Introduction

Purpose of Chapter

This chapter provides the Congestion Management Process (CMP) element of the RFATS 2035 Long Range Transportation Plan. Additional detail about the CMP is available in the Congestion Management Process (CMP) Plan, which was most recently updated in June 2011.

Relevance to the Transportation System and the Plan

Federal law requires a CMP in all urbanized areas with a population above 200,000. Although the RFATS Study Area itself does not fall within this category, it is considered part of the Charlotte-Mecklenburg urbanized area, which does fall within that category. RFATS conducts transportation planning for a portion of that area, and is therefore required to have a CMP.

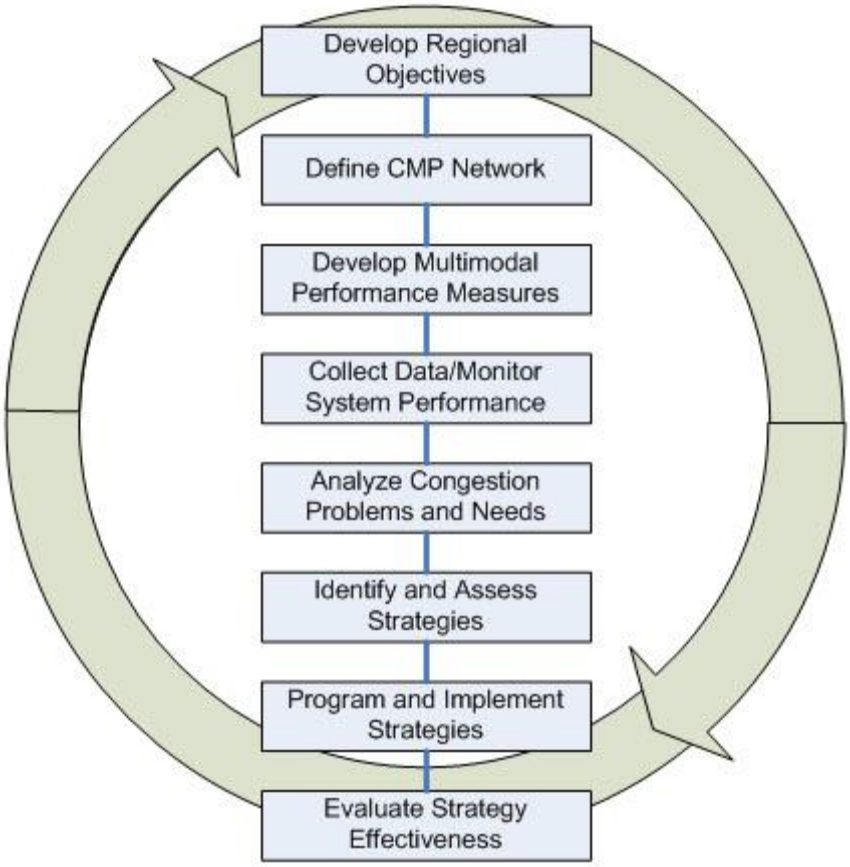
A CMP is a continuous cycle of transportation planning activities, designed to provide decision-makers with better information about transportation system performance and the effectiveness of alternative strategies to deal with congestion. A CMP has four main components:

- Measurement and identification of congestion
- A matrix of congestion mitigation strategies
- Monitoring of effectiveness after implementation
- An orderly evaluation process.

Figure 6.1 shows these components, and highlights the fact that a CMP is not a one-time exercise but an ongoing process of planning, action and review. It is also a learning process. By monitoring the effectiveness of congestion mitigation strategies and evaluating their benefits in an orderly, consistent manner, planners and decision-makers can improve their ability to select the most cost-effective strategies appropriate to their specific local conditions and needs.

Both capacity increases and management of existing capacity can be used to manage congestion. The latter can often be more effective and cost-efficient. Increasing attention is being paid to capacity management measures, as a result of financial and other constraints on capacity increases as well as new technologies.

Figure 6.1 The Congestion Management Process



Source: FHWA, Congestion Management Process

Existing Conditions and Trends

National Conditions and Trends

Congestion management has long been, and still remains, an important element of the transportation planning process. In particular, highway schemes aimed at relieving congestion have traditionally been a major part of the process. However, congestion management has only recently been formalized as an explicit goal with Federal rules and guidelines, under the original term Congestion Management Strategy (CMS) and now the term Congestion Management Process (CMP).

The US Department of Transportation's approach to congestion management is given in the National Strategy to Reduce Congestion on America's Transportation Network (also known as the 'Congestion Initiative'). The strategy includes several major components:

- Congestion Relief Programs;
- Public Private Partnerships;
- Corridors of the Future;
- Technological and Operational Improvements;
- Border Congestion Relief; and
- Increasing Aviation Capacity.

It is important to note that both capacity *increases* and capacity *management* are part of the national strategy.

Statewide Conditions and Trends

The SCDOT Multimodal Transportation Plan comments that while South Carolina is fortunate to not have the extreme congestion problems of larger metropolitan areas and states, South Carolina is growing, and the problem is worsening. In 2006 there were approximately 64 South Carolinians for every lane mile of roadway in the state. By the year 2030, South Carolina's population is expected to increase by 27 percent. Assuming mode choices stay constant, this growth would require approximately 17,000 additional lane miles to be in place to keep congestion levels at the same level in 2030 as they were in 2006. In fact, 17, 000 lanes miles would build an eight-lane facility from South Carolina to California.

Using data from the Texas Transportation Institute's Urban Mobility Report, SCDOT estimated that $345 million was lost due to congestion within the state. This includes $7 million within the Catawba Council of Governments area, a figure which can broadly be seen as the cost of congestion within the RFATS Study area.

Conditions and Trends in the RFATS Study Area

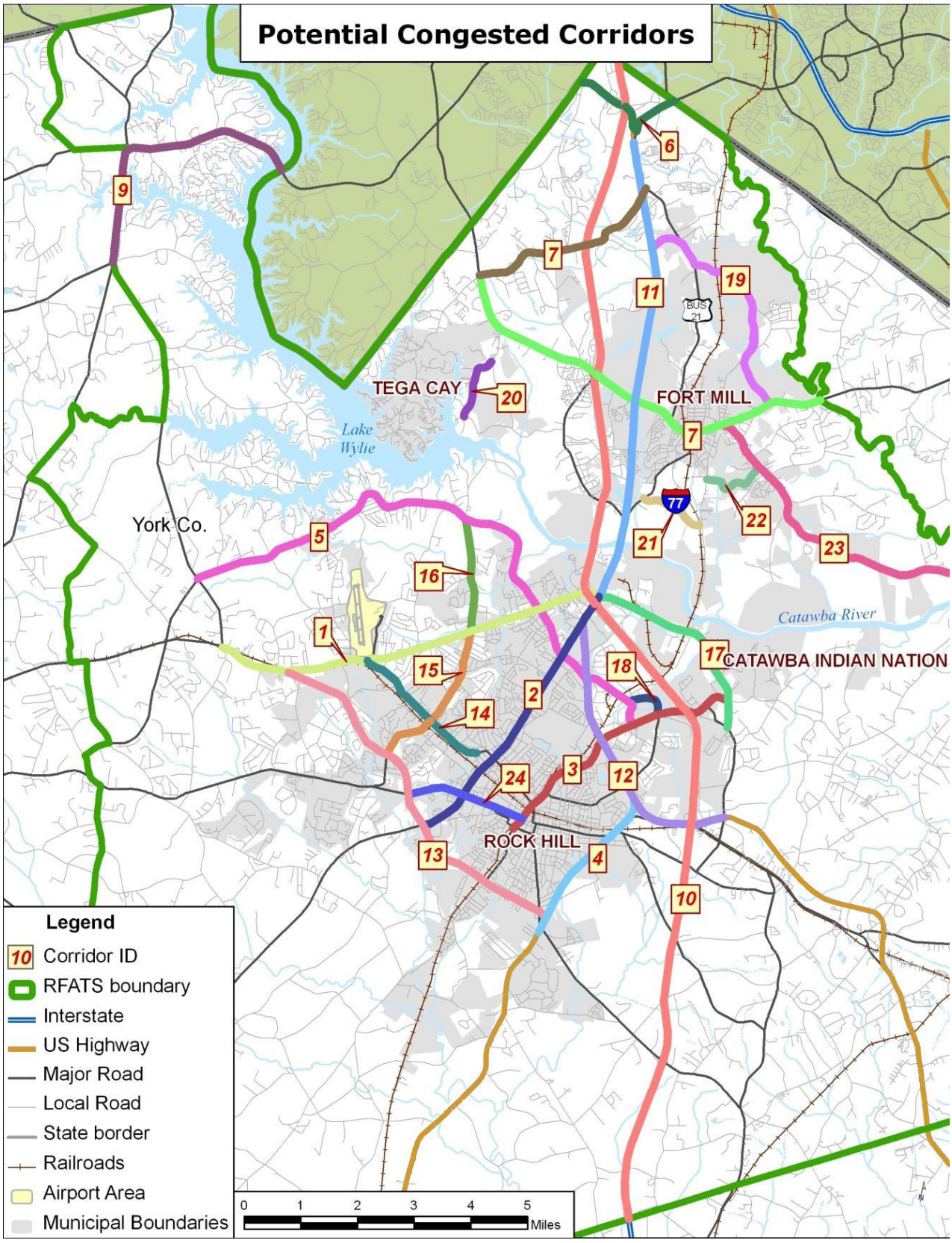
The 2010-11 CMP Update is designed to strengthen the linkage between the CMP and the LRTP. The CMP should serve as a source for generating viable congestion management strategies and projects that advance to the LRTP planning process where further detailed examination will occur. With the adoption of the CMP, applicable performance measures and data analysis are foundational components for evaluating alternative improvement strategies along our most congested corridors and intersections. This link in monitoring congestion points and identifying / prioritizing potential projects is a core aspect supporting the development of the fiscally constrained section of the LRTP.

Current and Future Issues

Congestion Monitoring Network

The adopted CMP plan recognizes the importance of identifying the roadways that should be monitored on a regular basis as part of RFATS congestion management planning; essentially, core arterial roads such as Celanese, SC 160, Gold Hill, US 21, Dave Lyle Blvd, are what RFATS views as it congestion monitoring network or CMN. The complete corridor network reflected on Figure 6.1 and the subareas indicated in Figure 6.2 reflect congestion management network routes.

Figure 6.2: Potential Congested Corridors



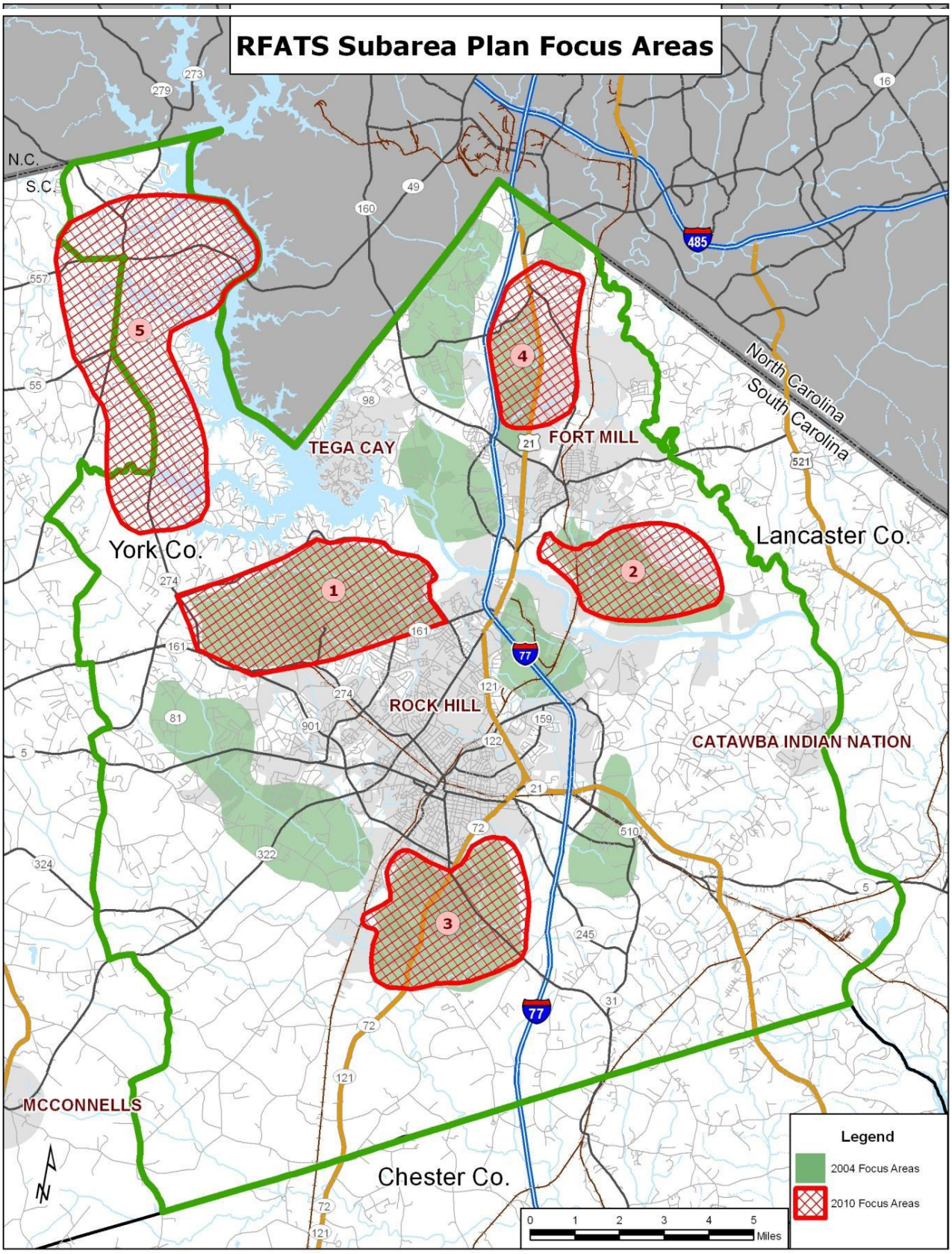
Source: RFATS Congestion Management System Plan, 2011

Table 6.1 Congestion Management Network Routes

ID	Corridor	From	To	Length (miles)
1W	Celanese Road / Hands Mill Highway Old York Road / Celanese Road	Hands Mill Road	India Hook Road	4.57
1E	Celanese Road / Hands Mill Highway Old York Road / Celanese Road	India Hook Road	US 21, N. Cherry Road	2.42
2	Cherry Road	Heckle Boulevard	SC 161, Cel-River Road	5.25
3W	Dave Lyle Boulevard (west of US 21 BYP)	W. Black Street	US 21 BYP / SC 121	2.20
3E	Dave Lyle Boulevard (east of US 21 BYP)	US 21 BYP / SC 121	Red River Road	2.41
4	Albright Road (SC 72) / Saluda Road	Rawlsville Road	Springdale Road	5.46
5N	Mt. Gallant Road. (north of Celanese Road)	Hands Mill Highway	Celanese Road	7.83
5S	Mt. Gallant Road. (south of Celanese Road)	Celanese Road	Dave Lyle Boulevard	2.85
6	Carowinds Boulevard, US 21 and SC 51	Pleasant Road	NC State Line	2.25
7	Gold Hill Rd	SC 160	Garrison Farm Road	3.47
8W	SC 160 (west of US 21 BYP)	SC State Line	US 21 BYP	4.62
8E	SC 160 (east of US 21 BYP)	US 21 BYP	Lancaster County Line	3.61
9	Charlotte Highway (SC 49)	SC 55	NC State Line	5.51
10S	I-77 (south of Dave Lyle Boulevard)	S. RFATS Boundary	Dave Lyle Boulevard	19.42
10N	I-77 (north of Dave Lyle Boulevard)	Dave Lyle Boulevard	N. RFATS Boundary	23.96
11	US 21 BYP	Cel-River Road, SC 161	Pineville – Rock Hill Road	8.15
12	Anderson Road (SC 121) / US 21 BYP	US 21, Cherry Road	Springdale Road	4.09
13	Heckle Boulevard (Hwy 901)	Celanese Road / Old York Road	Saluda Street / Anderson Road	6.63
14	Hands Mill Highway / Ebenezer Road	Old York Road / Celanese Road	Oakland Avenue / India Hook Road	2.80
15	Herlong Avenue	Heckle Boulevard	Celanese Road	2.86
16	India Hook Road	Celanese Road	Mt. Gallant Road	1.96
17	Red River Road, Cel-River Road	Celanese Road	Springdale Road	3.60
18	John Ross Parkway	Dave Lyle Boulevard	Mt. Gallant Road	0.63
19	Fort Mill Bypass, Springfield Parkway	I-77	SC 160, Tom Hall Road	1.11
20	Dam Road	Gardendale Road (S-741)	New Gray Rock Rd (S-251)	1.10
21	Fort Mill Parkway	Spratt Street	Brickyard Road	1.10
22	Fairway Dr (Fort Mill)	Brickyard Road	Doby's Bridge Road	1.20
23	Doby's Bridge Road	Tom Hall Road	Lancaster County Line	6.02
24	W. Main Street, SC 5	Heckle Boulevard	Dave Lyle Boulevard	2.10

Source: RFATS Congestion Management System Plan, 2011

Figure 6.3: RFATS Subarea Plan Focus Areas



Source: RFATS Congestion Management System Plan, 2011

Congestion Management Strategies

The 2011 plan recognized the potential benefits of implementing congestion management strategies. There are many congestion management strategies that differ in terms of effectiveness, cost, complexity, and difficulty of implementation. Congestion management strategies are not one size fits all. Rather, congested roadways and intersections have to be properly examined to evaluate which congestion mitigation strategy will effectively improve the congestion related problem(s). The CMP also identified numerous congestion mitigation strategies that can individually or collectively improve the operational efficiency of the RFATS transportation system. These strategies included the following:

- Access Management
  - Access Spacing
  - Driveway Spacing
  - Safe Turning Lanes
  - Median Treatments
  - Right-of-Way Management
- Transportation Systems Management
  - Highway Geometric Improvements
  - Traffic Signal Improvements
  - Wayfinding and Signage
- Incident Management
  - Motorist Assistance Patrols
  - Strategies to improve response times
  - Strategies to reduce clearance times
- Intelligent Transportation Systems
  - Ramp metering
  - Traveler information and rerouting systems
  - Electronic commercial vehicle clearance and tolls
- Travel Demand Management Strategies
  - Increasing rideshare
  - Alternative work time
  - Alternative commute mode

Access management also emphasizes the importance of maintaining a hierarchy of roadways, with greater control of access on roadways primarily intended to serve through traffic. Private access is directed to local and collector streets where feasible, and internal street systems and inter-parcel connections are promoted to improve overall accessibility. Access

management can be carried out through roadway design, access permitting, subdivision or site plan review, and access management plans and regulations.

Land Development Regulations

The 2011 plan referred to a wide range of land development regulations that can be used as a means of managing congestion or minimizing future congestion. Such regulations would be the responsibility of the individual member jurisdictions to champion.

Optimizing the Efficiency of Urban Goods Movement

The 2011 plan recognized that there can be problems due to mixing trucks and passenger cars in an urban setting, usually because of inadequate physical design of roadways and intersections. Potential solutions include physical improvements and/or re-routing, as well as addressing parking/loading facilities. The plan reported that the City of Rock Hill had conducted truck routing studies in the past, and suggested that an update of these efforts should be considered. This might include addressing ways in which in-town truck traffic movements could be made optimally efficient.

Selected Examples of CMAQ Projects

The following projects are examples of current RFATS activities that make use of CMAQ funds.

- **Traffic Signal Controller Upgrades (City of Rock Hill)** – This project involves the replacement of obsolete controllers along four major arterials (Cherry Road; Celanese Road; Dave Lyle Boulevard; and Albright Road). **Error! Reference source not found.** lists the intersections involved. The benefits to be realized by this project include travel time reduction, fuel cost savings, and lower overall vehicle emissions as well as achieving optimal traffic signal coordination.

- **Rail Yard Extension Project (City of Rock Hill)** – This project is designed to substantially reduce and/or eliminate extended grade crossing blockages by trains at Main and White Streets in Downtown Rock Hill. Specifically, this project will involve the construction of an additional side-track to allow trains to pull free of these streets prior to switching operations.

- **SC 160 / US 21 Intersection Upgrade (Town of Fort Mill)** – This project is a traffic flow improvement effort that will lessen congestion and therefore reduce excess vehicle idling by widening the westbound lane of SC 160 to include a turn lane with a straight right function to better facilitate the flow of traffic. Currently, there is no opportunity for westbound traffic on SC 160 to access northbound US 21, which creates extensive traffic queues at peak driving hours.

Incident Management

RFATS and SCDOT staff maintain ongoing liaison regarding Intelligent Transportation Systems (ITS) deployment within the RFATS Study Area. Incident management is the key application of ITS to date. This was already in place at the time of the 2011 report, and has been incrementally enhanced since then.

SCDOT is responsible for providing incident management services. Incident management operations are conducted from the District 4 Traffic Management Center (TMC), where camera and radar operators monitor traffic conditions. I-77 through the RFATS study Area is monitored with 31 video cameras and 46 radar speed detectors. The latter are useful for incident management because incidents often cause noticeable reductions in speed. The cameras also feed to the SCDOT website as information for drivers.

The State Highway Emergency Program (SHEP), now referred to as the Incident Response Program,. plays a important role in managing congestion on the I-77 Corridor. Under this program, SCDOT will respond to a variety of situations, including assisting with minor repairs to disabled vehicles; assisting with traffic control and incident management as well as providing first aid until emergency medical services arrive. This program primarily operates during rush hours and weekends, but is available any time circumstances dictate.

HOV / HOT Manage Lanes Study

The HOV / HOT Managed Lanes Study, known locally as the "Fast Lanes Study", is a cooperative planning effort to examine the feasibility of high occupancy vehicle and high occupancy toll lanes on major freeways and roads in the greater Charlotte region. Specifically, this study will determine the technical, financial and institutional feasibility of dedicating lanes on major highways (in particular the I-77 corridor) for active traffic management.

This study has been undertaken because it is generally recognized that traditional approaches to addressing congestion, such as widening existing roads, is unlikely to adequately resolve current and future problems. Therefore, evaluating the incorporation of dedicated lanes that would be operated strategically to prevent congestion during peak driving periods is viewed as an appropriate management tool.

In 2009, the City of Charlotte submitted a proposal to the Federal Highway Administration to receive funding from the Value Pricing Program in order to advance to a third phase of the Fast Lanes Study. The application was approved in 2010, and NCDOT provided the required non-federal match in 2011.

The objectives of Phase III of the Fast Lanes Study include:

- Build on Phase I and II results
- Familiarize the public with the concept of congestion pricing
- Develop a better understanding of policy and technical issues associated with congestion pricing
- Determine public acceptance for the next managed lanes projects

Primary study partners include the North Carolina Department of Transportation; South Carolina Department of Transportation; Mecklenburg-Union Metropolitan Planning Organization; Gaston Urban Area Metropolitan Planning Organization; Rock Hill-Fort Mill Area Transportation Study as well as the Lake Norman and Rocky River Rural Planning Organizations.

Stakeholder Input

As described in the Public Involvement Element, stakeholders wanted to see improved traffic flow and congestion mitigation.

Summary and Recommendations

All strategies and corridor specific projects identified during the CMP Update are the result of study activities, including input from the RFATS Technical Team, review of previous studies, and/or the analysis of data from the Metrolina Regional Travel Demand Model or travel time surveys.

The following is a summary of the recommendations from the 2011 CMP.

- RFATS should place an emphasis on Operations and Management (O&M) in order to preserve and maximize the efficient use of the existing infrastructure. Specific strategies should include the following:
  - Intersection and Geometric and Signal Operations Improvements
  - Conducting Safety Audits
  - Access Management Strategies and Projects

- RFATS should implement Travel Demand Management Strategies aimed at affecting travel demand by reducing the need for travel, increasing vehicle occupancy, encouraging alternative modes, or shifting the timing of trips to periods outside of peak travel times.

- RFATS should develop monitoring procedures and measures of effectiveness for the CMN.

- RFATS should assist local jurisdictions to review existing and potential land development and access management regulations.

- RFATS should add a congestion management component to all corridor plans, sub-area plans and other special projects.

- RFATS should update the CMP on a four-year cycle.