is typically measured in travel volumes and the speed of movement. The successful movement of people and goods is a strong indication of efficiency.

While mobility refers to the ease and convenience of moving people and goods, **accessibility** refers to the ease by which desired activities can be reached from a variety of locations. Accessibility is achieved not only through transportation improvements, but also by aligning land use decisions to provide a variety of options for travelers.

Causes of Congestion

FHWA identifies seven root causes of congestion that often interact and influence one another. FHWA further categorizes each of the seven root causes into one of three broader categories, as described below:

Traffic Influencing Events

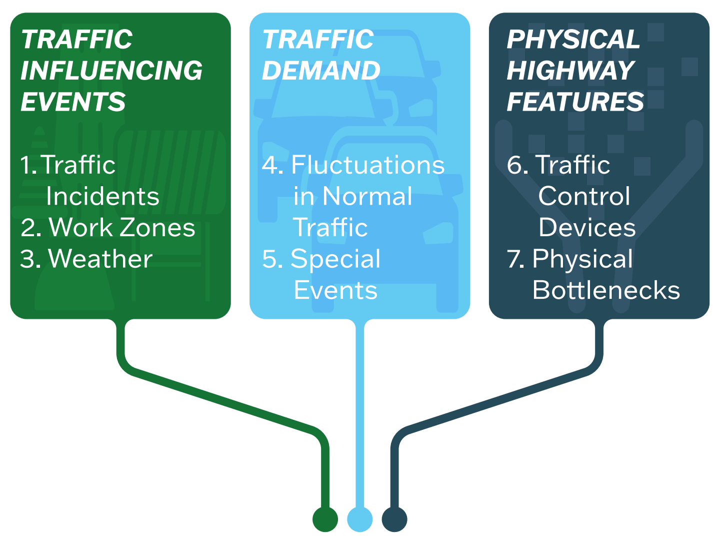
1. Traffic Incidents – these events interrupt traffic flow and may include crashes, broken down vehicles, or debris. They often block lanes or shoulders and impact driver behavior.
2. Work Zones – work zone conditions vary broadly, but often include physical changes to travel conditions such as reduced number of lanes, lane shifts, or detours.
3. Weather – changes in weather often affect visibility and road surface conditions, resulting in changes to driver behavior and traffic flow.

Traffic Demand

4. Fluctuations in Normal Traffic – traffic volumes can vary by season, day of the week, or time of day.
5. Special Events - traffic demand may surge due to special events and disrupt the network with atypical travel patterns.

Physical Highway Features

6. Traffic Control Devices – traffic control devices such as poorly timed signals, draw bridges, and at-grade rail crossings may cause disruptions to travel.
7. Physical Bottlenecks – these are areas where physical capacity changes due to a variety of factors, such as lane drops or merging/weaving areas.



7 ROOT CAUSES OF CONGESTION

Source: Traffic Congestion and Reliability: Trends and Advanced Strategies for Congestion Mitigation, FHWA

CHAPTER 3

Recurring and Non-recurring Congestion

In addition to the seven root causes, congestion can be further classified as recurring or non-recurring. The GPATS CMP considered both recurring and non-recurring congestion in the planning process. The methods and metrics used to consider each are described in the following sections.

Recurring Congestion

Recurring congestion is often predictable, regularly occurring, and typically caused by excess demand.

Non-recurring Congestion

Non-recurring congestion is caused by transient events that are not easily planned for or predicted.

The Center for Advanced Transportation Technology (CATT) Lab—housed within the University of Maryland—maintains the Regional Integrated Transportation Information System (RITIS), which includes a Causes of Congestion Tool that aggregates several data sources to calculate and provide insight into the causes of congestion along the National Highway System (NHS). The data represents Year 2019 conditions, and is summarized on the following page for the State of South Carolina as well as Greenville, Pickens, Anderson, Laurens, and Spartanburg counties. This data underscores the importance of considering non-recurring congestion and travel-time reliability in the CMP process for the GPATS region, as well as the inherent overlap in the causes of congestion.

Cost of Congestion

In addition to understanding the causes of congestion, the RITIS Causes of Congestion Tool provides a quantification of the costs of congestion based on the vehicle hours of delay. Figure 4 shows the statewide and county delay costs as well as the vehicle hours of delay on the NHS in 2019. Spartanburg, Anderson, and Laurens counties are shown in dark blue as the GPATS area only represents a small portion of the counties.

Greenville County

- User Delay Cost: $61.35 M
- Vehicle Hours of Delay: 2.34 M

Pickens County

- User Delay Cost: $3.15 M
- Vehicle Hours of Delay: 120.54 k

Spartanburg County

- User Delay Cost: $28.37 M
- Vehicle Hours of Delay: 1.08 M

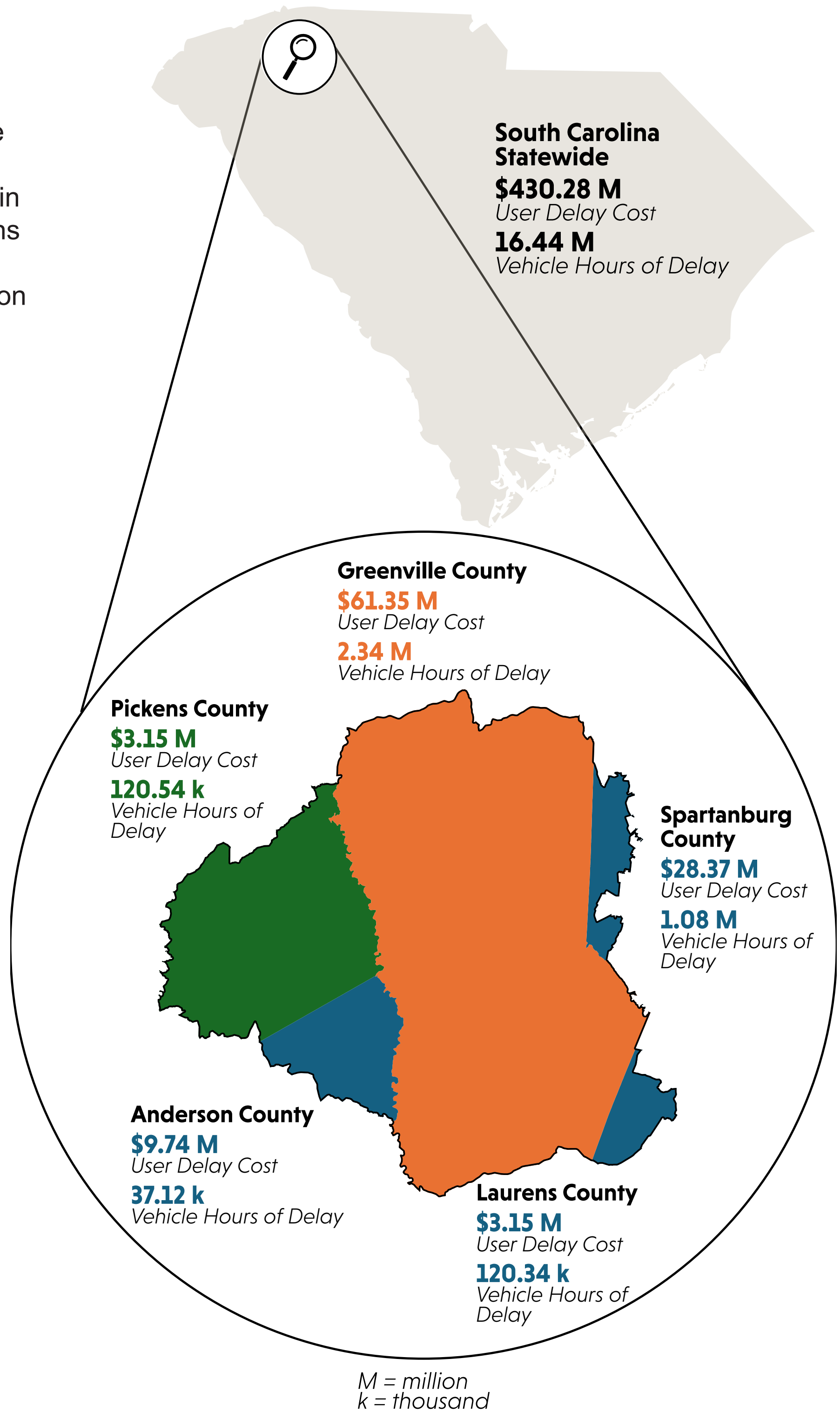
Anderson County

- User Delay Cost: $9.74 M
- Vehicle Hours of Delay: 37.12 k

Laurens County

- User Delay Cost: $3.15 M
- Vehicle Hours of Delay:120.34 k

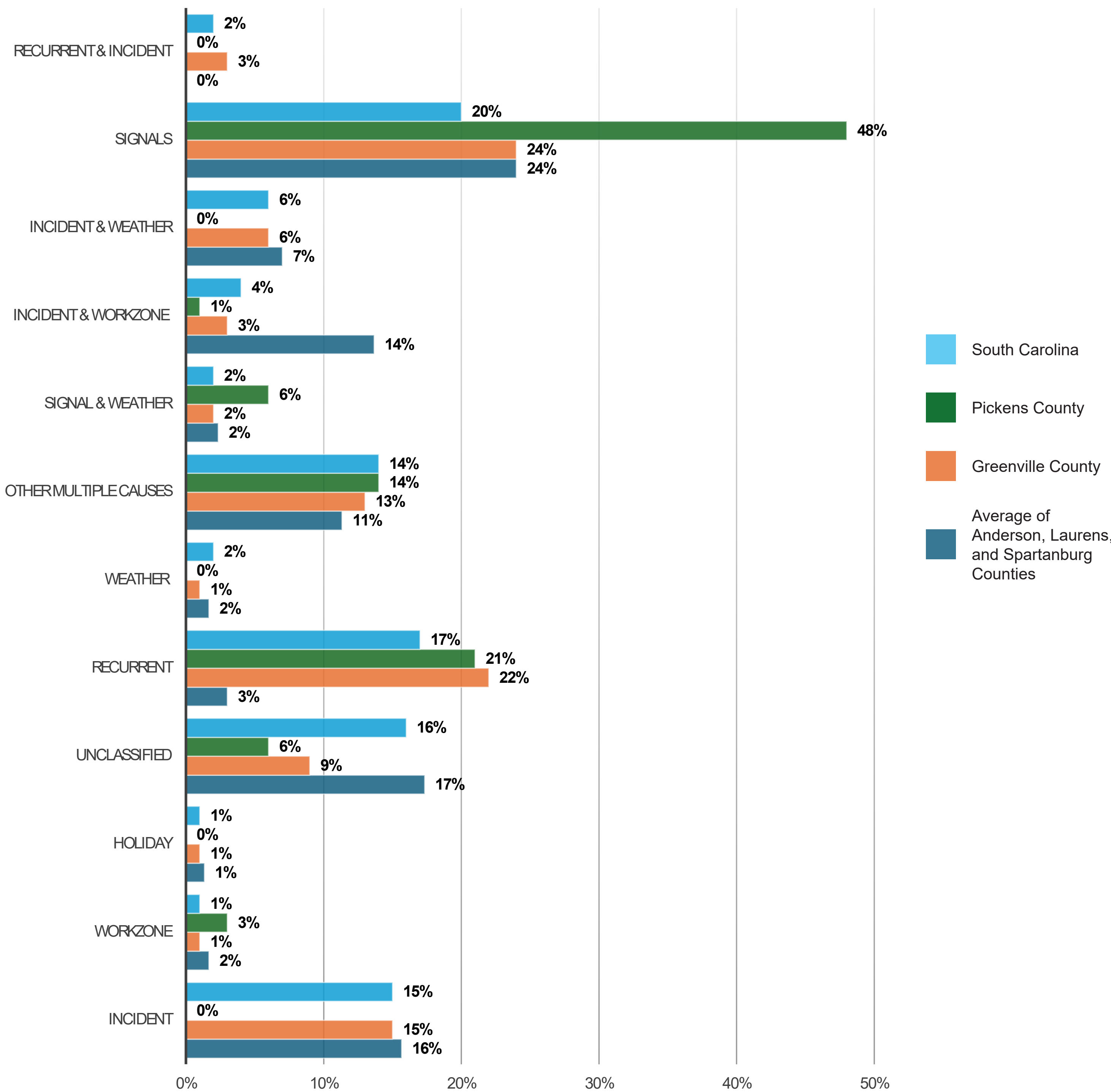
Figure 4. The Cost of Congestion



Source: RITIS Congestion Causes for the National Highway System (NHS), 2019

Figure 5 represents RITIS data and highlights the percentage of vehicle delay hours from each cause of congestion on the NHS in 2019. The figure compares Greenville and Pickens Counties to the statewide data. The darker blue represents the average from Laurens, Spartanburg, and Anderson county as the GPATS area only contains smaller portions of these counties.

Figure 5. Congestion Causes by Percent of Vehicle Delay Hours (2019



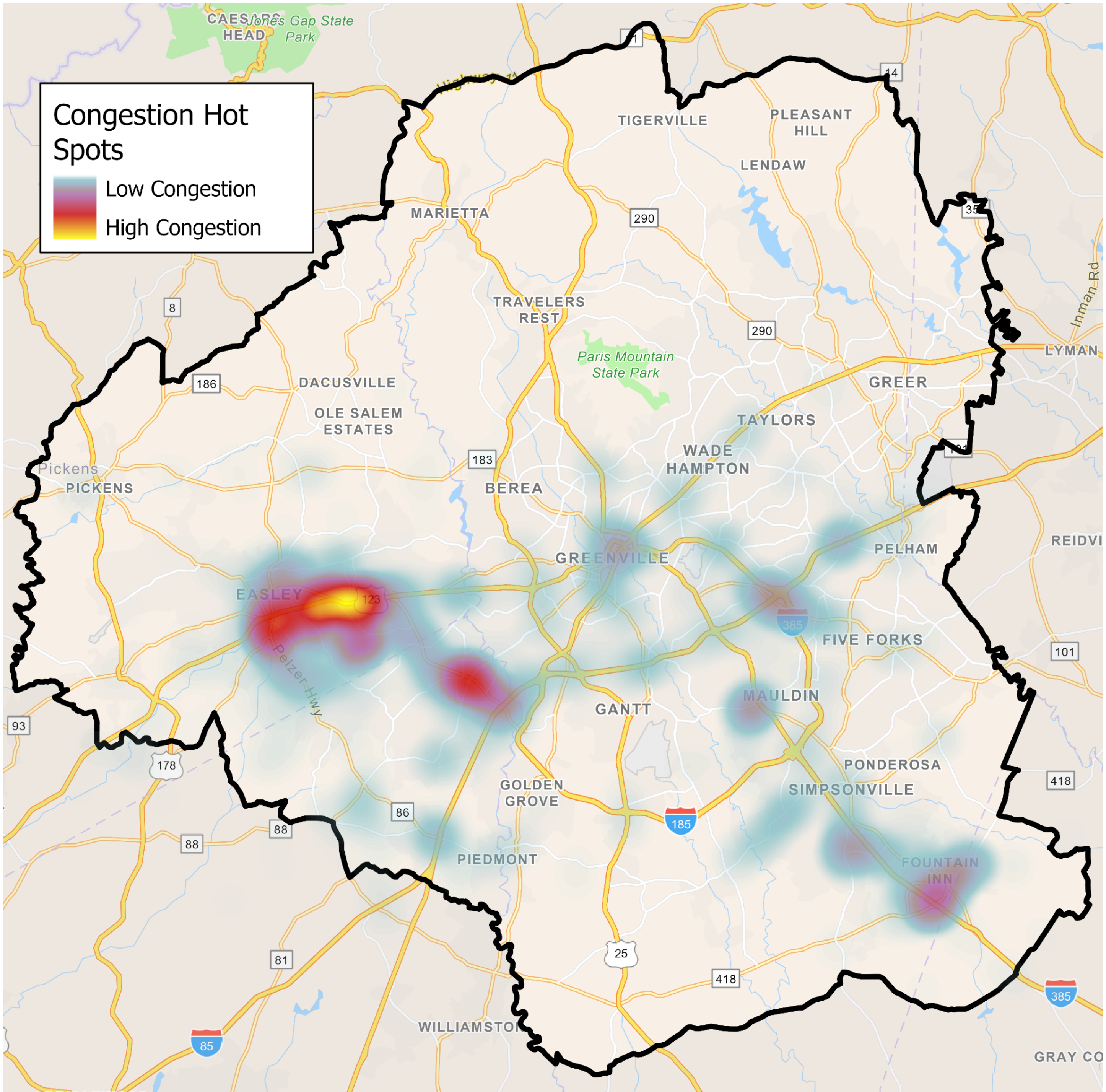
Source: RITIS Congestion Causes for the National Highway System (NHS), 2019

In the first MetroQuest survey, participants were asked to map where they think congestion is located. This included both recurring and non-recurring congestion. Figure 6 shows a heat map of all the collected responses. The yellow areas show the highest density of comments.

What We Heard

Survey participants were asked to map high-congestion areas. Most participants cited that congestion was recurring in the areas identified.

Figure 6. Let's Map Congested Areas Results



CHAPTER 3

Another question asked of participants in the first MetroQuest survey was to identify what kind of recurring congestion they experience. The responses from that question are summarized in Figure 7.

Survey participants were also asked to identify where they experience recurring congestion on a map. Figure 8 shows data collected for locations that were identified as having recurring congestion.

What We Heard

Survey participants said that high-traffic volumes are the primary reason for recurring congestion in the study area. The hotspots for recurring congestion were identified to be in Easley, Greenville, and Powdersville. The corridors associated with high-traffic volumes include I-385, I-85, and US-123.

Figure 8. Recurring Congestion Results Map

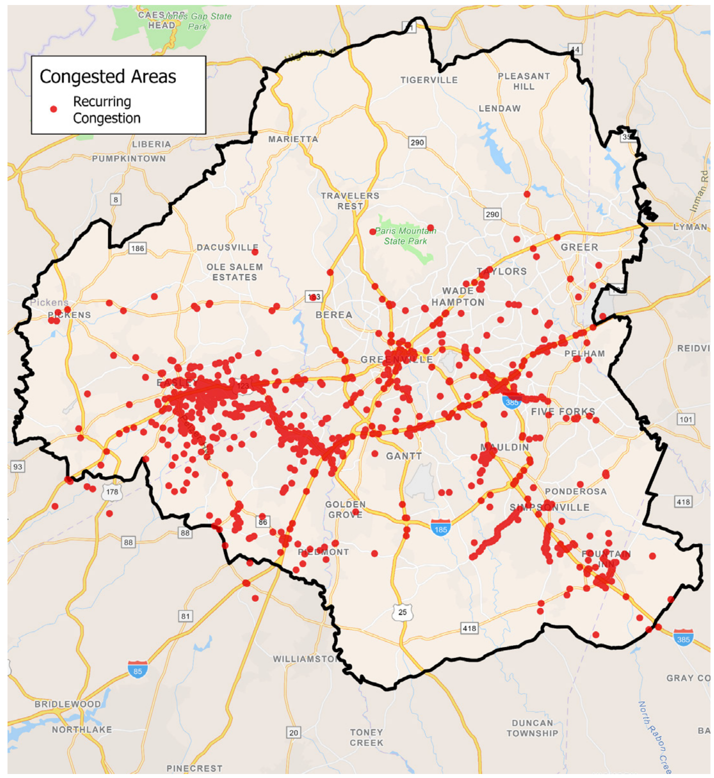
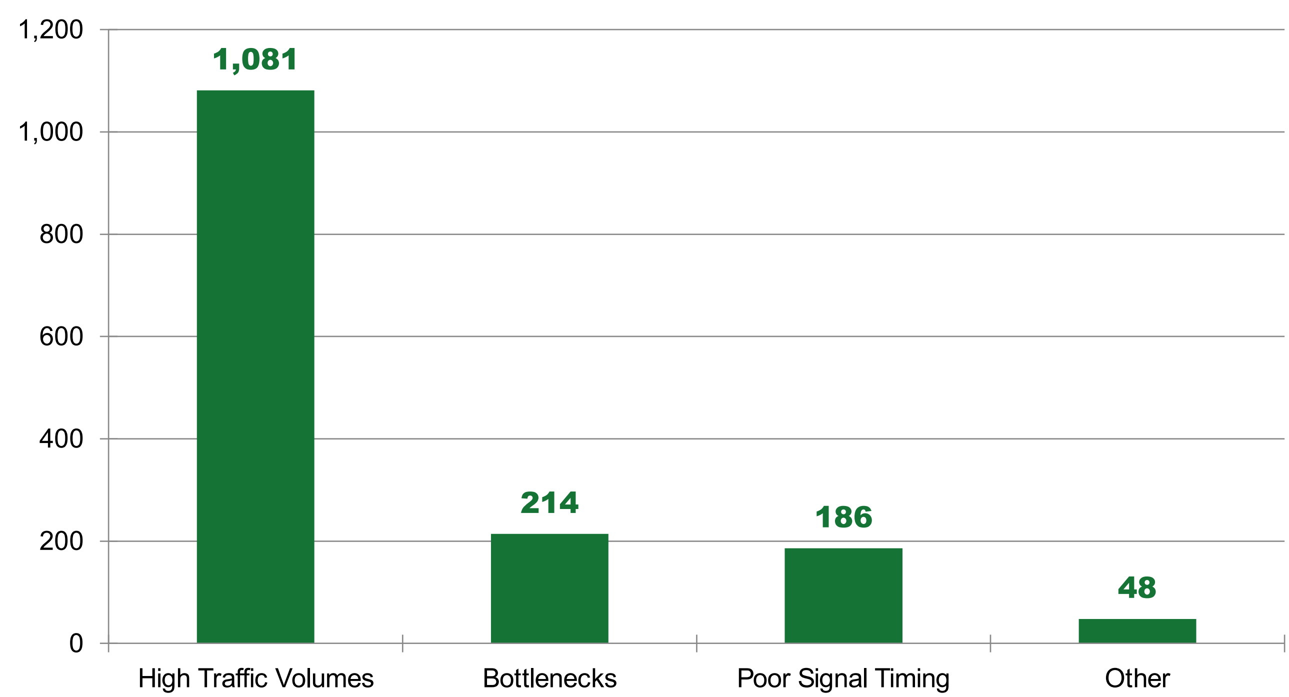


Figure 7. What Type of Recurring Congestion Occurs Here?



DEFINE THE NETWORK

The first step in defining the CMP network is to determine the geographic extent of application followed by the transportation system for analysis.

Geographic Area

The geographic area of the CMP includes the entirety of the MPO planning area which includes a significant portion of Greenville County and Pickens County, and smaller portions of Anderson, Laurens, and Spartanburg counties.

Network Definition

FHWA's Guidebook offers guidance on defining the regional network and acknowledges that it is appropriate to define a subset of roads based on a variety of easily-measured attributes, such as functional classification and traffic volumes. Creation of the CMP network considered data availability and other resources (e.g., manpower, time, etc.) available for analysis.

The proposed CMP network is comprised of three tiers.

Tier 1 – Interstates

The first tier includes interstates within the region. Below are examples of Tier 1 routes:

- I-85
- I-185
- I-385

Tier 2 – Non-Interstate Routes on the NHS

The second tier includes all non-interstate corridors along the NHS. Below are examples of Tier 2 routes:

- US-276
- US-29
- US-25
- US-123

Tier 3 – Other Significant Routes

The third tier includes other significant routes including roads functionally classified as major collectors and above that are not in the NHS. Below are examples of Tier 3 routes.

- US-178
- SC-153
- SC-418
- SC-11

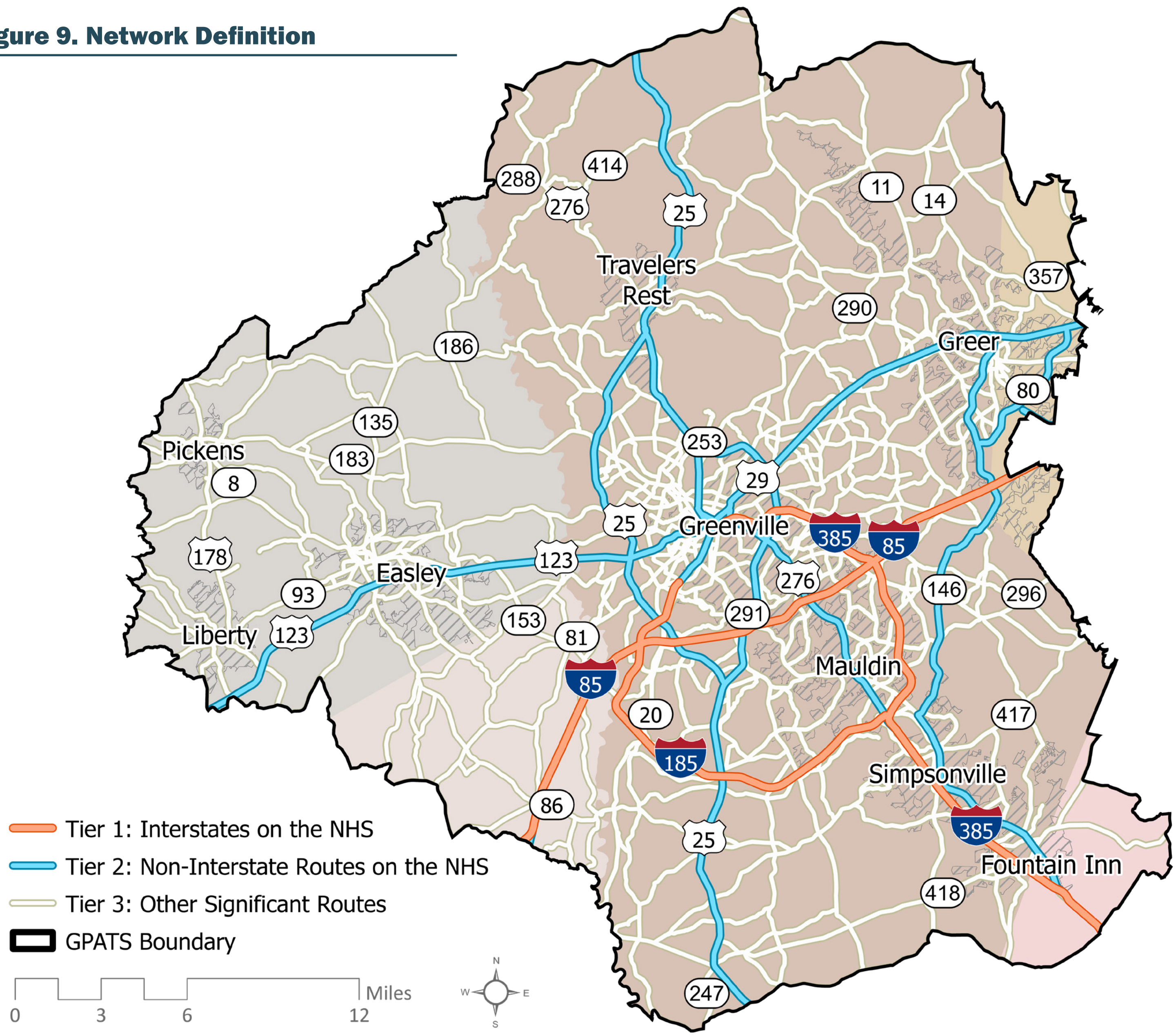
CHAPTER 3

Network Validation

The analysis and validation of the regional CMP network was dependent on presently available data sources and their usability. The degree of congestion on the network was validated against observed values and data tools readily-available to analysts.

Probe data from the Iteris' ClearGuide tool, procured by SCDOT, proved to be the most-effective and consistent dataset across all three tiers to facilitate a comprehensive evaluation of the regional network. An initial screening of the network based on Year 2019 data indicated a good coverage of major travel corridors in the region. A limited number of corridors missing are anticipated to be included in subsequent datasets as they become available.

Figure 9. Network Definition



PERFORMANCE MEASURES

Performance measures are metrics used to monitor and evaluate the effectiveness of the CMP on the regional transportation network. These measures help identify congested conditions at both the system-wide and corridor levels, track progress towards meeting regional objectives, and assess the effectiveness of congestion mitigation strategies. Additionally, performance measures play a crucial role in communicating system conditions to policymakers and the general public.

As outlined by the FHWA, effective performance measures possess the following characteristics:

- Consist of quantifiable data that are simple to present and interpret, while also maintaining professional credibility.
- Describe existing conditions and are capable of identifying problems and predicting changes.
- Easily calculable using existing field data, employ estimation techniques readily available for the specific measure, and yield consistent results.
- Applicable to multiple modes of transportation and meaningful across various scales and settings.

In an effort to evaluate prevailing ground conditions and proposed congestion strategies, the performance measures are listed in Table 1 with a check-mark signifying the applicable goal categories. All of the referenced measures are federally required. There is the option to include more measures in the future, but due to data availability and staff resources, GPATS is not electing to do so at this time.

Federally-Mandated Measures: These measures align with MAP-21, FAST Act, and IIJA federal transportation legislation. These measures establish reporting schedules at the state and MPO levels per federal regulations. Federally-mandated performance measures are grouped into categories to address areas such as safety, maintenance, system performance, and public transportation. The federal performance measurement areas most pertinent to the CMP include:

- Highway Safety | PM1
- System Performance | PM3
- Public Transportation Agency Safety Plan (PTASP)

Table 1. Federal Performance Measures and CMP Goals

Performance Measure		culture & environment	economic vitality	growth & development	mobility & accessibility	safety & security	system preservation & efficiency
Fatalities (PM1)	Number of Fatalities	✓			✓	✓	✓
Rate of Fatalities (PM1)	Rate of fatalities per 100 million VMT			✓	✓	✓	
Serious Injuries (PM1)	Number of serious injuries	✓			✓	✓	✓
Rate of Serious Injuries (PM1)	Rate of serious injuries per 100 million VMT			✓	✓	✓	
Non-Motorized Fatalities (PM1)	Number of non-motorized fatalities	✓			✓	✓	
Fatalities per Revenue Mile (PTASP)	Total number of reportable fatalities		✓	✓	✓	✓	✓
Fatalities per Revenue Mile (PTASP)	Fatalities rate per total vehicle revenue miles by mode		✓	✓	✓	✓	✓
Injuries per Revenue Mile (PTASP)	Total number of reportable injuries		✓	✓	✓	✓	✓
Injuries per Revenue Mile (PTASP)	Injuries rate per total vehicle revenue miles by mode		✓	✓	✓	✓	✓
Reportable Safety Events (PTASP)	Total number of reportable safety events				✓	✓	✓
Reportable Safety Events (PTASP)	Safety events rate per total vehicle revenue miles by mode				✓	✓	✓
System Reliability (PTASP)	Mean distance between major mechanical failures by mode				✓		
Person-miles (PM3)	Percent of person-miles traveled on the Interstate system that are reliable		✓				✓
Person-miles (PM3)	Percent of person-miles traveled on non-Interstate NHS that are reliable		✓				✓
TTTR (PM3)	Truck travel time reliability on primary freight corridors		✓		✓		

Source: Federal Transit Administration Safety Performance Targets Guide

ANALYSIS

EVALUATE CONGESTION

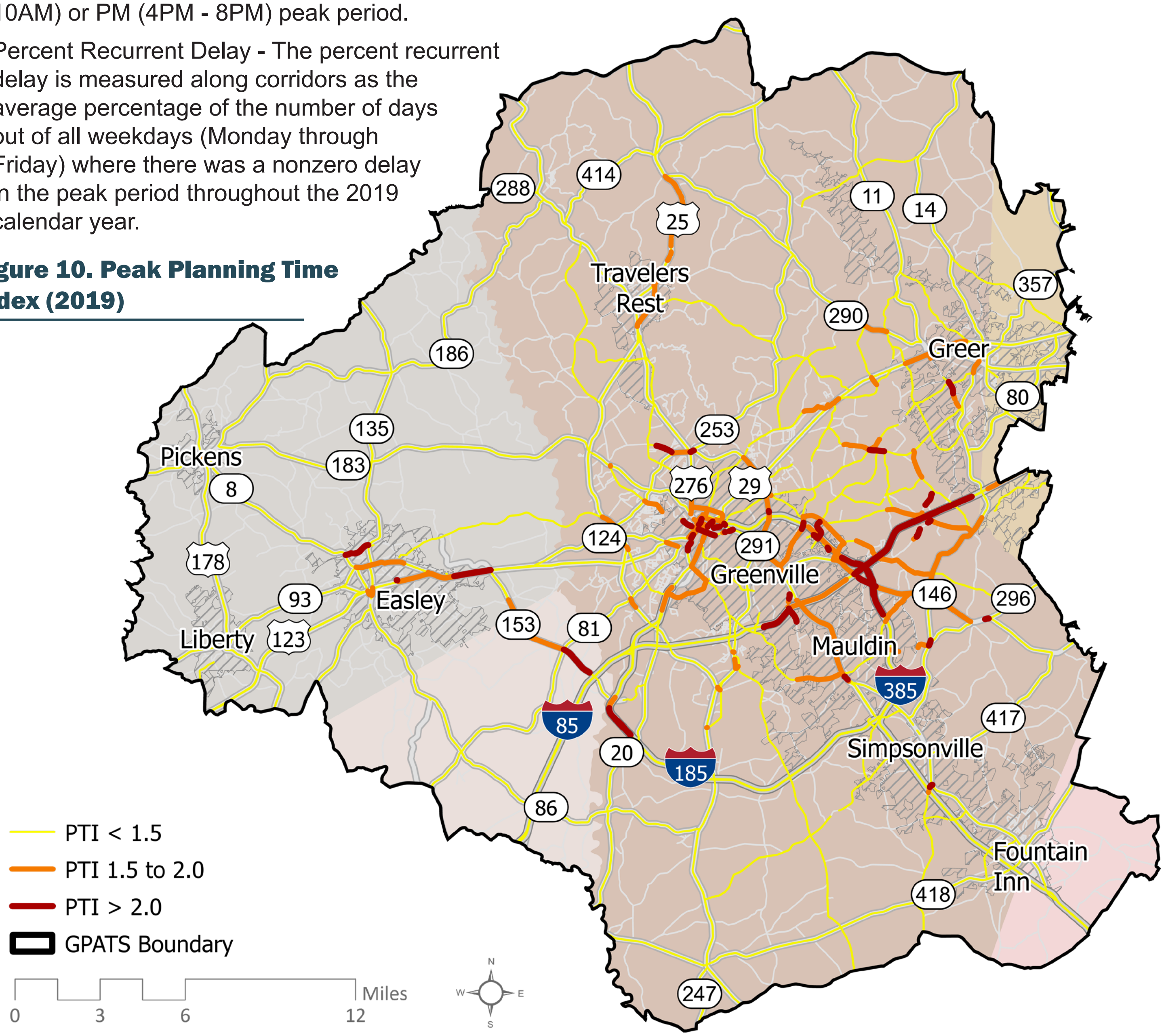
To evaluate congestion in the GPATS region, the project team leveraged 2019 Iteris ClearGuide data. Corridors were screened using two primary metrics:

- Planning Time Index - The Planning Time Index (PTI) is the ratio of the 95th percentile travel time to the free flow travel time. Planning time index indicates the total travel time required to ensure on-time arrival. The Peak PTI used in this analysis represents the highest PTI for either the AM (6AM - 10AM) or PM (4PM - 8PM) peak period.
- Percent Recurrent Delay - The percent recurrent delay is measured along corridors as the average percentage of the number of days out of all weekdays (Monday through Friday) where there was a nonzero delay in the peak period throughout the 2019 calendar year.

Peak Planning Time Index

Initially, the CMP network was screened to identify any corridor segments that exceeded a Peak PTI of 1.5. This screening yielded many segments, largely concentrated in the urban core of the region. Figure 10 shows the Peak PTI in the GPATS region. Table 2 represents a congestion evaluation of corridors sorted by highest PTI Values.

Figure 10. Peak Planning Time Index (2019)



Percent Recurrent Delay

In addition to screening the regional network for congestion by Peak Planning Time Index, Percent Recurrent Delay was also reviewed for morning (AM) and afternoon (PM) peak periods during weekday travel conditions. Comparing the two metrics underscored the importance of considering travel time reliability in this process.

Corridors with a percent recurrent delay greater than 50%, in either the AM or PM peak, were added to the list of congested corridors. This included corridors beyond those screened as having a PTI greater than 1.5, representing a more reliable travel network, but with more recurrent congestion.

The following two maps, Figure 11 and Figure 12, present Percent Recurrent Delay during the two peak periods. As is evident, the afternoon (PM) recurrent delay is more widespread.

Figure 11. Percent Recurrent Delay (AM)

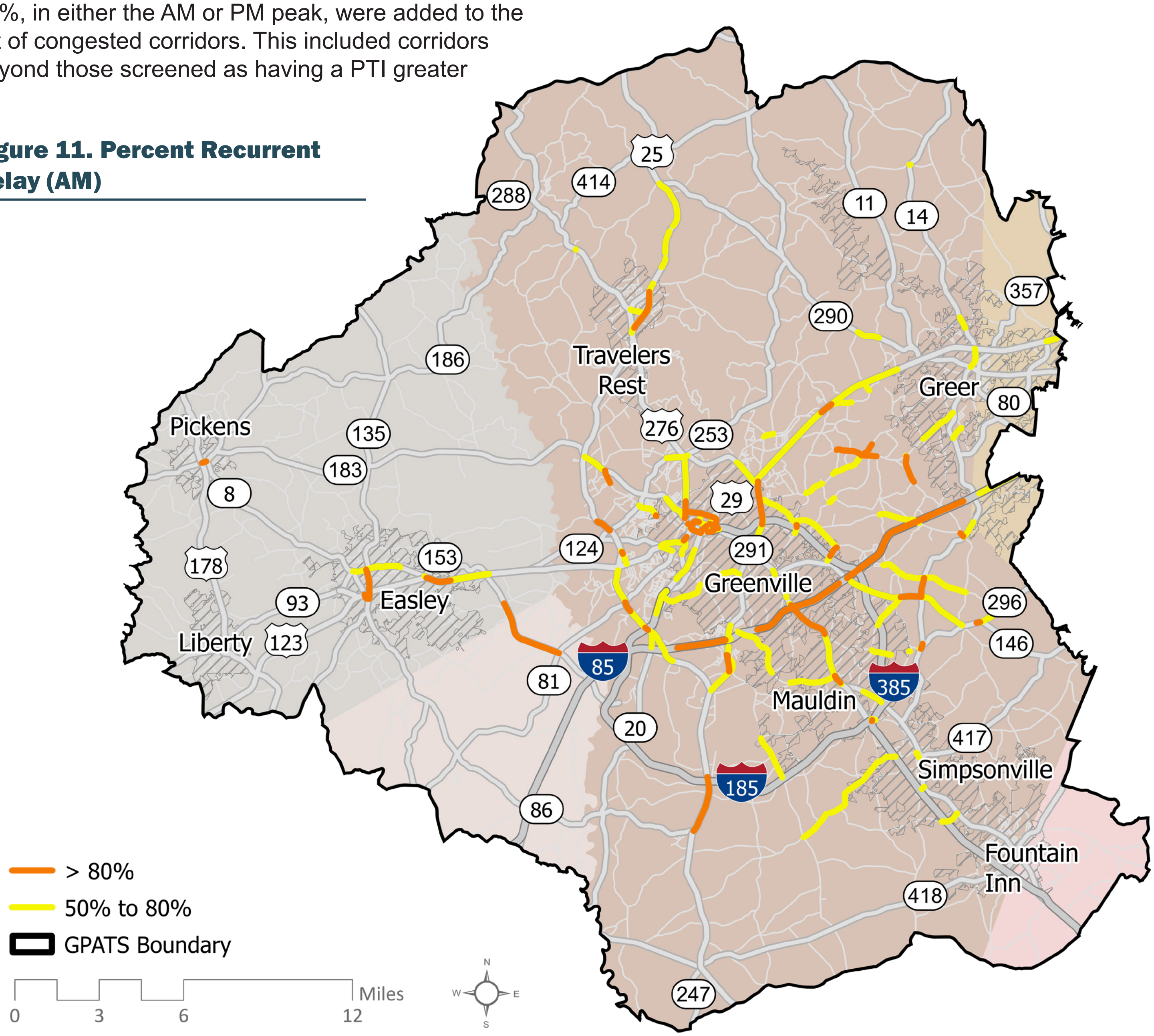


Figure 12. Percent Recurrent Delay (PM)

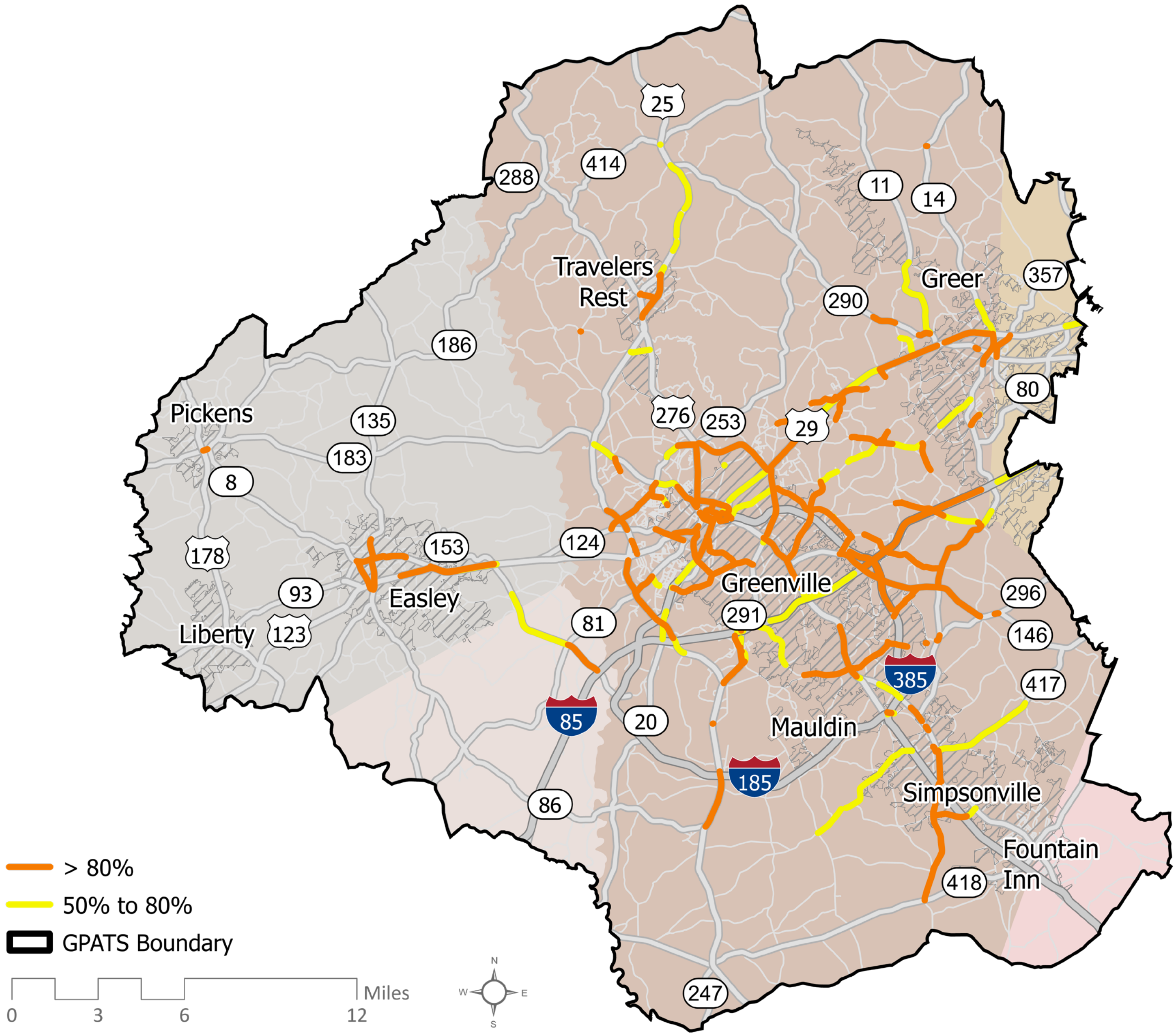


Table 2. Congestion Evaluation of Corridors

Corridor ID	Local Name	Termini	Length (miles)	Avg Peak PTI	AM Recurrent Delay (%)	PM Recurrent Delay (%)	Crashes (Total)	Crashes (Fatal & Serious Injury)
S-731	Dairy Dr	Ridge Rd to Confluence Outdoors	1.14	4.39	0.40	0.01	14	1
S-435	Ridge Rd	Parkins Mill Rd to Fairforest Wy	1.05	2.88	19.15	15.53	68	0
S-21-A	Fleetwood Dr	Main St/Gentry Memorial Hwy to Dacusville Hwy	0.96	2.48	0.54	1.38	40	0
I-85 E	I-85	Roper Mountain Rd to S-12	6.34	2.28	52.77	51.01	1331	4
S-1077	Washington St	Trescott St to Pettigru St	1.16	2.23	1.43	4.46	251	1
S-87	Franklin Rd	Old Buncombe Rd to Blue Ridge Dr	0.94	2.09	0.58	0.01	73	2
S-136	Buncombe Rd	Hood Rd to Hwy 14	1.33	2.06	1.85	18.23	207	1
SC14-A	Hwy 14	Woodruff Rd to Batesville Rd	2.88	1.92	59.11	86.97	406	2
S-107-A	Butler Rd	I-385 to Woodruff Rd	1.31	1.89	73.78	97.34	379	3
SC146-B	Woodruff Rd	Verdae Blvd to Hwy 14	3.70	1.86	59.10	96.53	3045	20
US123-A	Calhoun Memorial Hwy	Brushy Creek Rd to Hwy 153	5.55	1.84	53.63	84.93	920	7
S-200	Rutherford St	Stone Ave to Buncombe St	0.25	1.83	97.90	99.20	109	4
S-75	Washington St	McBee Ave to Laurens Rd	0.66	1.82	0.80	3.10	106	1

Corridor ID	Local Name	Termini	Length (miles)	Avg Peak PTI	AM Recurrent Delay (%)	PM Recurrent Delay (%)	Crashes (Total)	Crashes (Fatal & Serious Injury)
S-664	River St	Main St to North St	0.66	1.82	11.29	24.15	147	2
S-201	Augusta St	Grove Rd to Faris Rd	0.59	1.79	46.94	96.56	298	0
US276-D	Stone Ave	Rutherford St to North St/I-385	1.54	1.78	93.16	96.74	1036	9
I-85-D	I-85	US 25 to Roper Mountain Rd	8.15	1.77	47.37	34.73	2613	30
SC146-A	Woodruff Rd	Hwy 14 to Batesville Rd	1.68	1.77	73.38	89.46	249	2
SC253-B	Blue Ridge Dr	Franklin Rd to State Park Rd	0.77	1.70	69.52	98.30	473	1
S-94-A	Brushy Creek Rd	Cunningham Rd to Batesville Rd	2.56	1.67	69.48	83.02	385	1
S-3	Main St	Stone Ave to Academy St	0.32	1.65	72.80	99.62	89	1
US123-C	Academy St	College St to North St	0.87	1.64	79.86	87.94	344	4
S-312	Batesville Rd	Old Spartanburg Rd to Devenger Rd	1.00	1.63	83.66	89.71	119	1
S-104-B	W Parker Rd	W Blue Ridge Dr to E Bramlett Rd	0.77	1.63	71.41	84.97	106	2
US276-B	Laurens Rd/ Main St	Pleasantburg Dr to Woodruff Rd	1.25	1.60	34.93	97.37	571	2
S-492-B	Pelham Rd	Blacks Rd to Hwy 14	3.97	1.59	50.48	79.98	1903	4

Corridor ID	Local Name	Termini	Length (miles)	Avg Peak PTI	AM Recurrent Delay (%)	PM Recurrent Delay (%)	Crashes (Total)	Crashes (Fatal & Serious Injury)
US29-C	Mills Ave/ Church St	Henrydale Ave to Academy St	2.77	1.59	48.19	82.20	1006	6
S-107-B	W Butler Rd	Main St to Conestee Rd	1.64	1.59	56.13	96.55	537	7
SC-291-C	Pleasantburg Dr	Faris Rd to Wade Hampton Blvd	3.86	1.57	55.79	84.44	2029	19
SC135-A	Pendleton St	Main St to 5th St/Walker Ellison Rd	1.06	1.56	85.25	95.92	113	0
SC93-B	Main St	Liberty Dr to Dennis Dr	1.73	1.55	61.71	98.00	119	2
SC14-D	Main St	Brushy Creek Rd to Wade Hampton Blvd	1.18	1.55	60.04	92.19	291	1
US276-A	Laurens Rd/ Main St	Woodruff Rd to Main St	6.63	1.55	55.41	77.81	1660	13
S-273	Haywood Rd	Laurens Rd to North St	3.49	1.55	42.27	87.53	1648	13
US276-C	Poinsett Hwy	Stone Ave to Pleasantburg Dr	1.94	1.54	73.48	97.14	696	9
S-547	Roper Mountain Rd Ext.	Pelham Rd to Roper Mountain Rd	0.97	1.53	63.23	96.13	90	0
US25-C	White Horse Rd	Anderson Rd to I-85	2.23	1.53	79.54	90.34	1102	16
S-21-B	Rutherford Rd	Tanner Rd to Rutherford Road Ext	0.53	1.52	27.40	97.89	63	1
SC153-A	Hwy 153	Old Easley Bridge Rd to I-85	8.35	1.51	58.63	54.69	884	13
US29-B	Wade Hampton Blvd	Pine Knoll Dr to Buncombe Rd	7.33	1.49	58.25	80.90	2789	55

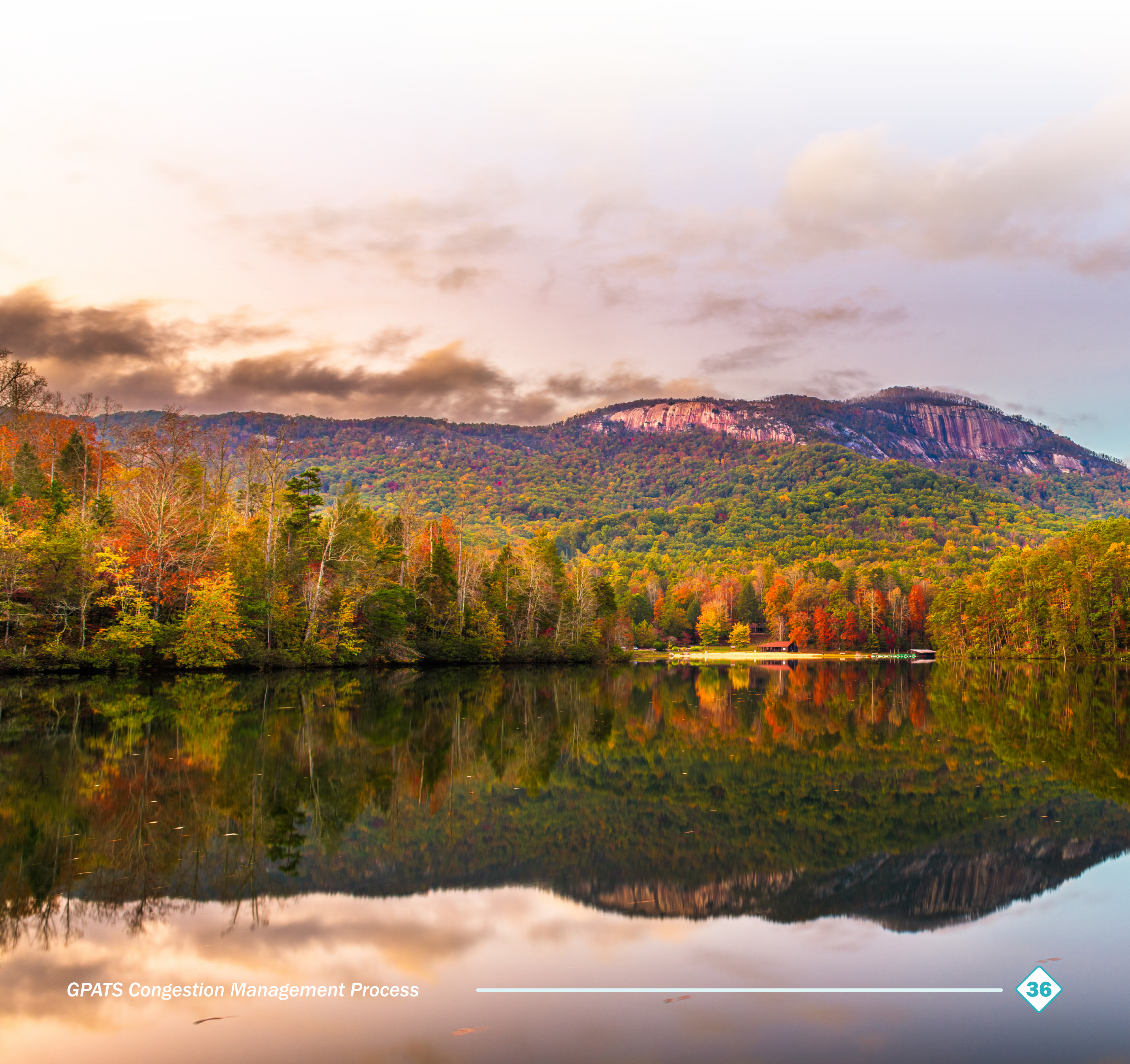
Corridor ID	Local Name	Termini	Length (miles)	Avg Peak PTI	AM Recurrent Delay (%)	PM Recurrent Delay (%)	Crashes (Total)	Crashes (Fatal & Serious Injury)
US123-B	Academy St	Pendleton St to Falls Park Dr	0.85	1.49	74.53	90.50	323	2
SC291-A	Pleasantburg Dr	Poinsett Hwy to Wade Hampton Blvd	2.89	1.48	41.54	92.03	1028	15
S-335	Edwards Rd	Lee Rd to Wade Hampton Blvd	0.96	1.48	19.79	82.63	127	2
SC124-A	Pendleton St	Lois Ave to Main St	1.05	1.48	53.68	92.19	245	2
S-149	Faris Rd	Anderson Rd to Pleasantburg Dr	4.12	1.47	54.18	86.02	956	9
S-22	State Park Rd	Poinsett Rd to Hwy 25	0.55	1.46	57.00	96.60	26	0
S-492-A	Pelham Rd	North St to Hudson Rd	2.11	1.45	55.04	85.87	579	8
SC14-C	Main St	Curtis St to Fairview Rd	1.08	1.45	45.79	84.29	178	3
US29-A	Wade HamptonBlvd	Poinsett St to Main St	3.15	1.45	15.50	64.25	515	4
S-548	Roper Mountain Rd	Woodruff Rd to Hwy 14	4.57	1.45	41.58	80.07	1618	9
SC417-A	Georgia Rd/ Lee Vaughn Rd	Hunter Rd to Scuffletown Rd	1.92	1.43	41.96	78.55	96	1
US25-F	Augusta Rd	Sandy Springs Rd to I-185	1.80	1.43	89.16	84.64	268	4
US25-A	White Horse Rd	Lily St to Old Easley Hwy	1.87	1.43	53.76	75.45	1033	20
S-55	Fairview Rd	Main St to Hwy 418	4.36	1.42	4.23	92.68	1266	15

Corridor ID	Local Name	Termini	Length (miles)	Avg Peak PTI	AM Recurrent Delay (%)	PM Recurrent Delay (%)	Crashes (Total)	Crashes (Fatal & Serious Injury)
S-104-A	W Parker Rd	Cedar Lane Rd/ Farrs Bridge Rd to Lily Street	0.49	1.42	88.88	93.36	52	1
S-94-B	Hammett Bridge Rd	Suber Rd to Hwy 14	1.46	1.41	51.54	67.54	92	2
S-107-C	E Butler Rd	Main St to I-385	2.64	1.40	47.78	72.50	332	3
SC253-A	Blue Ridge Dr	Old Easley Hwy to White Horse Rd	0.49	1.39	31.66	84.70	178	1
S-94-D	North St/Old Spartanburg Rd/Brushy Creek Rd	Howell Rd to Taylors Rd	3.01	1.38	64.31	53.47	562	6
S-189	Cleveland St	Jones Ave to Faris Rd	1.08	1.38	32.38	87.74	79	3
S-94-C	Park Ave/ North St	Church St to Pleassantburg Dr	2.12	1.37	43.56	78.43	348	3
SC81-A	Anderson Rd	White Horse Rd to Washington Ave	0.82	1.37	49.24	81.42	179	2
SC291-B	Augusta Rd/ Pleasantburg Dr	White Horse Rd to Mauldin Rd	3.82	1.37	51.15	69.66	634	19
SC183-C	Buncombe/ North St and College St/ Beattie Pl	Butler Ave to Church St	1.20	1.37	64.67	83.35	792	3
S-453	Harrison Bridge Rd	Fairview Rd to Main St	1.61	1.35	45.52	85.35	479	6
S-88	Roe Ford Rd	Hwy 25 Byp to Poinsett Hwy	0.68	1.34	29.93	71.45	14	0
S-149-B	Washington Ave	White Horse Rd to Easley Bridge Rd	0.66	1.31	54.30	75.47	82	1

Corridor ID	Local Name	Termini	Length (miles)	Avg Peak PTI	AM Recurrent Delay (%)	PM Recurrent Delay (%)	Crashes (Total)	Crashes (Fatal & Serious Injury)
S-201-B	Augusta St/Rd	Faris Rd to Pleasantburg Dr	2.94	1.29	34.54	55.24	796	14
S-38	Main St	Wade Hampton Blvd to Taylors Rd	0.77	1.26	48.58	86.97	93	1
S-107	Mauldin Rd	Augusta Rd to Fairforest Way	2.44	1.24	51.26	47.49	627	5
S-272	Georgia Rd	Fork Shoals Rd to I-385	4.80	1.20	52.30	72.29	651	8

Future Corridor Evaluation and Project Development

GPATS will continue to monitor performance of the corridors listed in Table 2 using the aforementioned performance measures as new transportation infrastructure improvements are implemented across the region. The measures may be supplemented as necessary and evaluated using other data sources as they become available. Corridors identified may also undergo further evaluation to identify specific causes of congestion and screen against potential mitigation measures outlined in the next chapter.



04
STRATEGIES

STRATEGIES METHODOLOGY

The subsequent section of this chapter provides a more detailed exploration of each of the overarching categories referenced on page 39. Each category is accompanied by a comprehensive description and an explanation of the strategies that fall within that category. Specific engagement data pertaining to each category is presented, including the public rating of strategies obtained from the MetroQuest survey, as well as heat maps illustrating the areas where the public identified potential benefits from the strategies associated with the identified categories.

More details on the specific strategies, including case studies, relative cost, and impacts for each specific strategy, can be found in Appendix B.

Strategy Identification

Each overarching category is accompanied by a map and table that outline the recommended strategies. These strategies, although not bound by financial constraints, are the result of the first six steps of the Process Model discussed in Chapter 1.

The public identification of congestion and strategies were crucial to Steps 5 and 6, Analyze Congestion Problems & Needs and Identify & Assess Strategies. The public's identification of problem areas was cross referenced with the quantitative data to data points within the regional CMP network, identified in Step 2. The public's identification of strategies was assessed to determine the feasibility, potential benefits, and necessity at each location.

Examples of situations that were deemed unfeasible include widening projects on six lane sections of roadway, new roadways in heavily populated urban areas, and dedicated truck lanes on four lane roadways.

While the public recognized the benefits of travel demand management on the network, these strategies often involve individual behavioral changes or personal decisions, rather than large-scale infrastructure. As a result, specific TDM geographically-based strategies were not identified.

Figure 13. Example of Corridors Identified for Active Transportation Strategies

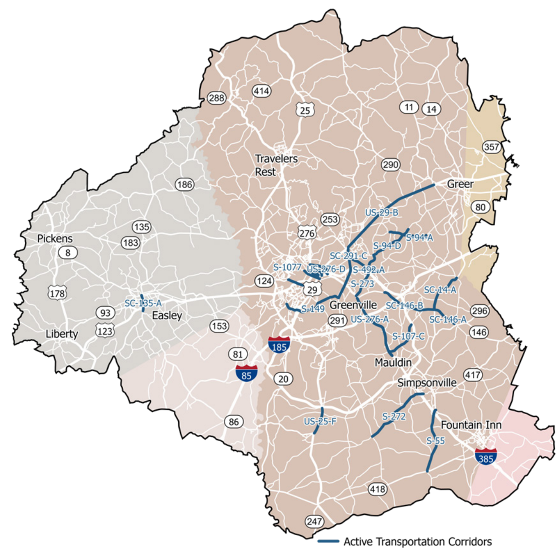
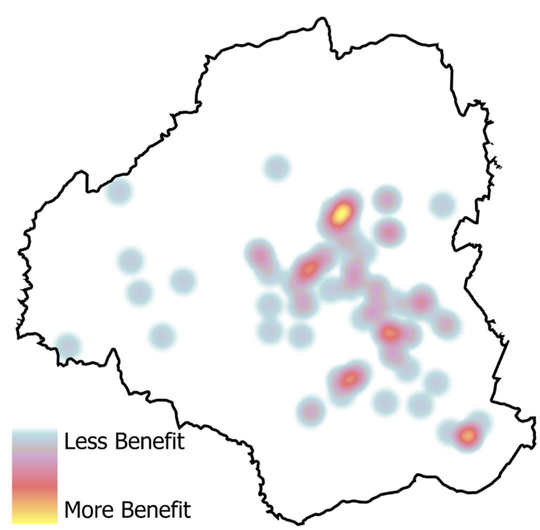


Figure 14. Example of Public Feedback on Active Transportation Strategies



CHAPTER 4

CONGESTION MITIGATION STRATEGIES

Identifying specific travel corridors experiencing congestion in the region and crafting appropriate mitigation strategies are essential parts of the CMP. While there is no one-size-fits-all approach to mitigate and manage congestion, a blend of strategies offers the potential to improve the overall efficiency of the existing transportation network. The GPATS CMP Steering Committee leveraged the data analysis discussed in the prior section to begin identifying potential strategies for congested corridors. The strategies were organized into eight overarching categories as shown below.

Active Transportation

Active transportation programs foster walking, biking, and other forms of non-motorized mobility to discourage use of personal automobiles, promote an active lifestyle, improve air quality, and enhance experiences of residents as well as visitors to the region.

Freight

Freight transportation is integral to local, regional, and national economies. Freight strategies minimize adverse impacts of freight activity on regional mobility and facilitate activity on regional mobility and facilitate efficient movement of goods while also propelling economic growth.

Transit

A well-designed transit system provides a competitive alternative to travel by single-occupancy vehicle, especially if well-coordinated with strong land use policy. A blend of service types and emerging technologies can reduce the number of drivers on the road and mitigate congestion.

Land Use

Land use and growth management strategies greatly influence transportation. These strategies provide increased access, connectivity, and mode choice, which in turn can mitigate congestion along CMP network corridors.

Capacity Expansion

Capacity expansion is achieved through improvements that enhance mobility of vehicles along a corridor through the addition of travel lanes, construction of new roadways, or creation of new interchanges.

Operations

The Transportation Systems Management and Operations (TSMO) approach emphasizes strategies that aim to optimize existing infrastructure through near-term solutions. These strategies enable active management of transportation systems based on current operational conditions.

TDM

Transportation Demand Management (TDM) refers to a set of strategies and measures designed to manage and reduce the demand for travel to alleviate congestion, improve transportation efficiency, and promote sustainable transportation options. TDM is typically includes a combination of policies and programs that influence travel choice and behavior.

Technology

Intelligent Transportation Systems (ITS) leverage technology-based solutions to improve travel time reliability and safety in an organized, coordinated, and cost-effective way.

STRATEGIES

CHAPTER 4

What We Heard

The chart to the right is a digitized version of the chart used in the April 23, 2024 public workshop. Participants placed stickers representing each strategy based on their perception on how well or not well each can impact congestion and how feasible each strategy was within the context of the Greenville-Pickens area.

Active Transportation

Freight

Transit

Land Use

Capacity Expansion

Technology

TDM

Operations

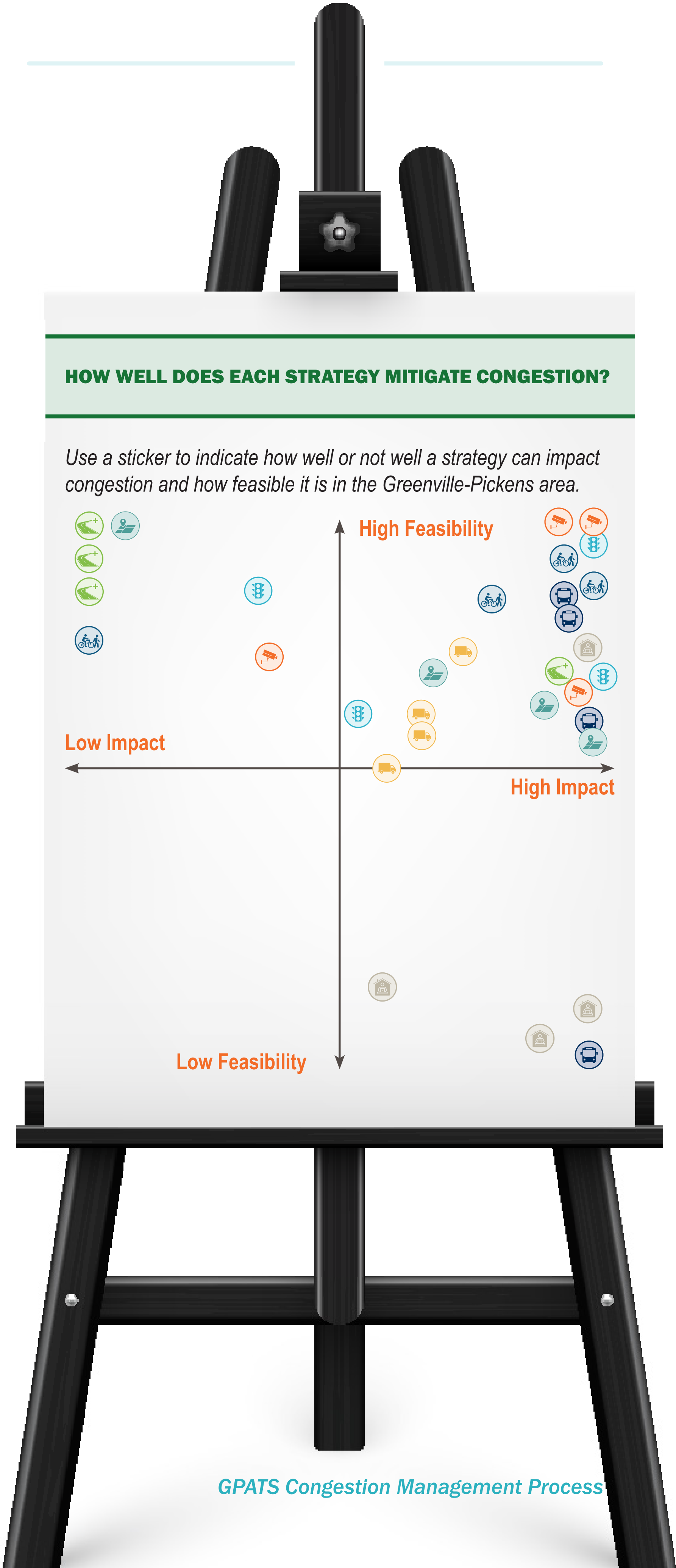
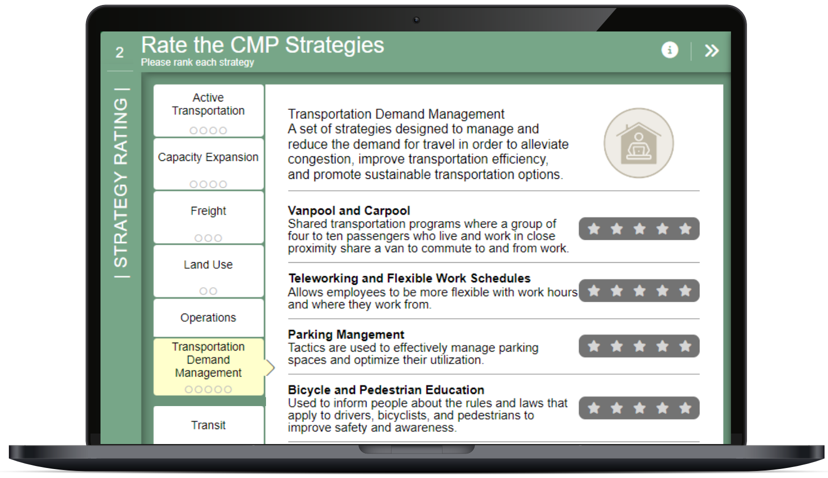


Figure 15. How Well Does Each Strategy Mitigate Congestion Results

What We Heard

The online survey provided a similar opportunity for the public to provide feedback on which strategies might be most applicable or relevant to the Greenville-Pickens area. In the online survey, participants were asked to rate strategies out of five stars (with five being the best) to determine which might be the best for the region.



Highest Rated Strategies

4.5 Traffic Signal Coordination

4.2 Walkways

4.2 Alternative Interchange Design

Lowest Rated Strategies

2.6 Bikeshare or Scooter Program

2.8 Managed Lanes

2.9 Vanpool and Carpool

CHAPTER 4

Active Transportation

Active transportation programs foster walking, biking, and other forms of non-motorized mobility to discourage use of personal automobiles, promote active lifestyles, improve air quality, and enhance experiences of residents and visitors in the region.

The active transportation strategies identified for the GPATS region include:

- Walkways
- Bikeways
- Pathways
- Bikeshare or Scooter-Share Programs

What We Heard

When asked to rank active transportation strategies based on how applicable they are to the study area, survey participants rated active transportation strategies an average of 3.5 out of 5.0 stars.

3.5 ★★★½

Active Transportation

Walkways

Walkways include sidewalks or other dedicated pedestrian facilities that provide safe infrastructure for people to walk.

Bikeways

Bikeways represent protected or painted bicycle lanes, shared lanes, or "sharrows," or other dedicated bicycle facility types.

Bikeshare or Scooter-Share Programs

A bicycle or scooter sharing program allows individuals to borrow vehicles using a membership or credit card. Systems vary greatly and may be either docked or dockless.

Pathways

A pathway can consist of a shared-use path or a sidepath. A shared-use path is a physically separated path that is set apart from vehicular traffic by an open space or other landscaping elements. These paths are designed to be used by pedestrians, bicyclists, and other non-motorized users. Alternatively, a sidepath is located immediately adjacent to a roadway and is separated from it by a narrow barrier.

Figure 16. Corridors Identified for Active Transportation Strategies

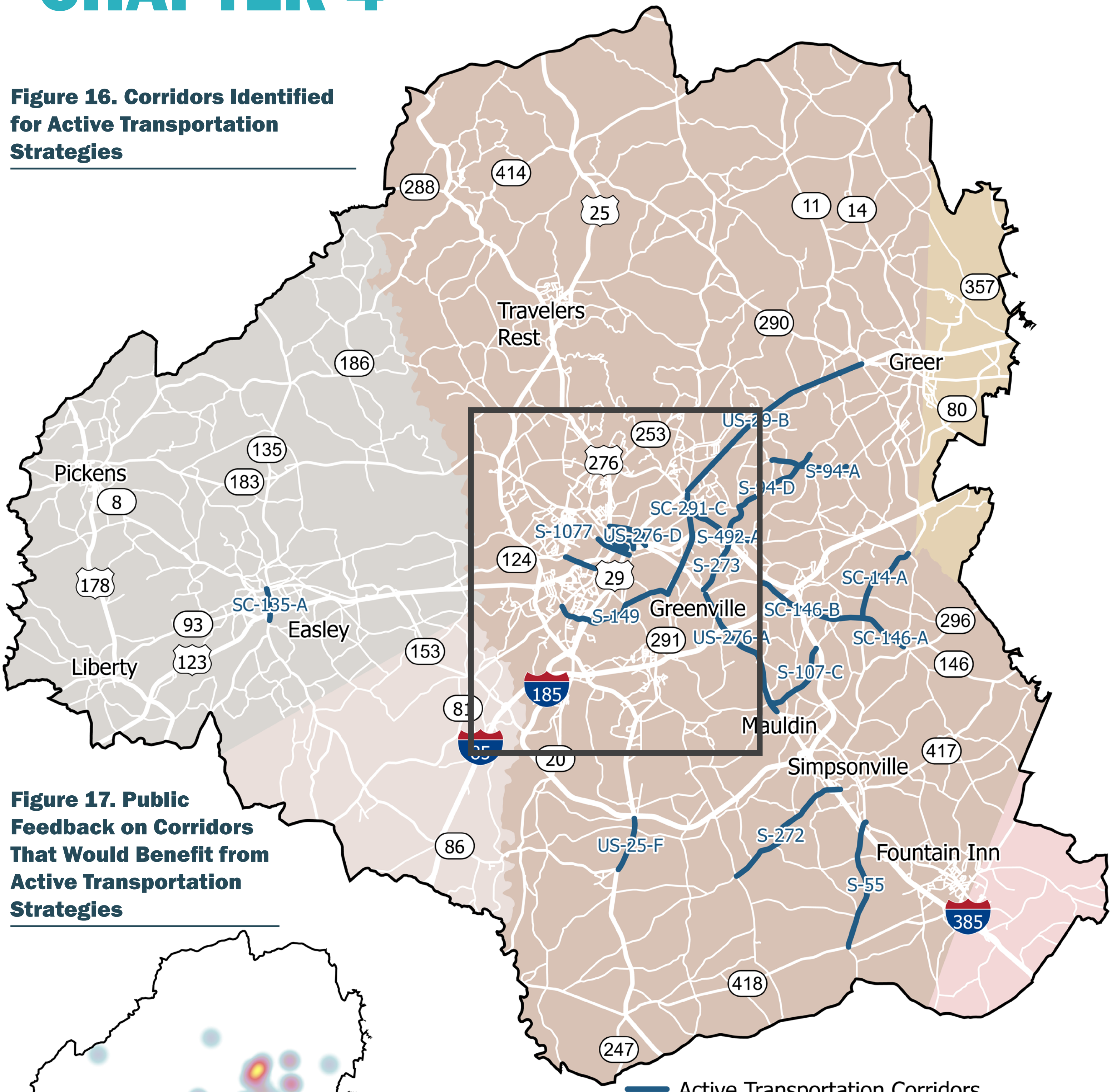


Figure 17. Public Feedback on Corridors That Would Benefit from Active Transportation Strategies

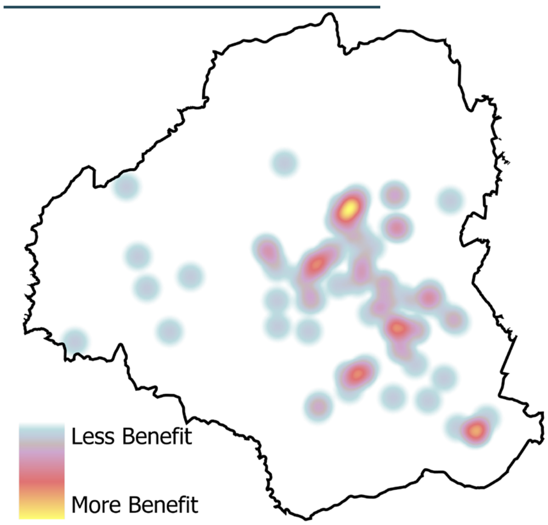
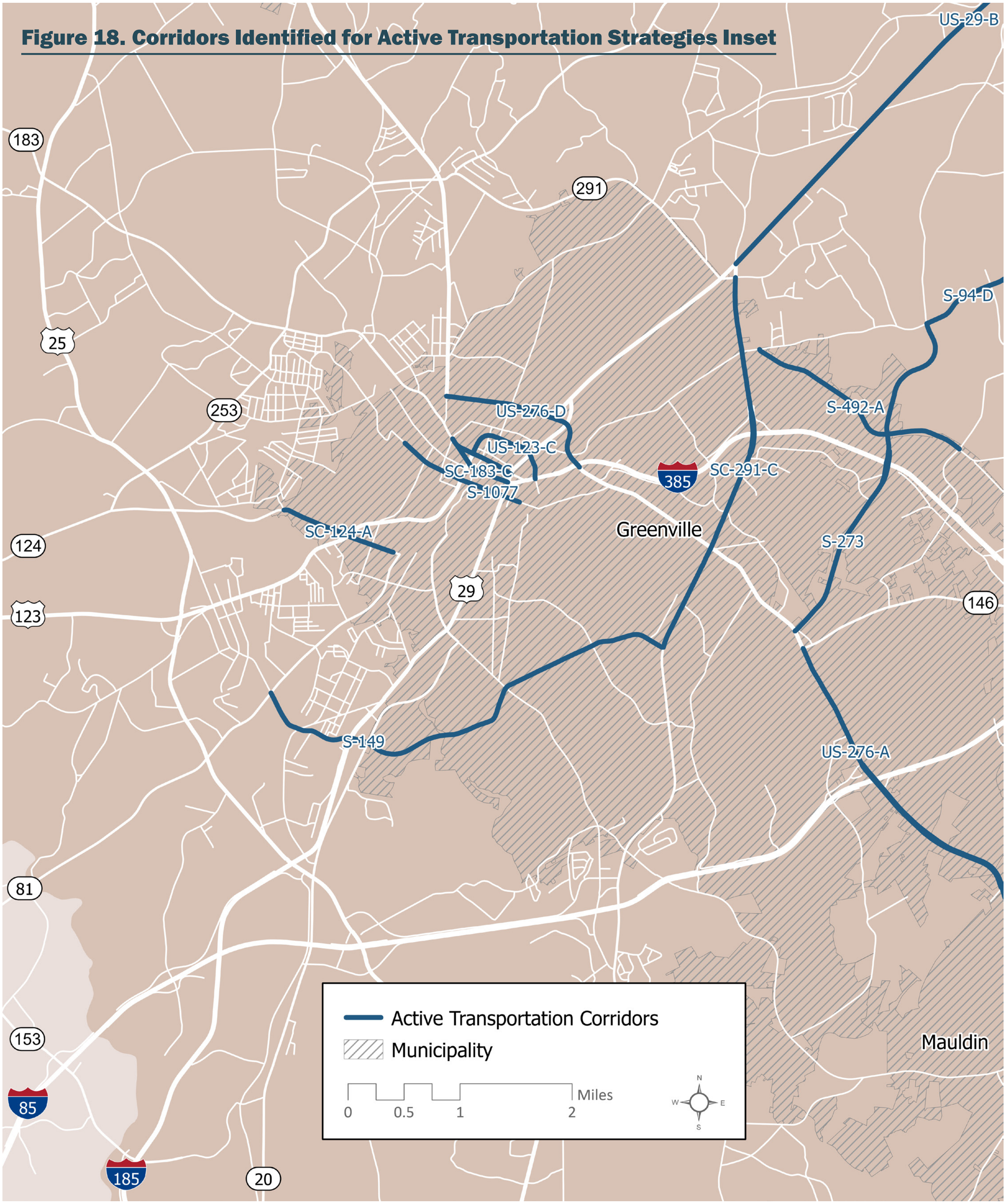


Table 3. Identified Active Transportation Strategies

Corridor ID	Local Name	Extents	Recommended Strategy
US-29-B	Wade Hampton Blvd	Pine Knoll Dr to Buncombe Rd	Bikeways, Pathways
US-276-D	Stone Ave	Rutherford St to North St/I-385	Bikeways
US-276-A	Laurens Rd/Main St	Woodruff Rd to Main St	Bikeways
US-25-G	Hwy 25	US 276/Poinsett Hwy to Locust Hill Rd	Bikeways
US-25-F	Augusta Rd	Sandy Springs Rd to I-185	Pathways
US-123-C	Academy St	College St to North St	Pathways, Bikeways,
SC-291-C	Pleasantburg Dr	Faris Rd to Wade Hampton Blvd	Bikeways
SC-183-C	Buncombe/North St and College St/Beattie Pl	Butler Ave to Church St	Pathways
SC-14-A	Hwy 14	Woodruff Rd to Batesville Rd	Bikeways, Walkways
SC-146-B	Woodruff Rd	Verdae Blvd to Hwy 14	Bikeways
SC-146-A	Woodruff Rd	Hwy 14 to Batesville Rd	Pathways
SC-135-A	Pendleton St	Main St to 5th St/Walker Ellison Rd	Pathways
SC-124-A	Pendleton St	Lois Ave to Main St	Pathways
S-94-D	North St/Old Spartanburg Rd/ Brushy Creek Rd	Howell Rd to Taylors Rd	Walkways, Pathways
S-94-A	Brushy Creek Rd	Cunningham Rd to Batesville Rd	Walkways, Pathways
S-55	Fairview Rd	Main St to Hwy 418	Pathways
S-492-A	Pelham Rd	North St to Hudson Rd	Pathways
S-273	Haywood Rd	Laurens Rd to North St	Walkways
S-272	Georgia Rd	Fork Shoals Rd to I-385	Bikeways
S-149	Faris Rd	Anderson Rd to Pleasantburg Dr	Walkways
S-107-C	E Butler Rd	Main St to I-385	Walkways
S-1077	Washington St	Trescott St to Pettigru St	Bikeways

Figure 18. Corridors Identified for Active Transportation Strategies Inset



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CHAPTER 4

Transit

A well-designed transit system provides a competitive alternative to travel by single-occupancy vehicle, especially if well-coordinated with strong land use policy. A blend of service types and emerging technologies can reduce the number of drivers on the road and help mitigate congestion along major corridors.

The transit strategies identified for the GPATS region include:

- On-Demand Transit Service
- Bus Service
- Bus-On-Shoulder
- Park-and-Ride Lots
- Transit Signal Priority

What We Heard

When asked to rank transit strategies based on how applicable they are to the study area, survey participants rated transit strategies an average of 3.6 out of 5.0 stars.

3.6

Transit

On-Demand Transit Service

On-demand transit service is a non-fixed route service that is flexible. On-demand transit provides door-to-door or curb-to curb service for passenger pick-ups and drop-offs. To request a ride, passengers must request and schedule a ride in advance of the trip. An on-demand service is the most cost-effective in low population or low-density areas where fixed-route is not operationally or financially feasible.

Bus Service

Bus service can provide convenient and accessible public transportation in urban and rural areas. Public transportation agencies can provide a variety of services including local bus service, express bus service, and circulators. Generally, local bus service follows a fixed route, has scheduled stops, and follows a set frequency (how often the bus comes). An express bus service can provide connections at peak hours of the day or to and from a destination and park-and-rides with a limited number of stops. Circulator routes are circuitous and typically provide connections to key destinations in a small area.

Bus-On-Shoulder System

Bus-on-shoulder system, also known as BOSS, is a cost-efficient strategy that allows buses to travel in the shoulder area of arterials and freeways to avoid congestion.

Park-and-Ride Lots

A park-and-ride lot is intended to provide commuters or travelers with a place to leave their personal vehicles and transfer to a public transportation system or carpool opportunity.

Transit Signal Priority

Transit signal priority—or TSP—is a technology that modifies traffic signal timing or phasing for transit vehicles.

Figure 19. Corridors Identified for Transit Strategies

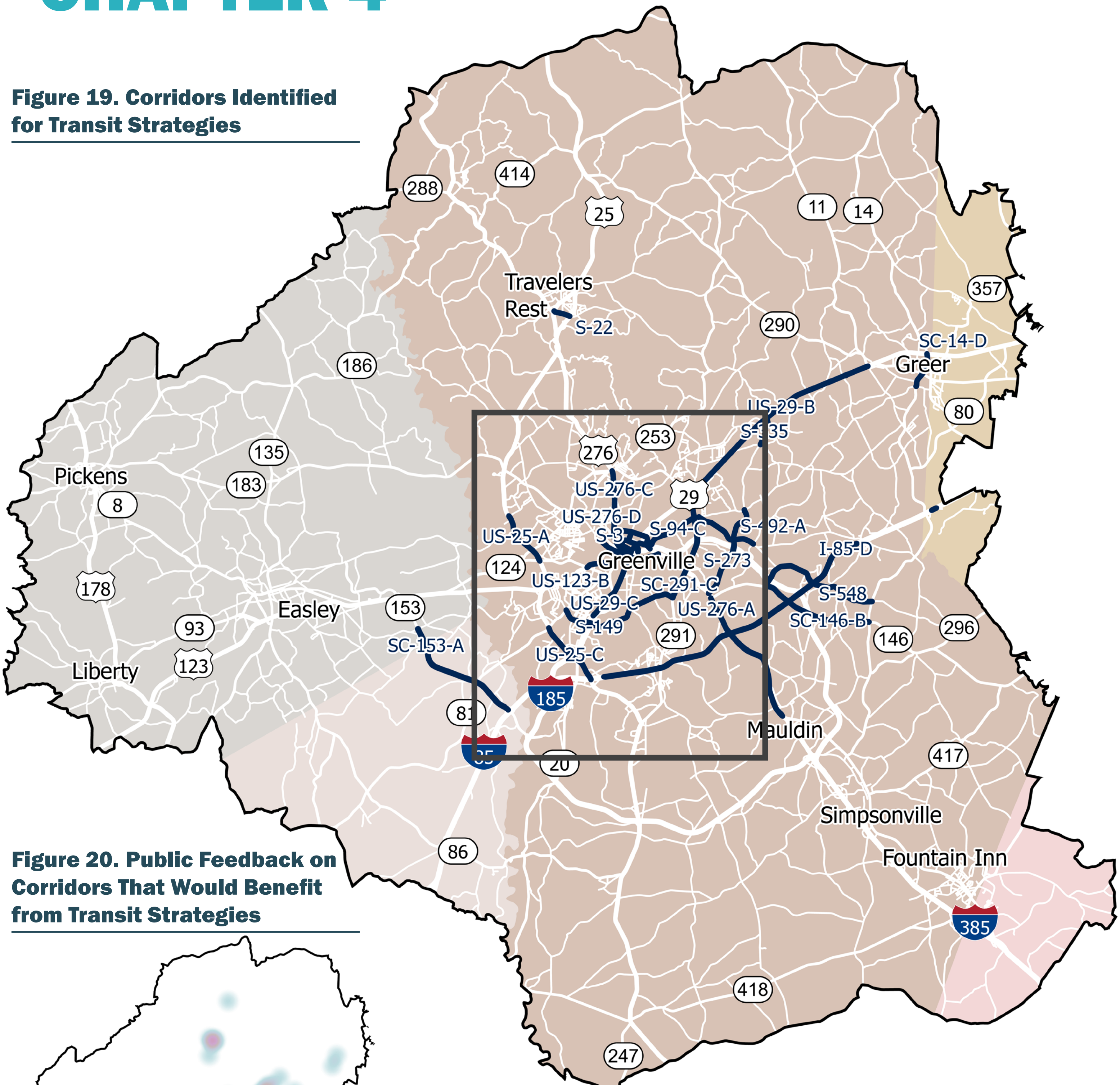


Figure 20. Public Feedback on Corridors That Would Benefit from Transit Strategies

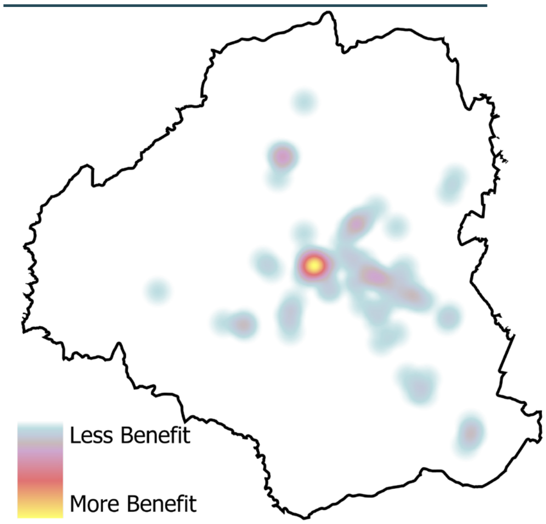
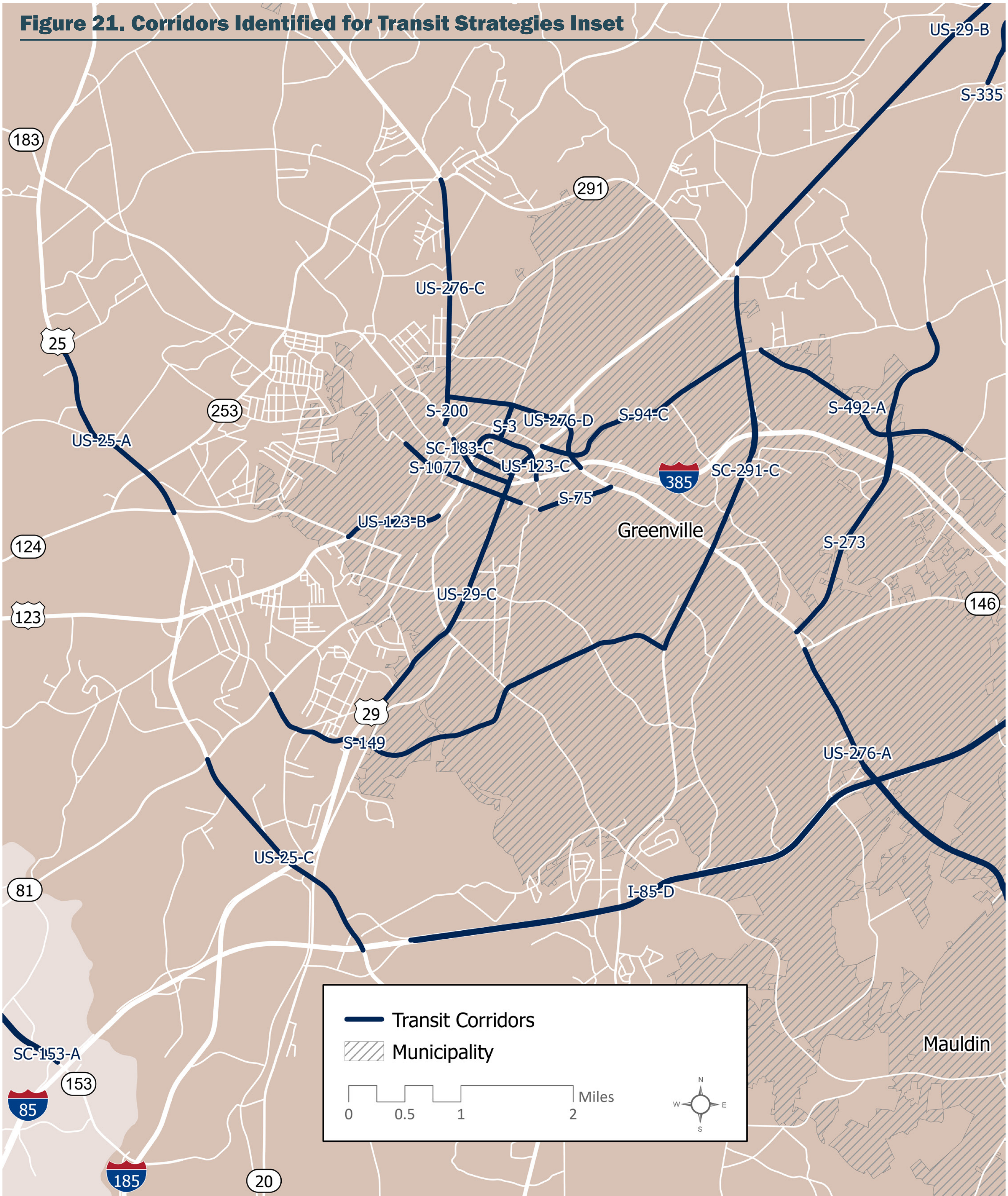


Table 4. Identified Transit Strategies

Corridor ID	Local Name	Extents	Recommended Strategy
I-85-D	I-85	US 25 to Roper Mountain Rd	Bus Service (add)
US-29-C	Mills Ave/Church St	Henrydale Ave to Academy St	Bus Service (Improve)
US-29-B	Wade Hampton Blvd	Pine Knoll Dr to Buncombe Rd	Bus-On Shoulder, Transit Signal Priority, Bus Service (improve)
US-276-D	Stone Ave	Rutherford St to North St/I-385	Park-and-Ride Lots, Transit Signal Priority, Bus Service (improve & add)
US-276-C	Poinsett Hwy	Stone Ave to Pleasantburg Dr	Transit Signal Priority, Bus Service (improve)
US-276-A	Laurens Rd/Main St	Woodruff Rd to Main St	Bus Service (improve)
US-25-G	Hwy 25	US 276/Poinsett Hwy to Locust Hill Rd	On-Demand Transit Service, Bus Service (add)
US-25-C	White Horse Rd	Anderson Rd to I-85	Bus Service (improve), Park-and-Ride Lots
US-25-A	White Horse Rd	Lily St to Old Easley Hwy	Bus Service (improve)
US-123-C	Academy St	College St to North St	Bus-On Shoulder, Transit Signal Priority, Park-and-Ride Lots
US-123-B	Academy St	Pendleton St to Falls Park Dr	Bus-On Shoulder
SC-291-C	Pleasantburg Dr	Faris Rd to Wade Hampton Blvd	Bus Service (add & improve), Transit Signal Priority
SC-183-C	Buncombe/North St and College St/Beattie Pl	Butler Ave to Church St	Bus Service (add & improve)
SC-153-A	Hwy 153	Old Easley Bridge Rd to I-85	Bus Service (add)
SC-14-D	Main St	Brushy Creek Rd to Wade Hampton Blvd	Bus Service (add)
SC-146-B	Woodruff Rd	Verdae Blvd to Hwy 14	Transit Signal Priority, Bus-On Shoulder
S-94-C	Park Ave/North St	Church St to Pleassantburg Dr	Bus Service, Transit Signal Priority
S-75	Washington St	McBee Ave to Laurens Rd	Transit Signal Priority
S-548	Roper Mountain Rd	Woodruff Rd to Hwy 14	Bus Service (add)
S-492-A	Pelham Rd	North St to Hudson Rd	Transit Signal Priority
S-335	Edwards Rd	Lee Rd to Wade Hampton Blvd	Bus Service (add)
S-3	Main St	Stone Ave to Academy St	Bus Service (Improve), Park-and-Ride Lots
S-273	Haywood Rd	Laurens Rd to North St	Bus Service (add)
S-22	State Park Rd	Poinsett Rd to Hwy 25	Bus Service (add), On-Demand Transit Service

Corridor ID	Local Name	Extents	Recommended Strategy
S-200	Rutherford St	Stone Ave to Buncombe St	Transit Signal Priority
S-149	Faris Rd	Anderson Rd to Pleasantburg Dr	Bus Service (improve)
S-1077	Washington St	Trescott St to Pettigru St	Bus Service (improve), Transit Signal Priority

Figure 21. Corridors Identified for Transit Strategies Inset



Capacity Expansion

Capacity expansion is achieved through improvements that enhance the mobility of vehicles along a corridor through the addition of travel lanes, construction of new roadways, the addition of new interchanges, or the modification of existing ones.

The capacity expansion strategies identified for the GPATS region include:

- Alternative Interchange Design
- Grade Separated Crossings
- Lane Additions (Widening)
- New Roadways

What We Heard

When asked to rank capacity expansion strategies based on how applicable they are to the study area, survey participants rated capacity expansion strategies an average of 3.7 out of 5.0 stars.

3.7 ★★★★

Capacity Expansion

Alternative Interchange Design

Alternative interchange designs can reimagine existing interchanges to alleviate congestion.

Grade Separated Crossings

Grade-separated crossings allow different streams or modes of transportation to flow independently of one another.

Lane Additions (Widening)

Lane widening or expansion is the addition of one or more lanes to a roadway.

New Roadways

A new roadway consists of constructing a new route for drivers, pedestrians, cyclists, or transit operators.

CHAPTER 4

Figure 22. Corridors Identified for Capacity Expansion Strategies

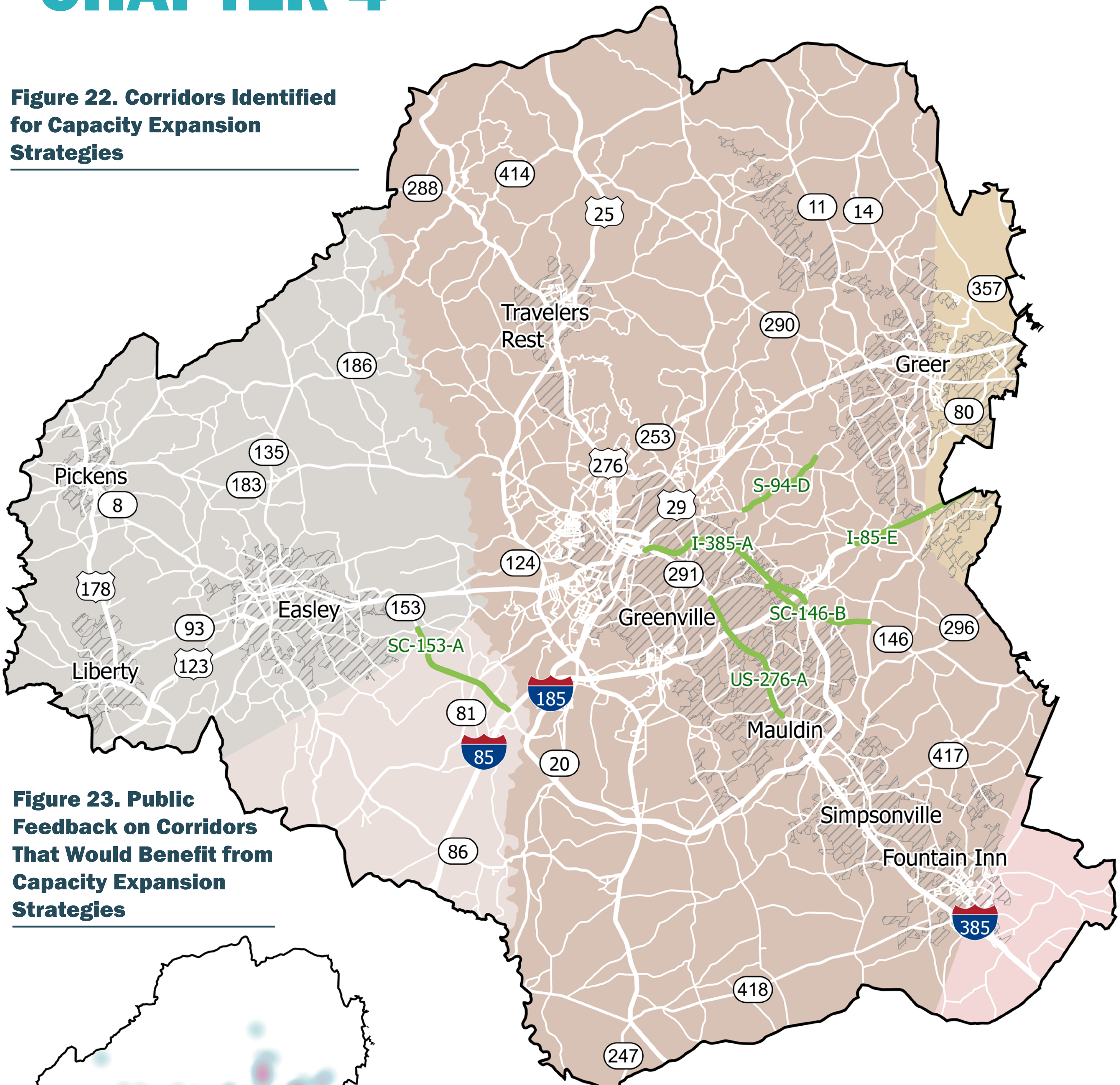


Figure 23. Public Feedback on Corridors That Would Benefit from Capacity Expansion Strategies

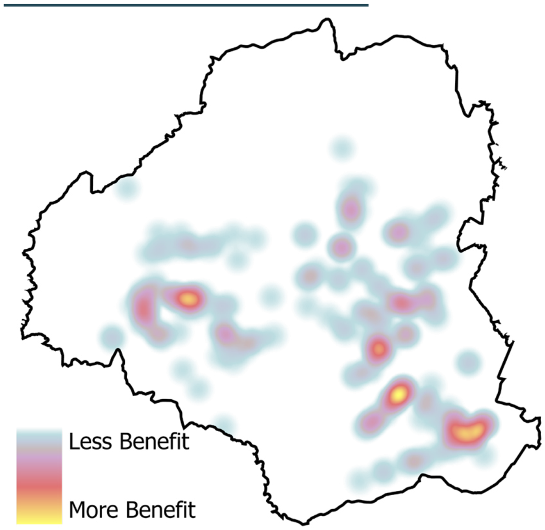


Table 5. Identified Capacity Expansion Strategies

Corridor ID	Local Name	Extents	Recommended Strategy
I-385-A	I-385	East North Street to I-85	Alternative Interchange Design
I-85-E	I-85	Pelham Rd to Brockman McClimon Rd	Alternative Interchange Design
US-276-A	Laurens Rd/Main St	Woodruff Rd to Main St	Alternative Interchange Design
SC-146-B	Woodruff Rd	Verdae Blvd to Hwy 14	Lane Additions (Widening)
SC-153-A	Hwy 153	Old Easley Bridge Rd to I-85	Lane Additions (Widening)
S-94-D	North St/Old Spartanburg Rd/ Brushy Creek Rd	Howell Rd to Taylors Rd	Lane Additions (Widening)

CHAPTER 4

Transportation Demand Management

Transportation Demand Management (TDM) refers to a set of strategies and measures designed to manage and reduce the demand for travel in order to alleviate congestion, improve transportation efficiency, and promote sustainable transportation options. TDM typically includes a combination of policies and programs that influence travel choice and behavior.

The transportation demand management strategies identified for the GPATS region include:

- Vanpool and Carpool
- Teleworking and Flexible Work Schedules
- Parking Management
- Bicycle and Pedestrian Education
- Safe Routes to School Program

What We Heard

When asked to rank TDM strategies based on how applicable they are to the study area, survey participants rated TDM strategies an average of 3.6 out of 5.0 stars.

3.6 ★★★½

TDM

Vanpool and Carpool

Vanpool is a shared transportation program where a group of four to ten passengers who live and work in close proximity share a van to commute to and from work. Carpooling is a program where a group of people who live and work in close proximity share a car to commute together.

Teleworking and Flexible Work Schedules

Flexible work schedules allow employees to choose their own start and end times within a specific range of hours. Teleworking enables employees to work from locations other than the traditional office setting, such as their homes or other remote locations.

Parking Management

Parking management is the tactics used to effectively manage parking spaces and optimize their utilization.

Bicycle and Pedestrian Education

Educational programs help improve awareness and safety for all roadway users. Bicycle and pedestrian education help inform people about the rules and laws that apply to drivers, bicyclists, and pedestrians. These programs focus on how all roadway users should interact.

Safe Routes to School Programs

Safe Routes to School programs are initiatives aimed at promoting and encouraging safe and healthy walking and biking to school. These programs incorporate a combination of education, infrastructure improvements, and encouragement activities to create safer and more accessible routes for students to commute to and from school.

Public identification of corridors that would benefit from TDM strategies, collected during the second MetroQuest survey, revealed a number of trends throughout the GPATS planning area. The public identified Easley, Simpsonville, and Travelers Rest as areas which would see the most benefit from TDM strategies.

Residents from the Simpsonville and Easley areas identified vanpool and carpool as feasible solutions that would benefit congestion and improve the network. Engagement also found that populations located further away from downtown Greenville were more likely to identify teleworking and flexible work schedules as beneficial strategies.

Figure 24. Public Feedback on Corridors That Would Benefit from TDM Strategies

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CHAPTER 4

Freight

Freight transportation is integral to local, regional, and national economies. Freight strategies minimize adverse impacts of freight activity on regional mobility and facilitate efficient movement of goods while also propelling economic growth.

The freight strategies identified for the GPATS region include:

- Dedicated Truck Lanes
- Weigh-In-Motion Technology
- Truck Incentives and Use Restrictions

What We Heard

When asked to rank freight strategies based on how applicable they are to the study area, survey participants rated freight strategies an average of 3.2 out of 5.0 stars.

3.2

Freight

Dedicated Truck Lanes

Dedicated truck lanes are specific lanes on roadways that are reserved exclusively for use by trucks.

Weigh-in-Motion Technology

Weigh-in-motion (WIM) technology is a system that is used to measure the weight of vehicles while they are in motion. It is typically installed on roadways and highways and consists of sensors or scales embedded in the road surface.

Truck Incentives and Use Restrictions

Truck incentives encourage commercial vehicles to modify their route, time, or trip for deliveries by providing financial incentives. Use restrictions impose limits on the location or time for trucks to access certain corridors.

CHAPTER 4

Figure 25. Corridors Identified for Freight Strategies

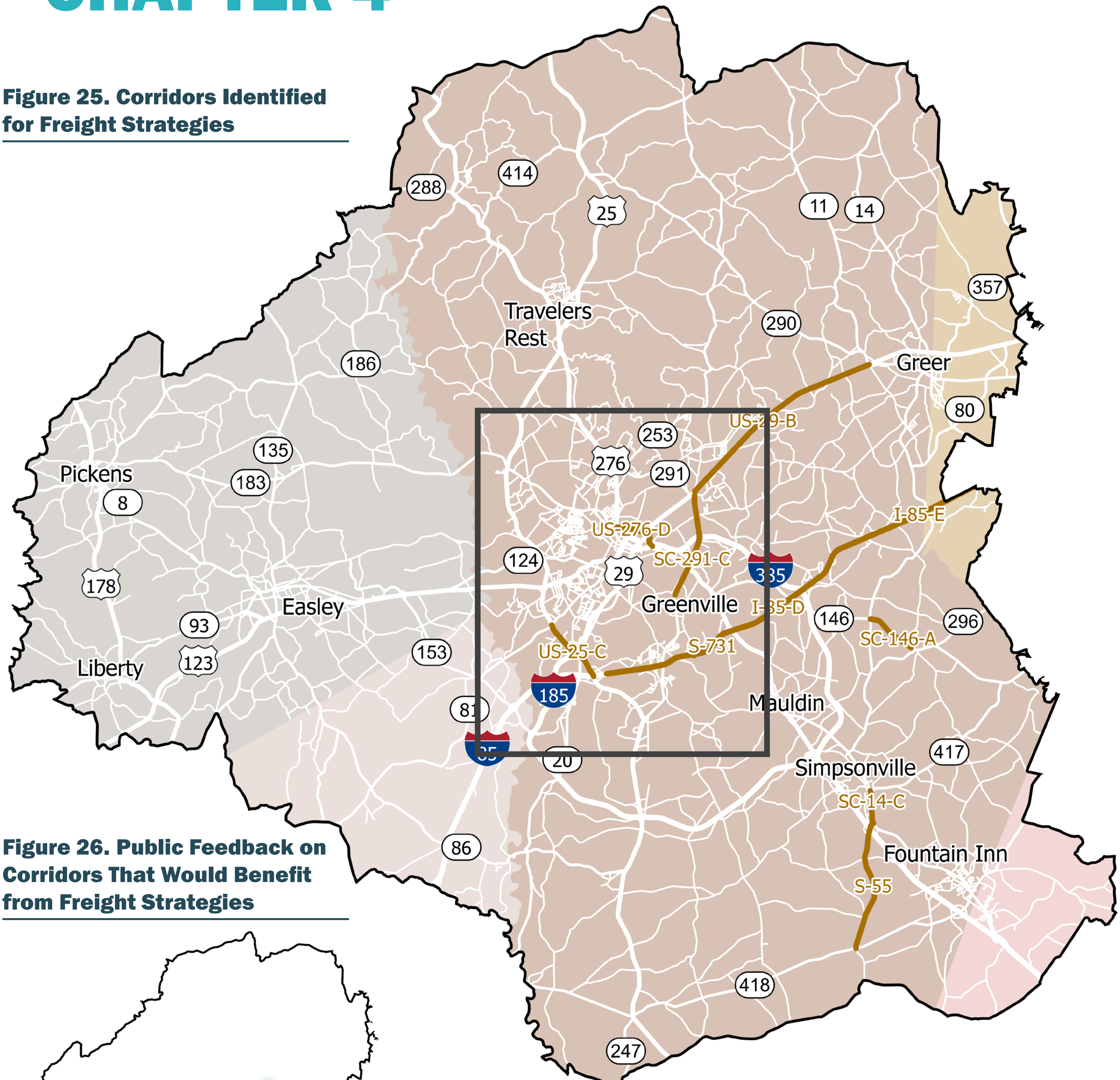


Figure 26. Public Feedback on Corridors That Would Benefit from Freight Strategies

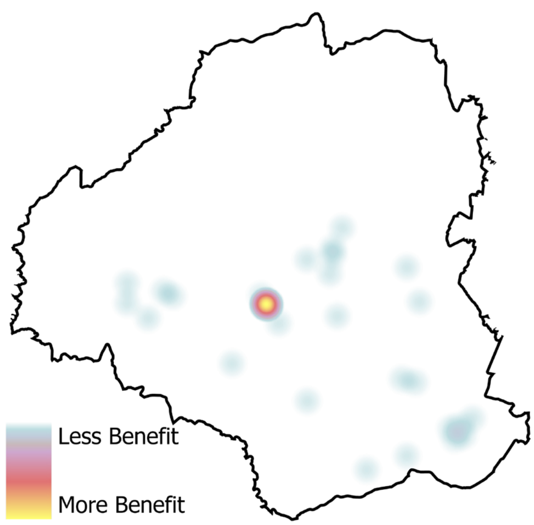
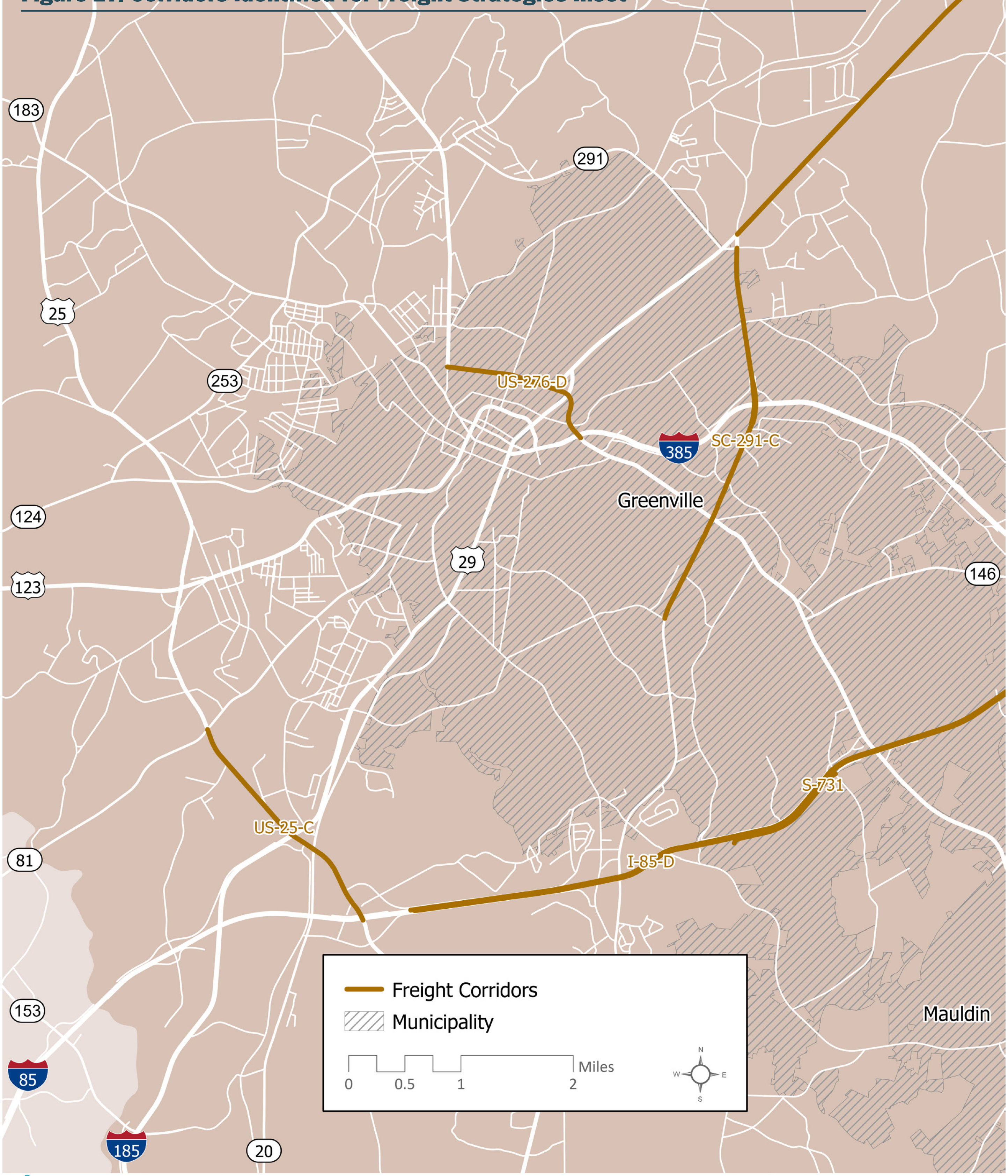


Table 6. Identified Freight Strategies

Corridor ID	Local Name	Extents	Recommended Strategy
I-85 E	I-85	Roper Mountain Rd to S-12	Dedicated Truck Lanes
I-85-D	I-85	US 25 to Roper Mountain Rd	Dedicated Truck Lanes
US-29-B	Wade Hampton Blvd	Pine Knoll Dr to Buncombe Rd	Truck Incentives and Use Restrictions
US-276-D	Stone Ave	Rutherford St to North St/I-385	Truck Incentives and Use Regulations
US-25-C	White Horse Rd	Anderson Rd to I-85	Truck Incentives and Use Restrictions, Dedicated Truck Lanes
SC-291-C	Pleasantburg Dr	Faris Rd to Wade Hampton Blvd	Truck Incentives and Use Restrictions
SC-14-C	Main St	Curtis St to Fairview Rd	Truck Incentives and Use Regulations
S-731	Dairy Dr	Ridge Rd to Confluence Outdoors	Dedicated Truck Lanes
S-55	Fairview Rd	Main St to Hwy 418	Truck Incentives and Use Regulations

Figure 27. Corridors Identified for Freight Strategies Inset



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CHAPTER 4

Land Use

Land use strategies greatly influence transportation. These strategies can provide increased access, connectivity, and mode choice which in turn can mitigate congestion along corridors.

The land use strategies identified for the GPATS region include:

- Redevelopment and Infill Development
- Transit-Oriented Development

What We Heard

When asked to rank land use strategies based on how applicable they are to the study area, survey participants rated land use strategies an average of 3.7 out of 5.0 stars.

3.7 ★★★★

Land Use

Redevelopment and Infill Development

Infill development encourages the redevelopment of underused or vacant land to create economic or community assets. In urban areas, this type of development can be effective in increasing density on parcels with existing utility and transportation infrastructure. Redevelopment encourages environmental stewardship instead of developing or building on undeveloped land.

Transit-Oriented Development

Transit-oriented development (TOD) creates dense, mixed-use communities around public transportation hubs. It maximizes the amount of residential, service, and employment opportunities around transportation hubs.

Figure 28. Corridors Identified for Land Use Strategies

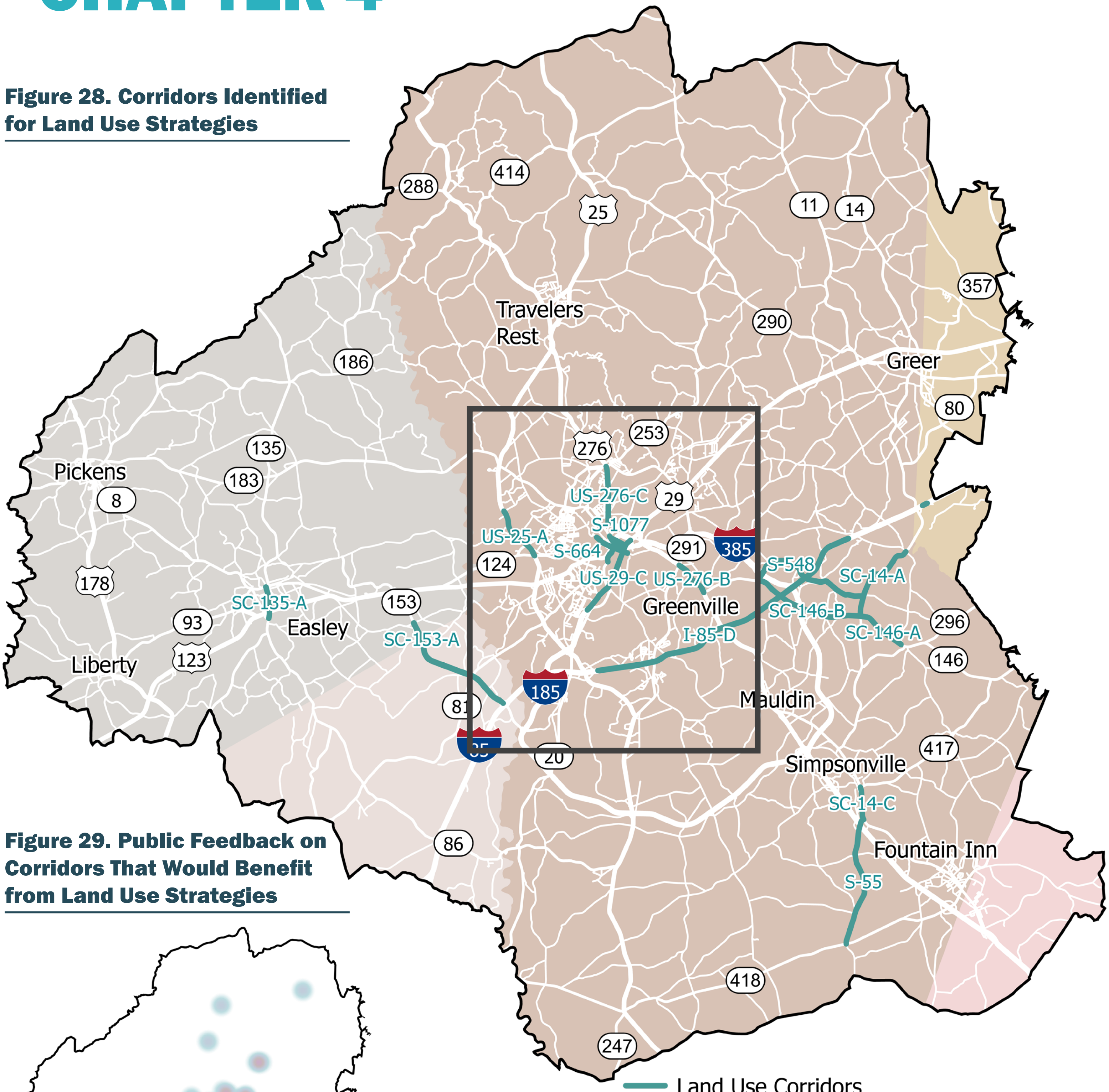


Figure 29. Public Feedback on Corridors That Would Benefit from Land Use Strategies

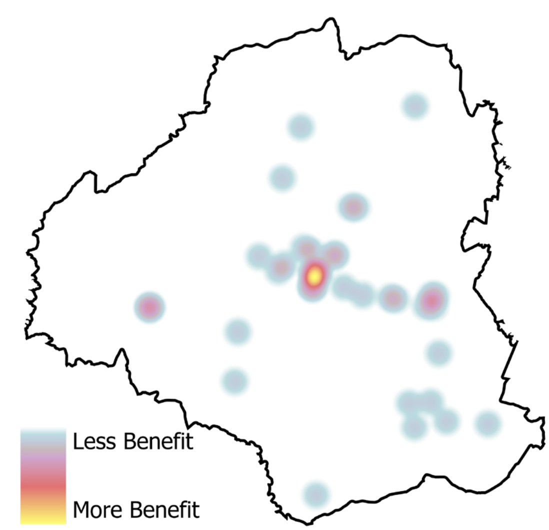
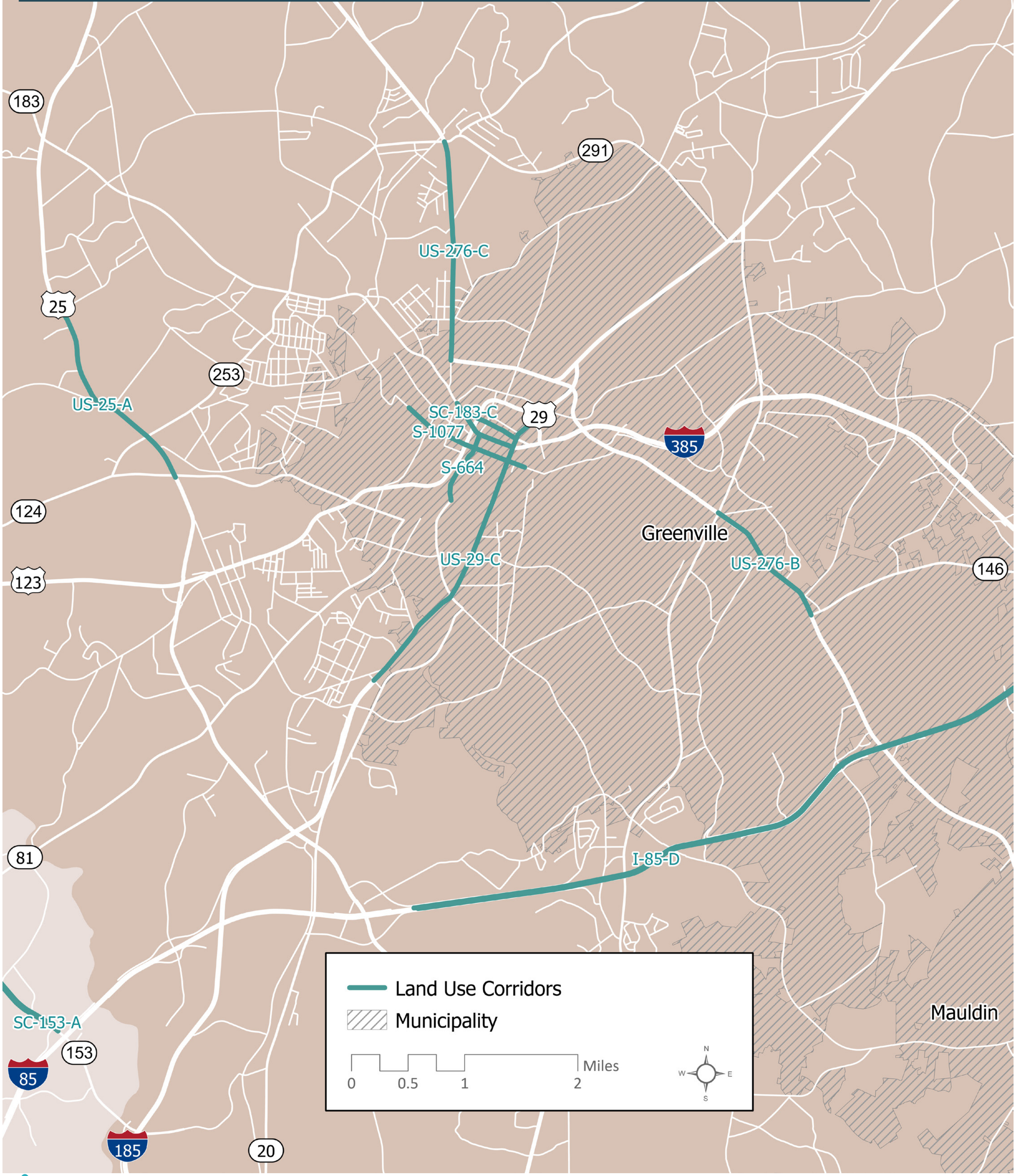


Table 7. Identified Land Use Strategies

Corridor ID	Local Name	Extents	Recommended Strategy
I-85-D	I-85	US 25 to Roper Mountain Rd	Transit-Oriented Development
US-29-C	Mills Ave/Church St	Henrydale Ave to Academy St	Redevelopment and Infill Development, Transit-Oriented Development
US-276-C	Poinsett Hwy	Stone Ave to Pleasantburg Dr	Redevelopment and Infill Development
US-276-B	Laurens Rd/Main St	Pleasantburg Dr to Woodruff Rd	Redevelopment and Infill Development
US-25-G	Hwy 25	US 276/Poinsett Hwy to Locust Hill Rd	Transit-Oriented Development
US-25-A	White Horse Rd	Lily St to Old Easley Hwy	Redevelopment and Infill Development
SC-183-C	Buncombe/North St and College St/Beattie Pl	Butler Ave to Church St	Transit-Oriented Development
SC-153-A	Hwy 153	Old Easley Bridge Rd to I-85	Transit-Oriented Development
SC-14-C	Main St	Curtis St to Fairview Rd	Redvelopment Infill Development
SC-14-A	Hwy 14	Woodruff Rd to Batesville Rd	Redvelopment and Infill Development
SC-146-B	Woodruff Rd	Verdae Blvd to Hwy 14	Redevelopment and Infill Development
SC-146-A	Woodruff Rd	Hwy 14 to Batesville Rd	Transit-Oriented Development
SC-135-A	Pendleton St	Main St to 5th St/Walker Ellison Rd	Redevelopment and Infill Development
S-664	River St	Main St to North St	Transit-Oriented Development
S-55	Fairview Rd	Main St to Hwy 418	Redevelopment and Infill Development
S-548	Roper Mountain Rd	Woodruff Rd to Hwy 14	Redevelopment and Infill Development
S-1077	Washington St	Trescott St to Pettigru St	Transit-Oriented Development, Redevelopment and Infill Development

Figure 30. Corridors Identified for Land Use Strategies Inset



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CHAPTER 4

Operations

Operations emphasize strategies that aim to optimize existing infrastructure through often lower-cost, near-term solutions. These solutions enable active management of transportation systems based on current operational conditions.

The operations strategies identified for the GPATS region include:

- Managed Lanes
- Channelization or Delineation
- Access Management
- Special Event Management
- Traffic Incident Management (TIM)

What We Heard

When asked to rank operations strategies based on how applicable they are to the study area, survey participants rated operations strategies an average of 3.6 out of 5.0 stars.

3.6 ★★★½

Operations

Managed Lanes

Managed lanes provide special access to vehicles based on high-occupancy vehicle (HOV), toll lanes, or high-occupancy toll (HOT) lanes, or vehicle type such as bus- or truck-only lanes. Managed lanes can also include additional access control measures to minimize turbulence in the flow of vehicles, or dynamic lane reversals.

Channelization or Delineation

Channelization and delineation utilize physical elements and visual cues to enhance traffic flow.

Access Management

Access management refers to street design techniques that control where vehicles may enter or exit a roadway to enhance traffic flow and improve safety.

Special Event Management

Special event management refers to the coordination and organization of traffic movement for large, planned events. These events include concerts, sporting events, conventions, or fairs held at large venues.

Traffic Incident Management (TIM)

Traffic Incident Management (TIM) refers to planned and well-coordinated multidisciplinary processes implemented to respond to and clear traffic incidents.

CHAPTER 4

Figure 31. Corridors Identified for Operations Strategies

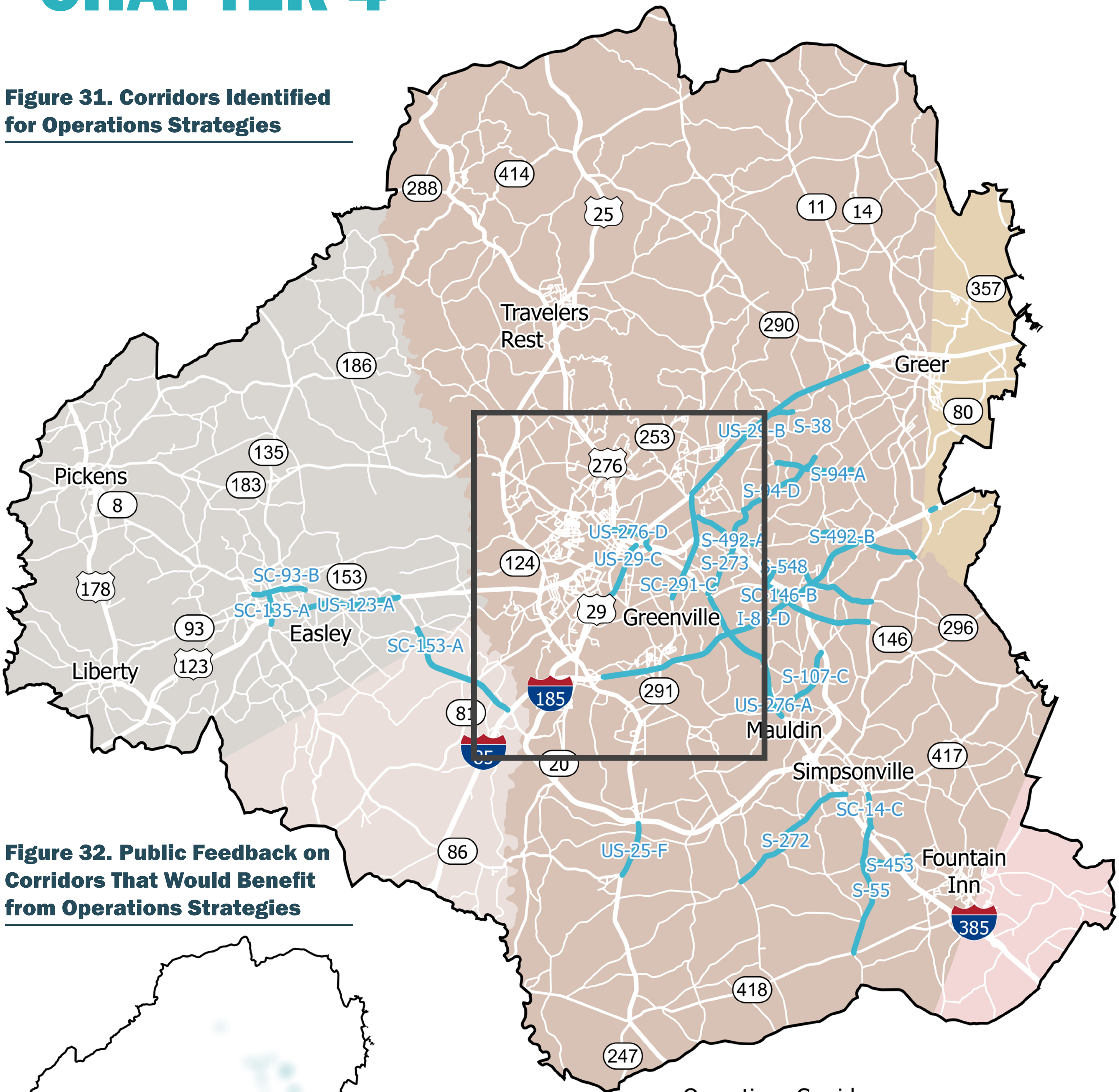


Figure 32. Public Feedback on Corridors That Would Benefit from Operations Strategies

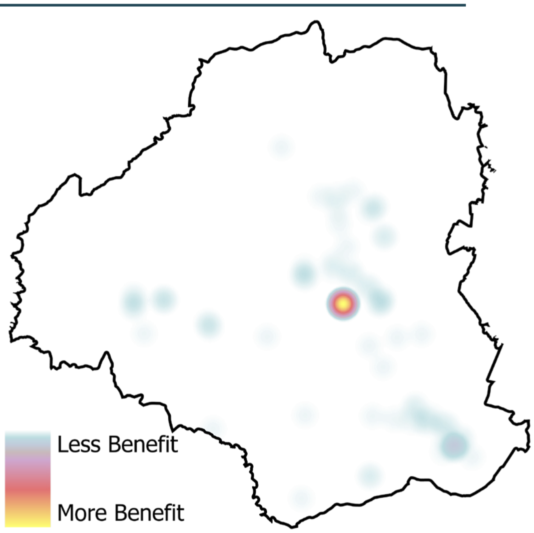
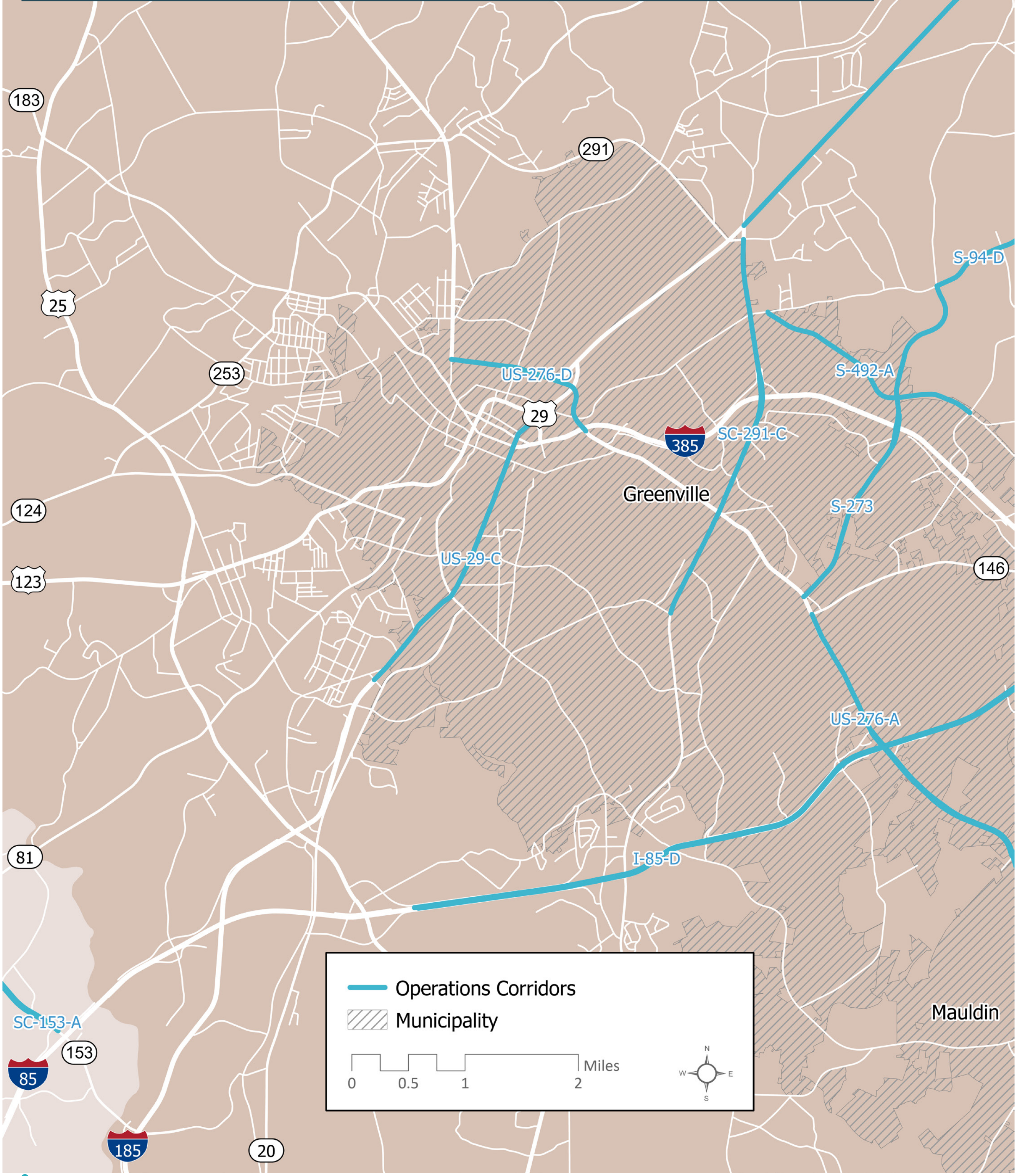


Table 8. Identified Operations Strategies

Corridor ID	Local Name	Extents	Recommended Strategy
I-85-D	I-85	US 25 to Roper Mountain Rd	Managed Lanes
US-29-C	Mills Ave/Church St	Henrydale Ave to Academy St	Channelization or Delineation, Special Event Management
US-29-B	Wade Hampton Blvd	Pine Knoll Dr to Buncombe Rd	Managed Lanes, Traffic Incident Management (TIM)
US-276-D	Stone Ave	Rutherford St to North St/I-385	Managed Lanes
US-276-A	Laurens Rd/Main St	Woodruff Rd to Main St	Access Management, Managed Lanes
US-25-F	Augusta Rd	Sandy Springs Rd to I-185	Access Management
US-123-A	Calhoun Memorial Hwy	Brushy Creek Rd to Hwy 153	Managed Lanes
SC-93-B	Main St	Liberty Dr to Dennis Dr	Special Event Management
SC-291-C	Pleasantburg Dr	Faris Rd to Wade Hampton Blvd	Managed Lanes, Access Management
SC-153-A	Hwy 153	Old Easley Bridge Rd to I-85	Channelization or Delineation, Access Management, Managed Lanes
SC-14-C	Main St	Curtis St to Fairview Rd	Channelization or Delineation
SC-146-B	Woodruff Rd	Verdae Blvd to Hwy 14	Access Management, Traffic Incident Management (TIM)
SC-135-A	Pendleton St	Main St to 5th St/Walker Ellison Rd	Channelization or Delineation, Special Event Management, Access Management
S-94-D	North St/Old Spartanburg Rd/ Brushy Creek Rd	Howell Rd to Taylors Rd	Managed Lanes
S-94-A	Brushy Creek Rd	Cunningham Rd to Batesville Rd	Managed Lanes
S-55	Fairview Rd	Main St to Hwy 418	Channelization or Delineation, Access Management
S-548	Roper Mountain Rd	Woodruff Rd to Hwy 14	Channelization or Delineation
S-492-B	Pelham Rd	Blacks Rd to Hwy 14	Access Management
S-492-A	Pelham Rd	North St to Hudson Rd	Managed Lanes
S-453	Harrison Bridge Rd	Fairview Rd to Main St	Channelization or Delineation, Access Management
S-38	Main St	Wade Hampton Blvd to Taylors Rd	Managed Lanes
S-273	Haywood Rd	Laurens Rd to North St	Managed Lanes, Channelization or Delineation
S-272	Georgia Rd	Fork Shoals Rd to I-385	Channelization or Delineation, Managed Lanes, Traffic Incident Management (TIM)
S-107-C	E Butler Rd	Main St to I-385	Managed Lanes

Figure 33. Corridors Identified for Operations Strategies Inset



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CHAPTER 4

Technology

Intelligent Transportation Systems (ITS) leverage technology-based solutions to improve travel time reliability and safety in an organized, coordinated, and cost-effective way.

The technology strategies identified for the GPATS region include:

- Queue Warning
- Ramp Metering and Management
- Traffic Signal Coordination
- Integrated Corridor Management
- Real-Time Traveler Information

What We Heard

When asked to rank technology strategies based on how applicable they are to the study area, survey participants rated technology strategies an average of 3.8 out of 5.0 stars.

3.8 ★★★★

Technology

STRATEGIES

Queue Warning

A queue warning is a system that uses signage or flashing lights to alert drivers to upcoming stop-and-go traffic.

Ramp Metering and Management

Ramp metering uses controlled access to regulate the flow of vehicles onto a freeway. Ramp metering is also known as ramp flow control.

Traffic Signal Coordination

Traffic signal coordination is a cost-effective strategy used to synchronize traffic signals along a corridor or network of roads. The coordination reduces delays by minimizing the number of stops at traffic signals.

Integrated Corridor Management

Integrated Corridor Management (ICM) aims to improve the efficiency and reliability of traffic flow by integrating various technologies and their operations. It bundles many of the other strategies into a concerted effort.

Real-Time Traveler Information

Real-time traveler information provides information on current roadway conditions to drivers.

Figure 34. Corridors Identified for Technology Strategies

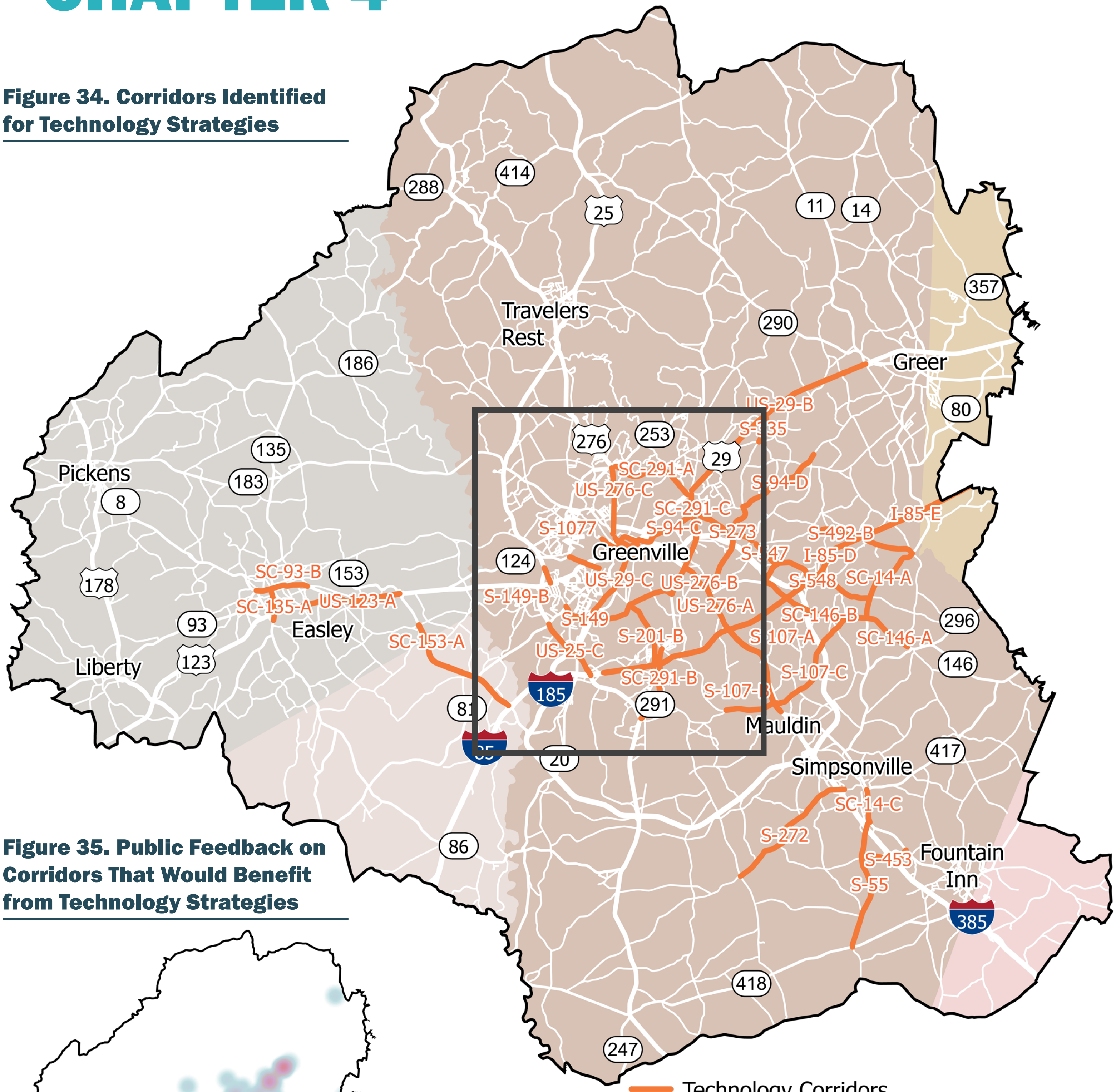


Figure 35. Public Feedback on Corridors That Would Benefit from Technology Strategies

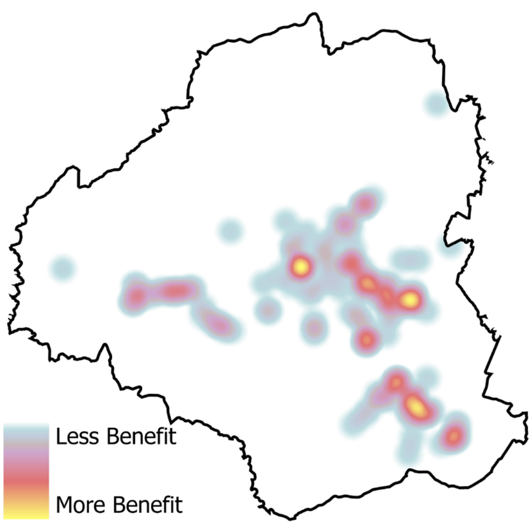
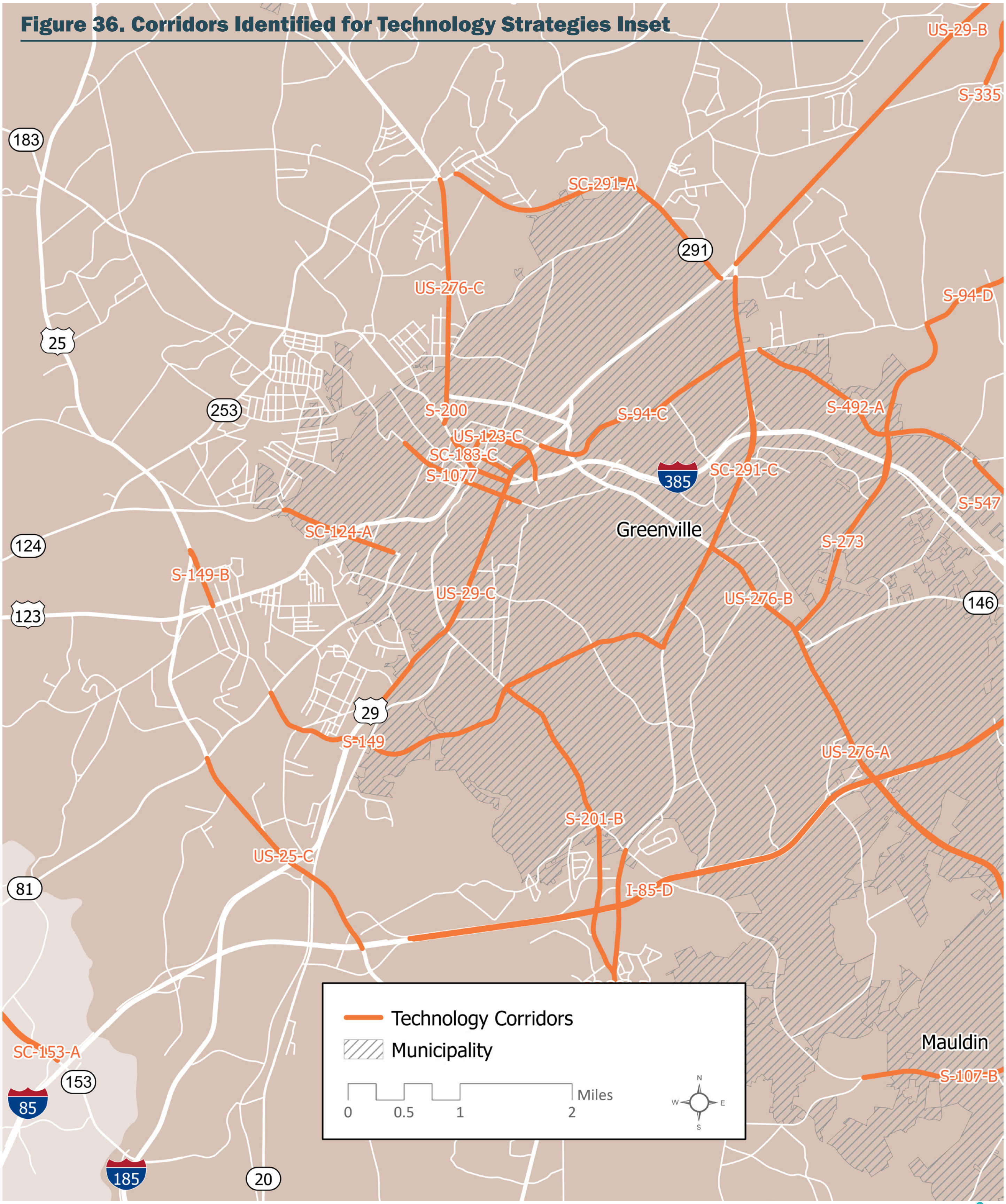


Table 9. Identified Technology Strategies

Corridor ID	Local Name	Extents	Recommended Strategy
I-85 E	I-85	Roper Mountain Rd to S-12	Real-Time Traveler Information
I-85-D	I-85	US 25 to Roper Mountain Rd	Traffic Signal Coordination (at interchanges), Real-Time Traveler Information
US-29-C	Mills Ave/Church St	Henrydale Ave to Academy St	Traffic Signal Coordination
US-29-B	Wade Hampton Blvd	Pine Knoll Dr to Buncombe Rd	Traffic Signal Coordination, Integrated Corridor Management
US-276-C	Poinsett Hwy	Stone Ave to Pleasantburg Dr	Traffic Signal Coordination
US-276-B	Laurens Rd/Main St	Pleasantburg Dr to Woodruff Rd	Traffic Signal Coordination
US-276-A	Laurens Rd/Main St	Woodruff Rd to Main St	Traffic Signal Coordination
US-25-C	White Horse Rd	Anderson Rd to I-85	Integrated Corridor Management
US-123-C	Academy St	College St to North St	Traffic Signal Coordination
US-123-A	Calhoun Memorial Hwy	Brushy Creek Rd to Hwy 153	Traffic Signal Coordination, Ramp Metering and Management, Queue Warning
SC-93-B	Main St	Liberty Dr to Dennis Dr	Traffic Signal Coordination,
SC-291-C	Pleasantburg Dr	Faris Rd to Wade Hampton Blvd	Traffic Signal Coordination
SC-291-B	Augusta Rd/ Pleasantburg Dr	White Horse Rd to Mauldin Rd	Ramp Metering and Management*, Traffic Signal Coordination
SC-291-A	Pleasantburg Dr	Poinsett Hwy to Wade Hampton Blvd	Traffic Signal Coordination, Integrated Corridor Management
SC-183-C	Buncombe/North St and College St/Beattie Pl	Butler Ave to Church St	Traffic Signal Coordination
SC-153-A	Hwy 153	Old Easley Bridge Rd to I-85	Queue Warning, Traffic Signal Coordination, Integrated Corridor Management
SC-14-C	Main St	Curtis St to Fairview Rd	Traffic Signal Coordination
SC-14-A	Hwy 14	Woodruff Rd to Batesville Rd	Traffic Signal Coordination
SC-146-B	Woodruff Rd	Verdae Blvd to Hwy 14	Traffic Signal Coordination, Integrated Corridor Management
SC-146-A	Woodruff Rd	Hwy 14 to Batesville Rd	Integrated Corridor Management
SC-135-A	Pendleton St	Main St to 5th St/Walker Ellison Rd	Traffic Signal Coordination
SC-124-A	Pendleton St	Lois Ave to Main St	Traffic Signal Coordination

Corridor ID	Local Name	Extents	Recommended Strategy
S-94-D	North St/Old Spartanburg Rd/ Brushy Creek Rd	Howell Rd to Taylors Rd	Traffic Signal Coordination
S-94-C	Park Ave/North St	Church St to Pleassantburg Dr	Traffic Signal Coordination
S-55	Fairview Rd	Main St to Hwy 418	Traffic Signal Coordination, Ramp Metering and Management
S-548	Roper Mountain Rd	Woodruff Rd to Hwy 14	Ramp Metering and Management, Traffic Signal Coordination, Queue Warning
S-547	Roper Mountain Rd Ext.	Pelham Rd to Roper Mountain Rd	Traffic Signal Coordination
S-492-B	Pelham Rd	Blacks Rd to Hwy 14	Traffic Signal Coordination
S-492-A	Pelham Rd	North St to Hudson Rd	Traffic Signal Coordination, Queue Warning
S-453	Harrison Bridge Rd	Fairview Rd to Main St	Real-Time Traveler Information, Integrated Corridor Management, Ramp Metering and Management, Traffic Signal Coordination
S-335	Edwards Rd	Lee Rd to Wade Hampton Blvd	Integrated Corridor Management
S-273	Haywood Rd	Laurens Rd to North St	Traffic Signal Coordination
S-272	Georgia Rd	Fork Shoals Rd to I-385	Ramp Metering and Management, Traffic Signal Coordination, Real-Time Traveler Information
S-201-B	Augusta St/Rd	Faris Rd to Pleasantburg Dr	Traffic Signal Coordination
S-200	Rutherford St	Stone Ave to Buncombe St	Traffic Signal Coordination
S-149-B	Washington Ave	White Horse Rd to Easley Bridge Rd	Ramp Metering and Management
S-149	Faris Rd	Anderson Rd to Pleasantburg Dr	Traffic Signal Coordination
S-107-C	E Butler Rd	Main St to I-385	Traffic Signal Coordination
S-107-B	W Butler Rd	Main St to Conestee Rd	Traffic Signal Coordination
S-107-A	Butler Rd	I-385 to Woodruff Rd	Traffic Signal Coordination
S-1077	Washington St	Trescott St to Pettigru St	Traffic Signal Coordination

Figure 36. Corridors Identified for Technology Strategies Inset



05
IMPLEMENTATION

PRIORITIZATION AND PROGRAMMING

There are a number of ways to leverage the CMP in further prioritization and programming efforts within GPATS. The strategies identified by the CMP Steering Committee as having the greatest potential for both implementation and return on congestion reduction should be considered as a starting point in future planning and project development activities. Future planning studies, as well as the LRTP and TIP, provide the opportunity to apply the strategies outlined in the CMP to identify projects and move them through project development and implementation.

Planning Studies

The CMP should act as a guide as GPATS continues to consider corridors that overlap the CMP network for future study. The CMP offers a menu of strategies that may be leveraged to improve corridor operations. CMP strategies should be considered prior to exploring any capacity expansions that add additional single occupancy vehicle capacity. The framework below provides guidance for the order in which strategies should be explored during future planning studies.

1. Strategies to improve roadway operations via technology
2. Strategies to shift auto trips to other modes
3. Strategies to reduce person trips and shift travel behaviors via TDM tools
4. Strategies to improve roadway operations via construction
5. Strategies to add capacity

Prioritizing Congested Corridors

The regional CMP facilitates opportunities for project identification and prioritization efforts, and bridges the gap between local planning efforts such as the LRTP and the state's up-and-coming Regional Mobility Program (RMP). GPATS plays a vital role in the planning and oversight of short- and long-term project efforts through this new process under the aegis of SCDOT and FHWA. Instituting the RMP represents a shift in the way transportation plans are developed and implemented statewide by providing a unified, scalable, and data-driven approach to identifying and prioritizing transportation investments. Although the RMP in and of itself is not intended to be an exclusive process, it serves as a tool for MPOs and COGs to develop short- and long-term transportation plans.

The CMP plays a unique role within the region and has a major impact on the LRTP. The CMP examines congestion on the existing transportation network and can be used as a tool to determine metrics and strategies to mitigate congestion and improve the efficiency of the transportation system. This is a necessary step that should be considered prior to exploring capacity-adding strategies. The RMP provides a means to further evaluate these strategies for their application within the LRTP. The integration of the LRTP with the CMP and RMP is highlighted in Figure 37.

Figure 37. RMP, CMP, and LRTP Relationship and Process Integration

LRTP Process

1 Goals and Objectives

2 Needs and Gaps Analysis

CMP Integration

Evaluates strategies as effective means to alleviate congestion issues prior to identifying capacity-adding recommendations.

3 Multimodal Recommendations

RMP Integration

Perform operations and safety assessments, assist with project recommendations, determine benefit-cost ratios for each project.

4 Project Prioritization

5 Financial Constraint

CMP & RMP Integration

Include CMP and RMP strategies in documentation as part of the LRTP.

6 Plan Documentation

RMP Evaluation Tool

The RMP Corridor Evaluation Tool consists of five modules built into Microsoft Excel, described below.

Module 1: Corridor Inventory – Data Gathering

The purpose of Module 1 is to first define critical study segments and intersections on each priority corridor. Module 1 then inventories available data related to existing roadway geometry and traffic control, non-motorized infrastructure and demand, traffic volumes and compositions, and planned or active projects.

Module 2: Operations & Safety Assessment

Module 2 leverages data compiled in Module 1 supplemented by other data sources such as crash history, regional travel demand model outputs, and travel time reliability data to develop volume-to-capacity ratios and crash rate estimates. The travel time reliability data used in Module 2 is the same data used to screen and evaluate the CMP network.

Module 3: Strategy Identification

Module 3 considers the Operation and Safety Assessment to make project recommendations at the corridor and intersection levels. Projects programmed into the tool fall under one of the following seven primary program types identified in Table 10.

Module 4: Benefit-Cost Analysis

The purpose of Module 4 is to attach benefit-cost ratios to each project recommendation to aid the end users of this process (the MPOs and COGs) in prioritizing investments within their region of the state.

Module 5: Corridor Evaluation Summaries

The purpose of Module 5 is to generate the external deliverables to be used by SCDOT and the MPOs and COGs to identify and prioritize projects for inclusion in each region's LRTP. These deliverables take three forms:

- Deliverable A: A two-page evaluation summary geared towards the MPO/COG audience that contains general corridor information (e.g., corridor name, limits, functional class, traffic volumes, priority rankings) and a high-level summary of the recommended access, safety, and mobility strategies along with short-form notes and planning-level prioritization metrics.
- Deliverable B: A three-page evaluation summary geared towards the SCDOT District engineering staff audience that contains a detailed summary of all project recommendations with long-form notes and planning-level prioritization metrics, including operations and safety data by segment and intersection and conceptual cost estimate details.
- Deliverable C: A regional database of project recommendations compiled from each of the individual corridor evaluations housed in a fully filterable Microsoft Excel workbook and supported by corresponding GIS files. This database will provide the MPOs and COGs staff with invaluable information as a next step is identifying finite projects that address the congested segments identified across the region.

Table 10. RMP and CMP Strategy Comparison

	CMP Strategies							
RMP Strategies								
Intersection Improvements						X	X	X
Signal System/ITS				X			X	
Lane Miles Added								X
Access Management/Safety	X		X					
Road Safety Audit			X	X		X		
Bicycle and Pedestrian Improvement			X		X			
Transit Improvements		X			X			

MONITORING

The ability to monitor system performance is one aspect of the congestion management process that supports effective investment decisions for transportation improvements. By tracking system performance, GPATS, SCDOT, and local jurisdictions can evaluate the effectiveness of implemented strategies and determine whether operational or policy adjustments are needed to improve these approaches in the future.

The CMP establishes a plan for monitoring performance measures that can be leveraged across initiatives. GPATS may establish a System Performance Report to track progress on performance metrics identified in the CMP. Since many metrics typically do not change drastically year-over-year, it is anticipated that the System Performance Report will be updated at the forefront of the LRTP process, as data and staff resources allow. If desired, GPATS may choose to leverage an interactive dashboard, static report, or combination of tools.

The System Performance Report can serve as a clearinghouse for reporting regional and federal performance measures and to report on the progress made to address these measures through the CMP, LRTP, and TIP. The System Performance Report also presents an opportunity to report on regional transportation trends that will have an impact on the identification of congested corridors and the implementation of strategies.

Data Collection and Post-Implementation Evaluation

In addition to monitoring system performance at the regional level, a critical component of the CMP is evaluating strategy effectiveness post-implementation. The most common method of evaluating the performance of CMP strategies will be with before-and-after analysis. GPATS may elect to study one to two before-and-after studies between each major CMP update cycle, leveraging the process outlined within this section.

Step 1: Determine Performance Criteria and Analysis Periods

At the outset of a before-and-after study, GPATS should identify performance criteria that is meaningful to the strategy or strategies implemented. This will not be uniform, but examples based on common strategies are outlined in Table 11. In addition to identifying the performance criteria, a standard analysis period should be defined. The analysis periods for project types should be comparable to ensure that the results are not biased based on weekday or seasonal fluctuations. For most project types, two to three years is an acceptable analysis period.

Table 11. Strategies and Potential Performance Criteria

Strategy	Performance Criteria
Traffic Operations Improvements (e.g. signal timing, geometric improvements)	Changes in travel speed, delay, and person throughput
Transit Enhancements (e.g. dedicated bus lanes, transit signal priority)	Changes in bus travel time, on-time performance, and ridership
Capacity Enhancements (e.g. new lanes, interchange modifications)	Changes in travel speed, delay, and vehicular throughput
Technology Enhancements (e.g. DMS, ramp metering, traffic incident management)	Changes in travel time reliability, cost savings, or response and/or clearance times
Bicycle and Pedestrian Enhancements (e.g. walkways, bikeways)	Changes in multimodal level of service, crash trends, and access

Step 2: Collect Data

GPATS should collect both “before” and “after” data for analysis. The “before” data is often the limiting factor in evaluation; however, the GPATS may strategically identify projects for evaluation prior to implementation and proactively collect data, clearly document assumptions and data collection methods, and then recreate the data collection process 2 to 3 years post implementation.

Step 3: Evaluate and Compare Data

Following data collection, the before-and-after studies will compare and note differences between the performance criteria from Step 1. The performance criteria and identified changes can be used to analyze the strategy impacts.

Additional Considerations

Focusing entirely on data collection and evaluation efforts may be insufficient to comprehensively measure the effectiveness of a strategy after implementation. Factors such as socio-economic growth and local improvements need to be also considered in the before-and-after analyses of strategies.

In some cases, conducting before-and-after analyses of a strategy may not be feasible. Examples include building a new park-and-ride facility and providing a rideshare program that did not exist before. In such scenarios, the impacts of not implementing a strategy should be evaluated. Other strategy types not supported by data-driven analysis may necessitate stakeholder consultations and public input for a successful implementation.

CHAPTER 5

UPDATE CYCLE

For regions in air quality attainment such as GPATS, MPOs must update their long-range transportation plans every five years. Although there is no federally-required update cycle for CMPs, linking the update cycle with a long-range transportation plan (LRTP) update or updating the CMP sooner than every 5 years can aid in streamlining the two activities.

Figure 38 outlines a process that may be used in future updates. Additionally, the CMP should be treated as an ongoing effort that informs the day-to-day discussions and decisions being made about transportation in the region.

CONCLUSION

The GPATS CMP highlights the importance of addressing both recurring and non-recurring congestion issues within the region. It identifies strategies, and provides a framework for evaluating their effectiveness post-implementation. Furthermore, the CMP serves as a crucial tool for GPATS in identifying and prioritizing future projects as part of the LRTP. Overall, the CMP plays a vital role in improving transportation system reliability and creating a more efficient and sustainable transportation network for the region.

Figure 38. Potential Approach to Future CMP Updates

Phase			
Phase 1: Identification of Corridor Segments for Additional Analysis	**Recurring/Non-recurring Congestion Analysis and Policy Review**	**Steering Committee Involvement**	**Consideration of Congestion Causes**
	Leverage screening measure to identify congested corridors along the CMP network; Identify any relevant policy changes.	CMP Steering Committee input, review, and consideration.	Roadway characteristics, adjacent land use, multimodal characteristics, traffic characteristics, and safety characteristics.
	Set of corridor segments for strategy screening		
Phase 2: CMP Strategy Screening	Identification of potential CMP strategies for each of the corridor segments using the CMP Strategy Toolbox. Recommendation of CMP strategies for each corridor by the CMP Steering Committee.		
	Set of recommended strategies for each corridor segment		
Phase 3: Project Program/Identification and Implementation	Prioritize strategies and identify projects by leveraging the RMP Evaluation Tool and LRTP Process.		
	Program projects in the TIP/STIP and local Capital Improvement Programs (CIP)		
	Project Implementation		

APPENDIX A

ACRONYMS

APPENDIX A

CCTV	Closed-Circuit Television
CATT	Center for Advanced Transportation Technology
CMP	Congestion Management Process
DDI	Diverging Diamond Intersections
DMS	Dynamic Message Sign
FAST Act	Fixing America's Surface Transportation Act of 2015
FHWA	Federal Highway Administration
GPATS	Greenville-Pickens Area Transportation Study
HOT	High Occupancy Toll
HOV	High Occupancy Vehicle
ICM	Integrated Corridor Management
IIJA	Infrastructure Investment and Jobs Act
ISTEA	Intermodal Surface Transportation Efficiency Act
ITS	Intelligent Transportation Systems
LRTP	Long Range Transportation Plan
MAP-21	Moving Ahead for Progress in the 21st Century
MPO	Metropolitan Planning Organization
NHS	National Highway System
PTASP	Public Transportation Agency Safety Plan
PTI	Planning Time Index
RITIS	Regional Integrated Transportation Information System
RMP	Regional Mobility Program
SAFETEA-LU	Safe Accountable Flexible Efficient Transportation Equity Act - A Legacy for Users
SCDOT	South Carolina Department of Transportation
SCSWM	South Carolina Statewide Model
TDM	Transportation Demand Management
TEA-21	Transportation Equity Act for the 21st Century
TIM	Traffic Incident Management

TIP	Transportation Improvement Program
TMA	Transportation Management Area
TOD	Transit-Oriented Development
TSMO	Transportation System Management and Operations
TSP	Transit Signal Priority
TTTR	Truck Travel Time Reliability
UPWP	Unified Planning Work Program
VMT	Vehicle Miles Traveled
WIM	Weigh-in-motion

APPENDIX B

STRATEGIES

Active Transportation

Active Transportation programs foster walking, biking, and other forms of non-motorized mobility to discourage use of personal automobile, promote active lifestyle, improve air quality, and enhance experiences of residents as well as visitors in the region.

The active transportation strategies identified for the GPATS region include:

- Walkways
- Bikeways
- Pathways
- Bikeshare or Scooter-Share Programs

WALKWAYS

Walkways include sidewalks or other dedicated pedestrian facilities that provide safe infrastructure for people to walk.

Relative Cost

Impact

By providing safe and dedicated facilities, people are more likely to walk to and from their points of interest. It offers the potential to encourage a shift in mindset from auto-centric to walking, especially to cover short distance trips. Connecting residential, employment, and major activity centers with conducive pedestrian facilities promotes alternative transportation options, thereby alleviating congestion on roadways.

Like any other infrastructure expansion effort, planning and funding new sidewalk projects demands dedicated resources from local, state, and/or private organizations. It is important to note that sidewalk occupies space within the right-of-way that may be potentially utilized for other types of transportation facilities, especially with low pedestrian activity. Ideally, pedestrian facilities should be planned in conjunction with other transportation connections and surrounding land uses.

Case Study: Minneapolis, MN - Pedestrian Facilities

Minneapolis is a national leader in walkability thanks to its effective planning policies and commitment to constructing safe pedestrian facilities. Since 2019, the City has implemented multiple strategies to improve walkability, including the Transportation Action Plan, Complete Streets Policy, Americans with Disabilities Act (ADA) Transition Plan, Vision Zero Plan, and Street Design Guide. These plans have resulted in sidewalks being present on both sides of over 92% of Minneapolis' streets, totaling approximately 1,800 miles of sidewalk.

To further promote pedestrian-friendly environments, Minneapolis enforces maximum parking standards and has eliminated minimum parking standards. Additionally, lighting is installed on one or both sides of nearly all arterial and non-arterial streets, enhancing pedestrian safety at night. Marked mid-block crosswalks feature overhead flashing beacons and high visibility striping, while all signalized intersections in the city have marked crosswalks.

BIKEWAYS

Bikeways represent protected or painted bicycle lanes, shared lanes, or "sharrows," or other dedicated bicycle facility types.

Relative Cost

Impact

Bikeways offer safe and efficient means of transportation for people to travel to and from their points of interest. In urban or mixed-use areas, bikeways serve as an alternative to walking or driving for short-distance trips. It is important to consider bicycle-supportive infrastructure in the planning and programming of these facilities to complement the active transportation network. This may include amenities such as bicycle racks, long-term bicycle storage, bicycle repair stations, or other infrastructure that further encourages biking.

In areas with space constraints, incorporating bicycle facilities may pose a challenge given the minimum requirement for a bike lane is four feet wide. Factors such as magnitude of traffic volumes, roadway class, and adjacent land uses play a role in determining the type of bikeway suitable along a congested travel corridor.

Case Study: Charlotte, NC - Uptown CycleLink

To provide safer, more interconnected, and more equitable bike infrastructure, the City of Charlotte, NC has developed the Uptown CycleLink. This network of separated bike lanes spans 7 miles in Uptown and will connect over 40 miles of bikeways across Charlotte once complete. Currently, separated bike lanes are constructed along 5th Street and 6th Street, connecting the Irwin Creek Greenway and Little Sugar Creek Greenway to various entertainment and commercial destinations in Uptown. The remaining sections of the CycleLink are either under construction or in the final design phases.

When complete, Uptown Charlotte will have a comprehensive system of bike lanes that cater to residents of all ages and abilities, enabling them to enjoy cycling and to consider it as a viable travel option.

PATHWAYS

Relative Cost

A pathway can consist of a shared-use path or a sidepath. A shared-use path is a physically separated path that is set apart from vehicular traffic by an open space or other landscaping elements. These paths are designed to be used by pedestrians, bicyclists, and other non-motorized users. Alternatively, a sidepath is located immediately adjacent to a roadway and is separated from it by a narrow barrier.

Impact

A well-connected network of pathways can offer a safe facility for people of all ages and abilities to use and enjoy. A pathway provides a dedicated space for bicycles and pedestrians, making it an excellent option for commuting, recreation, and longer distance trips. Additionally, pathways showcase and leverage the unique environmental features of a community, such as rivers, parks, or wooded areas. To enhance safety and accessibility, pathways are complemented by signage, lighting, and other features.

A pathway requires more space compared to a bicycle lane or other pedestrian facilities. Typically, sidepaths are between 10 to 12 feet in width. Despite requiring more space, pathways provide safe and connected paths for both bicycles and pedestrians within a roadway corridor section. However, it is important to note that a pathway may not always offer the most direct route compared to a conventional sidewalk or bicycle lane. As a result, some cyclists and pedestrians prefer more direct connectivity, especially for commuting trips.

BIKESHARE OR SCOOTER-SHARE PROGRAMS

A bicycle or scooter sharing program allows individuals to borrow vehicles using a membership or credit card. Systems vary greatly and may be either docked or dockless.

Impact

Bikeways offer safe and efficient means of transportation for people to travel to and from their points of interest. In urban or mixed-use areas, bikeways serve as an alternative to walking or driving for short-distance trips. It is important to consider bicycle-supportive infrastructure in the planning and programming of these facilities to complement the active transportation network. This may include amenities such as bicycle racks, long-term bicycle storage, bicycle repair stations, or other infrastructure that further encourages biking.

In areas with space constraints, incorporating bicycle facilities may pose a challenge given the minimum requirement for a bike lane is four feet wide. Factors such as magnitude of traffic volumes, roadway class, and adjacent land uses play a role in determining the type of bikeway suitable along a congested travel corridor.

APPENDIX B

Transit

A well-designed transit system provides a competitive alternative to travel by single-occupancy vehicle, especially if well-coordinated with strong land use policy. A blend of service types and emerging technologies can reduce the number of drivers on the road and help mitigate congestion along major corridors.

The transit strategies identified for the GPATS region include:

- On-Demand Transit Service
- Bus Service
- Bus-On-Shoulder
- Park-and-Ride Lots
- Transit Signal Priority

ON-DEMAND TRANSIT SERVICE

On-demand transit service is a non-fixed route service that is flexible. On-demand transit provides door-to-door or curb-to curb service for passenger pick-ups and drop-offs. To request a ride, passengers must request and schedule a ride in advance of the trip. An on-demand service is the most cost-effective in low population or low-density areas where fixed-route is not operationally or financially feasible.

Relative Cost

Impact

On-demand transit service can provide service to people with disabilities who would otherwise not be able to operate a vehicle or take traditional transit service. The on-demand service provides flexibility in scheduling and enhanced access to and from destinations. As a service, on-demand transit can increase equitable transportation outcomes by increasing mobility to underserved populations. While on-demand service can be a standalone service, if paired with other types of services it can expand transit coverage to fill gaps in the existing transportation network.

The operational cost of on-demand transit is variable and may be either lower or higher than fixed-route service in the same area. While there are several factors that must be considered, the highest cost is to pay transit operators.

Case Study: Reno, NV - Spare Microtransit

With Spare, Reno, NV is providing on-demand microtransit service. The service replaced underperforming fixed routes with microtransit zones and expanded to outlying areas not covered by fixed-route or paratransit service. Additionally, the City leveraged Spare's Open Fleets integration with Uber and Lyft. The modifications doubled their microtransit ridership, enhanced accessibility and convenience, and allowed quick adaptation during driver strikes and shortages.

APPENDIX B

BUS SERVICE

Bus service can provide convenient and accessible public transportation in urban and rural areas. Public transportation agencies can provide a variety of services including local bus service, express bus service, and circulators. Generally, local bus service follows a fixed route, has scheduled stops, and follows a set frequency (how often the bus comes). An express bus service can provide connections at peak hours of the day or to and from a destination and park-and-rides with a limited number of stops. Circulator routes are circuitous and typically provide connections to key destinations in a small area.

Impact

Bus service can provide enhanced access to employment opportunities, education locations, and other important community destinations. Providing an affordable service can also convince more "choice riders" to use public transportation, especially if that service is also frequent and consistent. During commute hours, buses could reduce the number of vehicles along a corridor, in turn expanding the capacity of the existing roadway without widening.

Operating and maintaining quality bus service can be costly for agencies. The demand must align with the service type provided. Local bus service typically runs in mixed traffic, which makes the service susceptible to congestion and delays.

PARK-AND-RIDE LOTS

A park-and-ride lot is intended to provide commuters or travelers with a place to leave their personal vehicles and transfer to a public transportation system or carpool opportunity.

Impact

Park-and-ride facilities are strategically placed in areas that do not experience congestion. A well-placed park-and-ride lot can help alleviate traffic on congested roadways by providing a transportation alternative, especially during peak hours or for traditional commute trips. These facilities often serve as transfer points for buses, high-frequency transit, or other public transportation services. Park-and-rides can also serve as a first-and-last-mile connection, offering features such as long-term bicycle storage, rideshare staging, or connections to pedestrian or bicycle facilities.

Generally, park-and-rides are located outside of high-congestion areas. The location must be strategic and convenient to entice users to park their car and take transit instead of driving. This requires the associated public transportation option to be reliable and frequent, making it a compelling transportation alternative. Other constraints to consider may include financing or land acquisition.

BUS-ON-SHOULDER SYSTEM

Bus-on-shoulder system, also known as BOSS, is a cost-efficient strategy that allows buses to travel in the shoulder area of arterials and freeways to avoid congestion.

Impact

Bus-on-shoulder systems can improve speed and reliability along heavily congested corridors. This use of space can be particularly effective during peak hours to ensure transit operators can maintain their schedules. In some contexts, the bus-on-shoulder is dynamic and is only used during specific times of the day or when traffic speeds drop below a certain level. In other systems, it is used continuously to improve travel speed for transit vehicles.

There are certain considerations that may limit the ability of buses to access the shoulder, including road condition, weather, traffic, or other obstructions. These obstacles may delay buses and negatively impact the quality of service. The potential use of bus-on-shoulders should be further considered in a feasibility study to determine the practicality of bus-on-shoulder in specific locations.

TRANSIT SIGNAL PRIORITY

Transit signal priority—or TSP—is a technology that modifies traffic signal timing or phasing for transit vehicles.

Impact

Traffic signals are generally considered a major source of delay for all types of vehicles, especially public transit vehicles traversing along major commute corridors with relatively long signal cycles. In such a scenario, Transit Signal Priority (TSP) is considered a viable solution to improve flow of transit vehicles and increase system reliability. TSP is particularly successful at roadway intersections with long vehicle queues or extended transit delays. To be effective, TSP is complemented by other strategies such as dedicated bus lanes or bus-only shoulders.

Close coordination among agencies responsible for transit vehicles, transit operations, and traffic signals is essential for the success of TSP strategy. Any plans of transit route modifications and intersection improvements must be considered by agencies prior to implementation. Other considerations include on-board components, right-of-way constraints, intersection spacing, signal cycle length, and pedestrian crossings.

APPENDIX B

Capacity Expansion

Capacity expansion is achieved through improvements that enhance the mobility of vehicles along a corridor through the addition of travel lanes or construction of new roadways, the addition of new interchanges, or the modification of existing ones.

The capacity expansion strategies identified for the GPATS region include:

- Alternative Interchange Design
- Grade Separated Crossings
- Lane Additions (Widening)
- New Roadways

ALTERNATIVE INTERCHANGE DESIGN

Relative Cost

Alternative interchange designs can reimagine existing interchanges to alleviate congestion.

Impact

Interchanges are an integral and unique aspect of the nation's surface transportation network. They serve as the interface between the highest order of roadway facilities, such as the Interstates, and local thoroughfares, such as collectors. They also play a vital role in connecting roadways and efficiently moving vehicles across states.

There are various interchange designs that enhances traffic flow and improve safety. Some alternative interchanges include diamond interchanges, diverging diamond interchanges (DDI), displaced left turns, double crossover diamond, double raindrop, single exit (partial interchange), partial or full cloverleaf, or single-point interchange. The choice of alternative design depends largely on the surrounding context.

While the interchange may alleviate congestion at that specific location, it may not address congestion along the entire corridor. Ideally, changes to an interchange improve the flow and safety of the associated corridors. However, it is important to note that some drivers may not be familiar with certain interchange designs, which could lead to confusion. Therefore, the addition of adequate signage is crucial to help drivers navigate any interchange redesign.

New interchanges may also be appropriate to manage and address congestion. The FHWA's Policy on Access to the Interstate System provides the requirements for the justification and documentation necessary to substantiate any proposed changes in access to the Interstate System. This policy also facilitates decision-making regarding proposed changes in access to the Interstate System in a manner that considers and is consistent with the vision, goals, and Long-Range Transportation Plans of a metropolitan area, region, and State. FHWA has two requirements that must be satisfied for a new interchange:

1. An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility or on the local street network based on both the current and the planned future traffic projections.
2. The proposed access connects to a public road only and facilitates all traffic movements.

Planning Criteria - Section 10.11 of the SCDOT Roadway Design Manual mandates six criteria for identifying and evaluating new interchange locations including: access control, safety, site topography, road-user benefits, reduction of bottlenecks, and traffic volumes. Feasibility of new interchanges can be screened by assessing the current interchange spacing, existing and future congestion, environmental constraints, and the connectivity and configurations of the adjacent roadway network.

Case Study: Carmel, IN - Keystone Parkway Corridor Double Rain Drop Interchanges

The Keystone Parkway Corridor in Carmel, IN involved the construction of a four-lane expressway with grade-separated double raindrop interchanges at six existing intersections. The City's use of double raindrop interchanges minimized the footprint and eliminated the need for traffic signals. This design allowed for the free flow of traffic, reducing congestion and improving efficiency. The interchanges also significantly improved the safety of the corridor. Based on research by the Insurance Institute for Highway Safety, accidents with injuries have been reduced by 84% since the completion of the project. In addition, the project had positive environmental impacts. By reducing idling and improving traffic flow, emissions were lowered, resulting in a more sustainable transportation system.

APPENDIX B

GRADE SEPARATED CROSSINGS

Grade-separated crossings allow different streams, or modes, of transportation to flow independently of one another.

Impact

By providing an overpass or underpass, grade separated crossings allow traffic to remain free-flowing. This can also improve safety for drivers, pedestrians, freight, or transit. Its application is typically used to separate rail from vehicles or pedestrians and is particularly effective at high-volume intersections, intersections with more than four approaches, or an active railroad crossing.

Grade-separated crossings are expensive, and the cost to purchase the right-of-way in addition to construction may be a significant barrier. While this is a relatively expensive congestion management strategy, it is a long-term solution for managing different modes of transportation.

LANE ADDITIONS (WIDENING)

Lane widening, or expansion, is the addition of one or more lanes to a roadway.

Impact

Widening increases the capacity of a corridor by providing more travel lanes for traffic. While it temporarily alleviates congestion concerns, it also attracts more drivers to use the roadway, which, in turn, contributes to more congestion.

Lane widening is not an effective long-term strategy for managing congestion. This strategy also has the potential to exacerbate congestion. With limited right-of-way, it is difficult to continuously widen roadways to meet the travel demands and needs of the community. Other strategies might be more successful in enhancing efficiency than adding capacity.

NEW ROADWAYS

A new roadway consists of constructing a new route for drivers, pedestrians, cyclists, or transit operators.

Relative Cost

Impact

Constructing new roadways is a traditional strategy to alleviate congestion. A new roadway can create redundancy in the network by adding parallel routes. It may be an effective strategy if widening is not an option or if there is projected future growth in a new area. A new roadway can benefit local economies by providing alternative routes or stimulating new growth.

Building a new roadway requires a major financial investment. Limited funding or environmental constraints make it challenging to move from the planning phase to design and construction.

APPENDIX B

Transportation Demand Management

Transportation Demand Management (TDM) refers to a set of strategies and measures designed to manage and reduce the demand for travel in order to alleviate congestion, improve transportation efficiency, and promote sustainable transportation options. TDM typically includes a combination of policies and programs that influence travel choice and behavior.

The transportation demand management strategies identified for the GPATS region include:

- Vanpool and Carpool
- Teleworking and Flexible Work Schedules
- Parking Management
- Bicycle and Pedestrian Education
- Safe Routes to School Program

VANPOOL AND CARPOOL

Vanpool is a shared transportation program where a group of four to ten passengers who live and work in close proximity share a van to commute to and from work. Carpooling is a program where a group of people who live and work in close proximity share a car to commute together.

Relative Cost

Impact

Transportation agencies or employers can organize and sponsor vanpools by providing subsidized costs. Participants share the costs of the van, fuel, insurance, and maintenance expenses, making the cost of commuting lower than driving a personal vehicle. Vanpools help reduce congestion, commuting costs, and emissions. By consolidating individual drivers into a single van, vanpool programs eliminate cars on the road, alleviating congestion and reducing auto emissions.

Vanpools are affordable and easy to implement for transportation agencies or employers. However, the success of vanpools relies on interest from local commuters. Employers and agencies can support vanpool usage through incentives, subsidies, marketing, and regulation.

Employers can organize and support carpools by providing benefits, such as subsidized costs and favorable parking programs. Carpooling typically involves individuals taking turns driving their own cars or sharing one car, with each participant sharing the cost of fuel and maintenance expenses. Carpools help reduce congestion, commuting costs, and emissions. By consolidating individual drivers into a single car, vehicles are removed from the road, which alleviates congestion and lowers auto emissions. Carpooling can also leverage HOV lanes that contain less vehicles and potentially allow higher speeds. Utilizing carpools also enables participants to split the costs of travel and vehicle upkeep with multiple people, helping reduce travel costs.

Carpools are affordable and easy to implement by employers or local governments. Carpools are only viable if local commuters are willing to change their personal driving habits. Employers and local governments can persuade commuters to change their driving habits by providing incentives, such as parking incentives, subsidies, guaranteed ride-home programs, and marketing.

Case Study: Raleigh-Durham Area, NC - GoTriangle Vanpool

GoTriangle's vanpool program provides flexible and sustainable transportation options for commuters throughout the Triangle region. Since 2019, GoTriangle has operated in partnership with experts at Enterprise Rideshare, enabling them to expand their operation to over 50 vanpools. Vanpool groups range from 4 to 15 individuals who coordinate their own routes and times through the Enterprise app, typically meeting at a central location in the morning. Each vanpool contains multiple volunteer drivers, making the program more reliable on a day-to-day basis. The program offers each vanpool a monthly subsidy, making vanpooling costs on average 75% less than driving alone. By lowering the number of commuters driving alone, the program also reduces parking congestion, traffic congestion, and emissions.

APPENDIX B

TELEWORKING AND FLEXIBLE WORK SCHEDULES

Flexible work schedules allow employees to choose their own start and end times within a specific range of hours. Teleworking enables employees to work from locations other than the traditional office setting, such as their homes or other remote locations.

Impact

Teleworking and flexible work schedules help reduce congestion by allowing employees to avoid commuting during peak hours or even eliminate commuting altogether. Flexible work schedules and teleworking programs contribute to congestion reduction and emissions reduction by keeping commuters off the roads during busy traffic periods. These programs also offer cost savings for both employees and employers by reducing commute times and enhancing work productivity. However, it is important to note that teleworking and flexible work schedules may not be suitable for all businesses or employees. Employers need to assess whether these strategies can be implemented without compromising their operations. To support teleworking and flexible work schedules, employers can provide incentives, organizational assistance, and increase awareness among employees.

PARKING MANAGEMENT

Parking management is the tactics used to effectively manage parking spaces and optimize their utilization.

Impact

These strategies aim to address parking challenges such as limited availability, congestion, and inefficient use of parking resources. Parking management strategies include removing parking minimums and enforcing parking maximums (developmental requirements that mandate parking based on development type), improving wayfinding, reducing free parking, and implementing dynamic pricing for on-street parking. These strategies help optimize the use of parking spaces, reducing congestion and improving traffic flow. By implementing measures such as dynamic pricing and improved wayfinding, parking can be utilized more effectively.

Additionally, these strategies encourage the use of alternative modes of transportation such as walking, cycling, or public transit, which contributes to reducing traffic congestion and emissions. However, it is important to note that support for parking management strategies from private entities and local community members is limited, especially in areas with low amounts of existing parking. Furthermore, implementing parking management strategies may lead to a reduction in revenue generated from parking facilities, which can worsen local support for parking management initiatives.

BICYCLE AND PEDESTRIAN EDUCATION

Educational programs help improve awareness and safety for all roadway users. Bicycle and pedestrian education help inform people about the rules and laws that apply to drivers, bicyclists, and pedestrians. These programs focus on how all roadway users should interact.

Impact

Educational programs highlight biking and walking as safe modes of transportation. These programs encourage people to choose biking or walking for shorter trips, such as going to school, work, or the grocery store. By increasing awareness, these programs can also improve safety by helping roadway users understand potential conflict points.

Implementing an education program is a good way to raise community awareness, although it may not be a comprehensive solution for reducing congestion. While the investment required for an education program is relatively low compared to other strategies, it may not reach the intended audience as effectively.

Case Study: Statewide, NC - Watch For Me NC

Watch For Me NC started as a pilot program in 2012 in Wake, Orange, and Durham Counties. Since then it has evolved, and is open to all North Carolina communities. Watch for Me NC provides materials to partner communities aimed at improving pedestrian and bicyclist safety via public education, community engagement, and high visibility law enforcement.

SAFE ROUTES TO SCHOOL PROGRAMS

Safe Routes to School programs are initiatives aimed at promoting and encouraging safe and healthy walking and biking to school. These programs incorporate a combination of education, infrastructure improvements, and encouragement activities to create safer and more accessible routes for students to commute to and from school.

Impact

By implementing infrastructure improvements such as sidewalks, crosswalks, and traffic calming measures, Safe Routes to School programs create safer routes for students to walk or bike to school, reducing the risk of accidents and injuries. Promoting alternative modes of transportation also helps to decrease the number of cars on the road during peak school hours, leading to less traffic congestion and improved air quality around schools.

Implementing Safe Routes to School programs often requires collaboration between multiple stakeholders, including schools, local government agencies, transportation departments, and community organizations. Coordinating efforts and maintaining consistent communication can be challenging. Additionally, securing sufficient funding for infrastructure improvements and program implementation can be a hurdle. Limited financial resources may hinder the ability to make necessary changes to enhance safety and encourage active transportation.

APPENDIX B

Freight

Freight transportation is integral to local, regional, and national economies. Freight strategies minimize adverse impacts of freight activity on regional mobility and facilitate efficient movement of goods while also propelling economic growth.

The freight strategies identified for the GPATS region include:

- Dedicated Truck Lanes
- Weigh-In-Motion Technology
- Truck Incentives and Use Restrictions

DEDICATED TRUCK LANES

Dedicated truck lanes are specific lanes on roadways that are reserved exclusively for use by trucks.

Impact

Dedicated truck lanes provide the opportunity to allow trucks to travel at a consistent speed, reducing delays and improving travel times. Dedicated space for trucks may also reduce congestion, improve traffic flow, and reduce the potential for crashes caused by the interaction between trucks and other vehicles.

Case Study: GA - 1-75 Commercial Vehicle Lanes

While not yet implemented, Georgia Department of Transportation (GDOT) is working on a project that will add two, toll-free commercial vehicle lanes to I-75 between Macon and McDonough. The lanes will be barrier-separated and extend approximately 41 miles. Once completed, the project is anticipated to reduce delay and travel times for commercial vehicles, as well as passenger vehicles during the peak hours.

WEIGH-IN-MOTION TECHNOLOGY

Weigh-in-motion (WIM) technology is a system that is used to measure the weight of vehicles while they are in motion. It is typically installed on roadways and highways and consists of sensors or scales embedded in the road surface.

Impact

WIM technology offers several benefits such as improved efficiency, enhanced safety, and enhanced data collection. It eliminates the need for commercial trucks to stop and wait at weigh stations, minimizing delays and travel time. The technology also increases safety by allowing enforcement of weight violations such as overloaded trucks, as well as eliminates the need for trucks to merge and re-enter traffic. It also provides an enhanced level of data that may provide insights on travel patterns, vehicle weights, and axle loads.

APPENDIX B

TRUCK INCENTIVES AND USE RESTRICTIONS

Truck incentives encourage commercial vehicles to modify their route, time, or trip for deliveries by providing financial incentives. Use restrictions impose limits on the location or time for trucks to access certain corridors.

Relative Cost

Impact

Truck restrictions are structured to streamline freight trips during non-peak hours. Alternatively, truck incentives are used to encourage deliveries during non-peak or night hours. This strategy is particularly effective in dense areas with heavy traffic exacerbated by truck deliveries. Implementing truck incentives or restrictions helps reduce truck traffic in dense areas during peak times, improving traffic flow for commuters and enhancing the efficiency of deliveries during off-peak hours.

It is important to consider the potential impact on local businesses and companies that rely on deliveries if restrictions are imposed on after-hours deliveries. Additionally, an effective enforcement strategy must be in place to ensure the success of these measures.

Land Use

Land use strategies greatly influence transportation. These strategies can provide increased access, connectivity, and mode choice which in turn can mitigate congestion along our corridors.

The land use strategies identified for the GPATS region include:

- Redevelopment and Infill Development
- Transit-Oriented Development

APPENDIX B

REDEVELOPMENT AND INFILL DEVELOPMENT

Infill development encourages the redevelopment of underused or vacant land to create economic or community assets. In urban areas, this type of development can be effective in increasing density on parcels with existing utility and transportation infrastructure. Redevelopment encourages environmental stewardship instead of developing or building on undeveloped land.

Relative Cost

Impact

Infill and redevelopment can revitalize communities, improve transportation, and protect environmental assets. Infill development sites can create compact, walkable spaces that offer a mix of land uses to create and further cultivate a sense of place. In turn, infill or redevelopment can reduce urban sprawl and support community connectivity. This type of development is particularly successful in communities that are already constrained geographically or environmentally.

While infill development is often beneficial to communities, there are challenges associated with infill development. Infill development is typically market driven. To successfully promote infill development in certain areas, local policies must be in place to incentivize developers.

Other challenges associated with redevelopment include potential adverse impacts on adjacent homes or surrounding land uses. These impacts may include near-term impacts from construction, such as disruptions to access or congestion. The character of surrounding neighborhoods could be impacted by infill development, which could be especially challenging if these areas are historic or traditionally underserved. To prevent the alteration of a neighborhood's character, it is crucial to plan for infill development.

Case Study: Montgomery County, MD – Pike & Rose Infill Development

Pike & Rose is an infill development in Montgomery County, MD that transformed a standard strip mall into a livable and vibrant community where walking, biking, and transit flourish. With the use of comprehensive sector plans and flexible floating zones, Montgomery County and the Federal Realty Investment Trust added over 379,000 square feet of retail, 864 residential units, a 177-room hotel, and 300,000 square feet of office space to the site. In addition, the use of special taxing districts funded road network improvements that created a grid network more conducive to transit and active transportation.

TRANSIT-ORIENTED DEVELOPMENT

Transit-oriented development (TOD) creates dense, mixed-use communities around public transportation hubs. It maximizes the amount of residential, service, and employment opportunities around transportation hubs.

Impact

TOD can have positive impacts on community vibrancy, equity, and connectivity. It blends land use and transportation best practices to plan growth around transportation hubs to maximize community benefits. TOD is linked to increased transit ridership, higher property values, and reduced sprawl.

The barriers to create TOD include financing challenges, regulatory constraints, land use conflicts, or community resistance. Typically, transit agencies must work with private partners to create TOD developments, which can alleviate financial challenges but highlight other challenges. TOD can also change the neighborhood context, which can disenfranchise or disrupt existing communities. Without proper policies in place, TOD can lead to displacement and other unintended consequences such as higher rent and home prices, increased car ownership, and social and cultural homogenization.

Case Study: Arlington, VA - Rosslyn-Ballston TOD Corridor

The Rosslyn-Ballston Corridor in Arlington, VA is one of the most successful transit-oriented development projects to date in the United States. First planned in the 1960 general land use plan, County officials concentrated the highest density uses within a quarter mile of the five existing Metro stations. As a result, development was concentrated around the Metro stations while surrounding single family residential neighborhoods were preserved. County officials also utilized unique sector plans to guide development around each of the five Metro stations. Arlington now contains seven mixed-use urban villages that accommodate 36 million square feet of office space, 6 million square feet of retail space, and over 47,000 residential units.

APPENDIX B

Operations

Operations emphasize strategies that aim to optimize existing infrastructure through near-term solutions. These solutions enable active management of transportation systems based on current operational conditions.

The operations strategies identified for the GPATS region include:

- Managed Lanes
- Channelization or Delineation
- Access Management
- Special Event Management
- Traffic Incident Management (TIM)

MANAGED LANES

Managed lanes provide special access to vehicles based on high-occupancy vehicle (HOV), toll lanes, or high-occupancy toll (HOT) lanes, or vehicle type such as bus- or truck-only lanes. Managed lanes can also include additional access control measures to minimize turbulence in the flow of vehicles, or dynamic lane reversals.

Relative Cost

Impact

Managed lanes are effective in heavily congested areas with few travel alternatives, or in situations where there is a need to separate different types of vehicles. They can be a viable solution when traditional roadway improvements, such as widening, are no longer feasible or desirable. By providing dedicated spaces for trucks or buses, a managed lane strategy can enhance the efficiency of the current transportation network. Reversible lanes serve as dynamic lanes that can adjust to the demand of traffic flow. High-occupancy vehicle lanes can encourage carpooling and discourage single-occupancy vehicle use during peak hours.

Implementing managed lane strategies is considered challenging due to public acceptance and knowledge. It is essential for local, regional, and state planners and engineers to actively engage the public throughout the discussion of managed lanes. Operational issues, such as signage, lane access, and enforcement, should also be carefully considered.

Case Study: Roswell, GA - Reversible Lanes

For over 30 years, Roswell, Georgia has effectively utilized reversible lanes on South Atlanta Street to overcome spatial restrictions and improve capacity during peak travel times. Since South Atlanta Street is surrounded by historic properties, widening the road was not a feasible option. Instead, a one-mile segment of South Atlanta Street was configured as a three-lane facility with a reversible center lane. The reversible lane is equipped with overhead illuminated signs to clearly communicate the directionality of the lane. This reversible lane is used to optimize commuting into and out of Atlanta, with the lane supporting southbound traffic into Atlanta in the mornings and northbound traffic during the afternoon and evening. The implementation of the reversible lane has significantly improved capacity for the direction it is operating in, effectively preventing major congestion for commuters.

CHANNELIZATION OR DELINEATION

Channelization and delineation utilize physical elements and visual cues to enhance traffic flow.

Impact

The physical elements include barriers or raised medians to separate traffic. The visual elements include vertical reflectors or cones, raised pavement markings, signage, or dynamic/variable messaging signage (DMS). Channelization and delineation increase mobility by reducing conflicts and improve safety by discouraging certain traffic movements. In particularly congested areas, channelization or delineation may impact emergency response vehicles, pedestrians, or bicyclists, as well as maintenance operations. Considering multimodal impacts is crucial to supporting the movement of other modes of transportation.

ACCESS MANAGEMENT

Access management refers to street design techniques that control where vehicles may enter or exit a roadway to enhance traffic flow and improve safety.

Impact

When driveways are closely spaced, it negatively impacts the flow of cross-street traffic. Access management techniques help alleviate this issue by improving traffic flow, reducing conflict points, and enhancing the overall appearance of the corridor through landscaping. Implementing access management strategies promotes better traffic circulation, creates more efficient street networks, and minimizes slowdowns. These strategies are applied at varying scales; however, it is crucial to strike a balance between mobility needs and facilitating access to activities.

Retrofitting existing roads is challenging and costly, which can serve as a barrier to implementing access management. To address these challenges, it is important to coordinate with developers during the early stages of site development. This approach requires collaboration with local governments to ensure that ordinances provide opportunities to address retrofitting access.

SPECIAL EVENT MANAGEMENT

Relative Cost

Special event management refers to the coordination and organization of traffic movement for large, planned events. These events include concerts, sporting events, conventions, or fairs held at large venues.

Impact

Special events have the potential to significantly disrupt traffic and worsen congestion in other parts of the road network. To mitigate these effects, event travel is coordinated to minimize the impact on traffic. For recurring events, agencies develop standard traffic plans to inform the community, enhance safety, and manage congestion effectively. Event management may involve changing normal traffic directions or adjusting signal timing. Proper planning for special events enhances safety, improves traffic flow for all modes of transportation, and garners community support for large-scale events.

Implementing a special event plan requires early coordination among various agencies involved in traffic control and parking management. These agencies must coordinate with event staff to ensure efficient traffic circulation. Additionally, it is crucial to communicate any changes or special event plans to the public.

TRAFFIC INCIDENT MANAGEMENT (TIM)

Relative Cost

Traffic Incident Management (TIM) refers to planned and well-coordinated multidisciplinary processes implemented to respond to and clear traffic incidents.

Impact

TIM programs are planned and well-coordinated processes aimed at reducing duration of traffic incidents, improving safety, and minimizing the chance of secondary crashes. These programs typically involve the implementation of procedures, operations, and effective communication among TIM responders. In addition, TIM incorporates the use of technology to enhance traffic response and clearance. These programs are typically managed out of traffic management centers that have access to real-time data and traffic conditions. TIM programs may also focus on detecting incidents before they occur in order to proactively manage traffic. Training programs are available to address different aspects of incident detection, response, and clearance.

Due to the collaborative nature of TIM, coordination among various agencies is essential. TIM primarily addresses non-recurring congestion caused by incidents on roadways and strives to address them in a timely and safe manner. These programs are often combined with other technology and operational strategies to achieve optimal results.

APPENDIX B

Technology

Intelligent Transportation Systems (ITS) leverage technology-based solutions to improve travel time reliability and safety in an organized, coordinated, and cost-effective way.

The technology strategies identified for the GPATS region include:

- Queue Warning
- Ramp Metering and Management
- Traffic Signal Coordination
- Integrated Corridor Management
- Real-Time Traveler Information

QUEUE WARNING

Relative Cost

A queue warning is a system that uses signage or flashing lights to alert drivers to upcoming stop-and-go traffic.

Impact

Advanced queue warning messages relayed via DMS allow drivers to slow down and avoid emergency braking or swerving on congested roadways. The messaging is updated automatically or managed remotely by a traffic operations center. The system may be complemented by dynamic speed limits or lane control signage and is particularly beneficial to warn drivers about presence of work zones ahead of time. Clear and consistent signage is key to optimizing its benefits especially on roadways with frequent queuing and poor sight distances. Queue warning systems are most-effective when implemented in conjunction with other strategies.

RAMP METERING AND MANAGEMENT

Relative Cost

Ramp metering uses controlled access to regulate the flow of vehicles onto a freeway. Ramp metering is also known as ramp flow control.

Impact

Ramp metering allows one or two vehicles to enter the mainline, typically freeways, at regular intervals so the flow and speed of vehicles on the mainline is minimally disrupted and remains consistent. It is proven to minimize congestion and stop-and-go traffic conditions downstream. There are two approaches to ramp metering: pre-timed systems and adaptive systems. Both systems control the speed and number of vehicles entering a ramp. While ramp metering may not completely eliminate congestion, it can delay or mitigate its impact. Ramp metering helps prevent crashes in signal-controlled areas, reduces travel time, and is a cost-effective and low-maintenance solution for mitigating congestion.

Case Study: Phoenix, AZ - SR-51 Ramp Metering

The Arizona Department of Transportation (ADOT) implemented an adaptive ramp metering project on SR-51. The implementation resulted in significant increases in traffic speed and flow during the morning peak hours. The average speed increased by over 4.8 mph and the traffic flow rate increased by 152 vehicles per hour, per lane.

APPENDIX B

TRAFFIC SIGNAL COORDINATION

Traffic signal coordination is a cost-effective strategy used to synchronize traffic signals along a corridor or network of roads. The coordination reduces delays by minimizing the number of stops at traffic signals.

Relative Cost

Impact

Traffic signal coordination is a convenient and low-cost strategy to improve street efficiency and assist with special event management. Upgrading signal equipment reduces congestion, and re-timing signals improves traffic flows. Newer signal technologies automatically re-time themselves to coordinate traffic across a corridor. Traffic signal coordination upgrades are particularly effective on major streets, around activity centers, and during special events or in work zones.

Upgrading a signal system along a corridor is a time-consuming process and many communities lack the resources to assess or implement traffic signal re-timing and synchronization. Signals are typically re-timed every three years, and ensuring adequate funding and staffing to upgrade and coordinate signaling systems more-frequently is crucial to maintaining an optimal system along major corridors.

Upgrading a signal system along a corridor is a time-consuming process and many communities lack the resources to assess or implement traffic signal re-timing and synchronization. Signals are typically re-timed every three years, and ensuring adequate funding and staffing to upgrade and coordinate signaling systems more-frequently is crucial to maintaining an optimal system along major corridors.

REAL-TIME TRAVELER INFORMATION

Real-time traveler information provides information on current roadway conditions to drivers.

Relative Cost

Impact

Real-time traveler information systems give drivers the information they need to make more informed decisions about their travel plans, resulting in reduced travel times and a better driver experience. Real-time information is provided via dynamic message signs (DMS), mobile devices, or media broadcasts. Drivers may be able to optimize their routes to avoid congestion and reduce overall fuel consumption and emissions.

Using sensors, transportation agencies collect real-time information to actively manage traffic conditions at the traffic management centers. Real-time traveler information allows transportation agencies and emergency responders to effectively manage traffic and respond to crashes.

INTEGRATED CORRIDOR MANAGEMENT

Integrated Corridor Management (ICM) aims to improve the efficiency and reliability of traffic flow by integrating various technologies and their operations. It bundles many of the other strategies into a concerted effort.

Relative Cost

Impact

ICM includes specialized signal timing, dynamic message signs, and multi-corridor-multi-jurisdictional coordination. These strategies offer the ability to improve incident response times, provide real-time information, and move people and goods more efficiently. ICM requires multi-agency coordination to perform traffic operations and integrate their systems. Long-term planning and budgeting for the operations and maintenance of ICM are essential. System issues and updates need to be addressed for successful implementation. ICM is particularly beneficial in corridors where widening is not an option or non-recurring congestion occurs.

Case Study: Nashville, TN - 1-24 Smart Corridor

Tennessee Department of Transportation (TDOT) is currently developing and implementing the I-24 SMART Corridor Project. Phase 1 and 2 launched in June of 2023 and included additional fiber, overhead DMS for Active Traffic Management System, and upgraded detection between I-24 and connecting arterials. Phase 3 is anticipated to be completed in the summer of 2024 and includes ramp meeting along I-24, updated fiber along arterials, CCTVs and DMS along connecting arterials, and an automated Decision Support System.

APPENDIX C

ENGAGEMENT

GPATS

Congestion Management Plan

Online Engagement Summary #1

MetroQuest Survey

OVERVIEW

795 *online participants*

19 *in-person participants*

9,000+ *individual data points*

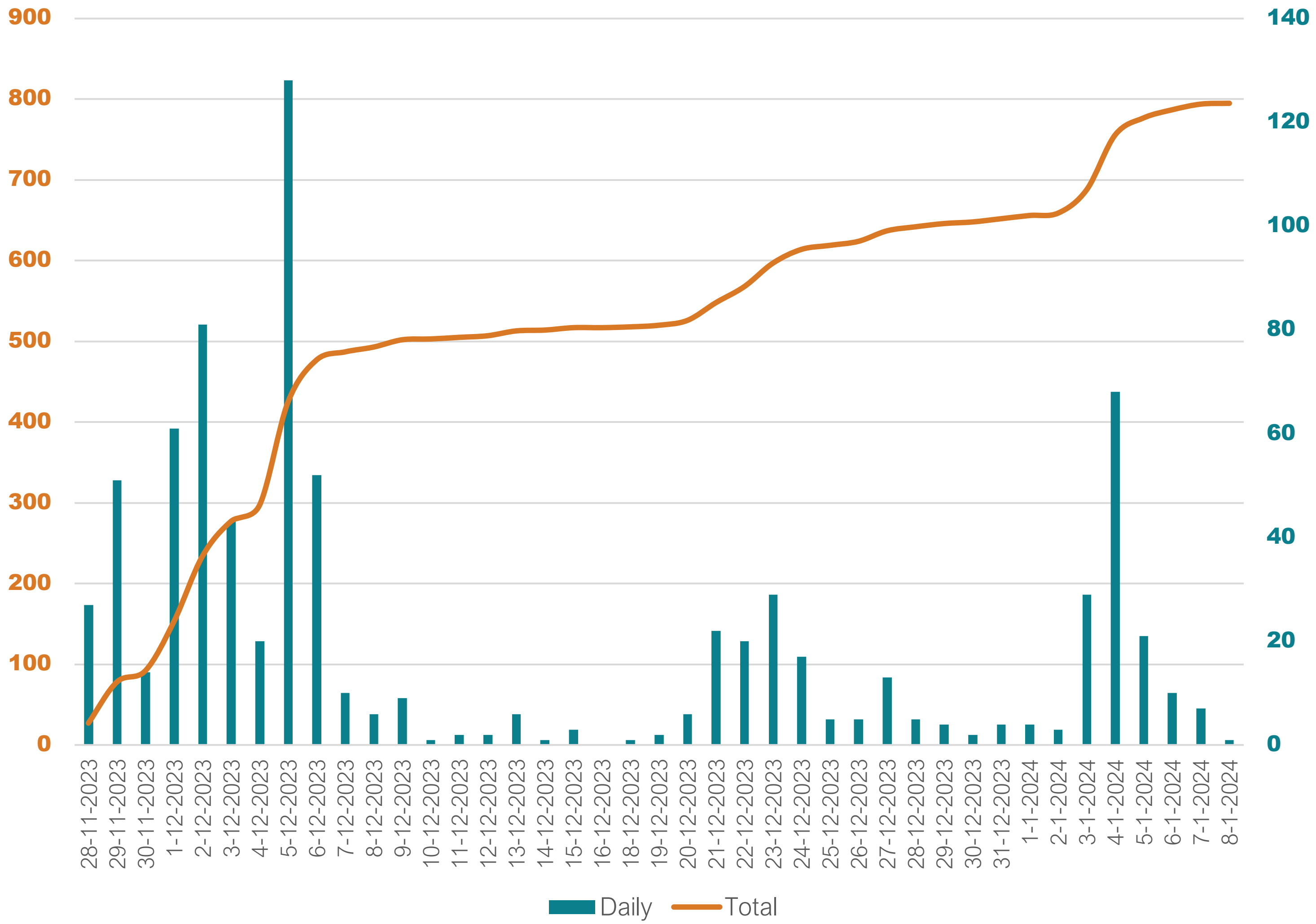
450+ *written comments*

Online engagement site designed to educate the public about the project and collect feedback using interactive and visual screens.

- Open from November 28, 2023 to January 8, 2024

Project information provided on the "welcome" screen.

Participants were asked to weigh in on guiding statements, existing congestion, & solutions. The mapping feature, allowed participants to identify areas of concern.

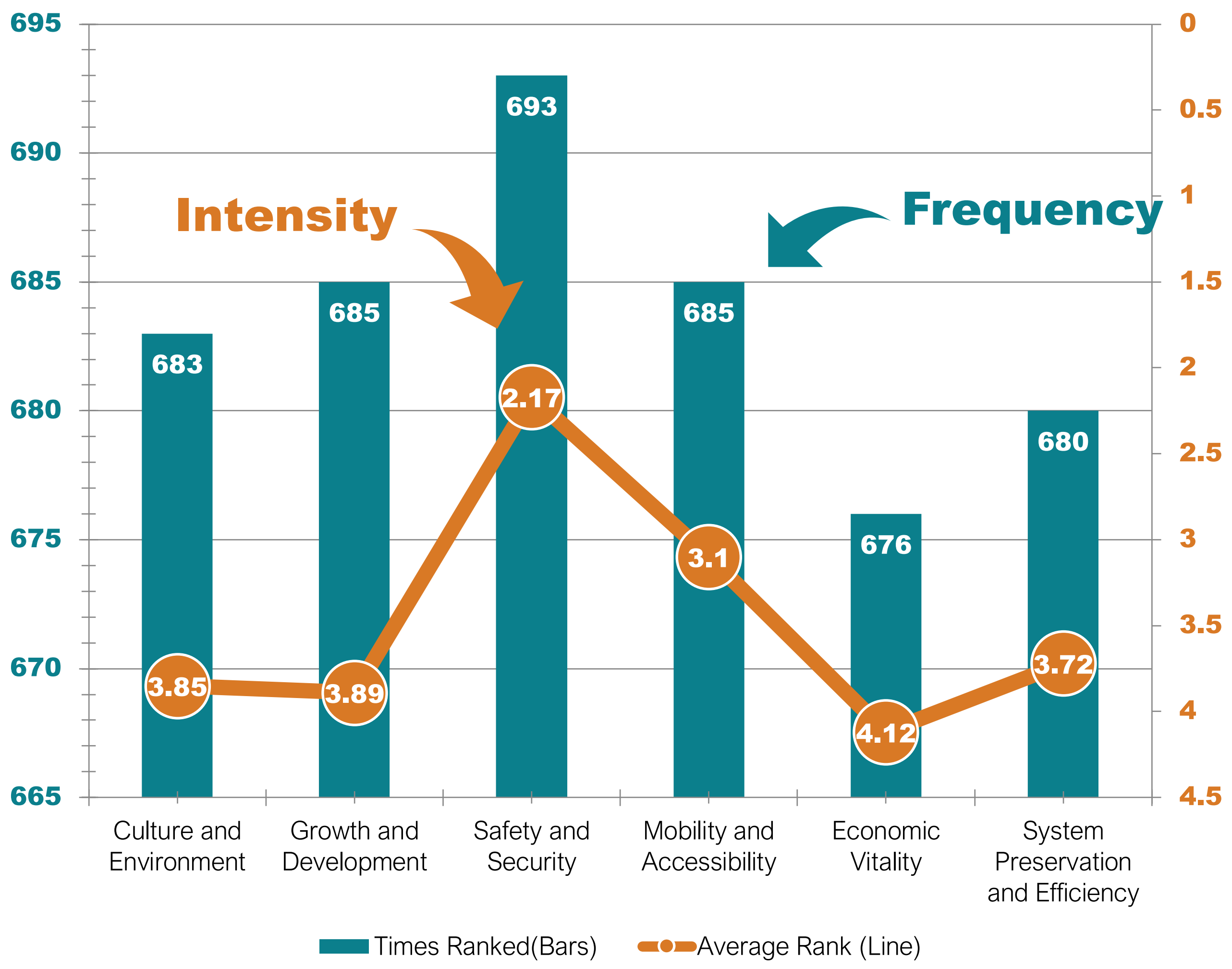


Guiding Statements

Help us rank and prioritize preliminary goals

Priorities

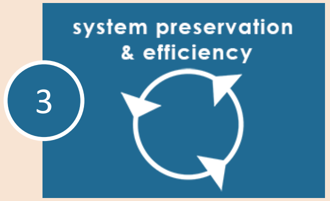
These are the preliminary goals for creating a successful congestion management plan for the Greenville-Pickens Area. Participants were asked to rank the preliminary goals to determine what the community identifies as important.



Safety and Security: most frequently ranked and highest average ranking

Culture & Environment and Mobility & Accessibility: ranked a similar number of times but Mobility & Accessibility ranked higher

System Preservation & Efficiency: higher average ranking shows that those that ranked it ranked it higher on average

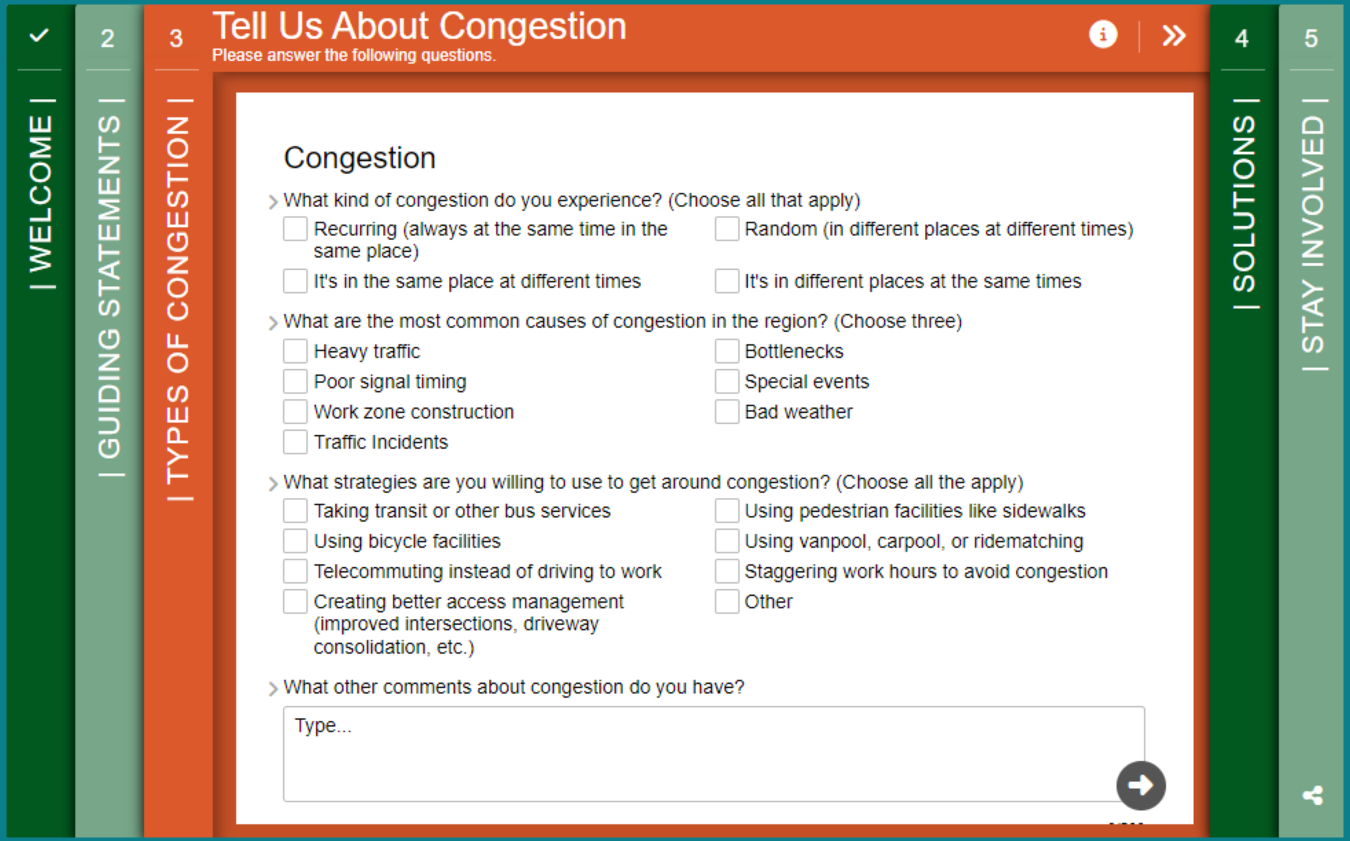


Growth & Development: gap between the intensity and frequency shows that while not everyone see it as an important consideration, those that do think it's very important

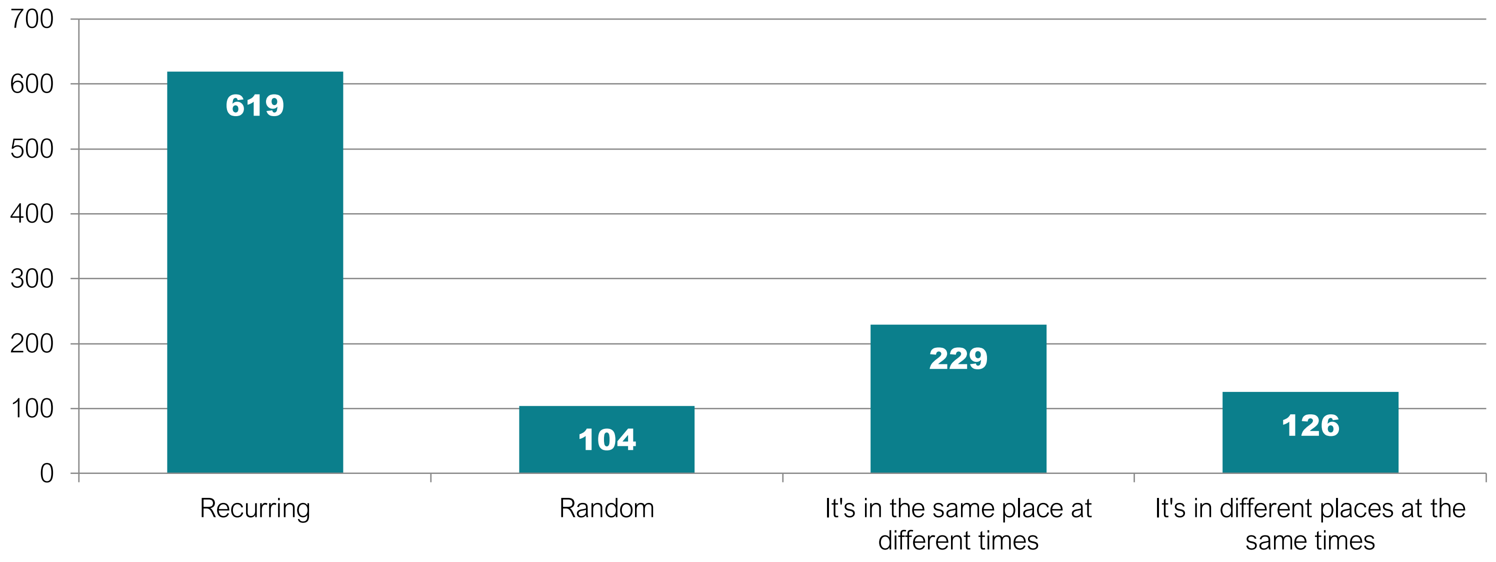
Economic Vitality: least frequently ranked and lowest average ranking

Congestion Survey

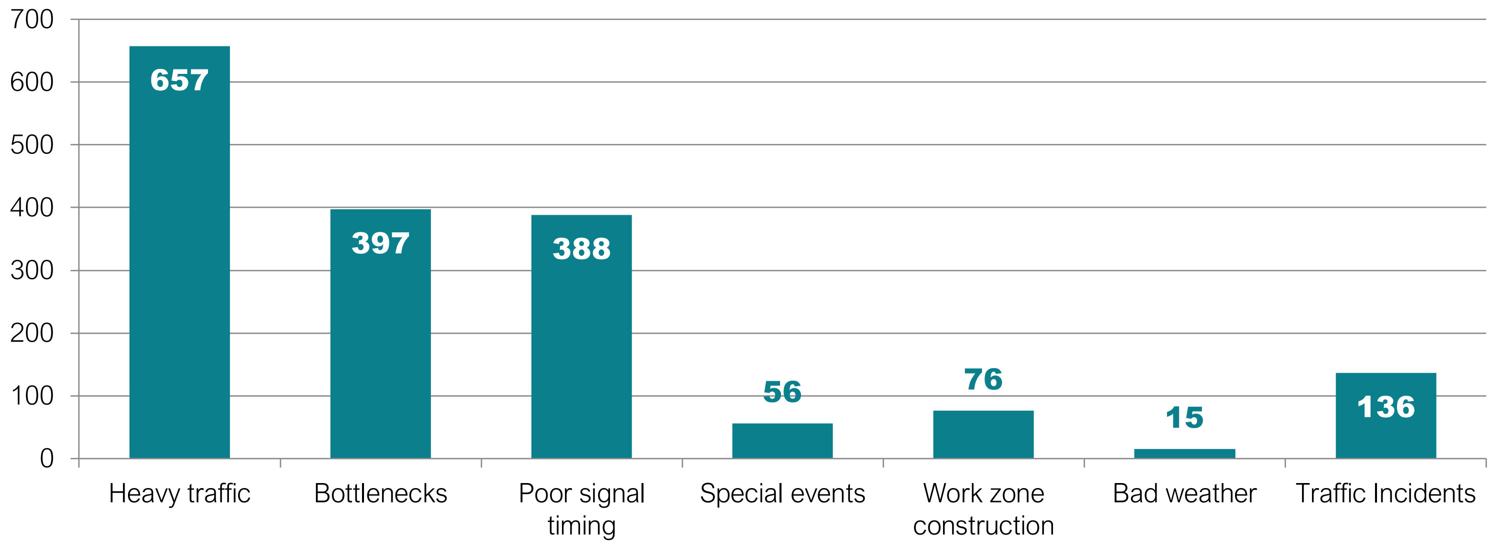
Tell us about congestion in the GPATS area



What kind of congestion do you experience?

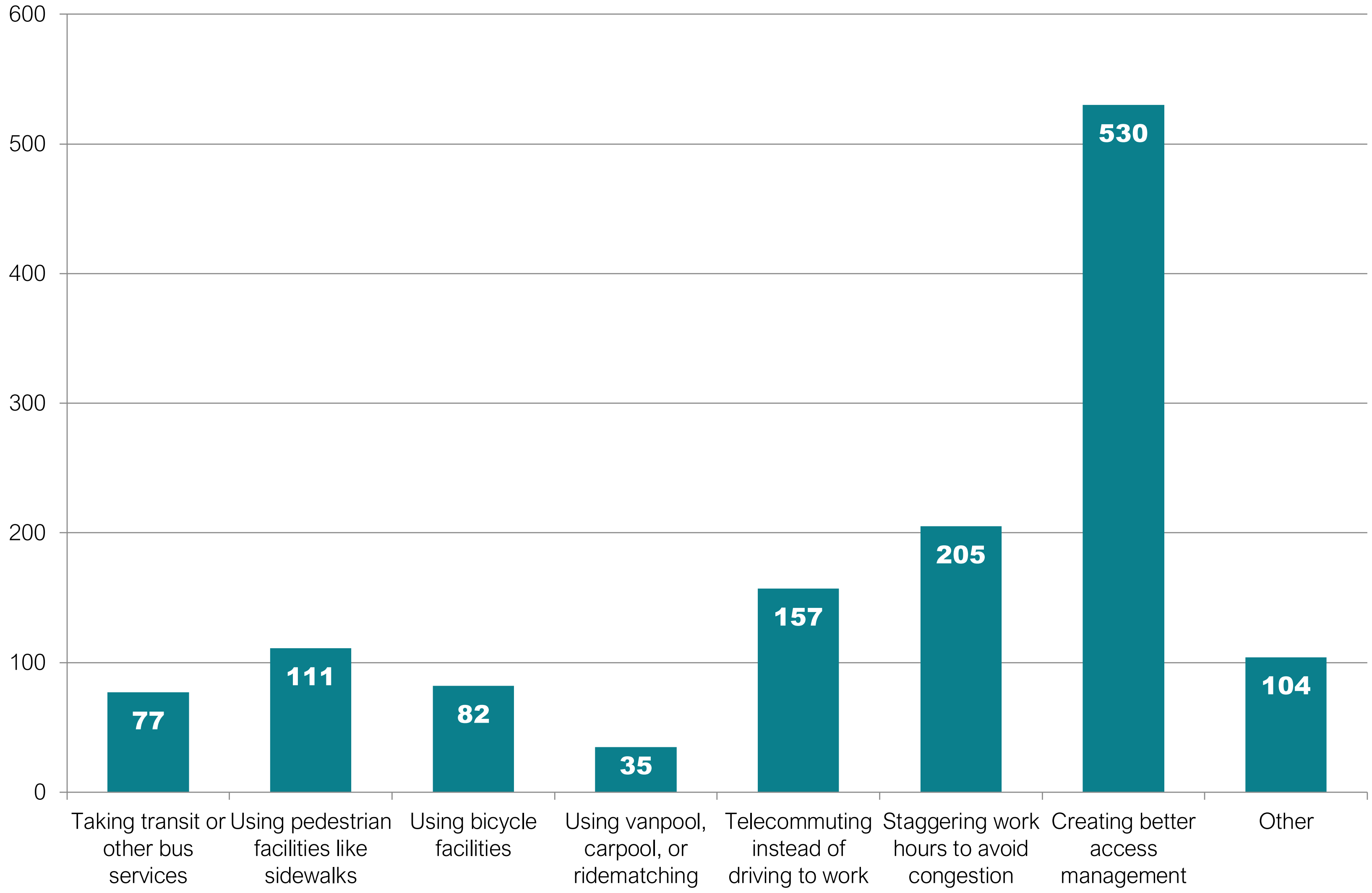


What are the most common causes of congestion in the region?



- Recurring Congestion: congestion that is always at the same time in the same place. Was the most common type of congestion experienced.
- Random Congestion: congestion that is in different places at different times. Was the least common type of congestion experienced.
- Heavy traffic was the most common cause of congestion in the region
- Bottlenecks and poor signal timing were other common causes of congestion

What strategies are you willing to use to get around congestion?



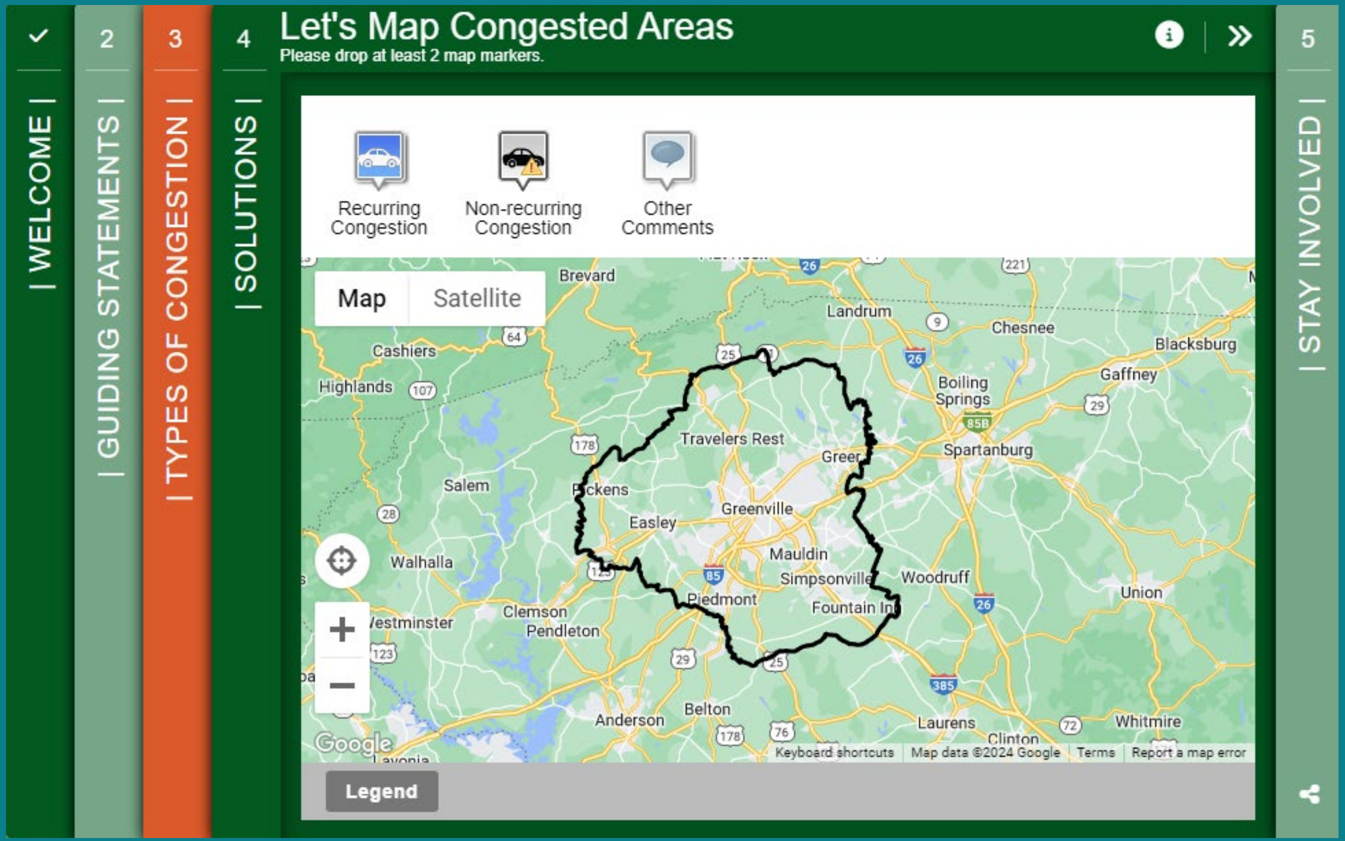
- Creating better access management was by far the most popular congestion mitigation strategy.
- Access Management strategies include improving intersections, driveway consolidation, etc.
- Telecommuting and staggering work hours were the next two most popular strategies. Unlike access management, both strategies are on the policy side of congestion management
- Alternative transportation options received a small amount of support

Other Comments

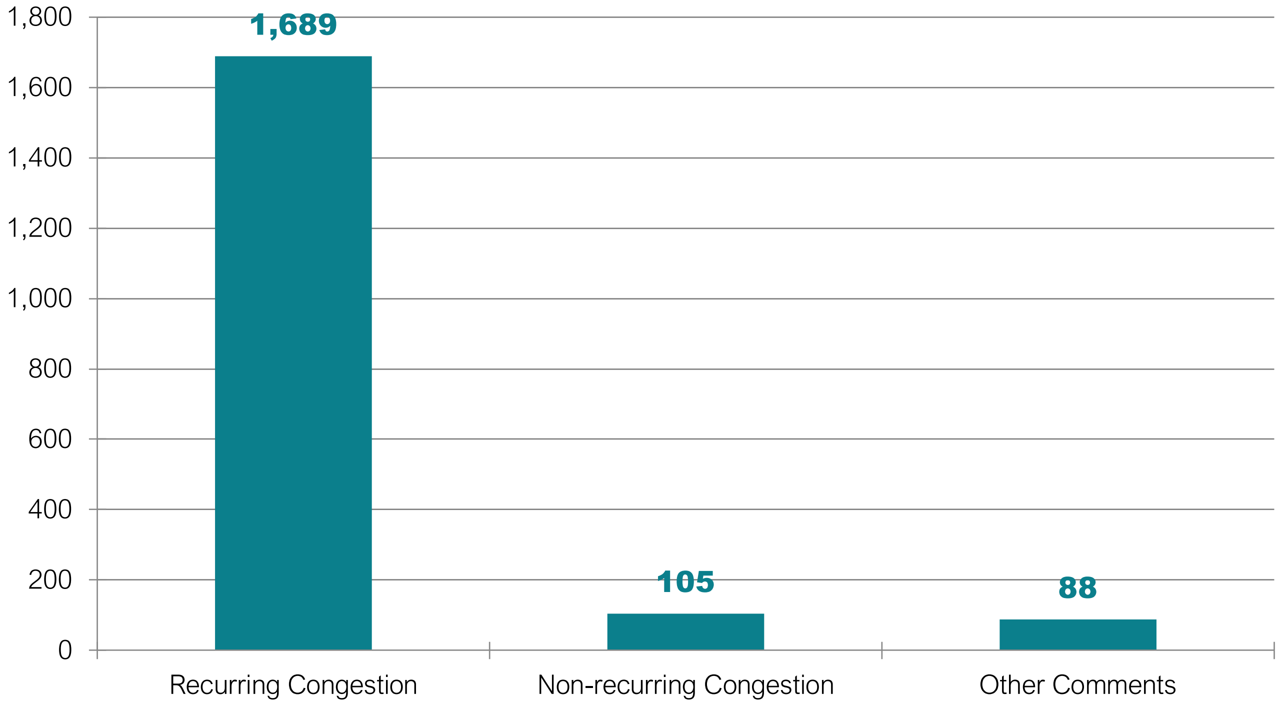
- Rapid development and population growth without adequate transportation infrastructure
- Improved intersection design and timing
- Expand alternative transportation options
- School generated congestion

Mapping Ideas

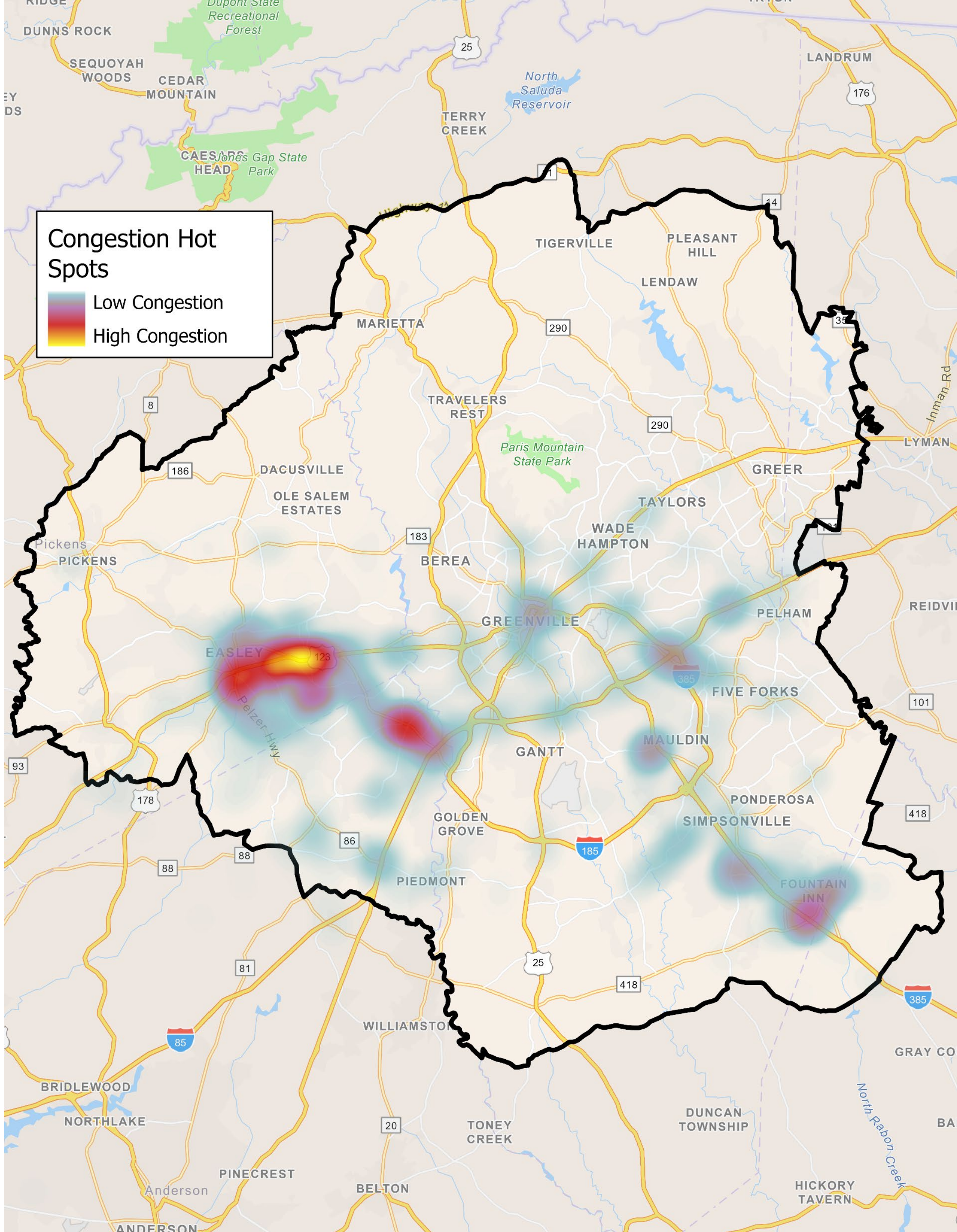
Help identify needs by dragging markers to specify locations



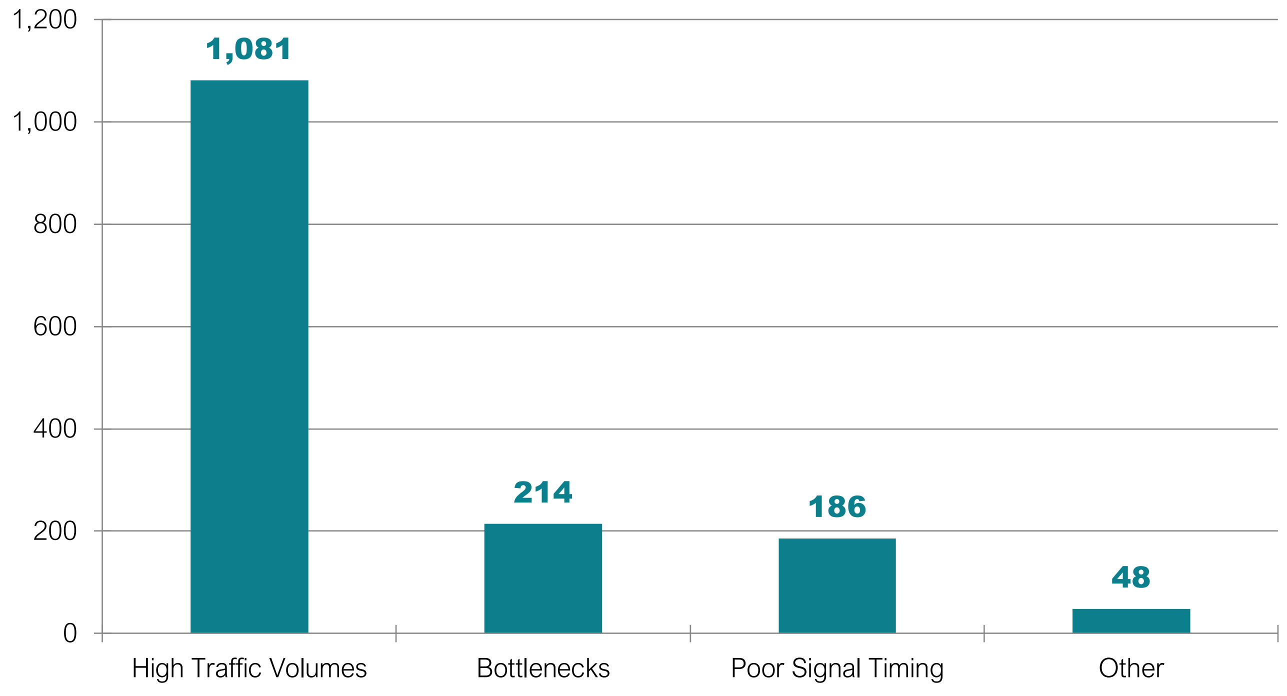
Mapping Congestion



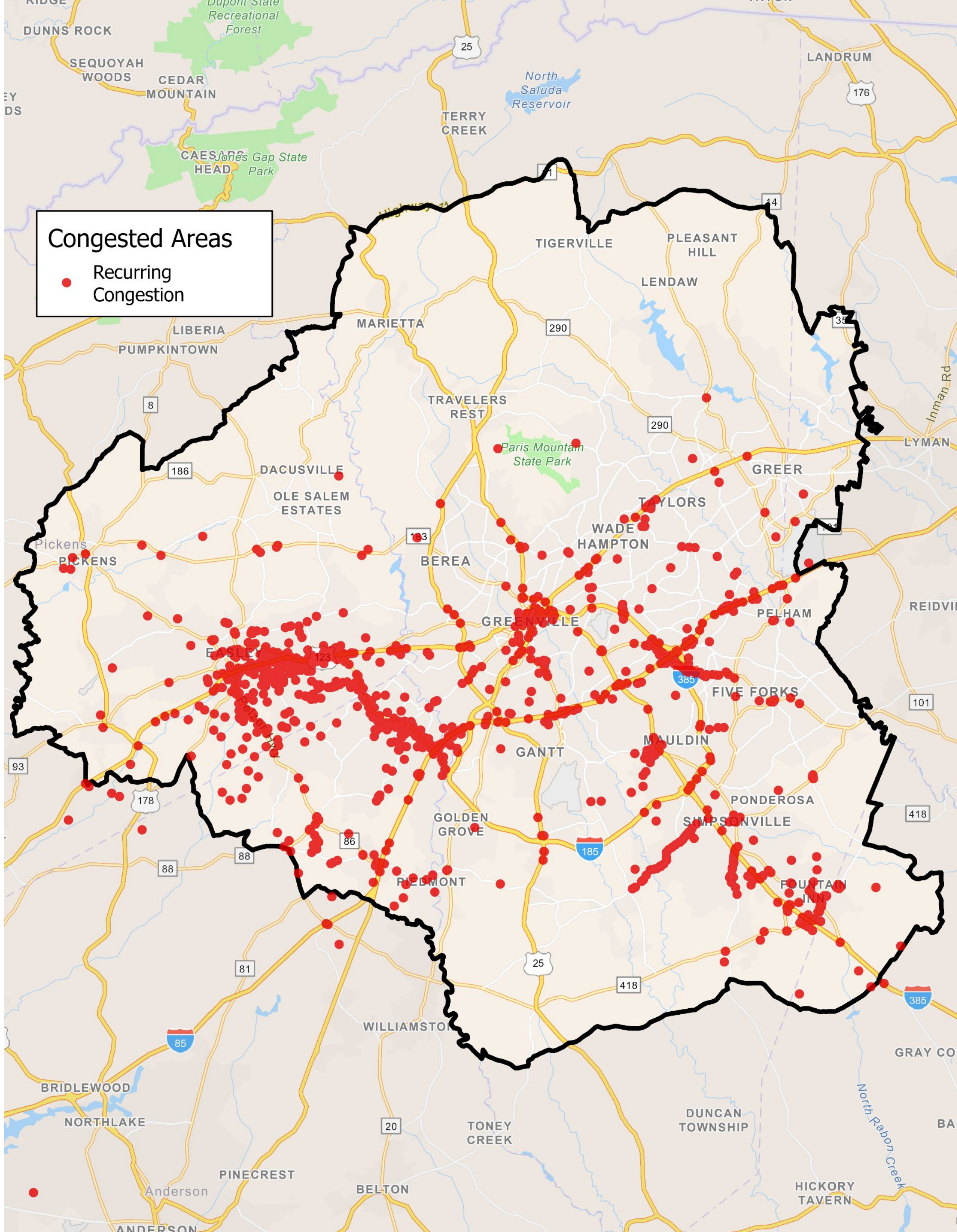
- **Recurring Congestion** is the **dominant type** of congestion that was mapped in the region.
- **Congestion concerns are concentrated** in Easley, Powdersville, Fountain Inn, Greenville, and Mauldin
- **Congested corridors include** I-85, US 123, Hwy 153, Pelzer Hwy, Woodruff Rd, W Butler Rd, Milacron Dr, N Main St and Fairview Rd



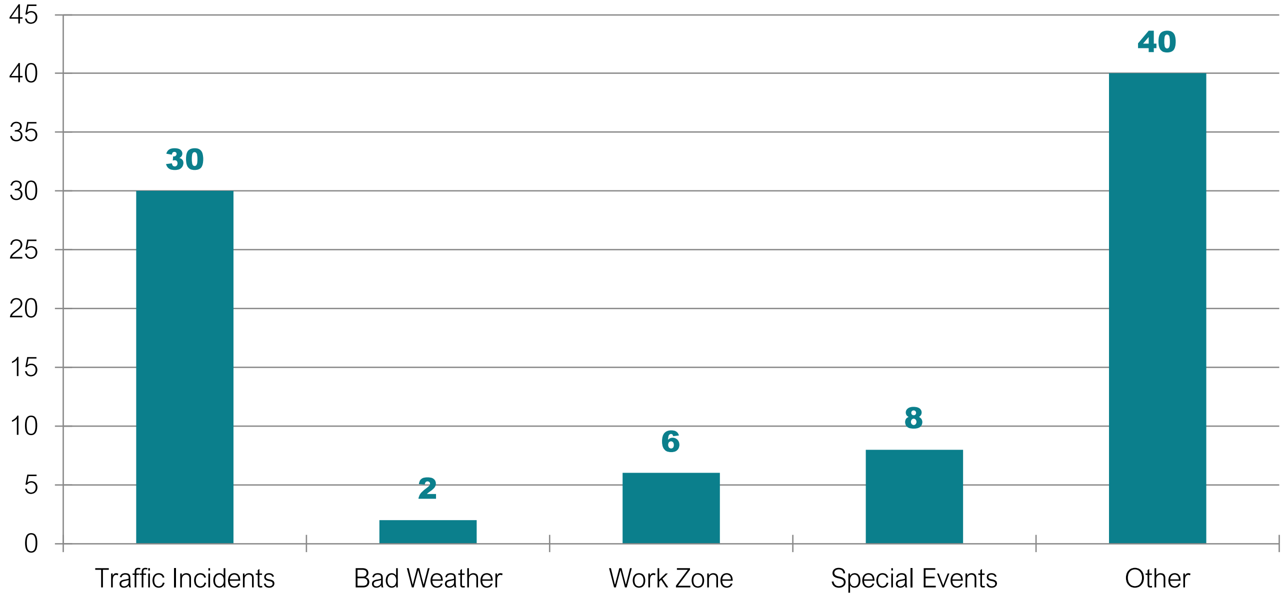
Recurring Congestion



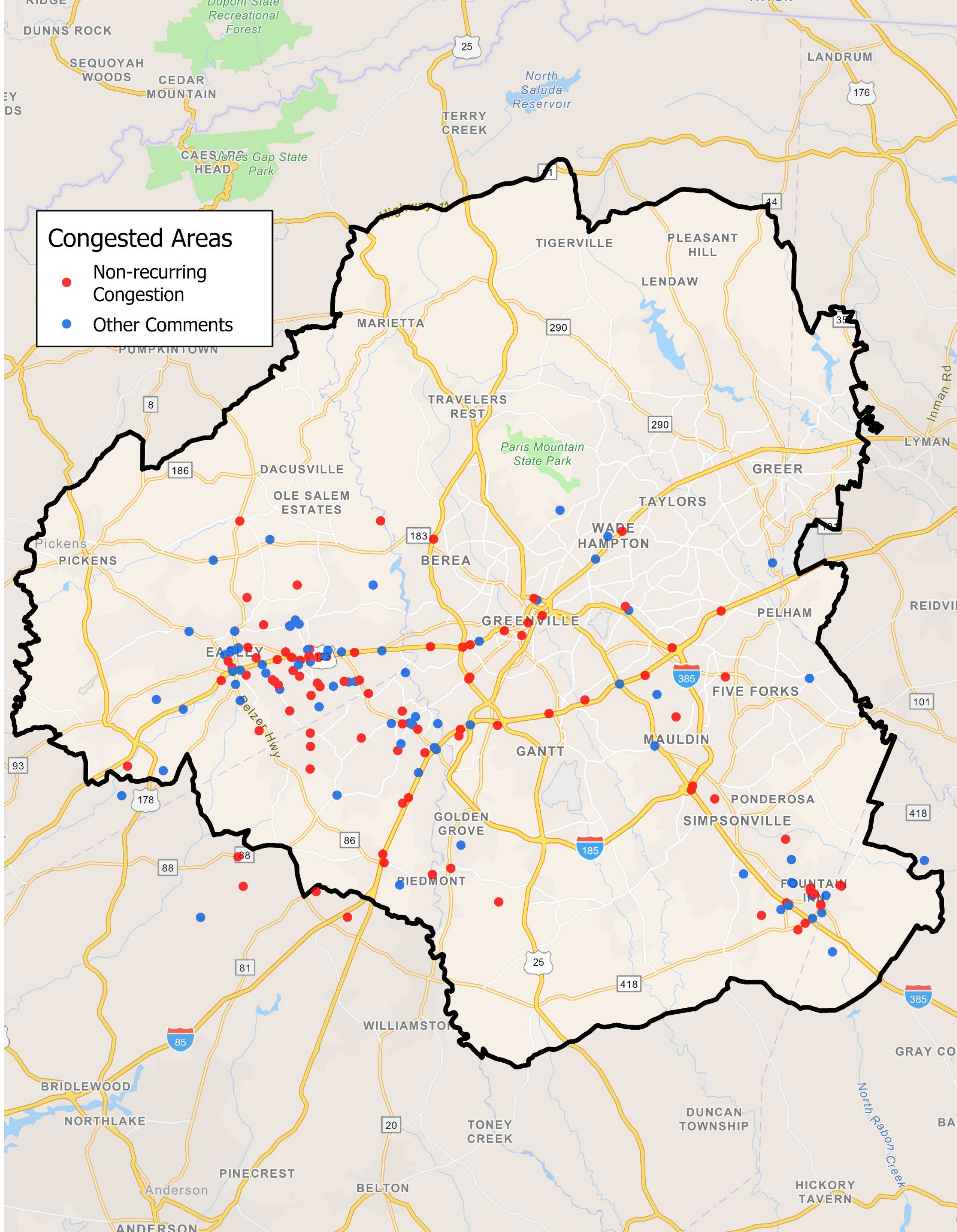
- **High Traffic Volumes** is the **dominant reason** for recurring congestion.
- Recurring Congestion is **concentrated** in Easley, Greenville, and Powdersville
- **Congested corridors include** I-385, I-85, Hwy 153, Hwy 146, US 123, US 29, West Georgia Rd, and Fairview Rd
- **Common other comments:** Poor intersection design and traffic lights needed



Non-recurring Congestion



- **Traffic Incidents** were noted as the **dominant reason** for non-recurring congestion
- Participant mapped non-recurring congestion concerns are **concentrated** in Easley, Powdersville, Fountain Inn and Greenville
- **Congested corridors of concern include** I-85, US 123, Powdersville Rd, Brushy Creek Rd, and N Main St
- **Common other comments:** Lack of turn lanes/off ramps, roads not wide enough, school traffic and too many oversized vehicles

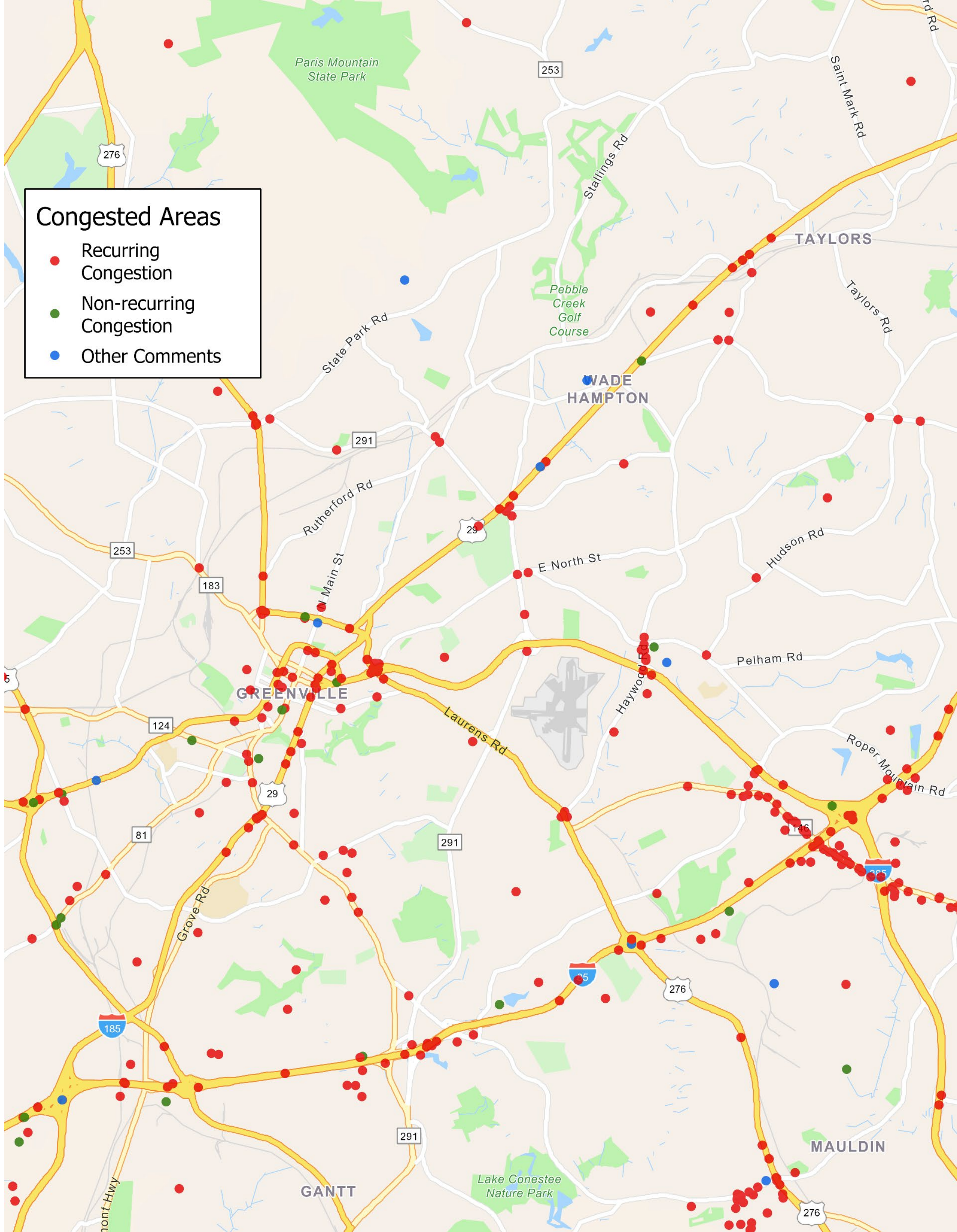


Greenville Area

- **Recurring congestion** is the **dominant** type of congestion mapped by participants in Greenville.
- Recurring congestion was most often mapped along:
  - US 29
  - I-85
  - Woodruff Rd
  - Haywood Rd
  - Augusta St
  - Interchange at Laurens Rd & I-395
- Some areas of non-recurring congestion noted were:
  - Easley Bridge Rd (US 123)
  - I-85
  - Anderson St
  - US 29

Common Comments:

- Frequent **construction** slows traffic
- Redesign intersections with **roundabouts** and **new signals**
- **Standstill traffic** during **peak AM** and **PM** hours

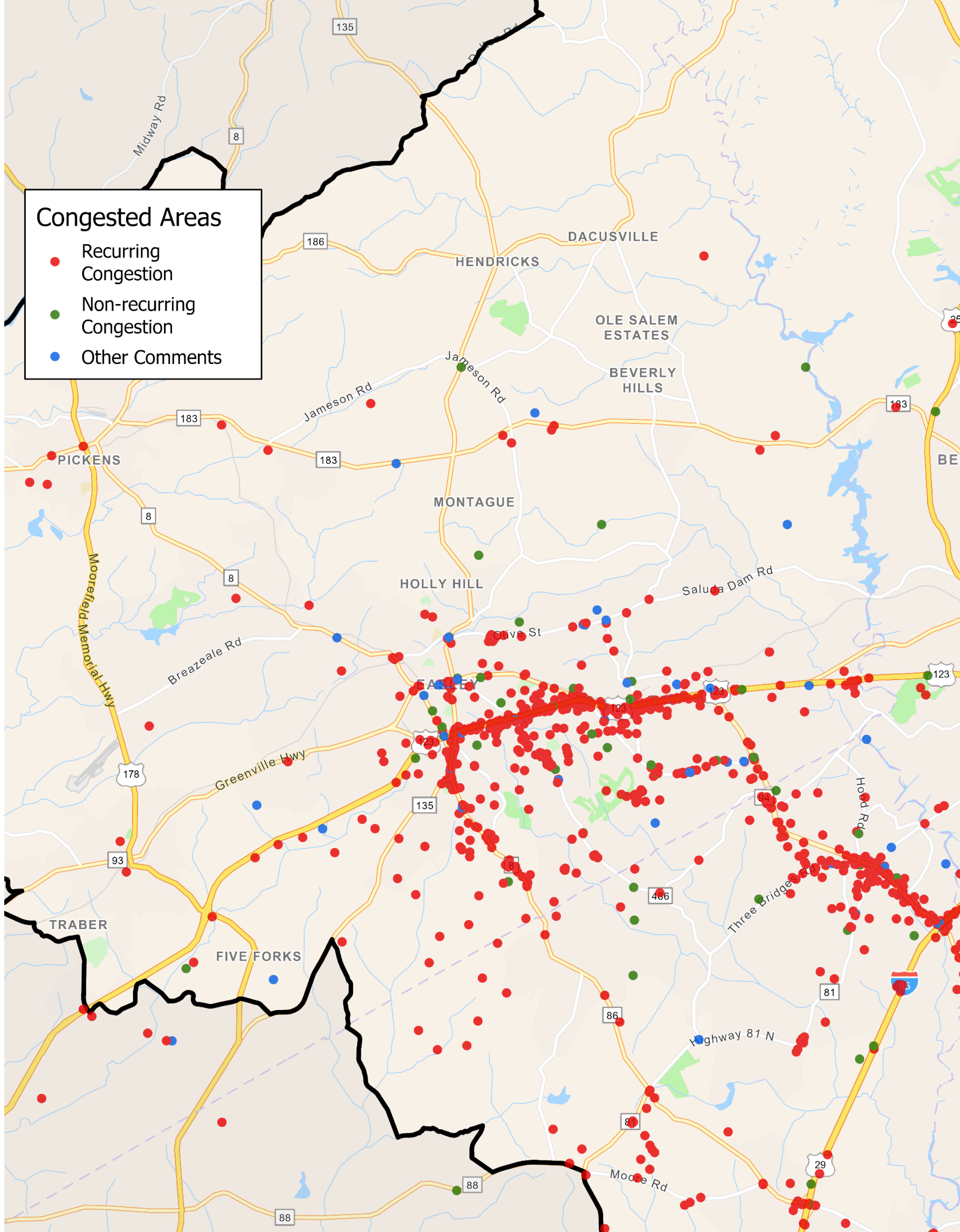


Easley/Pickens/-Powdersville

- **Recurring congestion** is the **dominant** type of congestion mapped by participants in the area.
- Recurring congestion was most often mapped along:
  - US 123
  - Hwy 153
  - Pelzer Hwy
  - I-85
  - Powdersville Rd
  - Saluda Dam Rd/Olive St
- Some areas of non-recurring congestion noted were:
  - US 123
  - Brush Creek Rd
  - I-85
  - Powdersville Rd
  - Hwy 153
  - Olive St

<u>Common Comments:</u>

- Improve **intersections** and expand use of **left turn lanes**
- **School** traffic causes increased congestion
- **Expand lanes** on highways
- **Rapid development** with inadequate road infrastructure

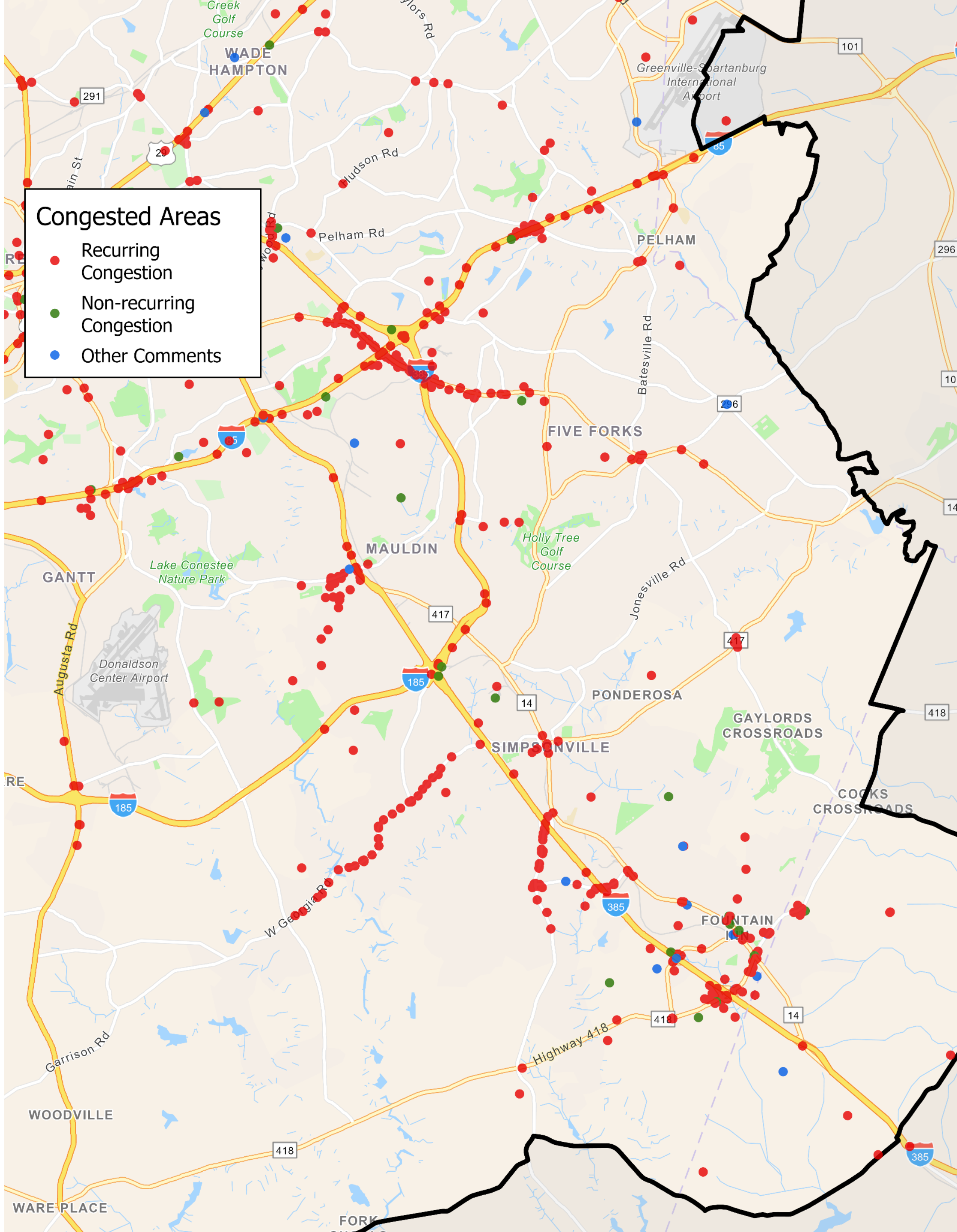


Mauldin/Simpsonville/ Fountain Inn

- **Recurring congestion** is the **dominant** type of congestion mapped by participants in the area.
- Recurring congestion was most often mapped along:
  - W Georgia Rd
  - Fairview Rd
  - I-395
  - W Butler Rd
  - N Main St/SE Main St
  - Interchange at Milacron Dr & I-395
- Some areas of non-recurring congestion noted were:
  - N Main St
  - I-385
  - Interchange at I-185 & I-385
  - Interchange at Fairview St & I-385

<u>Common Comments:</u>

- Daily traffic backups at local **intersections** & **interchanges**
- Improve **signal timing** and **intersection design**
- **Rapid growth** bringing increased **traffic**
- **Safety concerns** and frequent **crashes** along roadways
- **School** traffic

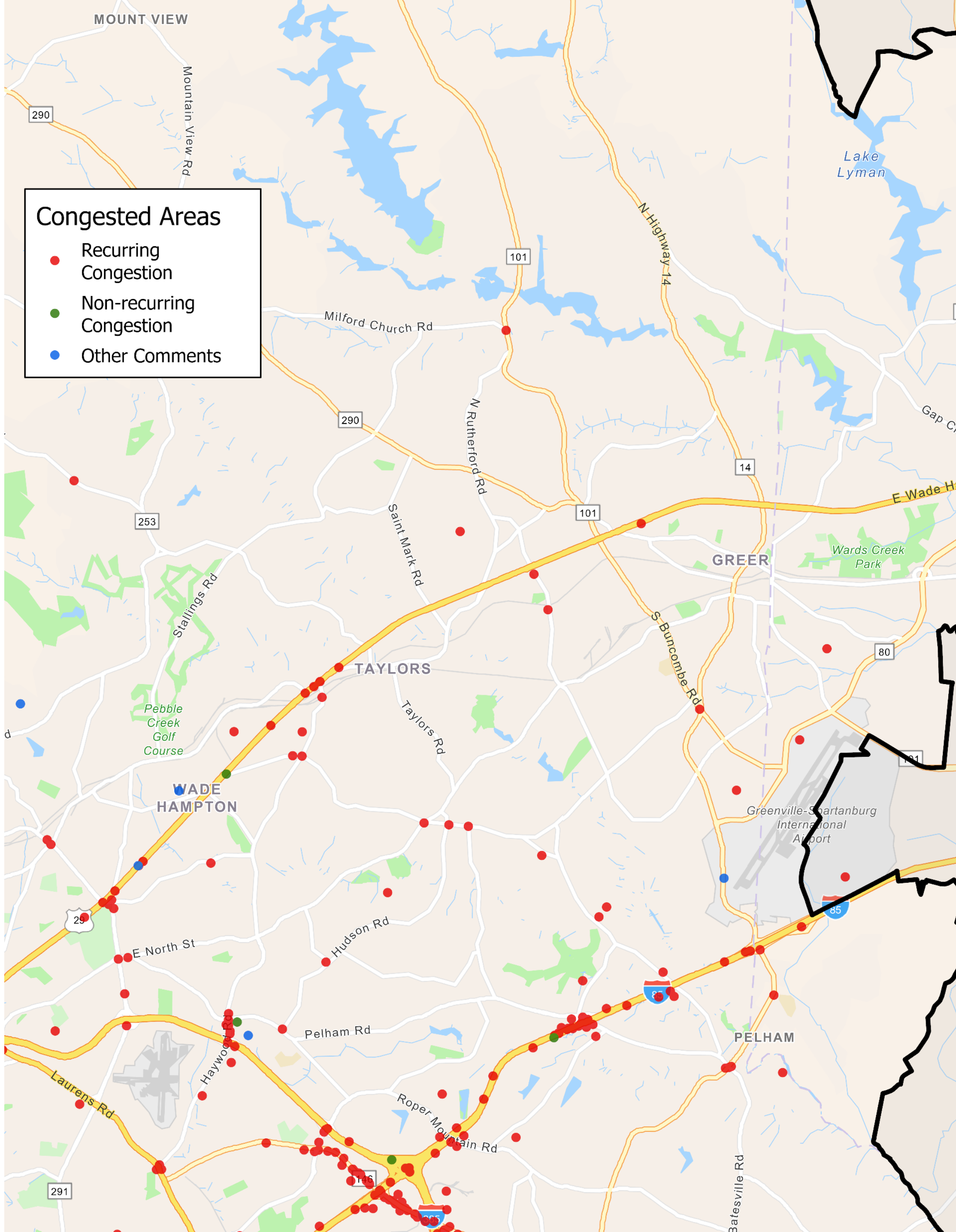


Greer & Taylors

- **Recurring congestion** is the **dominant** type of congestion mapped by participants in the area.
- Recurring congestion was most often mapped along:
  - I-85
  - US 29
  - Old Spartanburg Rd
  - Haywood Rd
  - N Pleasantburg Dr
- Some areas of non-recurring congestion noted were:
  - I-85
  - US 29
  - Orchard Park Dr

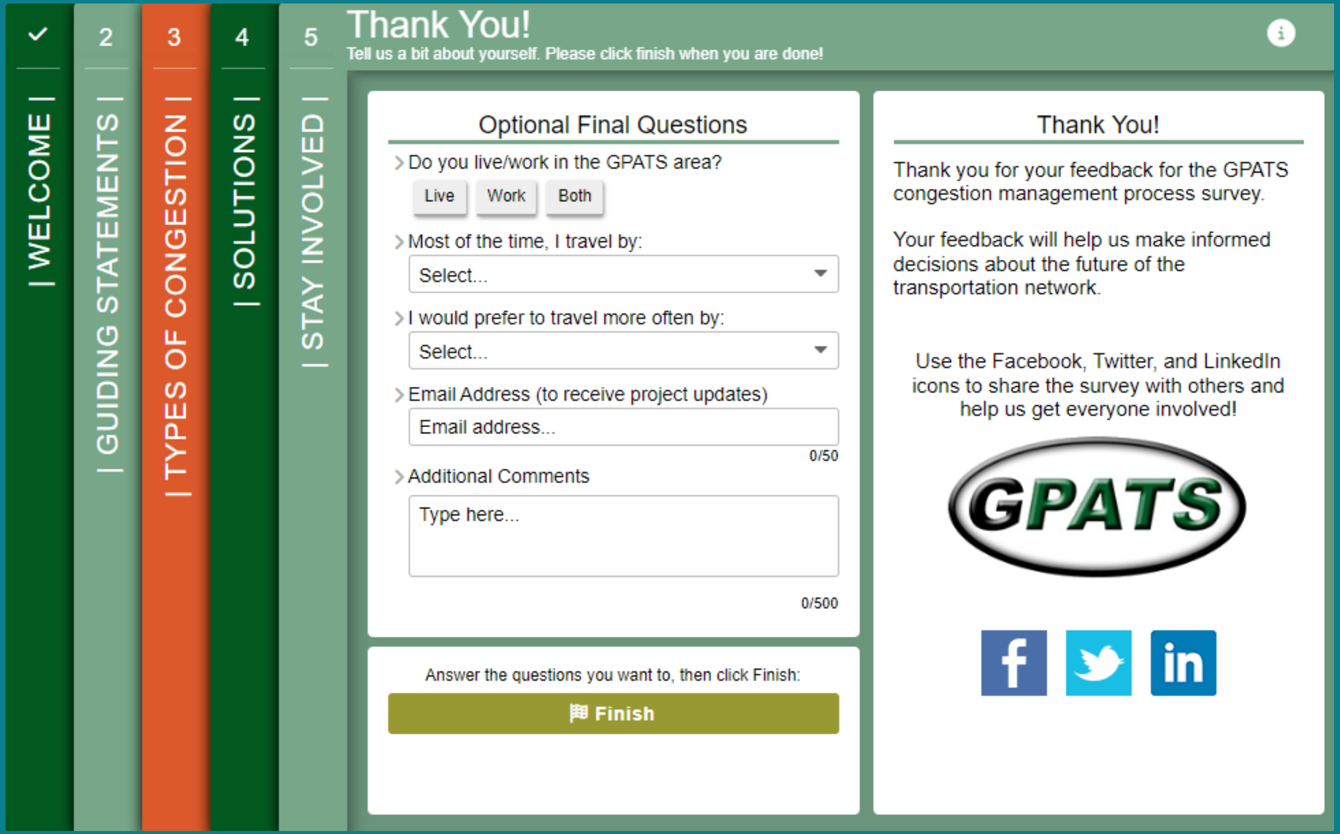
<u>Common Comments:</u>

- Improve **signal timing** and **intersection designs**
- Various **bottlenecks** along local roads
- **Population growth** is generating increased **traffic volumes**
- **Standstill traffic** during **AM** and **PM peaks**



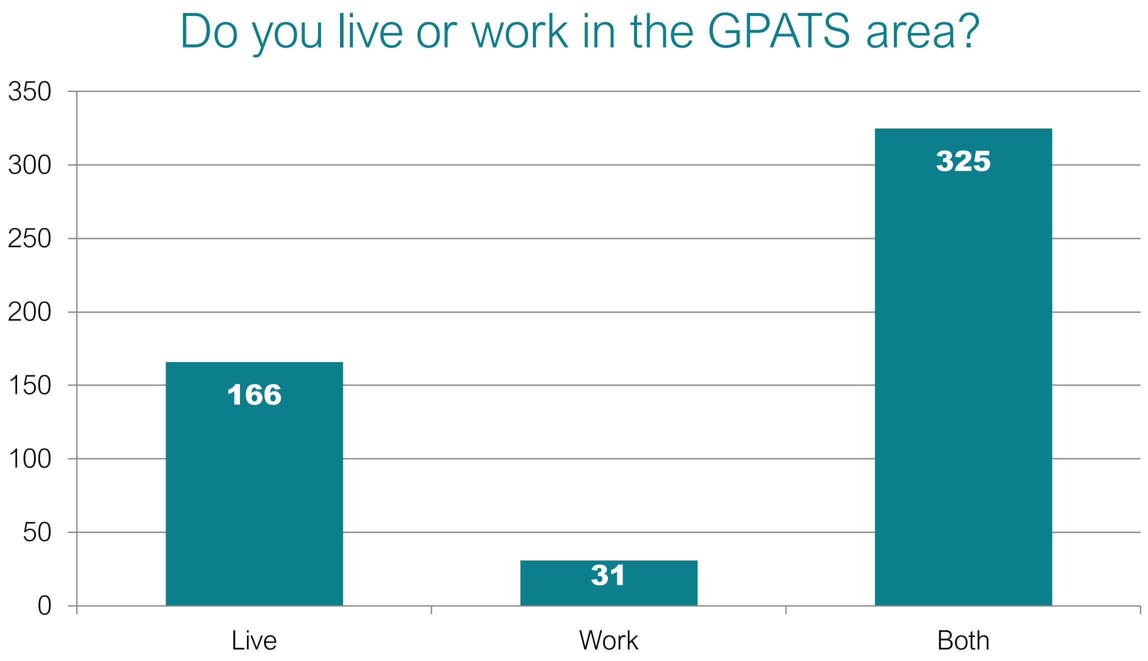
Participant Profile

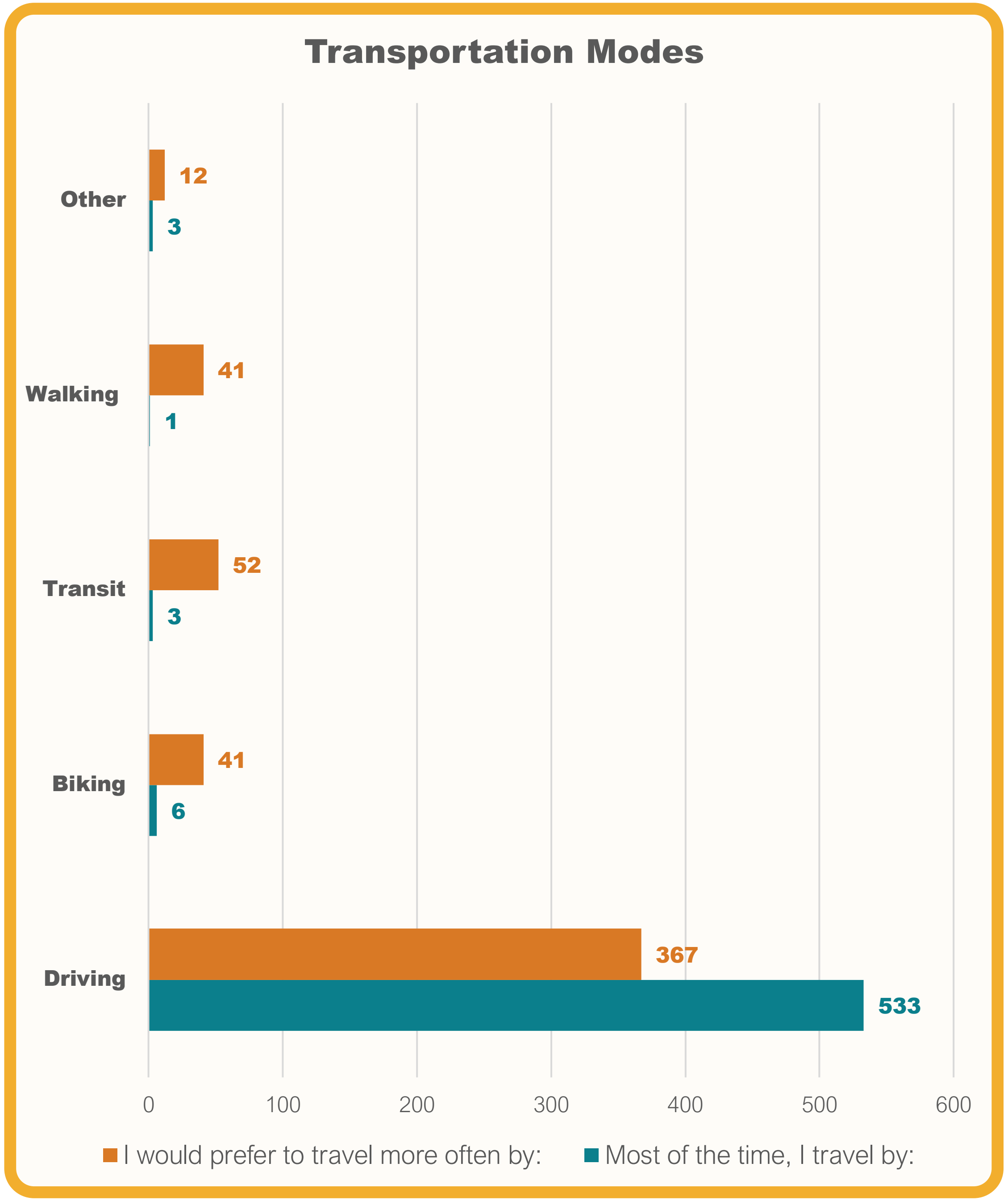
Tell us a bit about yourself



Participant Profile

- **Most** participants **live and work** in the GPATS area.
- Participants expressed a desire to **drive less** and use **alternative transportation** options more often.
- Using **transit** is the most popular alternative to driving. Participants also expressed a desire for more **walking** and **biking** options





GPATS

Congestion Management Plan

Online Engagement Summary #2

MetroQuest Survey

OVERVIEW

150 *online participants*

4,500+ *individual data points*

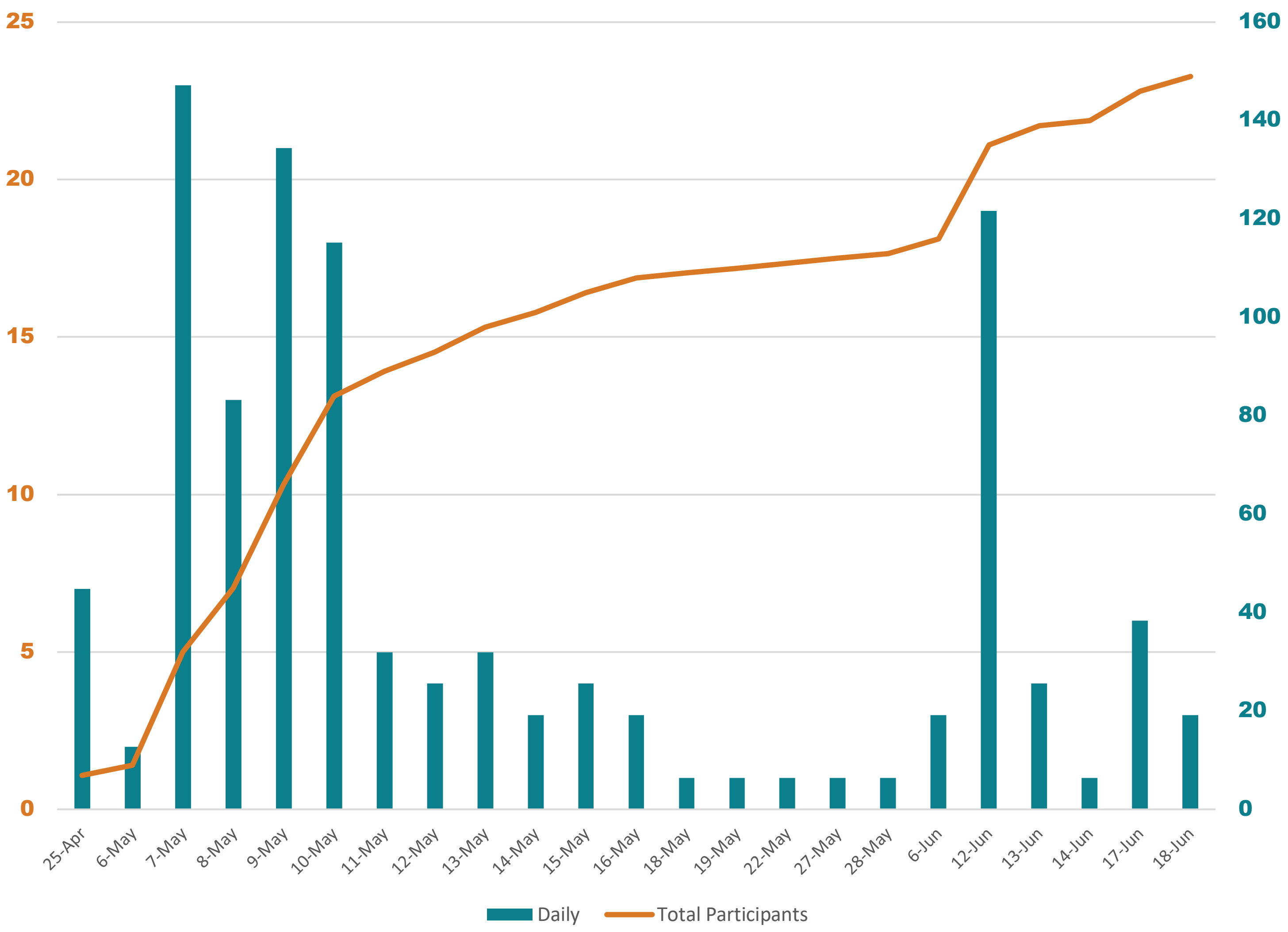
450+ *written comments*

Online engagement site designed to educate the public about the project and collect feedback using interactive and visual screens.

- Open from April 24, 2024 to June 18, 2024

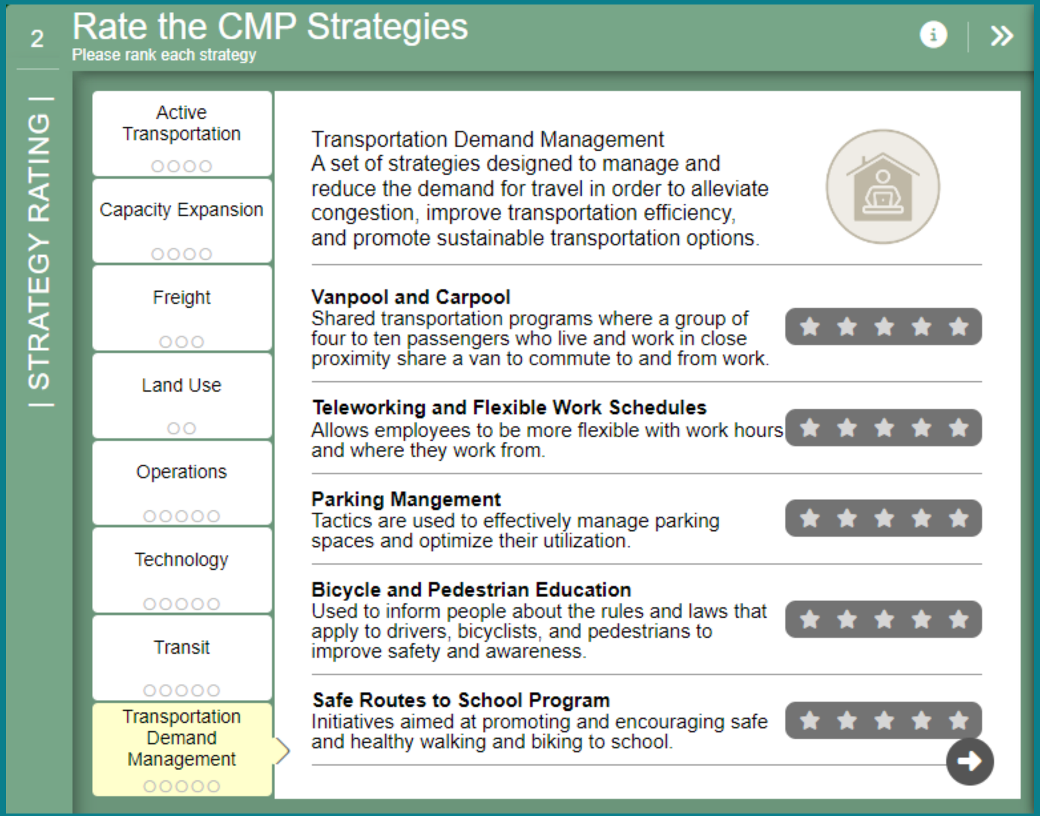
Project information provided on the "welcome" screen.

The survey asked participants to weigh in on strategies and locations that have recurrent congestion.

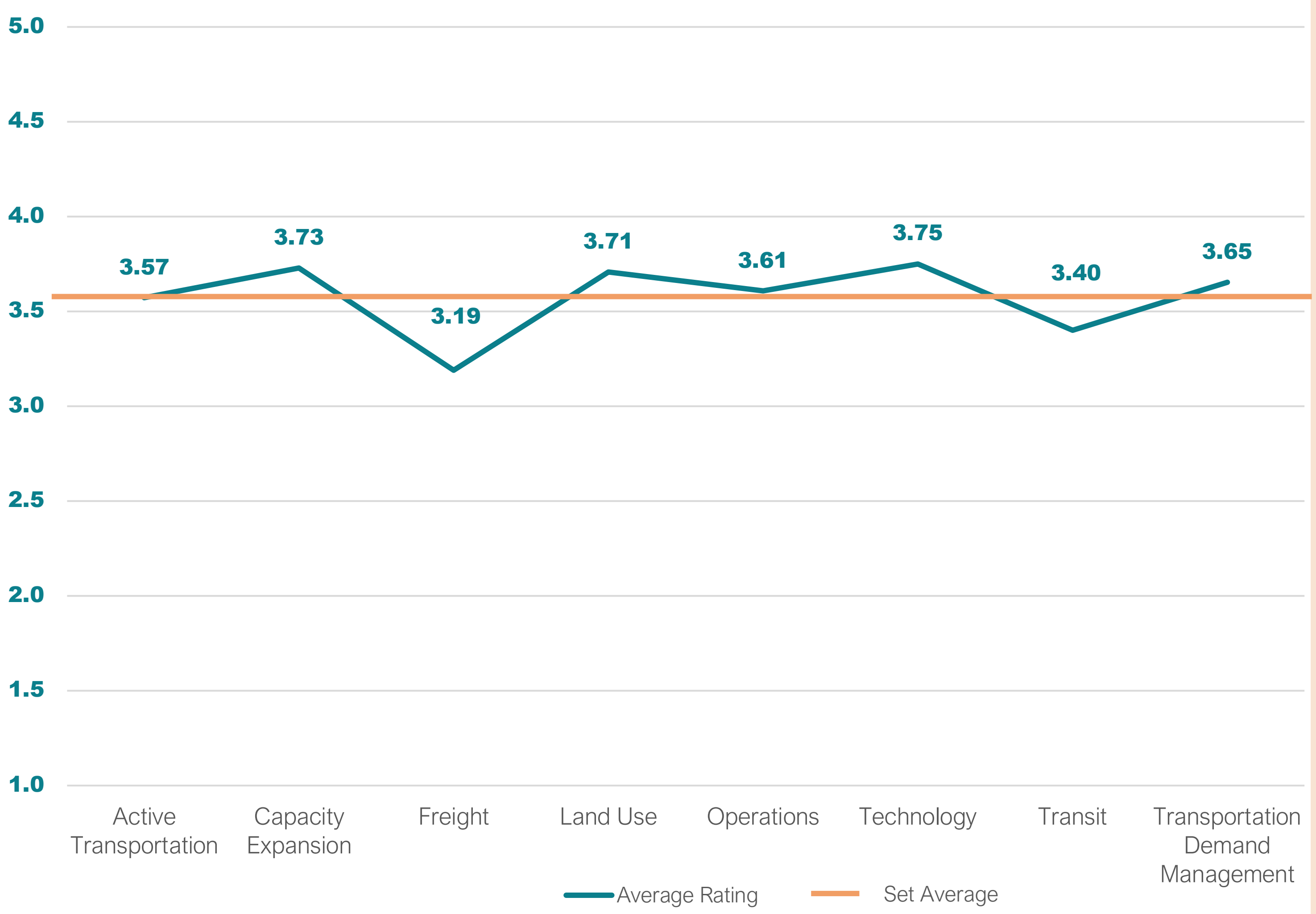


Strategy Rankings

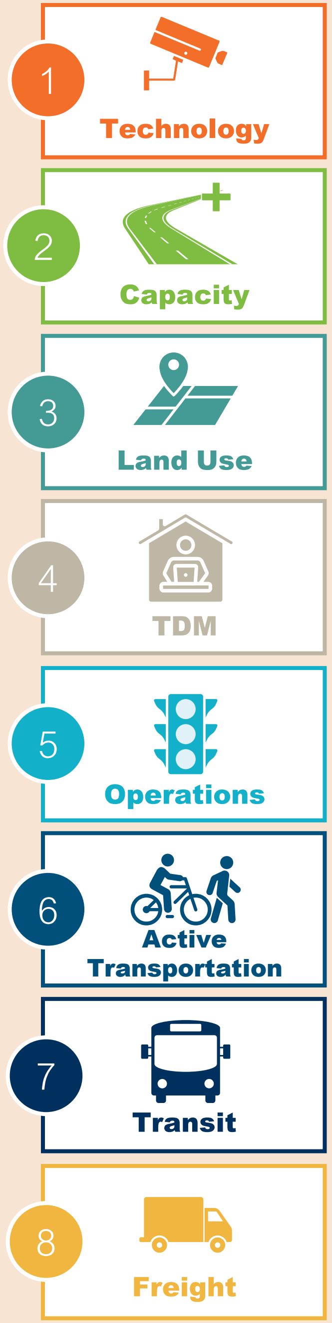
Help us rank each congestion strategy



Average Set Ranking



- The average strategy and strategy set had a ranking of 3.6 out of 5.0
- The highest ranked set of strategies are for **technology improvements**
- The lowest ranked set of strategies is for **freight**



Highest Rated Strategies

Traffic Signal Coordination	4.5
Walkways	4.2
Alternative Interchange Designs	4.2

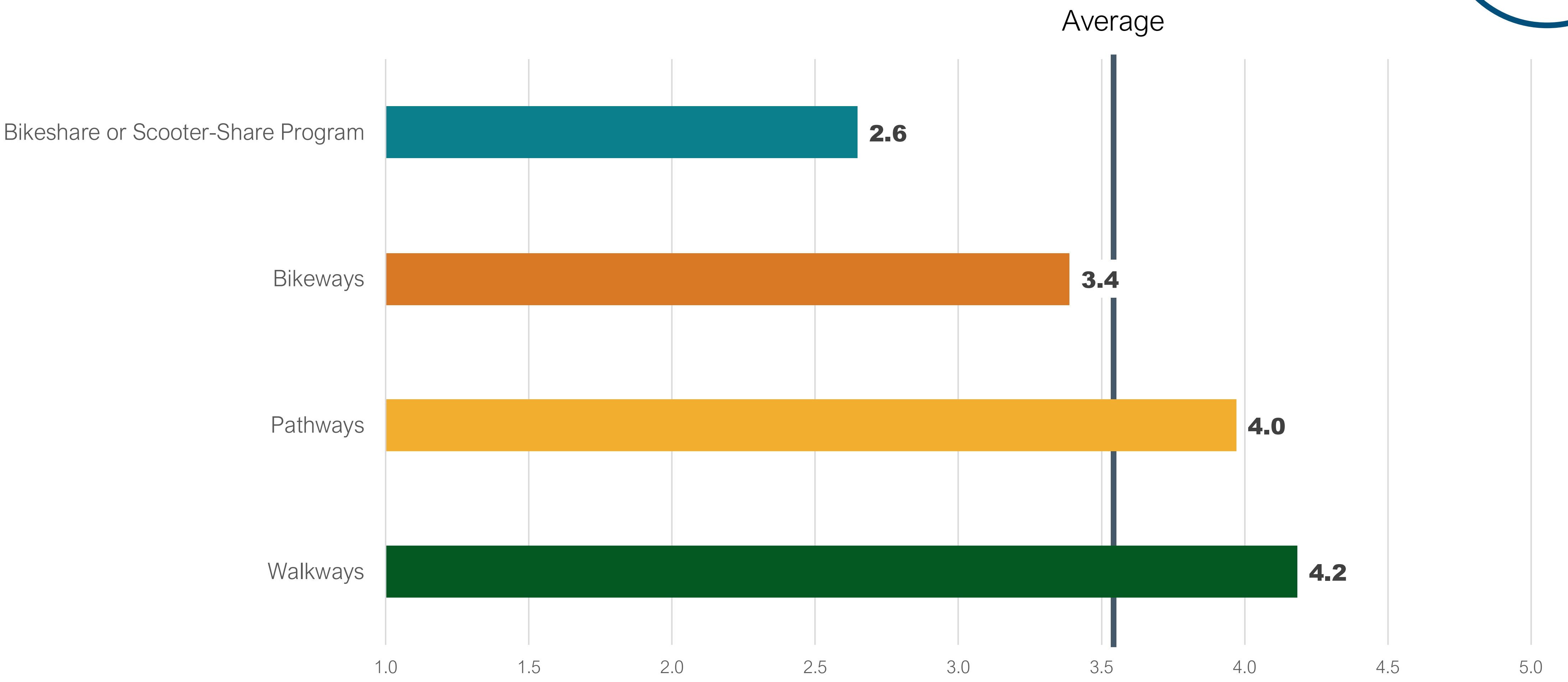
Lowest Rated Strategies

Bikeshare or Scooter Program 2.6

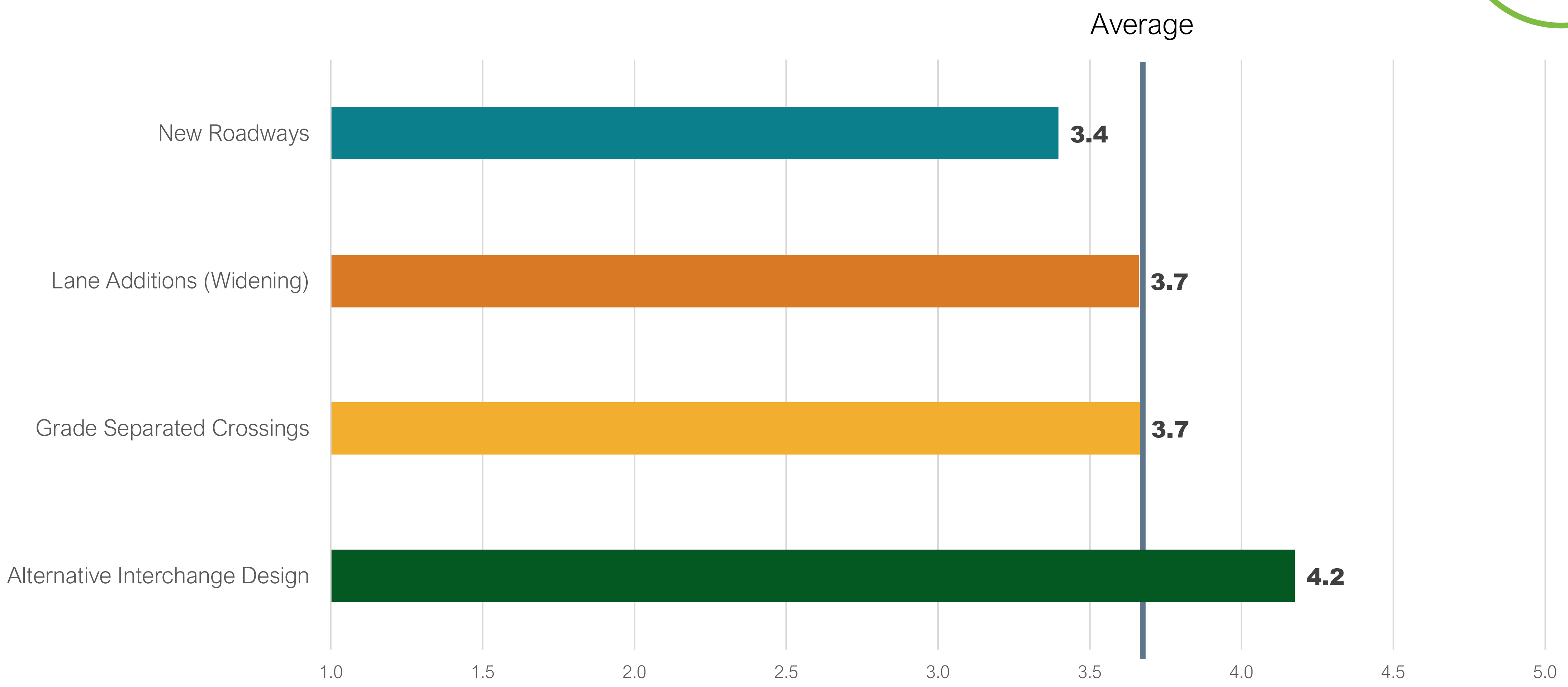
Managed Lanes 2.8

Vanpool and Carpool 2.9

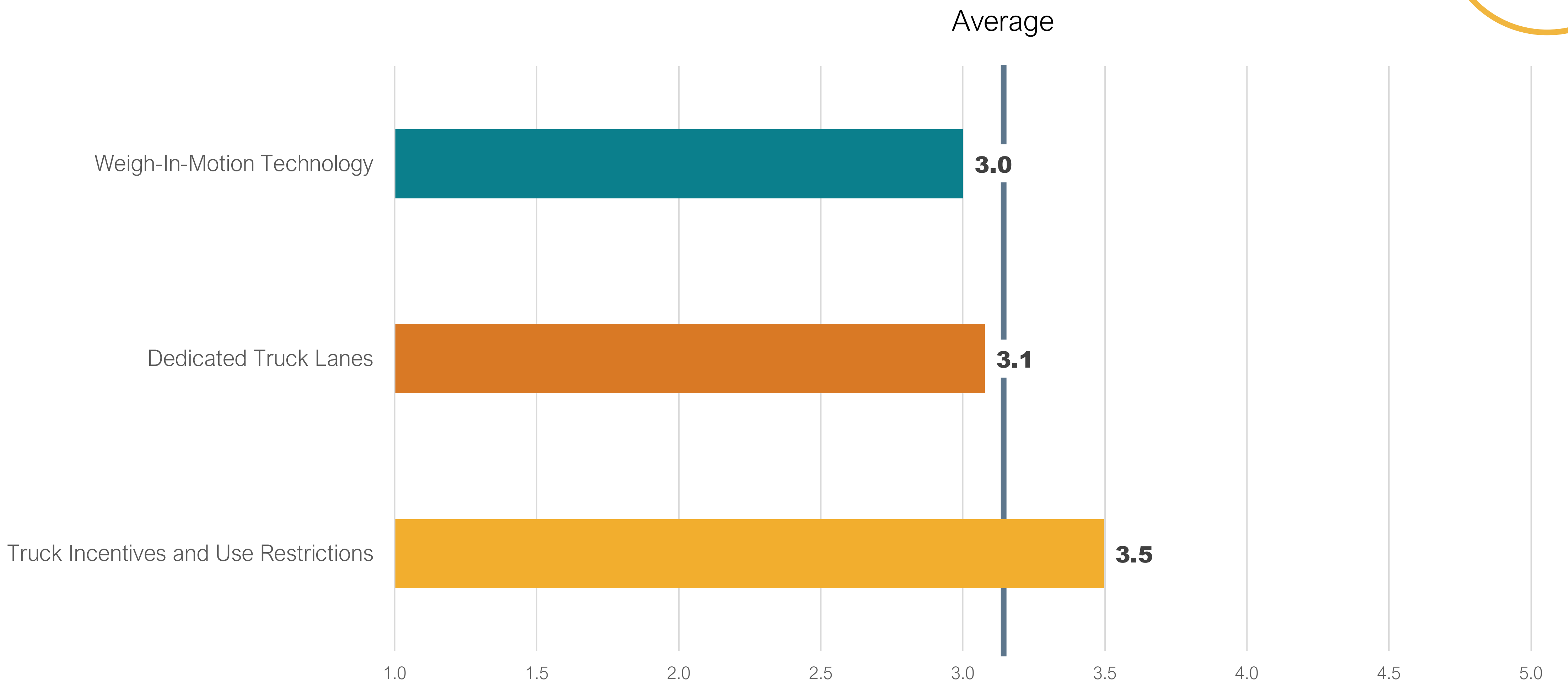
Active Transportation



Capacity Expansion

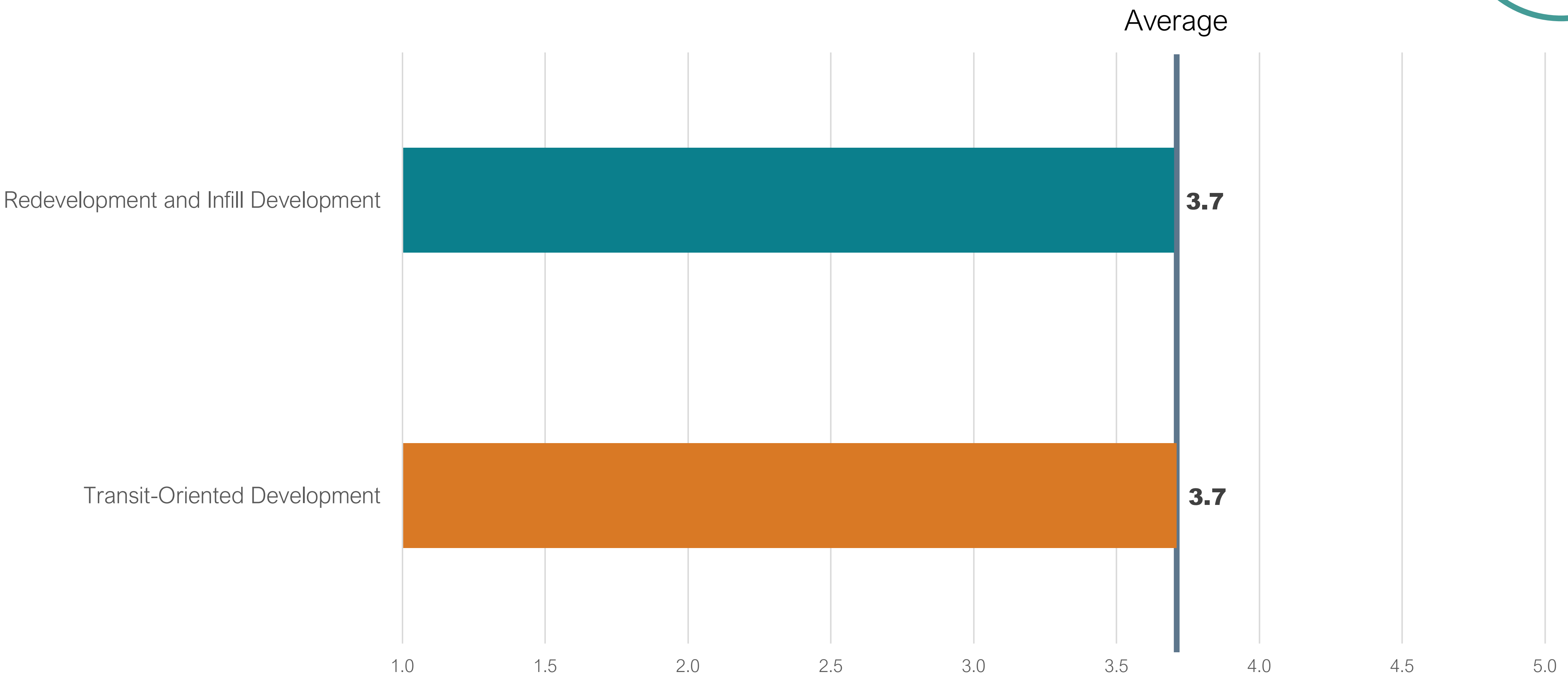


Freight



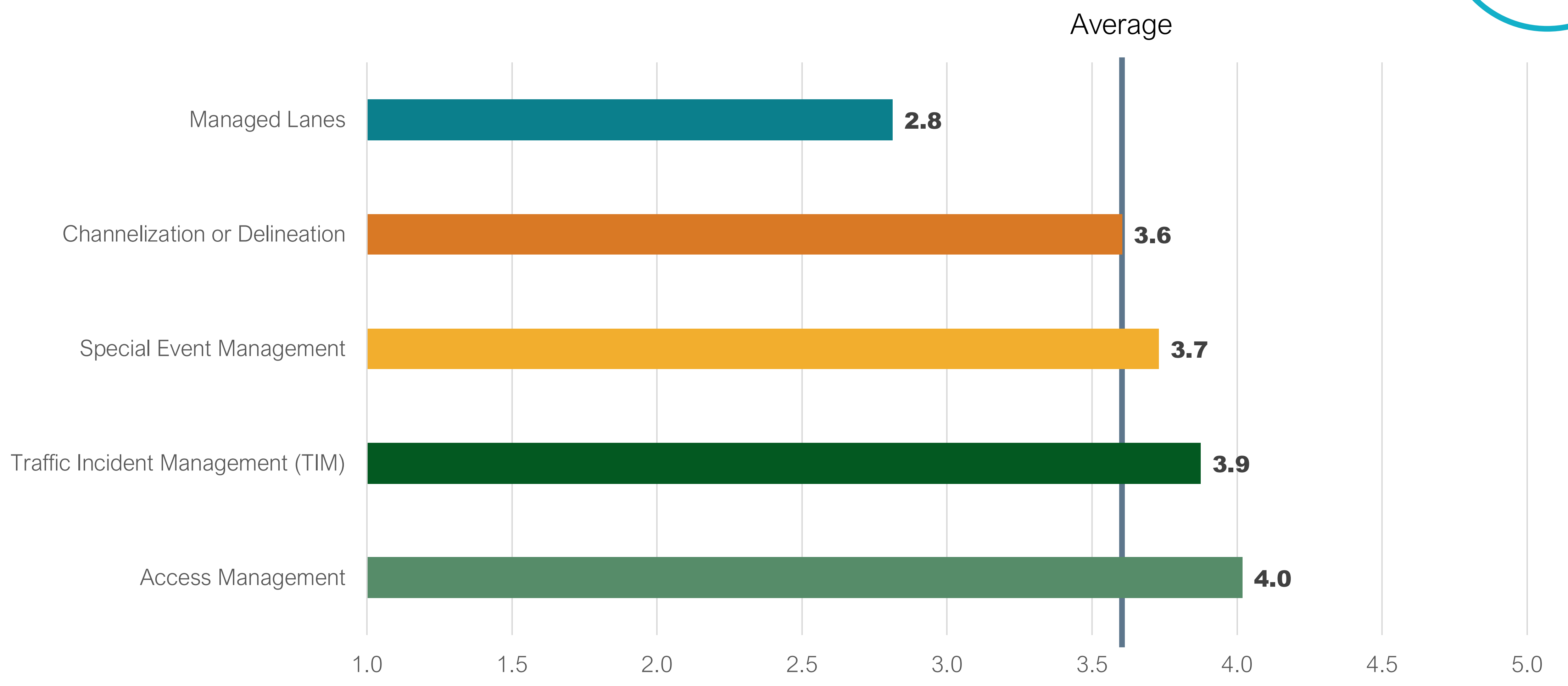
Average
Weigh-In-Motion Technology
3.0
Dedicated Truck Lanes
3.1
Truck Incentives and Use Restrictions
3.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0

Land Use



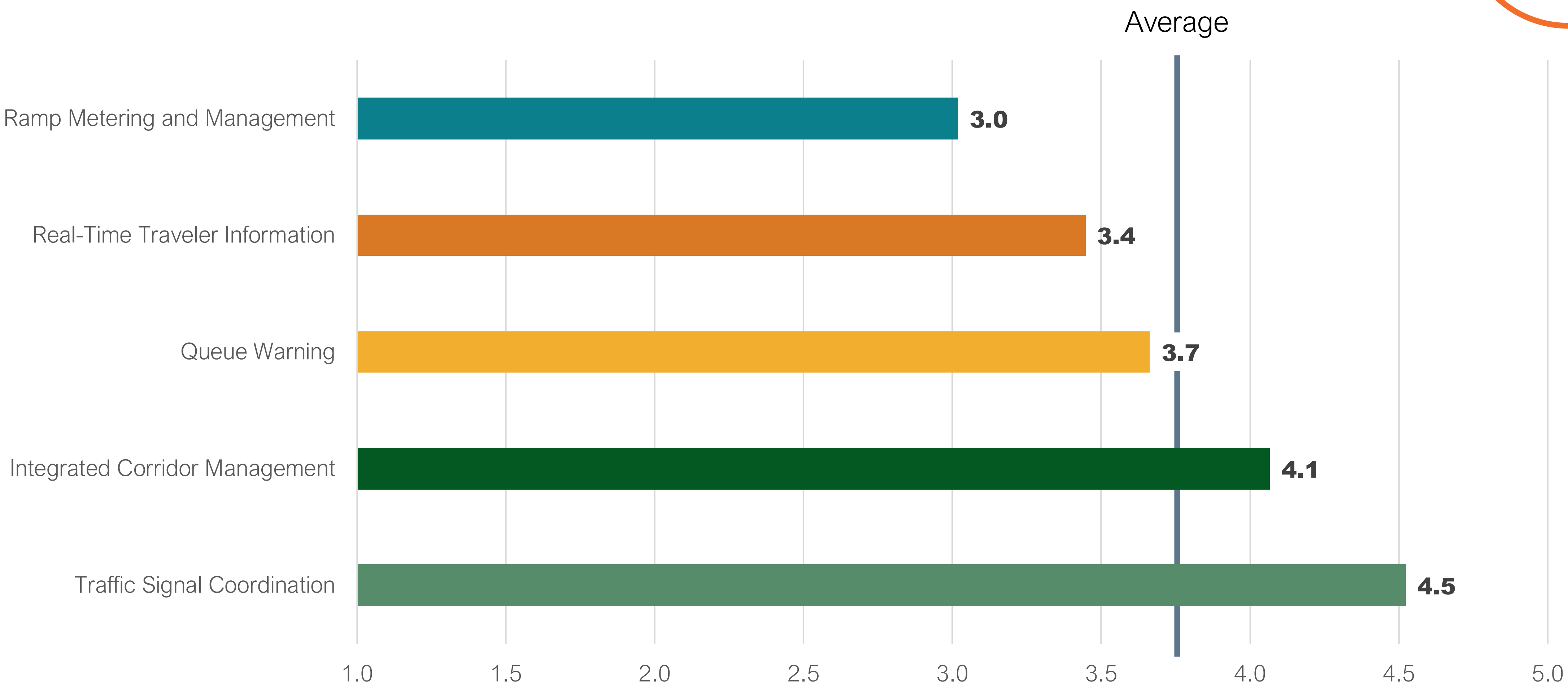
Average
Redevelopment and Infill Development
3.7
Transit-Oriented Development
3.7
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0

Operations



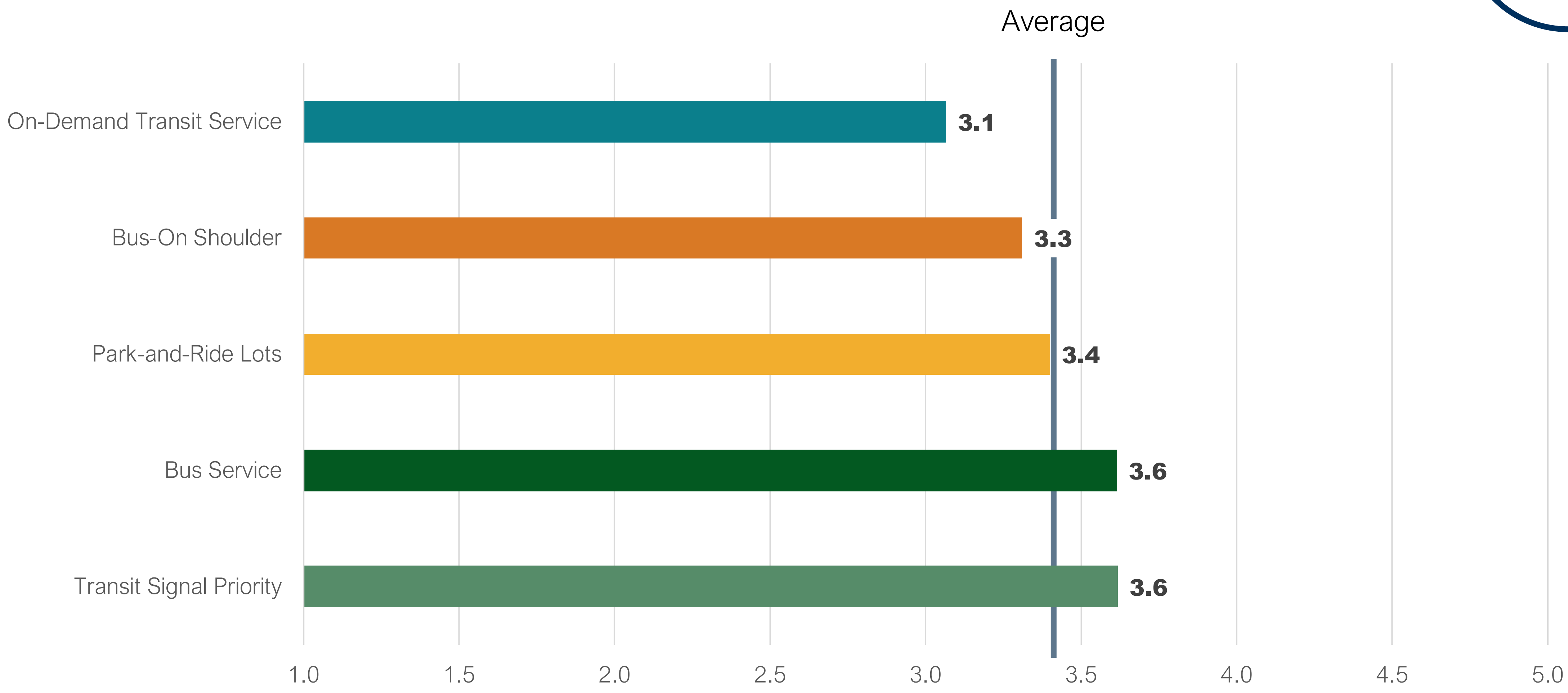
Average
Managed Lanes
2.8
Channelization or Delineation
3.6
Special Event Management
3.7
Traffic Incident Management (TIM)
3.9
Access Management
4.0
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0

Technology



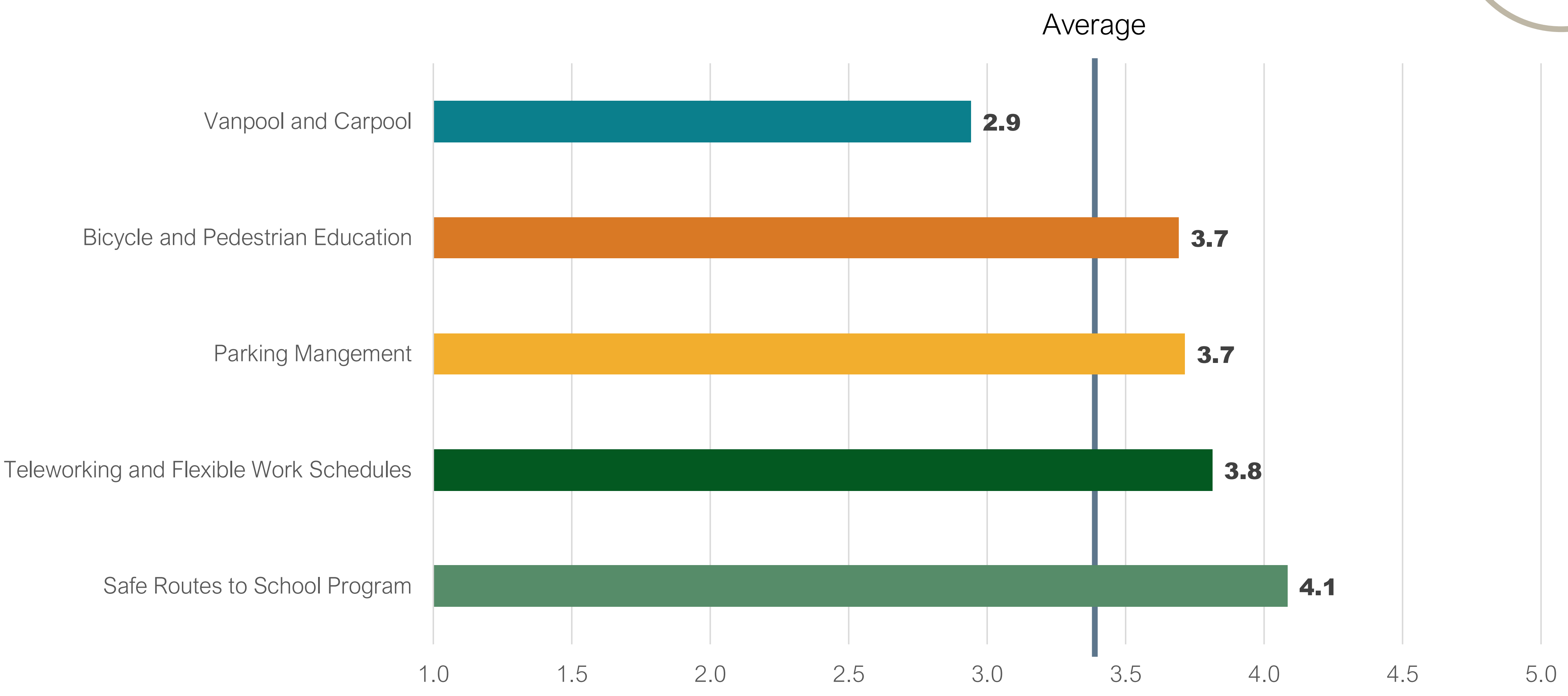
Average
Ramp Metering and Management
3.0
Real-Time Traveler Information
3.4
Queue Warning
3.7
Integrated Corridor Management
4.1
Traffic Signal Coordination
4.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0

Transit



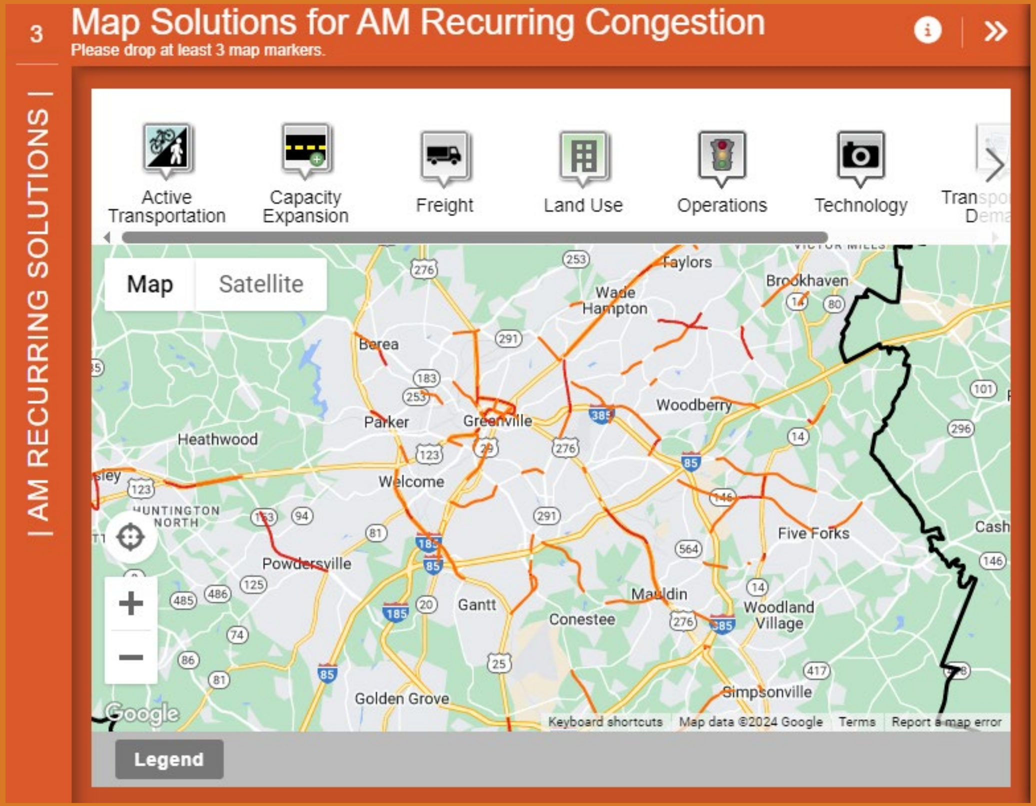
Average
On-Demand Transit Service
3.1
Bus-On Shoulder
3.3
Park-and-Ride Lots
3.4
Bus Service
3.6
Transit Signal Priority
3.6
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0

Transportation Demand Management



AM Congestion

Mapping solutions for the AM Peak



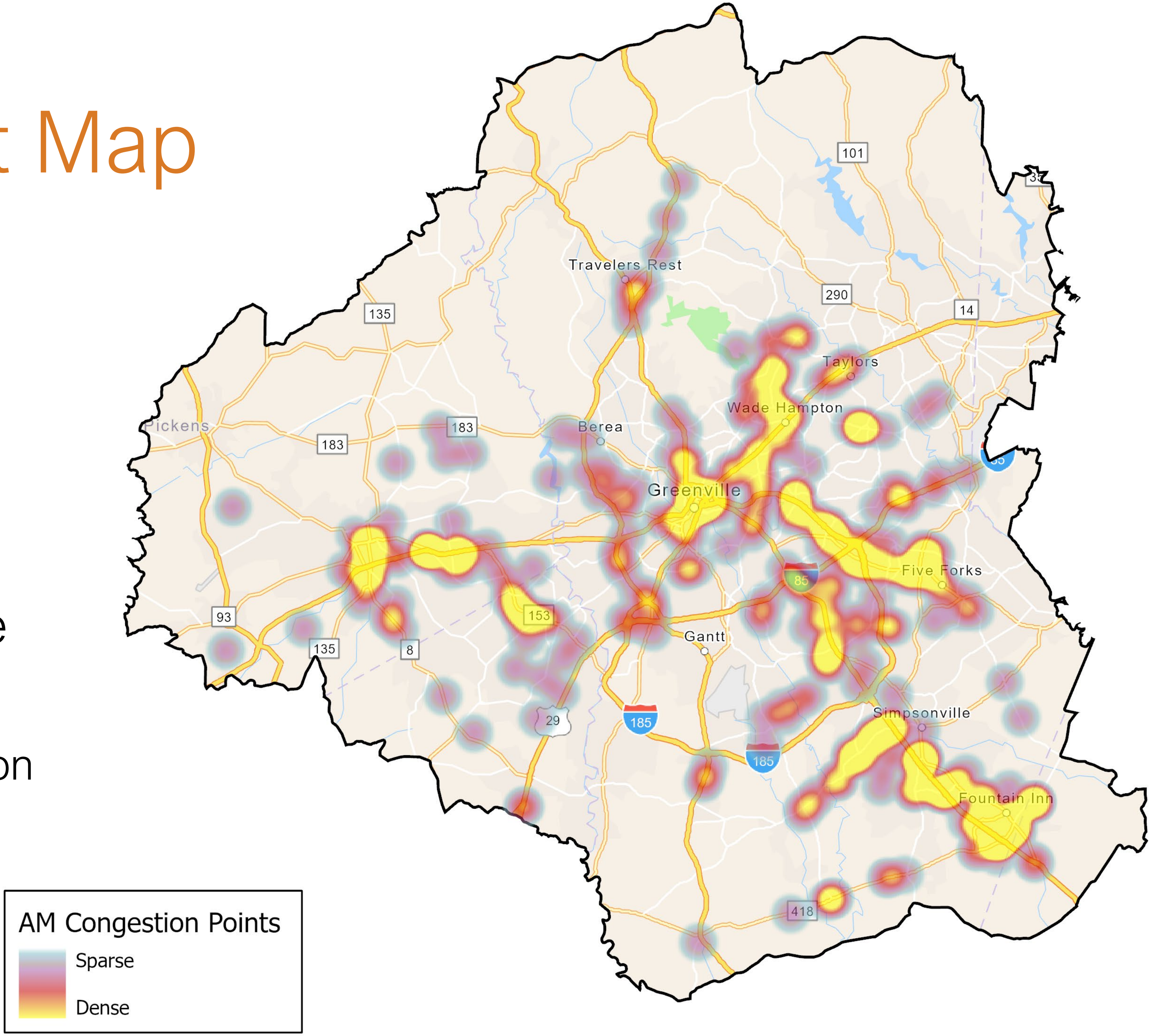
Comment Heat Map

Most comments were centered around:

- Fountain Inn
- Eastern Greenville
- Easley
- Wade Hampton

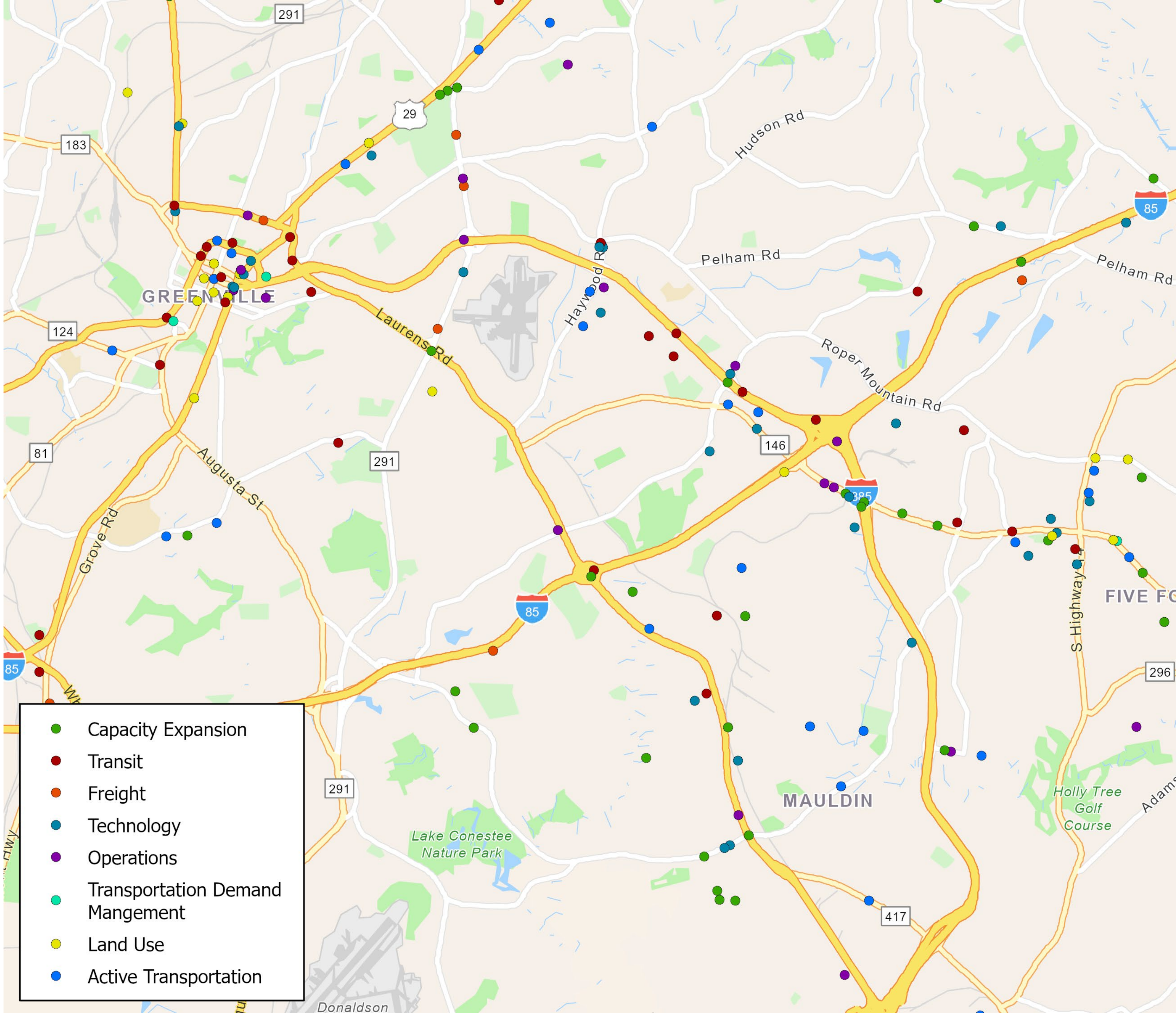
Region wide the top three strategies were:

- Lane additions
- Traffic signal coordination
- Alternative interchange designs



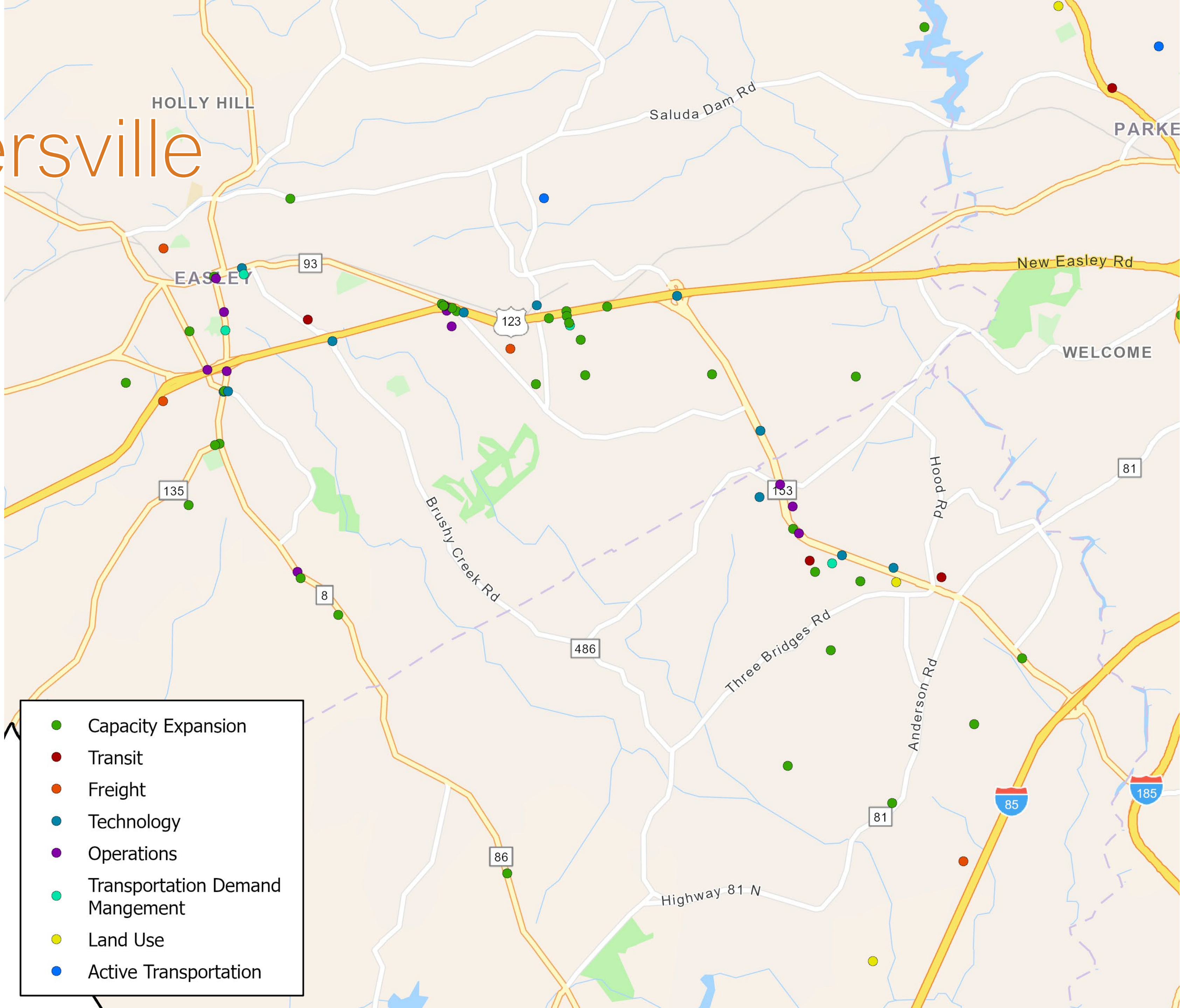
Greenville

- Downtown Greenville and Woodruff Rd got the most comments
- The most popular strategy is traffic signal coordination by a large margin
- In downtown signal coordination, TSP and TOD are the most popular strategies
- Signal coordination and new roadways are the most frequent strategies on Woodruff Rd



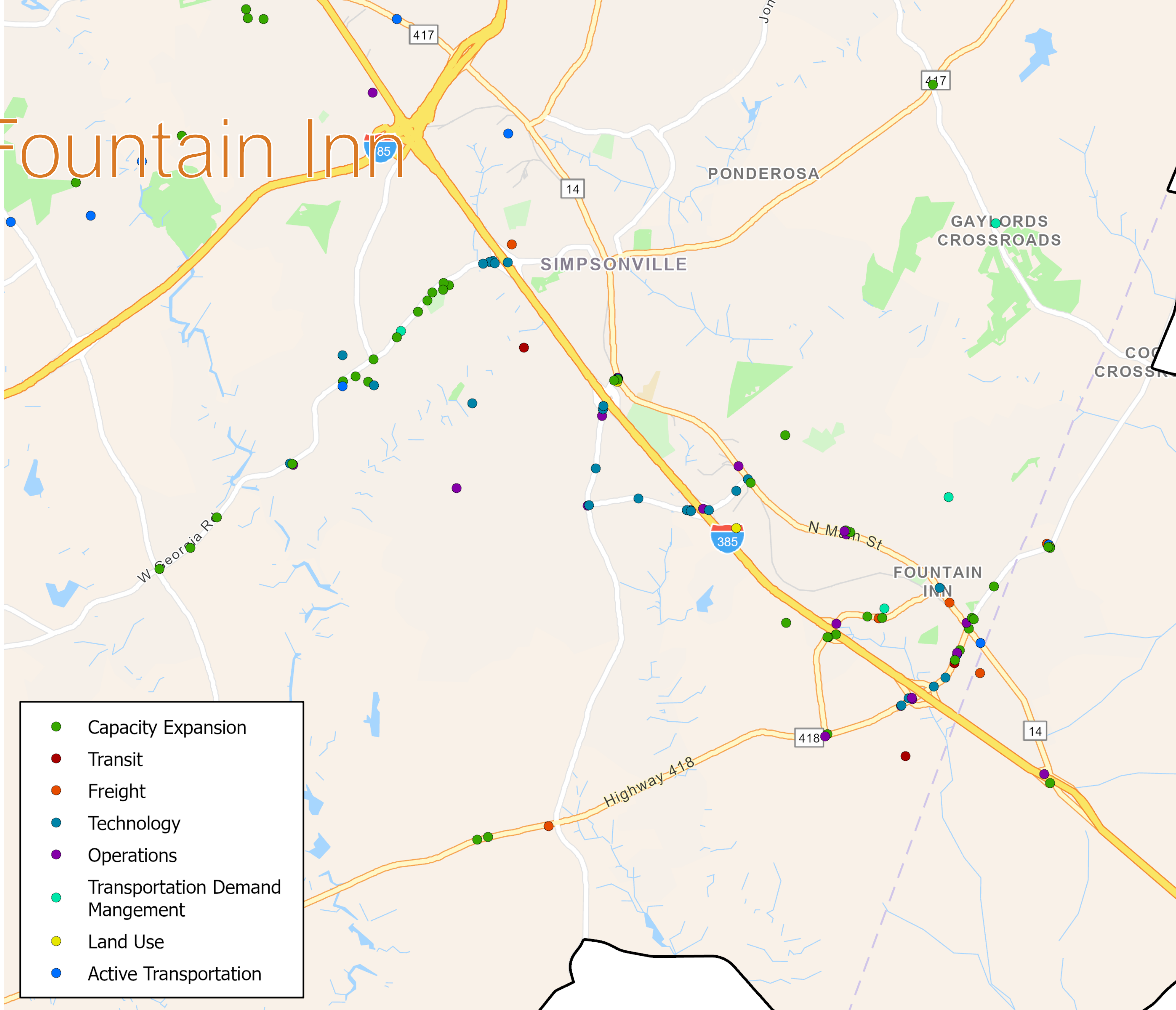
Easley/Powdersville

- Comments were mostly on US 123 and SC 8
- Minimal transit and land use recommendations
- Most common strategies were lane additions and alternative interchange design
- Many comments were centered on the US 123 and SC 93 intersection



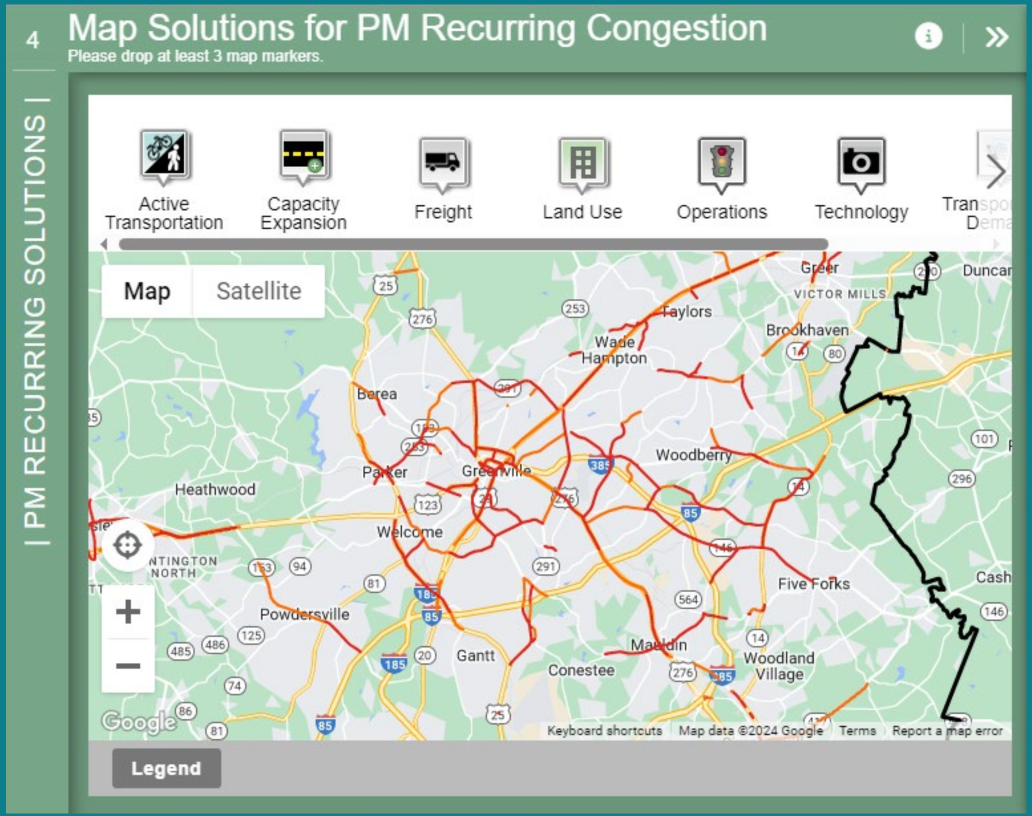
Simpsonville/Fountain Inn

- The two most popular corridors were W Georgia Rd and SC 413 east of I 385
- Most popular strategies were lane additions and signal coordination
- Minimal active transportation or land use suggestions



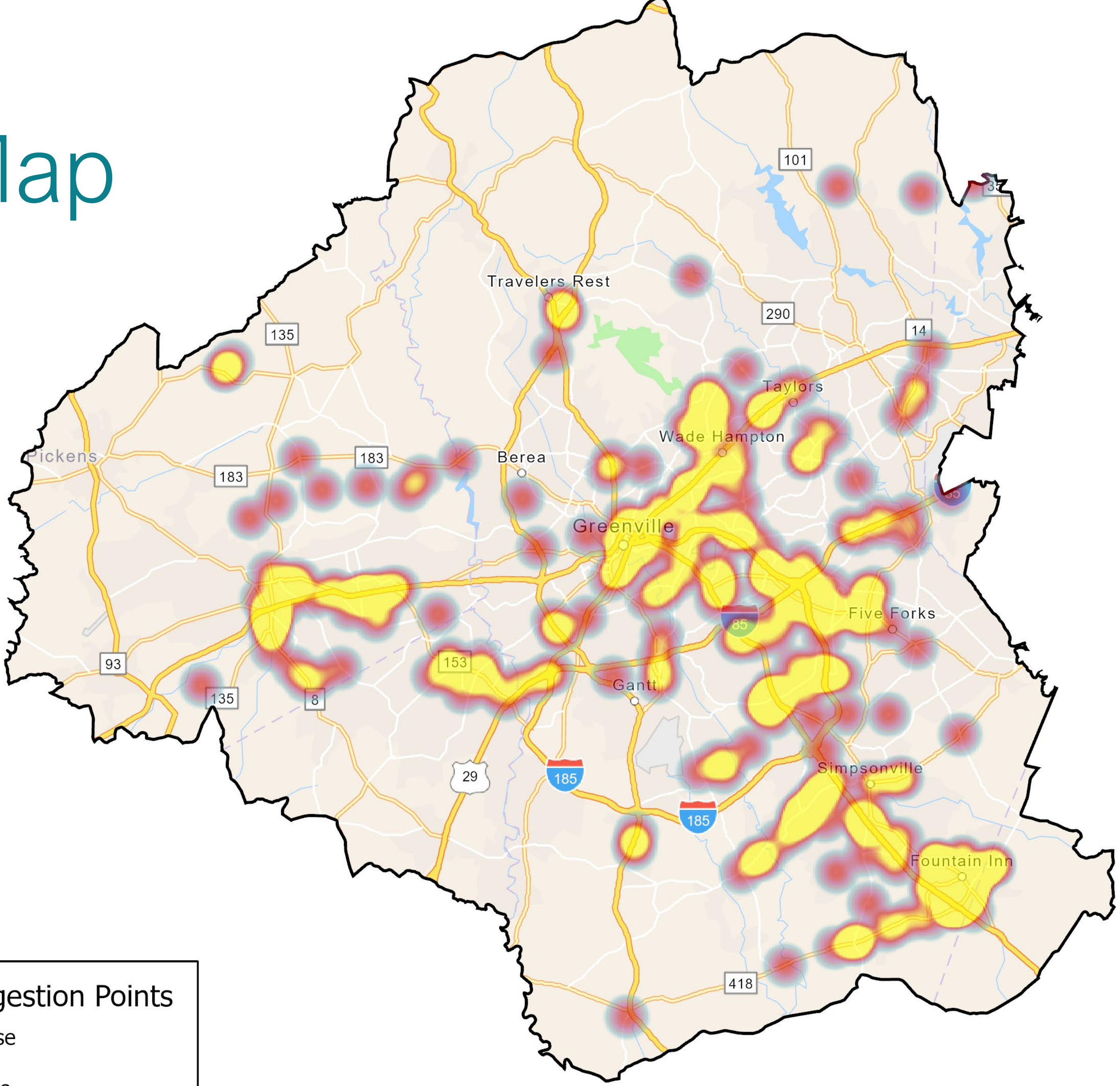
PM Congestion

Mapping solutions for the AM Peak



Comment Heat Map

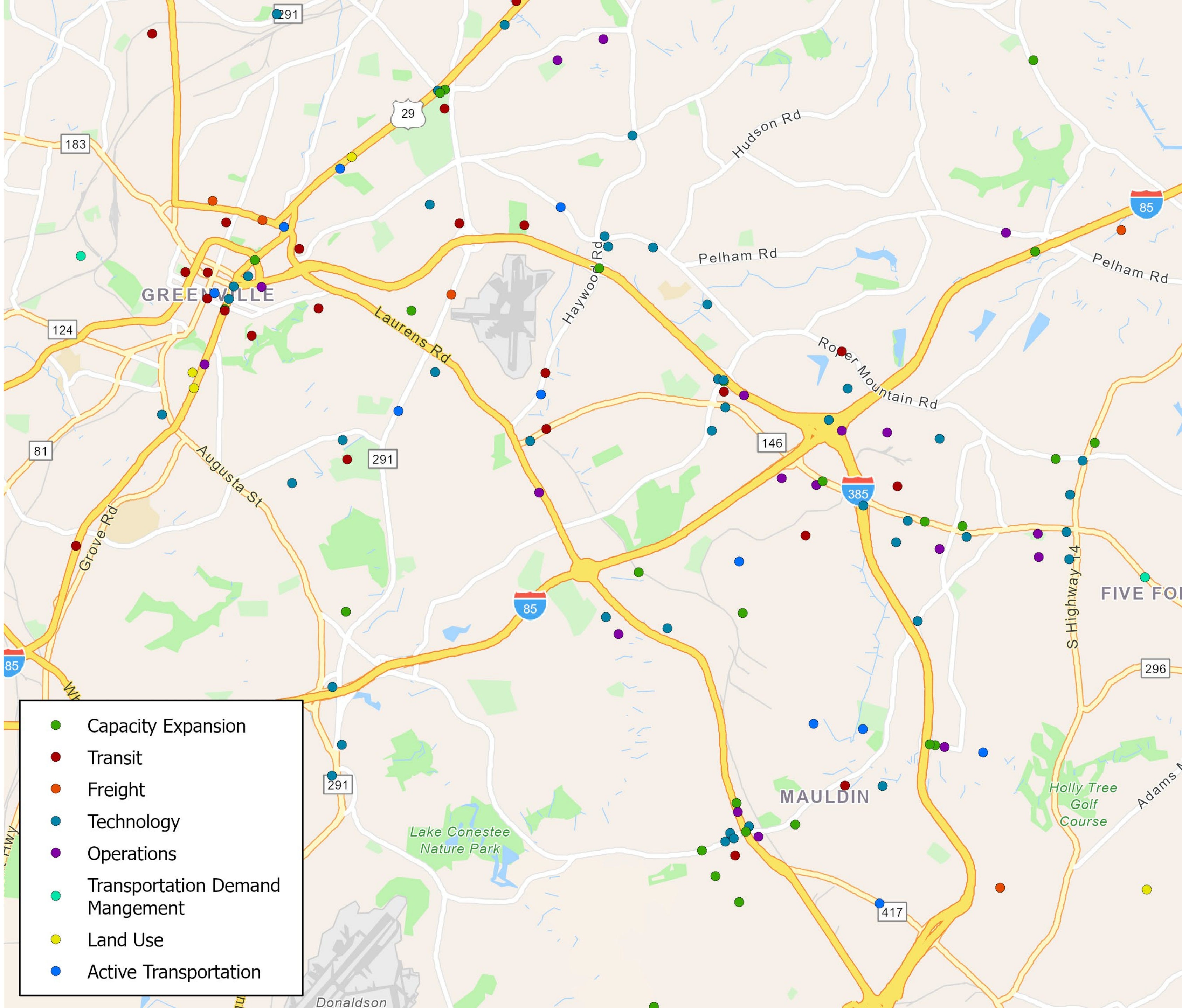
- Most comments were centered around:
  - Fountain Inn
  - SE Greenville
  - Easley
- Fewer responses for PM than AM
- Three most popular strategies were:
  - Lane additions
  - Traffic signal coordination
  - Alternative interchange design



PM Congestion Points
Sparse
Dense

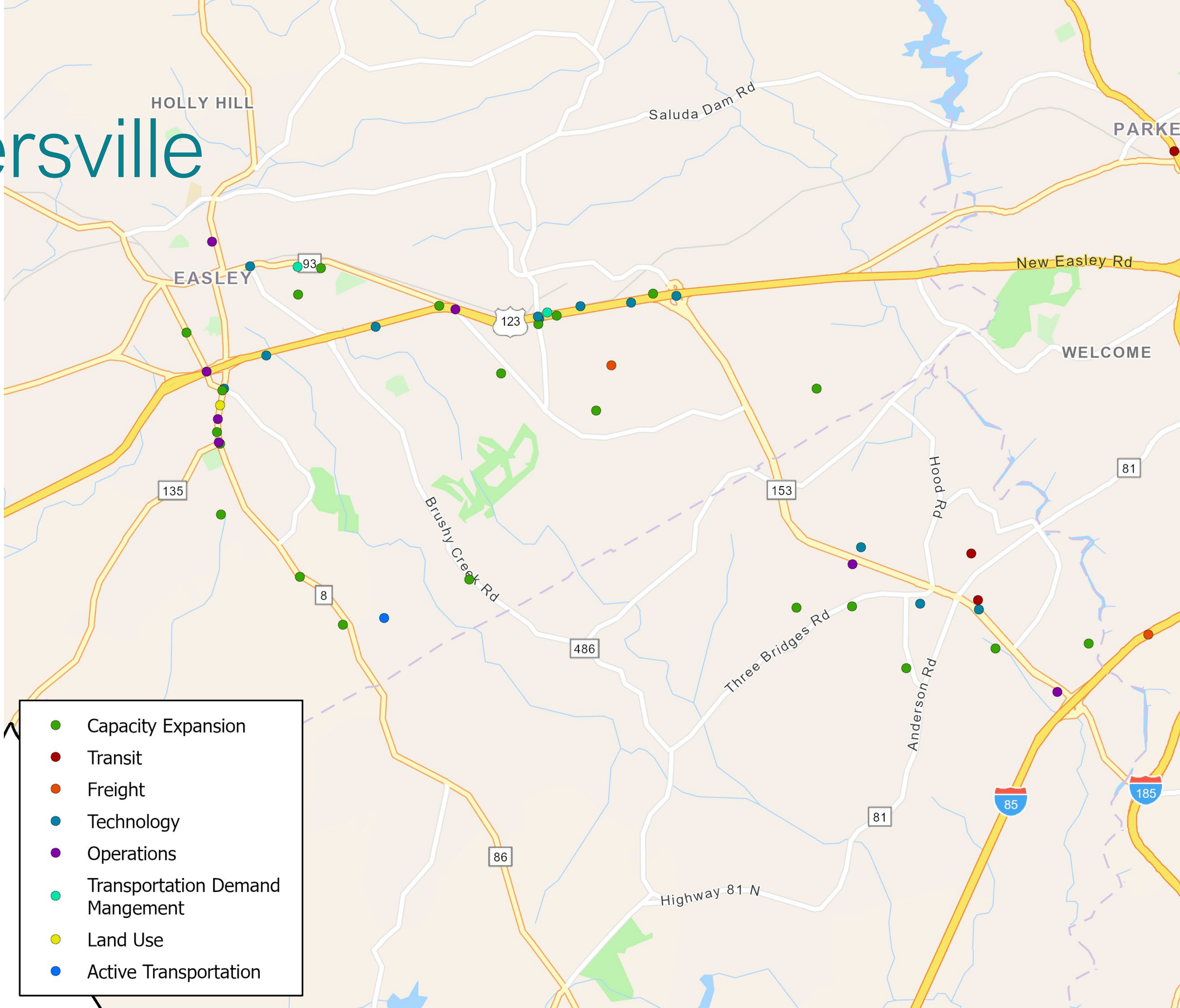
Greenville

- The commercial region around the intersection of E Butler Rd and US 276 in Mauldin has the highest density of comments
- Transit and Land Use comments were most common near downtown
- Technology and Capacity Expansion were more common in the suburban areas
- By a wide margin traffic signal coordination was the most popular strategy
- Bus Service was the next most popular



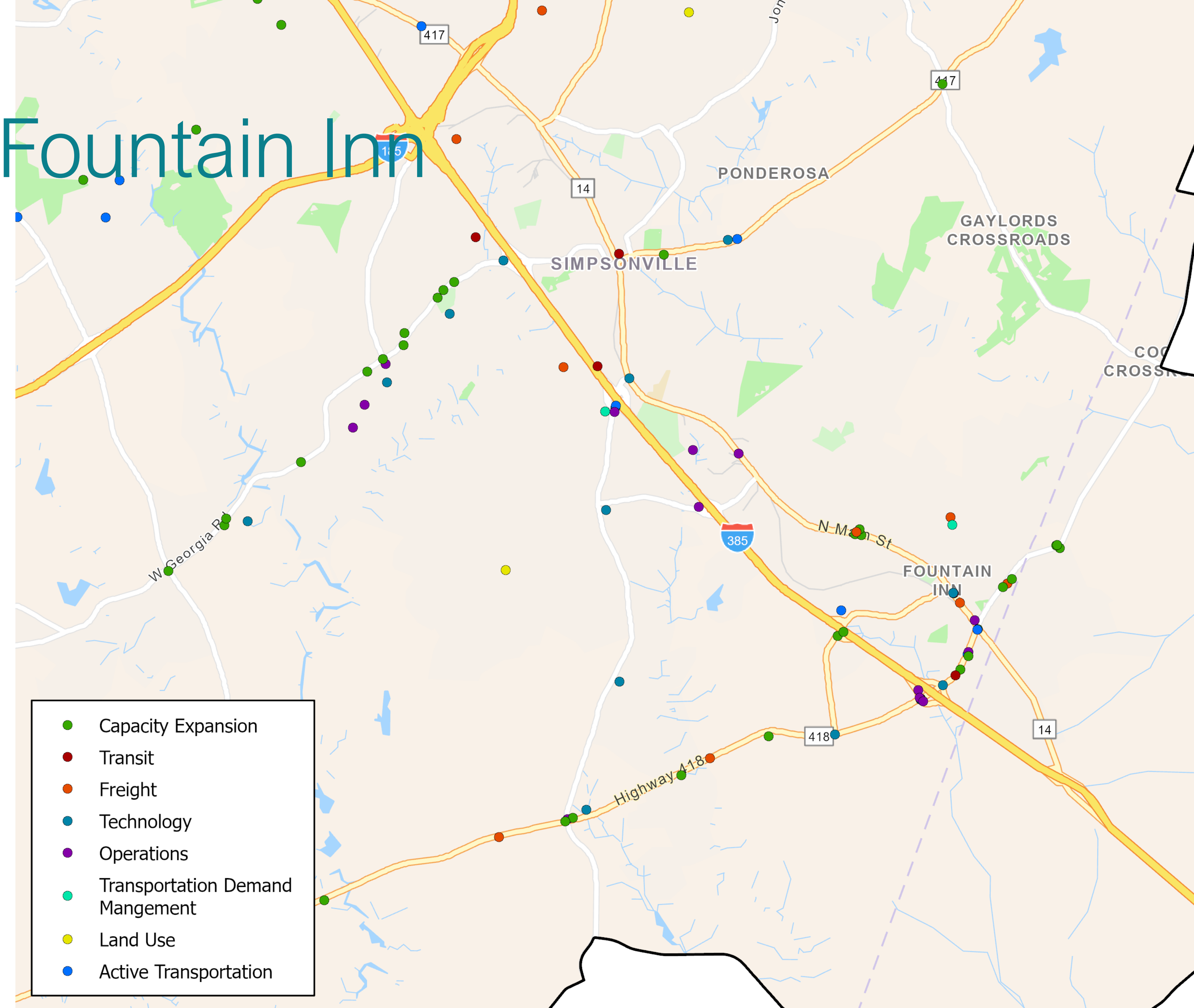
Easley/Powdersville

- Most comments were along US 123 just east of Easley and along SC 8 just south of Easley
- There were few multimodal points in the area
- Most focus on capacity expansion strategies with lane additions being the most popular
- The second most popular strategy was traffic signal coordination



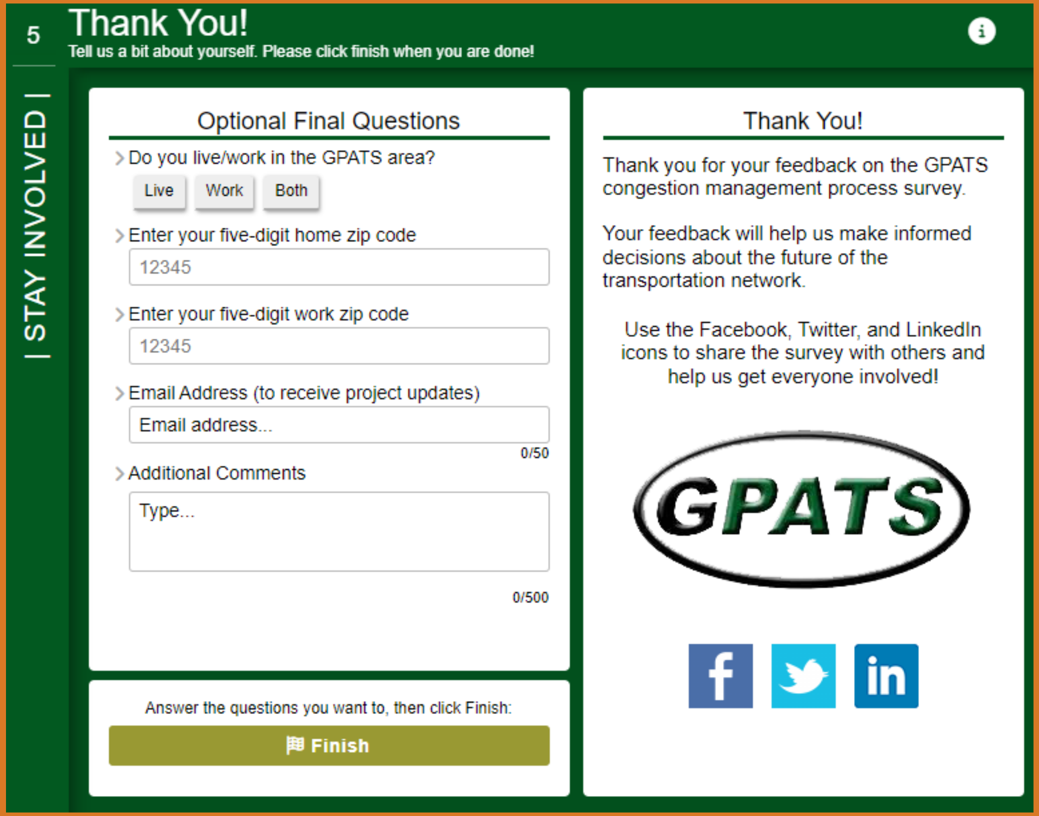
Simpsonville/Fountain Inn

- Most points were along W Georgia Rd and SC 418 going west
- Majority of points were for capacity expansion projects with the most popular being lane additions
- Alternative interchange designs ranked second
- Traffic signal coordination was another very popular option



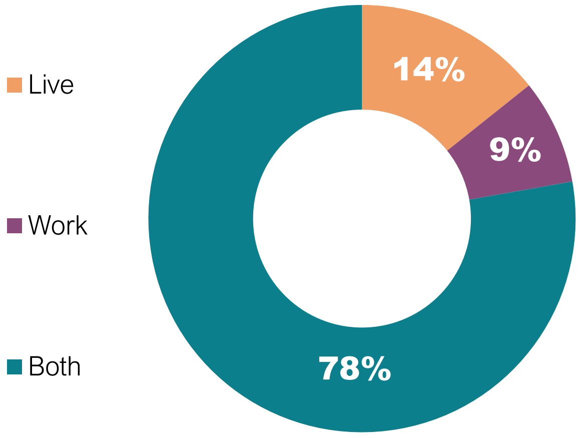
Participant Profile

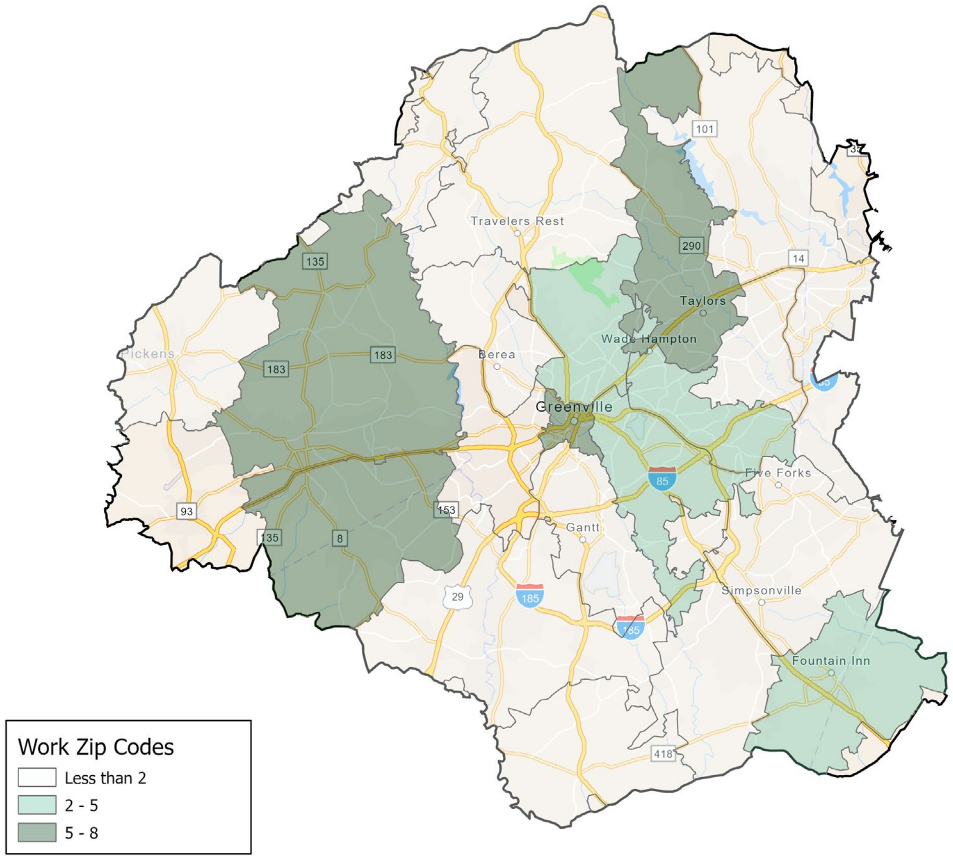
Who we reached

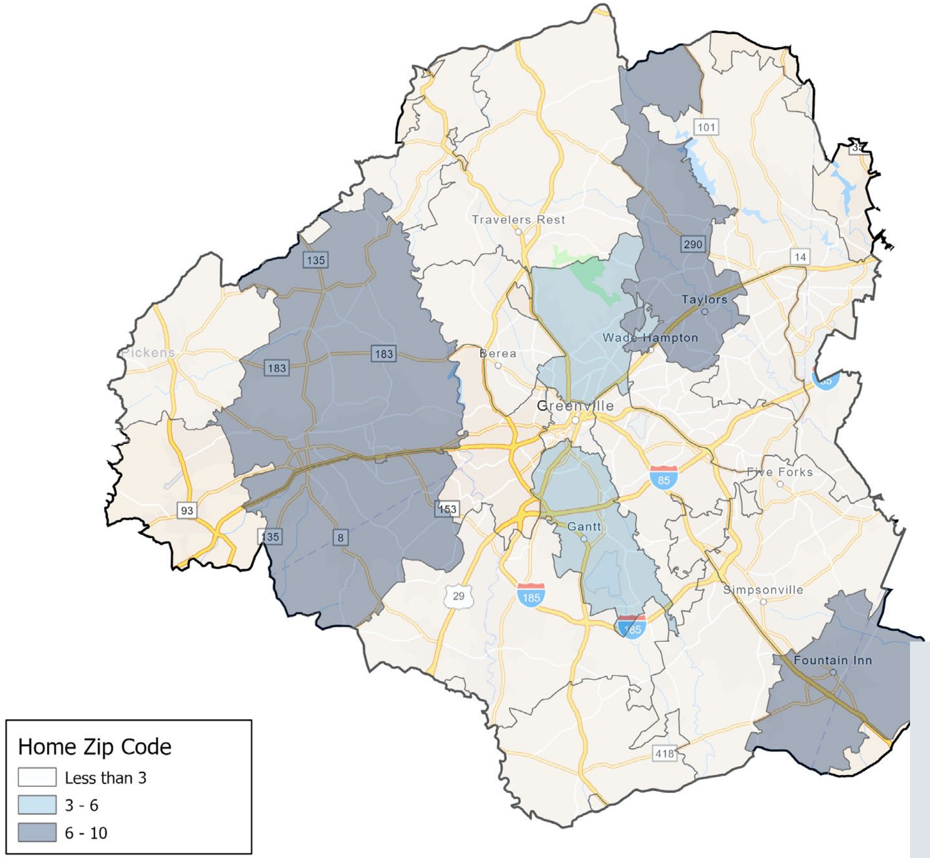


Where Respondents Live and Work

- 78% of respondents say they **live and work** within the study area
- 14% **only live** in the study area
- 9% **only work** in the study area
- Out of study area respondents came from Seneca, Anderson and Belton





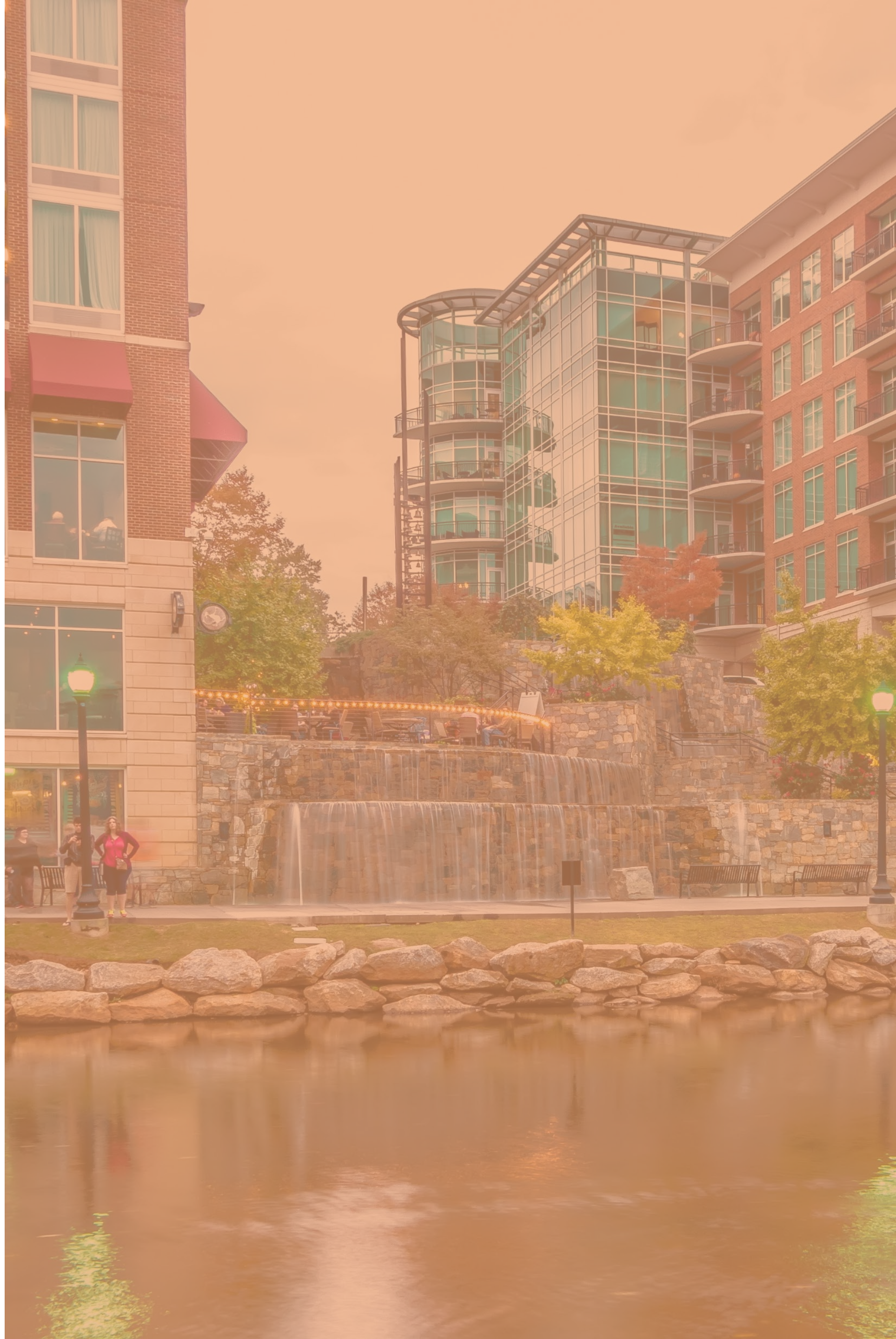


Only **40%** responded when asked about their ZIP code

Other Comments

Themes from other comments:

- Widenings near Easley
- Additional transit
- Congestion in high growth areas
- Appreciation for the study
- More comprehensive TIAs



Public Workshop | GPATS CMP

Sign-In

November 28, 2023

Name	Address/Neighborhood/Area	Email	Number of People in Group
STEVEN MARKOWITZ	[redacted]		
PAUL BARBER	[redacted]		
Randy Mayfield	[redacted]		
Regina Daugherty	[redacted]		
Ed Frey	[redacted]		
RICHARD O'NEILL	[redacted]		
Chuck Berry	[redacted]		
Dean Miller	[redacted]		
Bob Knight	[redacted]		
Frank Marshall	[redacted]		
Tyler Stone	[redacted]		
Luke Franchi	[redacted]		
Suzanne Terry	[redacted]		
Kayleigh Cleek	[redacted]		
Dan Lilly	[redacted]		
Richard Balentine	[redacted]		

Public Workshop | GPATS CMP

Sign-In

November 28, 2023

Name	Address/Neighborhood/Area	Email	Number of People in Group
Erin Predmore	[redacted]	[redacted]	1
Gaye Sprague	[redacted]	[redacted]	1
MARK STEENBACK	[redacted]	[redacted]	1

Public Workshop | GPATS CMP

Sign-In

April 23, 2024

Name	Address/Neighborhood/Area	Email	Number of People in Group
STEVEN MARKOWITZ	[redacted]		1
Kayleigh Creek			2
Slate owen			
Nicole Miglionico			1