transportation management element

9.1 Introduction

Transportation Management contributes to the overall goal of a rising quality of life for everyone by providing tools and techniques to improve the performance of existing facilities and services and to maintain the performance of new facilities and services.

Goal: ***Support a healthy, strong, regional economy***

Transportation Management contributes directly to this goal by providing methods to operate transportation facilities and services safely, effectively and efficiently in order to maximize the economic return from the region's transportation investments; optimize use of the existing system; improve access to jobs and labor markets; and improve regional connections to external markets.

Goal: ***Maximize access to opportunity for all area residents***

Transportation Management contributes to this goal by providing methods to increase mobility through improved operation of regional transportation facilities and services, and by providing methods to disseminate information about the operation of transportation systems, which allows people to make better-informed choices about their use of these facilities and services.

Goal: ***Support a quality built and natural environment***

Transportation Management contributes to this goal by providing tools and techniques to minimize or mitigate the negative environmental impacts of operating transportation facilities and services, and to operate facilities and services in ways that support adjacent land use.

Goal: ***Promote the safety and well-being of the traveling public***

Transportation Management contributes directly to this goal by providing tools and techniques to improve the safe operation of transportation facilities, including physical modifications to existing facilities; operations and management strategies; and public education, information and awareness activities.

9.2 Background

The term "transportation management" is used in the Long-Range Transportation Plan (LRTP) to encompass a wide range of strategies that make more efficient use of existing transportation facilities. Such strategies are generally less costly than major capacity improvements and may increase or constitute cost-effective alternatives to major highway and transit projects. In addition, transportation management strategies are generally viewed as having positive impacts on air quality and energy consumption when compared with more capital-intensive alternatives.

Transportation management techniques fall into two general categories: 1) *transportation system management* (TSM) and, 2) *transportation demand management* (TDM). TSM strategies are generally physical improvements that improve traffic flow, such as signalization, signal coordination, channelization, addition of turn lanes, ramp metering, contraflow or reversible traffic lanes, and high-occupancy vehicle (HOV) lanes. TDM strategies are intended to reduce or shift the demand for travel, and include alternative work schedule programs, programs to encourage transit use or ridesharing, telecommunications and congestion pricing. Other transportation management strategies include intelligent transportation system (ITS) techniques such as motorist information systems and incident management programs that address non-recurrent congestion caused by accidents or disabled vehicles.

A number of transportation management strategies have been implemented in the Kansas City metropolitan area, including the regional RideShare program administered by MARC, the motorist assistance programs operated by MoDOT and KDOT, and numerous signalization and channelization projects. More aggressive transportation management strategies — like HOV lanes and ramp metering — are relatively common in more congested metropolitan areas but have not been used in the Kansas City region. However, KDOT and MoDOT are currently studying the feasibility of implementing ramp metering as a component of regional freeway management and ITS deployment.

9.3 Issues

9.3.1 Vehicle Occupancy

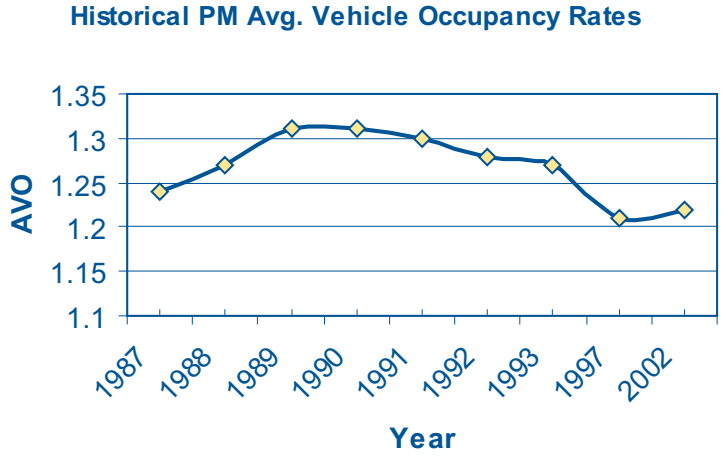
MARC conducts periodic vehicle occupancy studies as part of the regional RideShare program. These studies, which focus primarily on work trips, indicate a gradual decline in vehicle occupancy during peak periods from a high of 1.31 persons per vehicle in 1990 to 1.22 persons per vehicle in 2002 (see Figure 9-1). This trend is consistent with *Nationwide Personal Transportation Study* (NPTS) data, which indicate that vehicle occupancy for work trips has declined from 1.3 persons per vehicle in 1977 to 1.1 persons per vehicle in 1990. The reduction in carpooling can be attributed to a variety of factors, including declining gasoline prices, increased auto ownership and continued suburbanization.

MARC's RideShare program promotes ridesharing as a commute alternative that saves energy and helps maintain the region's air quality status. The program provides commuters with referrals to carpool, transit and vanpool services, offers employers information on flexible work schedules, manages a Guaranteed Ride Home service to provide commuters that share rides with transportation home in the event of an emergency, and works with schools to provide carpool matching. The LRTP supports continued efforts to promote ridesharing through an active RideShare program.

One approach to increasing vehicle occupancy is the implementation of high-occupancy vehicle (HOV) lanes. HOV lanes can be lanes that are added to highways or, less commonly, by using an existing lane. HOV lanes vary in terms of their hours of operation (full time or peak hours only) and the types of vehicles that are allowed to use them. Most are open to transit buses and to two-person carpools. To be effective, HOV lanes must result in a significant travel time differential between HOVs and single-occupancy vehicles (SOVs), thus providing an incentive for carpooling or transit use.

No HOV lanes have been implemented in the Kansas City region, with the exception of bus-only lanes on a few downtown streets. However, the LRTP indicates the need for capacity improvements on several major freeway corridors. Implementation of HOV lanes should be considered as an alternative to adding general-purpose lanes in these corridors and analyzed as part of major investment studies.

FIGURE 9–1
PEAK HOUR VEHICLE OCCUPANCY



In 1995, MARC depicted a potential HOV network in the LRTP. Since then, Major Investment Studies (MIS) have been completed for three segments of this proposed system including I-435 from I-35 to U.S. 71 in Jackson County, Mo.; I-35 from Olathe to downtown Kansas City, Mo.; and I-35/I-29 from KCI to downtown Kansas City, Mo. Each of these studies considered HOV facilities, but concluded that an HOV lane was not needed on these routes within the time frame of the LRTP. Figure 9-2 depicts a possible region-wide HOV lane network, modified to reflect the results of these MISs.

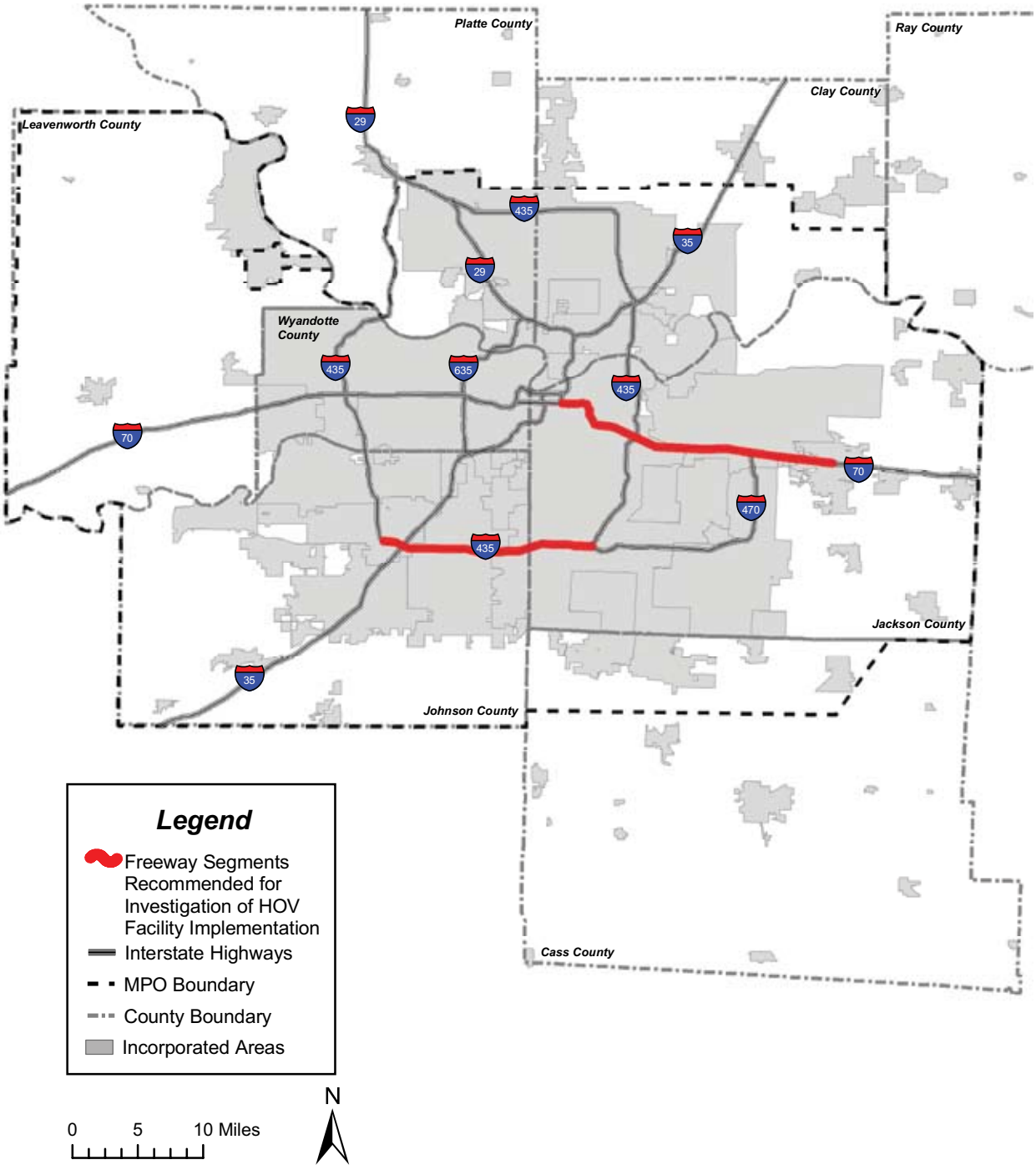
9.3.2 Congestion Management System

As noted elsewhere, when compared with peer regions in the United States, Kansas City's highway system does not experience a high level of congestion, and the rush hour is relatively short in duration. However, in recent years the region has experienced higher than average growth rates in peak hour congestion. As congestion levels increase in the future, strategies to maximize traffic flow and shift traffic out of the peak period

will become more important. These strategies include ramp metering, alternative work schedules, telecommuting and congestion pricing. The LRTP supports ongoing evaluation of these strategies, as well as promotional activities to encourage changes in travel behavior that reduce peak congestion.

The Transportation Equity Act for the 21st Century (TEA-21) requires the development of a congestion management system (CMS) for the region, which will allow more effective monitoring of congestion and identification of strategies to alleviate it. The CMS currently provides input to the LRTP, Transportation Improvement Program (TIP) and Major Investment Studies and other regional corridor studies.

FIGURE 9-2
POTENTIAL HOV CONCEPT
FOR THE KANSAS CITY METROPOLITAN AREA



The CMS network contains selected streets and highways within MARC's planning boundary. The basic framework for the MARC CMS network is the National Highway System, plus additional routes with high daily traffic volumes (over 25,000 ADT), potential freeway diversion routes and/or routes with significant bus transit service. Figure 9-3 shows the current CMS network.

MARC has developed performance measures to provide the basis for identifying the extent, severity and specific locations of congestion on a system-wide basis. MARC's CMS currently incorporates five measures of congestion: daily volume to capacity (v/c) ratios; level of service based on observed speeds in the morning and evening peak periods; and observed speeds verses posted speeds in the morning and evening peak periods. Additional performance measures, including travel times, transit travel times and accident analysis, are to be added to the system in the future.

A congestion index of 0 to 5 has been developed to indicate the likelihood that any given segment of the CMS network may experience recurring congestion. The congestion index reports how many of the five current performance measures' congestion thresholds have been met for each segment of the CMS network. Figure 9-4 shows the congestion index for all segments of the CMS network.

MARC considered this information in developing the list of financially constrained street and highway capacity projects for the LRTP.

The concept of managing traffic congestion is a dynamic procedure that considers the past, present and future. Improvements that have recently been implemented for the CMS include:

- Additional performance measures of congestion (and travel time)
- Composite Congestion Analysis (A matrix showing the performance of CMS segments according to different measures)
- Analyses of past, present and future trends in regional congestion
- Identification and evaluation of improvement options
- Recommendations for future plans and TIPs.

More details about the MARC Congestion Management System are available on the Internet at http://www.marc.org/transportation/congestionmanagementsystem.htm.

9.3.3 Intelligent Transportation Systems

Intelligent transportation systems (ITS) refer to the use of technological innovation to manage the transportation system more effectively, improve its efficiency, and to make the system more user friendly. There are a wide variety of ITS techniques under development or in use across the country, ranging from variable motorist message signs and automated vehicle locator (AVL) and toll collection systems to more futuristic in-vehicle guidance systems.

FIGURE 9-3
CONGESTION MANAGEMENT SYSTEM NETWORK

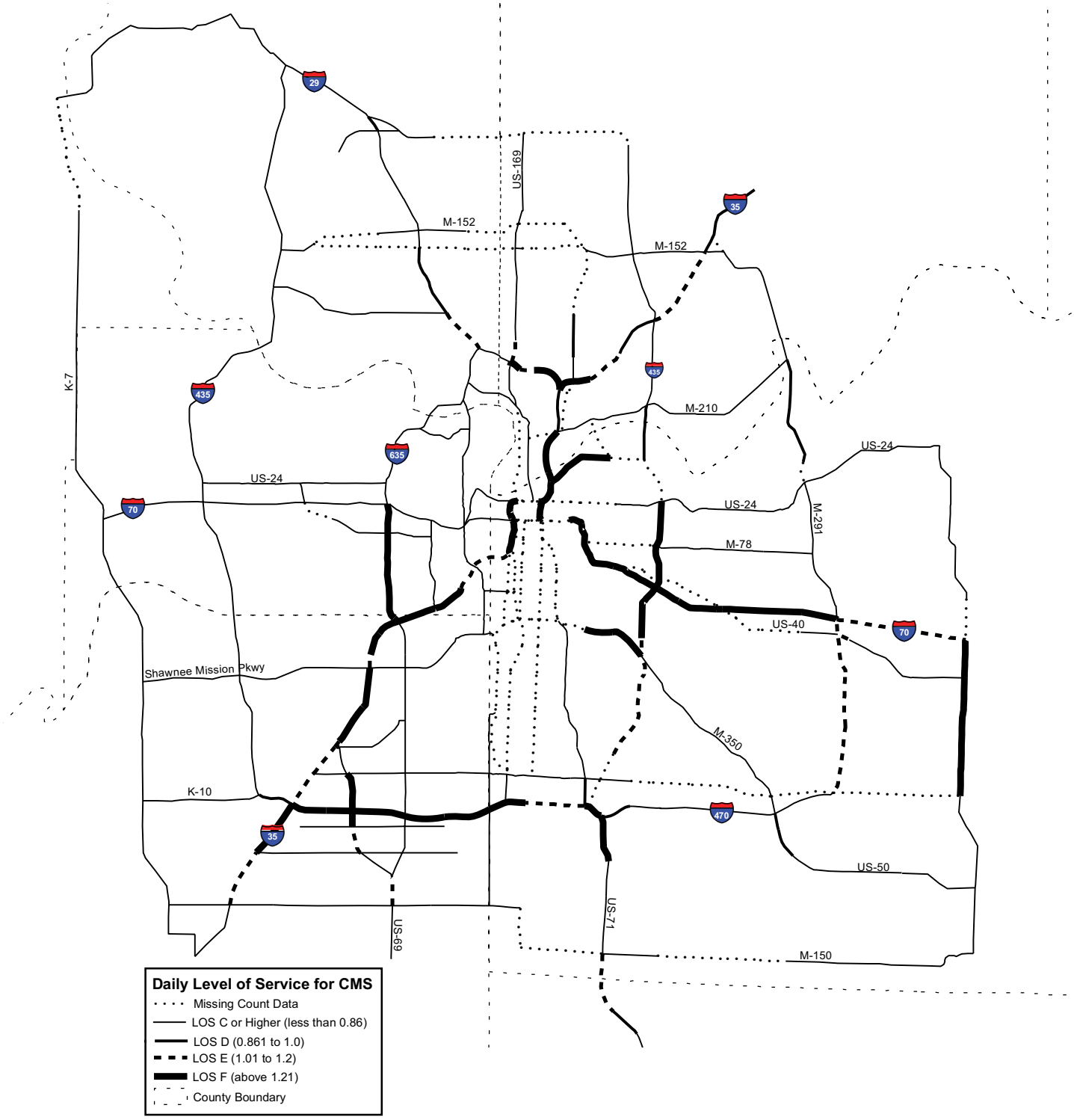
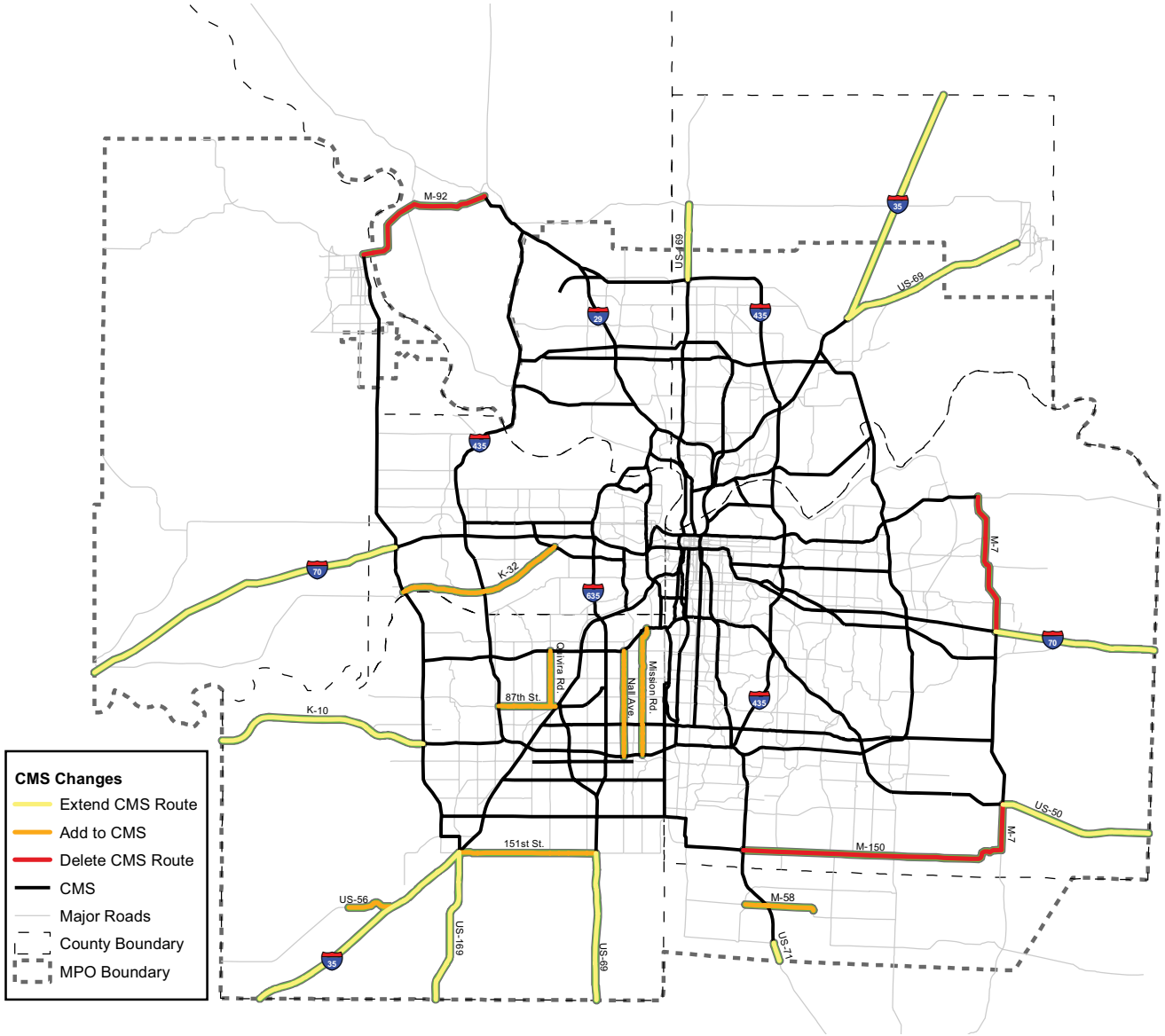


FIGURE 9-4
CONGESTION MANAGEMENT SYSTEM NETWORK RECOMMENDATIONS



With MARC involvement, KDOT and MoDOT completed a joint study of ITS early deployment strategies in 1997. This effort resulted in recommendations for improving freeway operations within the Kansas City region through ITS techniques. Both states developed plans to implement the early phases of KC Scout — the freeway management system recommended in the early deployment plan — as a cooperative, bistate program. The primary components of this project include: the establishment of a regional freeway Traffic Operations Center; developing and deploying a range of traffic monitoring and traveler information technologies; developing and deploying improved incident management strategies; and coordinating planning with other agencies to promote regional interoperability with other ITS applications. This project also includes a study of the feasibility of ramp metering on freeways in the Kansas City area. Figure 9-5 shows the freeway routes to be included in the KC Scout project.

In 1998, MARC, along with several other agencies in Kansas and Missouri, initiated Operation Green Light, a study of the possible congestion relief and air quality impacts of improved coordination of traffic signals on regional traffic corridors. This effort recommended corridors where enhanced traffic signal coordination could decrease congestion and meet air quality improvement goals; guidance for traffic signal communications hardware and software; and regional arrangements with agencies to plan and operate coordinated traffic signal equipment. Project architecture and communications backbone design is nearing completion. This will include an operator in the Scout Traffic Operations Center. This effort may also establish a link between the operation of regional freeway management systems and the operations of regional signalized arterial roadways.

In 1998, MARC also conducted a study of the feasibility of implementing an International Trade Processing Center in the Kansas City area. This effort, the *Mid-Continent TradeWay Study* provided recommendations for ITS technologies related to the movement of international freight and commercial vehicles through the Kansas City area and lead to the establishment of Kansas City SmartPort, which is currently completing detailed plans for ITS deployments to improve the safe, secure and efficient movement of freight to, from and through the Kansas City metropolitan area.

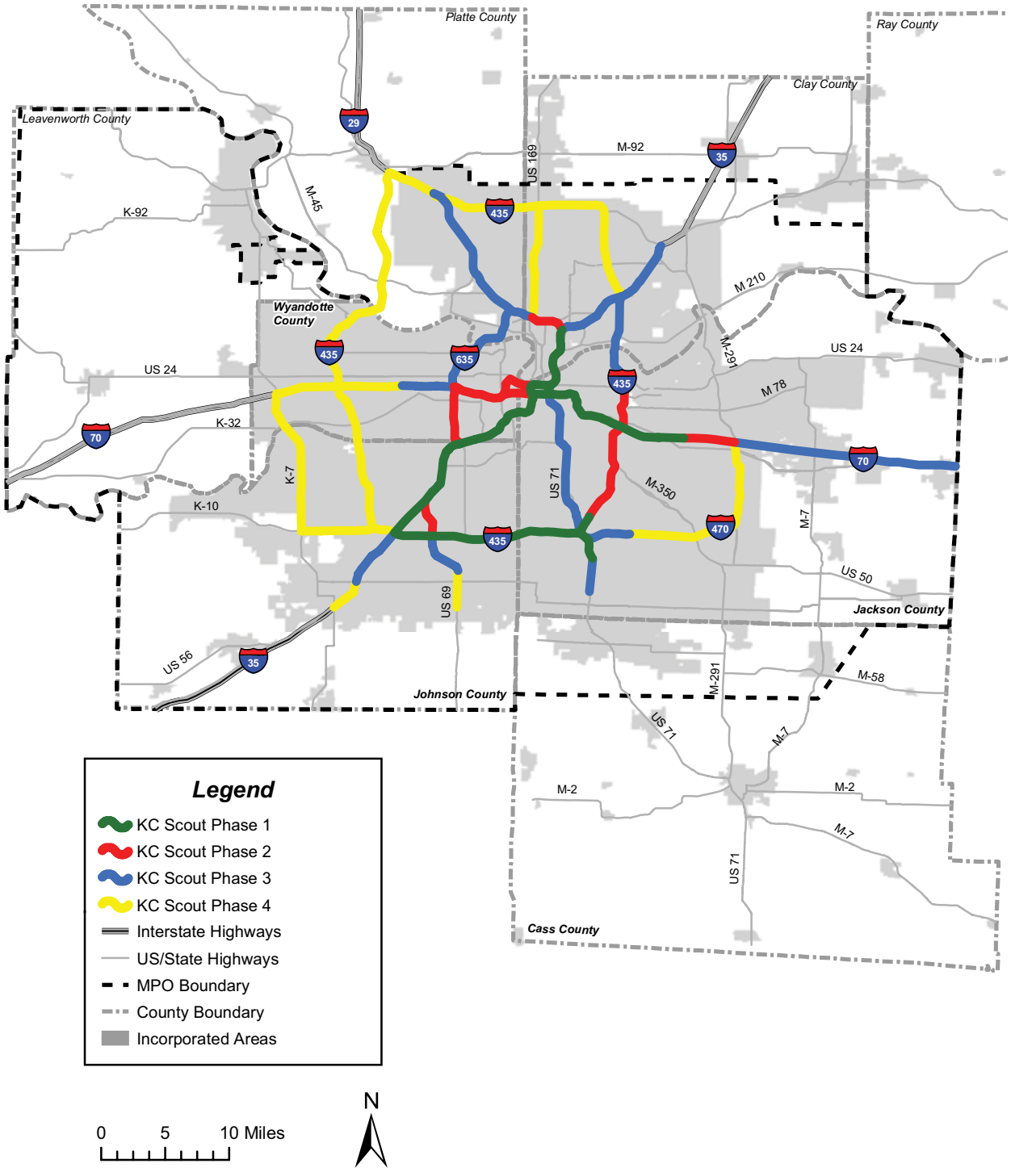
The Kansas City Area Transportation Authority is currently pursuing two ITS initiatives related to public transportation. The first is the upgrade of the automatic vehicle locator (AVL) system, currently used to aid in the dispatch of Metro buses. The second is the development of information kiosks to provide route, fare and schedule information to passengers at major transit activity centers, such as the transportation center at the renovated Union Station/Science City. The system is currently operational and includes real-time signage along the Metro Area Express (MAX) bus rapid transit route. Other ITS applications will be investigated in the future.

In 2000, the FHWA and FTA announced new joint regulations governing the planning of ITS projects. These new rules require that all federally funded ITS projects conform with regional ITS architectures that should be developed as part of the metropolitan planning process. The Kansas City region began this process with a series of workshops involving stakeholders from a variety of transportation-related disciplines, which resulted in an inventory of current ITS stakeholders, existing and planned ITS applications, and existing and planned information flows between ITS applications in the region. In 2004,

MARC adopted version 1.0 of the Regional ITS Architecture, which has already been used to develop new projects related to bus rapid transit and traffic signal priority for the KCATA MAX project; ITS elements of Kansas City SmartPort; Operation Green Light and other initiatives. The Regional ITS Architecture is available online at www.marc.org/transportation/ITS.

The LRTP supports continued evaluation and development of these and other ITS strategies and implementation when and if they are determined to be cost effective and needed.

FIGURE 9-5
KC SCOUT FREEWAY ROUTES



9.3.4 Incident Management

It is generally agreed that the majority of Kansas City's freeway congestion is caused by incidents (e.g., accidents, disabled vehicles, inclement weather) rather than just high volumes of traffic. MARC established a focus group in 1993 to explore ways to better manage such incidents to minimize their impact on congestion. The focus group included representatives from state DOTs, local governments, emergency services, trucking firms and other interested parties. An incident management conference was also held in Kansas City in 1994, jointly sponsored by MARC, MHTD (now MoDOT), KDOT and the National Incident Management Coalition.

As a result of these activities, KDOT and MoDOT are leading coordinated efforts to implement improved incident management programs for the region. One result of these efforts has been the operation of Motorist Assist programs on area freeways by MoDOT and by the Kansas Highway Patrol. The LRTP supports continued efforts to minimize congestion resulting from incidents. The regional incidence response manual was most recently updated in 2001.

9.4 Action Plan

9.4.1 Planning Activities

MARC should continue to coordinate with KDOT, MoDOT and local entities to implement and refine the regional congestion management system and integrate the CMS into the regional transportation planning process.

1. Transportation management strategies should continue to be thoroughly evaluated as part of major investment studies for major highway corridors.

2. Regional strategies identified in the CMS toolbox should be considered in developing alternative strategies for MIS and corridor studies.

3. MARC should continue to conduct periodic vehicle occupancy studies, travel time studies, and other technical studies to help identify potential transportation management strategies and monitor their effectiveness.

4. The feasibility of implementing high-occupancy vehicle lanes on freeway segments shown in Figure 9-2 should be analyzed in detail, either with a special study or as part of Major Investment Studies for specific corridors.

5. MARC should continue to coordinate with KDOT, MoDOT, transit operators and other local entities to implement and refine the Regional Intelligent Transportation Systems Architecture, and to integrate ITS into the regional transportation planning process and the operation of regional transportation systems.

9.4.2 Other Actions

1. Regional programs such as KC Scout, Motorist Assist and Operation Green Light should be maintained and expanded to improve the management and operation of freeways and arterial roadways.

2. The regional RideShare program should be maintained and expanded to address a broad range of transportation demand management strategies.

3. MARC should review its transportation committee structure to ensure the continued coordination, development, integration and improvement of transportation management strategies within the regional transportation planning process.