

5-COUNTY REGIONAL TRANSPORTATION STUDY



DOUGLAS • JOHNSON • LEAVENWORTH • MIAMI • WYANDOTTE

Phase 2 Final Report Executive Summary



Executive Summary

Every day, drivers travel millions of miles on the 5-County region's roadway system, thousands use the region's transit services and bicycle facilities, and millions of dollars of goods move through the transportation network. Even with the 2010-2020 T-WORKS transportation program, funding for transportation infrastructure and services cannot address all of the traffic safety and operational issues.

The Kansas Department of Transportation (KDOT), the Mid-America Regional Council (MARC) and the Lawrence-Douglas County Metropolitan Planning Organization (L-DC MPO) have completed a two-phase study to assess the changing transportation needs in Douglas, Johnson, Leavenworth, Miami, and Wyandotte counties. This comprehensive study involved residents, community leaders, and transportation stakeholders. The Study resulted in a set of recommended strategies to improve the region's transportation system through the year 2040.

PURPOSE OF THE STUDY

The purpose of the 5-County Regional Transportation Study was to assess the changing transportation needs of the region and identify key strategies to enhance the regional transportation system in a sustainable way. Difficult choices will need to be made, and this study will serve as a guide and help to shape the future transportation system for the region.

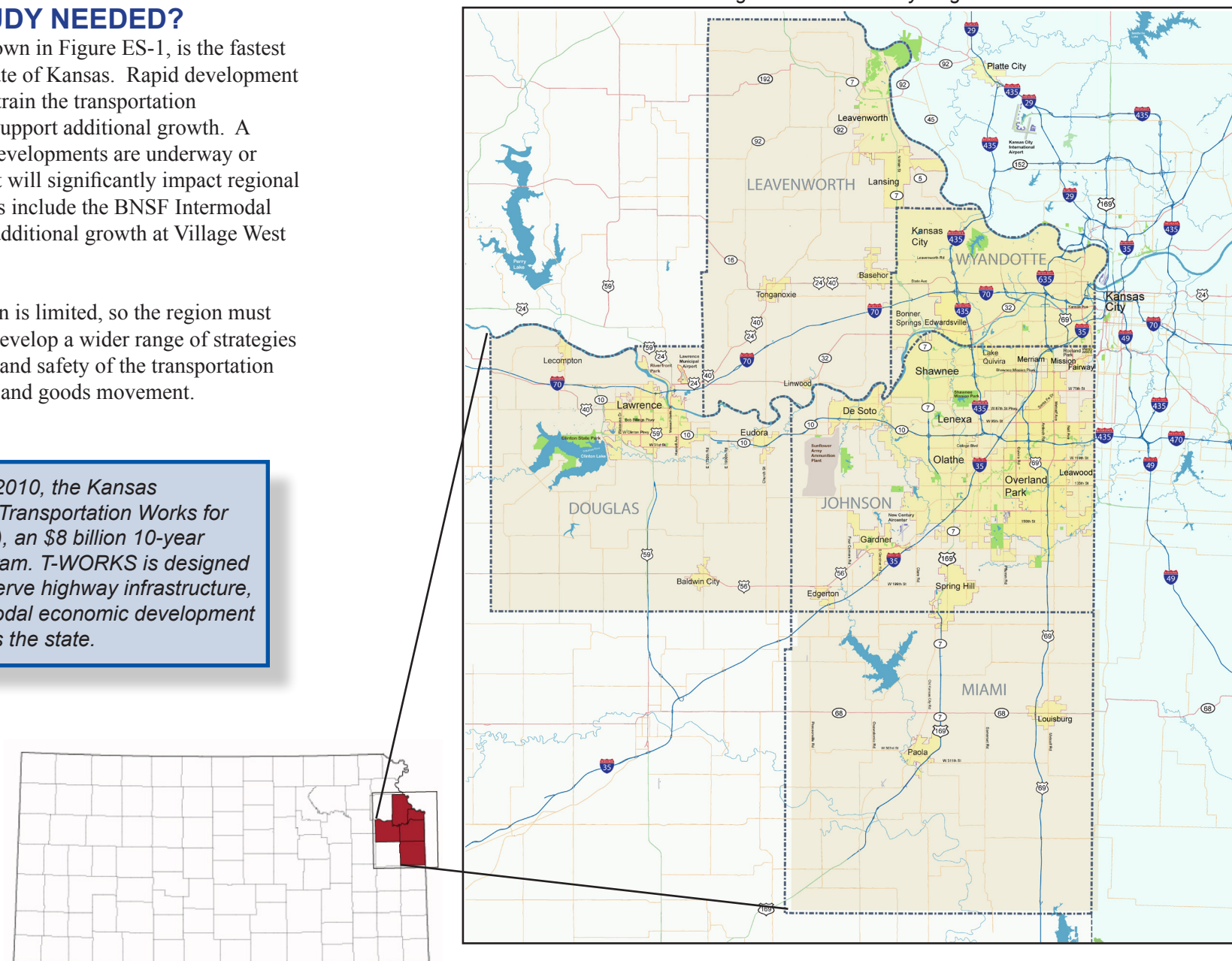
WHY IS THE STUDY NEEDED?

The 5-County region, shown in Figure ES-1, is the fastest growing region in the State of Kansas. Rapid development in the study region will strain the transportation infrastructure needed to support additional growth. A number of high-impact developments are underway or planned in the region that will significantly impact regional travel patterns. Examples include the BNSF Intermodal facility in Edgerton and additional growth at Village West in Kansas City, KS.

Funding for transportation is limited, so the region must prioritize the needs and develop a wider range of strategies to improve the operation and safety of the transportation system for both travelers and goods movement.

T-WORKS: In May 2010, the Kansas Legislature passed Transportation Works for Kansas (T-WORKS), an \$8 billion 10-year transportation program. T-WORKS is designed to create jobs, preserve highway infrastructure, and provide multimodal economic development opportunities across the state.

Figure ES-1: 5-County Region



STUDY SPONSORS

The sponsors for the study included KDOT, MARC, and the L-DC MPO. A **Core Team** of staff from each of the study sponsors provided oversight for the study process.

The study sponsors provided the following guiding principles for the 5-County Study:

The 5-County Regional Transportation Study will assess the region's multimodal needs and develop strategies that are:

- Regionally Based
- Technically Feasible
- Politically Acceptable
- Financially Realistic
- Sustainable

STUDY PHASES

The 5-County Regional Transportation Study was broken into two phases. Figure ES-2 shows the study process with Phase 1 described in the top box and Phase 2 in the remaining boxes.

Phase 1

Phase 1 of the study provided a complete assessment of the multimodal transportation needs for the 5-County region. Stakeholder outreach was a major component of Phase 1. Multiple opportunities were provided for the general public, elected officials, local government staff, and other transportation stakeholders to provide input on transportation issues, challenges, and trends.

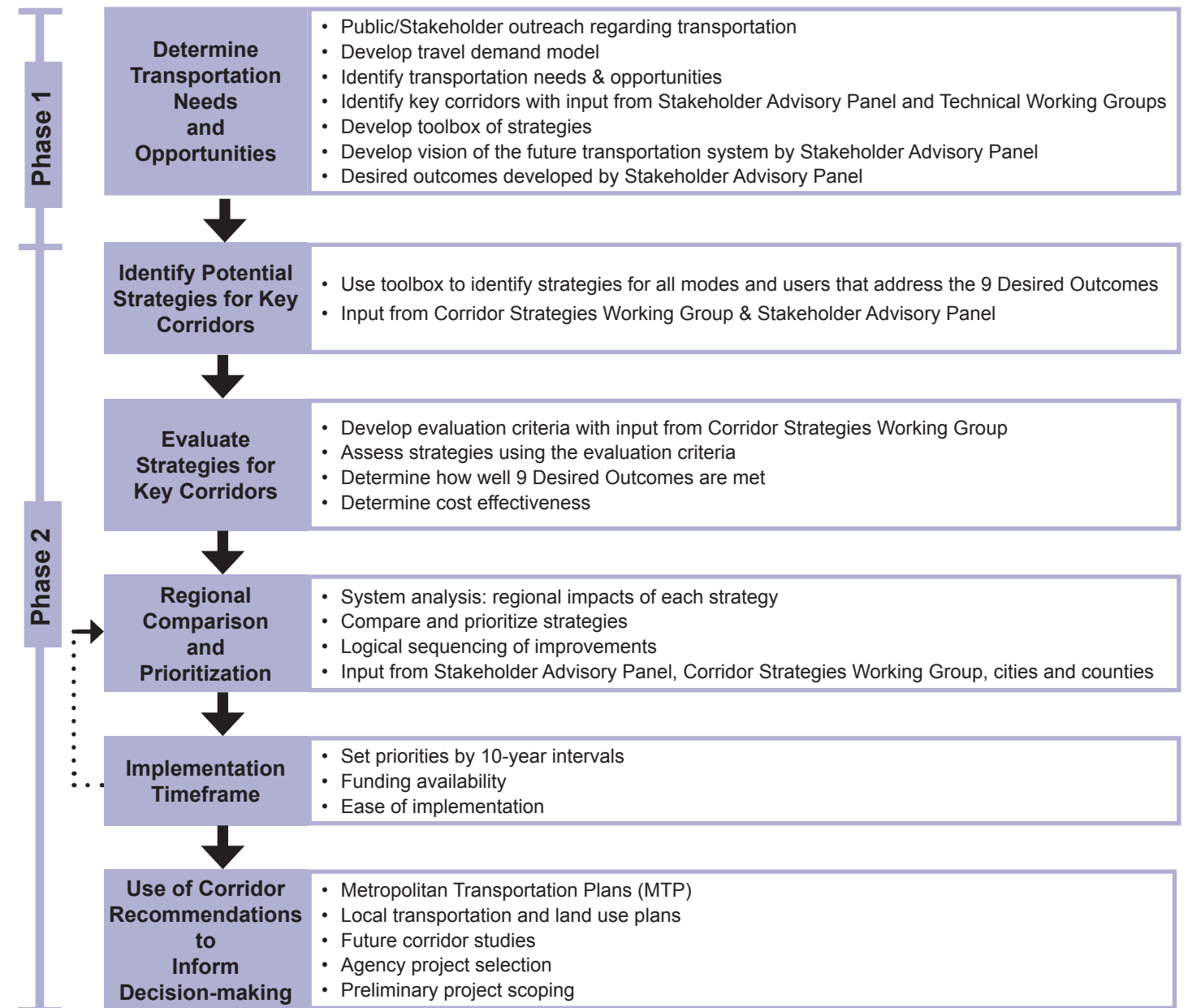
As a result of the stakeholder outreach, five primary themes emerged and have been used to guide the study recommendations:

1. Create a multimodal transportation system that provides choice and supports economic vitality of the region.
2. Focus on moving people and freight rather than on moving vehicles.
3. Invest in a transportation system that promotes the region's long-range vision and community goals and objectives.
4. Seek to maximize the vitality of social, economic, and environmental systems when making transportation investments.
5. Maintain and invest in the existing transportation system.

Phase 2

Phase 2 of the study used the guiding principles, vision for future transportation, and the 9 Desired Outcomes developed during Phase 1 to prioritize the region's transportation needs. Strategies for 17 key transportation corridors were evaluated and a potential outer loop was analyzed. In addition to public officials from each of the five counties, three stakeholder groups provided guidance throughout Phase 2. The **Stakeholder Advisory Panel** was a group of stakeholders from the public sector and key interest groups representing a wide range of interests. This panel was responsible for recommending transportation goals and providing input on decision-making criteria. The **Corridor Strategies Working Group** was a well-informed group of stakeholders that provided input on the strategies recommended for each of the corridors and on the evaluation criteria used to analyze those strategies. The **Travel Demand Model Technical Committee** provided input on the development of the 5-County regional model.

Figure 1-2: 5-County Transportation Study Process



DESIRED OUTCOMES

During Phase 1 of the study, the Stakeholder Advisory Panel and the four topical Working Groups developed a list of “9 Desired Outcomes” to be used in making transportation investment decisions. These groups used input obtained from the public and other stakeholders regarding transportation issues and desires for changes in a future multimodal transportation system.

The 9 Desired Outcomes fall into one of three categories:

Engineering

- **Mobility:** Move people and goods in an efficient manner.
- **Safety:** Reduce crash rates, severity, and reduce conflict points.

Economic Impacts

- **Regional Prosperity:** Improve economic competitiveness through reliable and timely transportation and expanded market access.
- **Efficient Use of Financial Resources:** Evaluate the affordability of transportation investments by considering the initial investment, operation/maintenance, and economic benefit.

Community and User Impacts

- **Choice:** Invest in a multimodal transportation system that maintains our existing roadways, but also allows individuals the choice of using other modes.
- **Environment:** Rather than mitigate the impacts on the environment, transportation investments should seek to enhance air and water quality as well as protect natural resources.
- **Public Health:** Improve traffic safety and air quality, and promote physical activity and fitness.
- **Social Equity:** Consider investment impacts on all population groups within communities.
- **Livability:** Integrate the transportation system with community desires.

These outcomes were used during Phase 2 to evaluate the strategies for 17 key corridors and were used as well to evaluate the benefits and impacts of a potential outer loop. The key corridors and potential outer loop are shown in Figure ES-3 and include:

East-West Corridors

- I-70
- I-435 (East-West Segment)
- US-24/40
- US-56
- K-10
- K-68
- K-92/M-92
- 175th Street/ 199th Street/223rd Street
- Shawnee Mission Parkway
- State Avenue

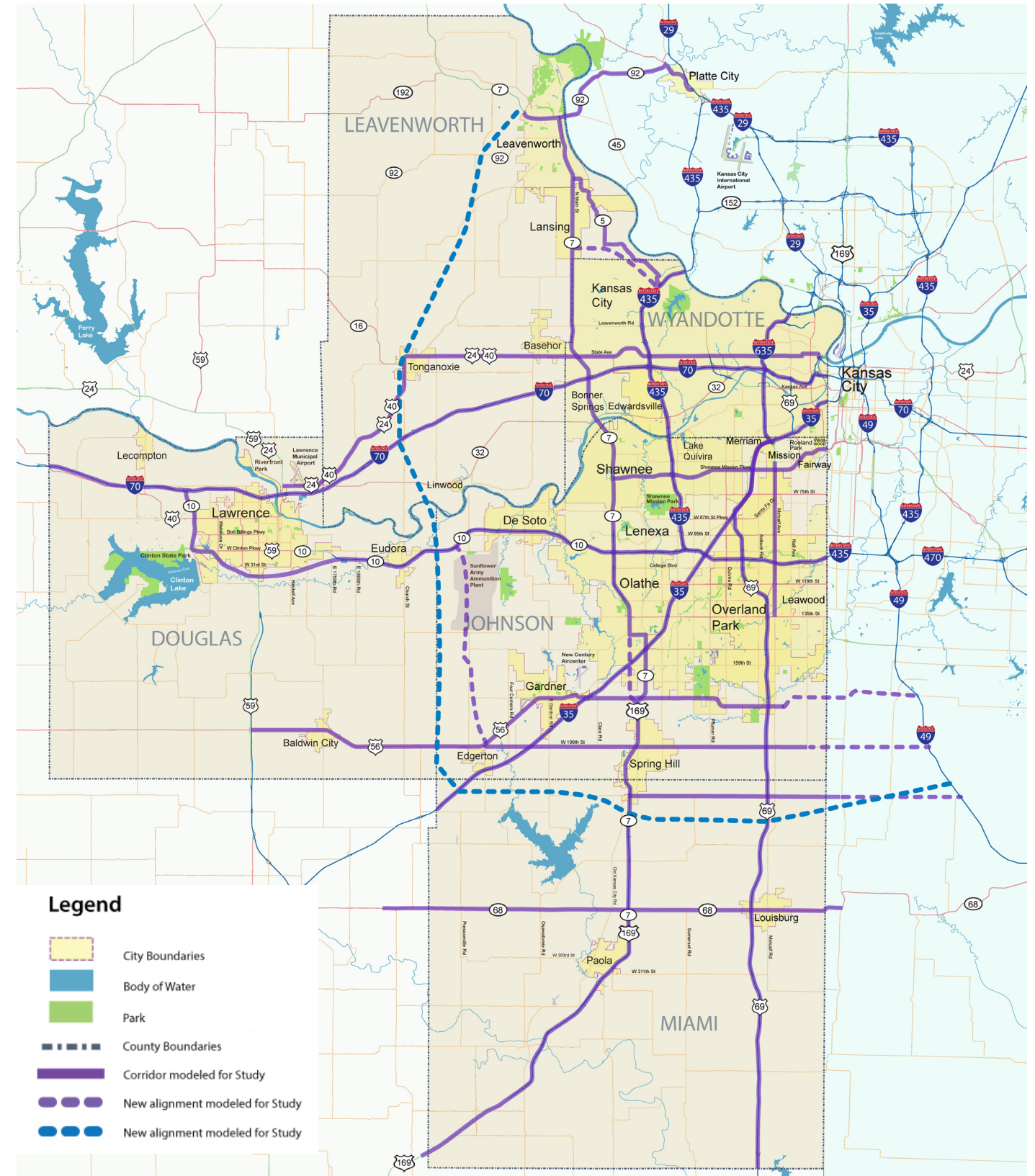
North-South Corridors

- I-35
- I-435 (North-South Segment)
- I-635/I-35/US-69
- K-5
- K-7/US-73/US-169
- Metcalf Avenue
- Western Johnson County North-South Arterial

Potential Outer Loop

A potential outer loop was also studied during Phase 2 as a possible strategy to address the needs in one or more of the corridors studied. The blue dashed line on Figure ES-3 illustrates the path that was modeled as part of the study, but does not necessarily represent the centerline of a future roadway. A more generalized corridor is depicted on pages 123-126.

Figure ES-3: Key Corridors Evaluated in Phase II of the 5-County Study



TRANSPORTATION LESSONS FROM PEER CITIES

Lessons can be learned from several Midwestern cities that have metropolitan areas of comparable size and geography to the Kansas City metropolitan area (Kansas City, KS and Kansas City, MO). These peer cities have experienced the same transportation challenges that are now facing the 5-County region and have developed strategies to address them.

Figure ES-4 provides a comparison of population, land area, and transportation system characteristics drawn from the 2011 Urban Mobility Report prepared by Texas A&M Transportation Institute.

Existing Highways and Arterial Streets

The Kansas City metropolitan area’s extensive roadway network has more than double the number of freeway lane-miles per capita found in Denver and Minneapolis-St. Paul, and almost double that in Dallas. The Kansas City area also exceeds all other peer cities in arterial street lane-miles per capita. These peer cities have determined that roadway capacity projects alone cannot address the transportation needs of their communities. They have incorporated managed lanes, transit systems, ramp metering, and other non-widening strategies to handle travel demand.

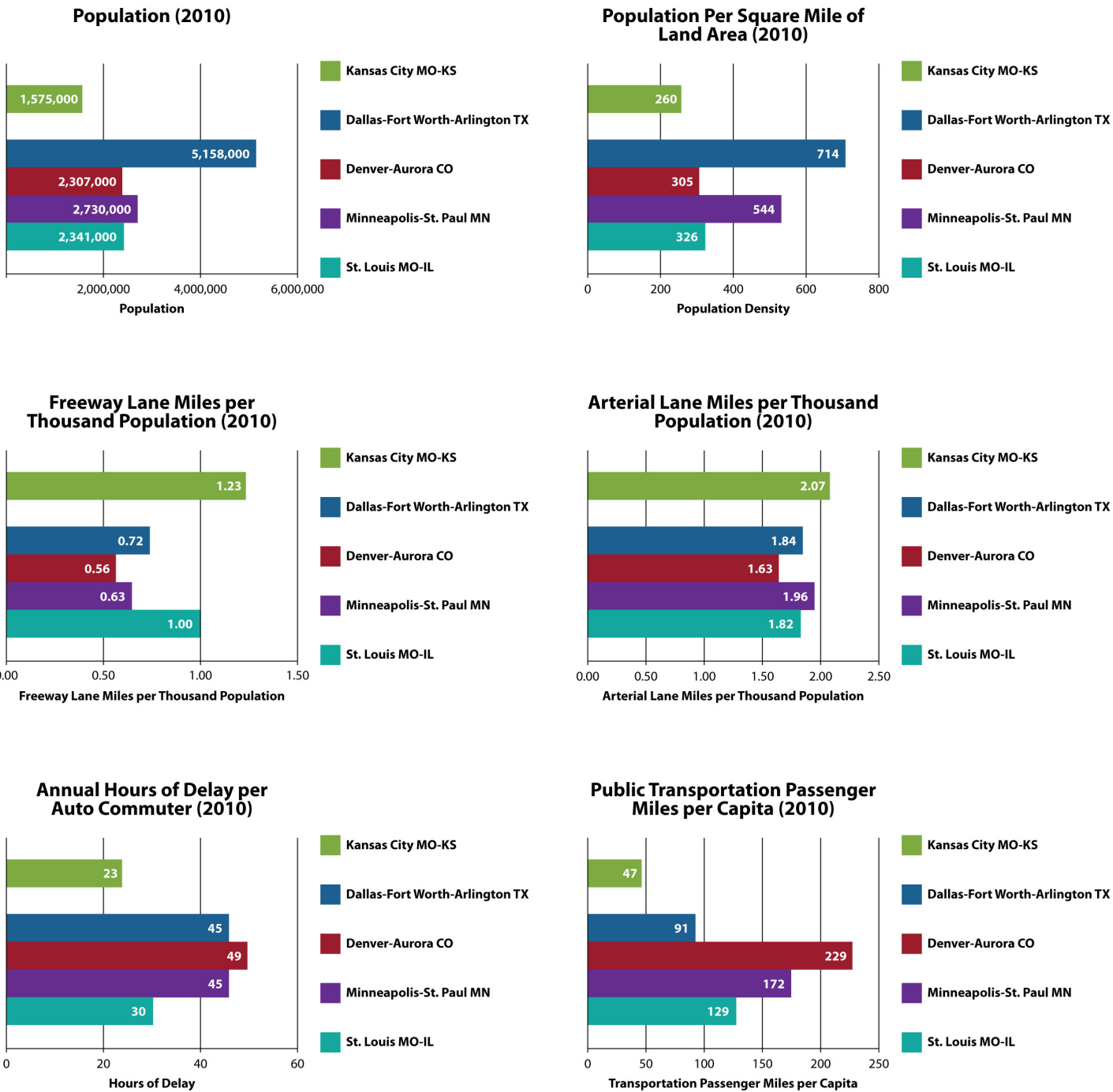
Commuter Delays

The travel delay experienced by commuters using personal vehicles is relatively low when compared to the peer cities. As part of the approach to address travel delay, the peer cities have implemented a variety of Transportation System Management (TSM) and Transportation Demand Management (TDM) strategies.

Public Transportation

One strategy where the Kansas City metropolitan area and the 5-County region appear to be falling behind is in providing a regional system of public transit. It is apparent that the peer cities have each implemented an aggressive public transportation strategy to address peak period congestion and to provide a choice in transportation modes to their residents. The peer cities do have an advantage in higher population densities that make public transportation more feasible. In the 5-County region, the implementation of a system of Park & Ride facilities is recommended to artificially create density. The K-10 Connector bus service and the I-35 Bus-on-Shoulder service have shown that they attract riders even though the 5-County region has lower population density.

Figure ES-4: Peer City Comparison of Population and Transportation Characteristics



Source: Lomax, Tim and Schrank, David. (2010) Urban Mobility Report. Texas A&M Transportation Institute, Strategic Solutions Center
 Note: Data represented in figure above is from the Kansas Metro area and does not cover the entire 5-County region.

REGIONAL CHALLENGES

In order to plan for the region’s future transportation and create strategies that will have a positive impact on the movement of people and goods, it’s important to understand the challenges that face the region through the year 2040.

Phase 2 of the study identified many of these challenges through the combined efforts of the Study Sponsors, a stakeholder/public outreach process, and technical analyses.

As shown in Table ES-1, the 9 Desired Outcomes provide a framework for discussing the challenges the region will face in the coming years.

Table ES-1: 9 Desired Outcomes and Regional Challenges

Desired Outcome	Challenges
Mobility	<ul style="list-style-type: none"> • Recurring and Non-Recurring Congestion – understanding and addressing the types and causes of congestion • Access Management – protecting the public investment in the mobility function of major roads while supporting economic activity (balance traveler safety, system efficiency and economic activity) • Latent Travel Demand – this short-term travel growth is difficult to predict and may result in design year traffic volumes being reached in less time as people change their travel behaviors (time of travel, route choice, mode choice, trip chaining, etc.) • Corridor Widening Constraints – existing right-of-way, development, and complex interchanges make further widening of some corridors cost-prohibitive • Funding Limitations – the need for transportation improvements far outpace the funding that is and will be available • Understanding the Benefits of Non-Capacity Strategies – educating stakeholders on the benefits of new Transportation System Management (TSM) and Transportation Demand Management (TDM) strategies
Safety	<ul style="list-style-type: none"> • Identifying Effective Countermeasures – identifying the causes of crashes in the region and finding effective strategies
Regional Prosperity	<ul style="list-style-type: none"> • Coordinating Land Use and Transportation Planning – major developments must coordinate as early as possible with transportation agencies • Family Budgets – the average household in the Kansas City Metropolitan area spends between 14% and 27% of their income on transportation costs
Efficient Use of Resources	<ul style="list-style-type: none"> • Limited Transportation Funding – spending the limited available funding for transportation in a manner to achieve the greatest benefits • Multiple Agencies – with many different agencies being part of the decision-making process, significant coordination is a must
Choice	<ul style="list-style-type: none"> • Recognizing the Regional Need for Transportation Options – many of the region’s population groups desire a more robust transit system for longer trips and improved bicycle and pedestrian facilities for shorter trips • Coordinating Transit Services – coordinating the services of the five transit agencies that serve the 5-County region • Funding Limitations – providing additional funding to address transit needs • Choice Ridership – making transit more attractive to choice riders, those who have a choice of transportation modes and choose to ride transit
Environment	<ul style="list-style-type: none"> • Air Quality – maintaining a reasonable level of air quality is a challenge with the current transportation system, mode choice options could provide a benefit
Public Health	<ul style="list-style-type: none"> • Lack of Transportation Mode Options – the lack of diversity in transportation options has an impact on public health • Access to Medical Facilities – lack of all-day transit in many areas makes it difficult for some citizens to have adequate access to medical facilities • Air Quality – the current transportation system that relies heavily on automobile travel has a negative impact on air quality
Social Equity	<ul style="list-style-type: none"> • Balance the Benefits of Transportation Improvements – transportation investments must be distributed throughout the region so that all population groups benefit
Livability	<ul style="list-style-type: none"> • Integrating Transportation with Community Goals – balance mobility goals with community goals for livability

REGIONAL CHANGES

Significant changes can be expected by 2040 in population demographics, development, travel demand, truck traffic, vehicle technology, and funding. These changes must be understood and considered as decisions are made for transportation investments.

Population, Employment, and Development Patterns

Population and employment within the 5-County region are expected to grow 41 percent by 2040, most of which will be in Johnson County. Many of the region's cities are planning city centers with compact spaces, mixed-use facilities, and localized resources which can minimize the need for longer distance commuting. However, the large employment centers such as downtown Kansas City, MO, Corporate Woods, and Village West will continue to draw commuters from throughout the region.

Figure ES-5 shows the areas forecasted to experience population growth between 2010 and 2040. Most of the forecasted growth is around the perimeter of the metro area, mostly outside I-435.

Figure ES-5: Forecasted Population Growth between 2010-2040

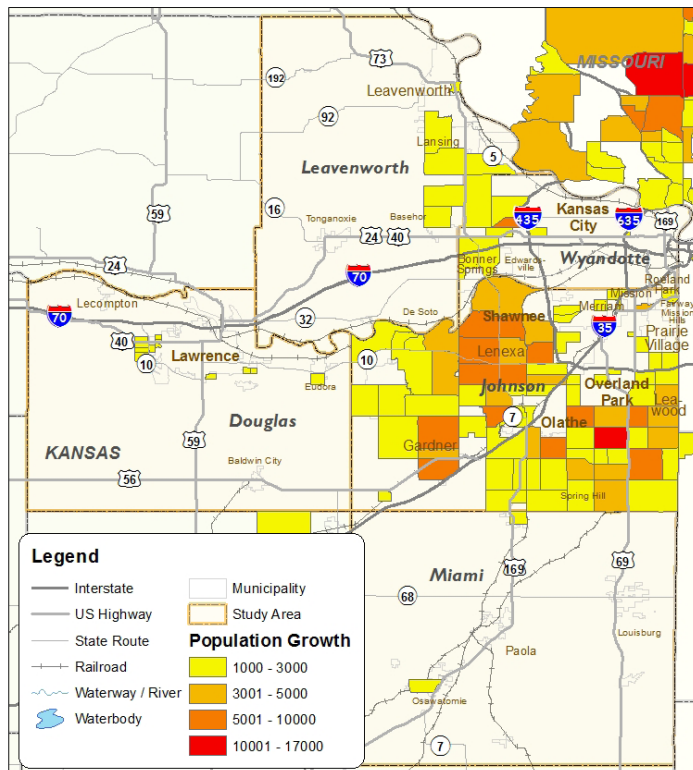
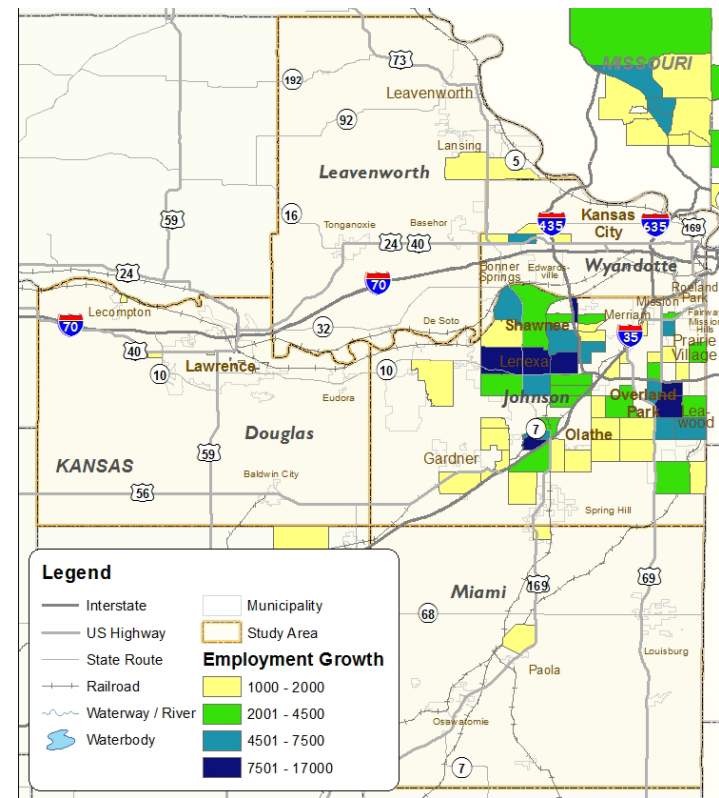


Figure ES-6 shows the areas forecasted to experience employment growth between 2010 and 2040. Major new employment hubs are projected along the K-10 corridor west of I-435, at Village West in Wyandotte County, and at the new BNSF Intermodal Facility near Edgerton. Increased commute distances may be a factor for the region's residents as development occurs outside existing developed areas.

Figure ES-6: Forecasted Employment Growth between 2010-2040



Source: Kansas Department of Transportation, Kansas GIS, US Census

Source: Kansas Department of Transportation, Kansas GIS, US Census

Demographic Changes

The makeup of the region's population will change in the coming years. The two population age groups that are expected to see the most significant change are those over the age 65 and those aged 35 and younger. Nationally, from 2010 to 2040, there is expected to be a 72 percent increase in the number of households in the age 65+ category. The changes will be seen specifically in the inner ring suburbs and this age group will want to rely less on automobiles and will desire access to medical and shopping needs via transit. National data shows that people 35 years of age and younger want to use their automobiles less and live in a more urban environment. The region will also see an increase in low-income and minority populations and these individuals are more likely to use transit.

While planning for the future, strategies considered in the region should take into account these demographic shifts and plan for multimodal transportation.

Changes in Land Use

A major land use concern facing the 5-County region is the sustainability of continued outward development. The Mid-America Regional Council (MARC) has analyzed this issue in the development of future year growth scenarios. MARC found that if 40 percent of the region's population growth were accommodated in existing centers along established corridors, the region could save over \$3 billion in infrastructure costs.

The developed area around Lawrence is also expanding, but planning efforts are being made to encourage development in a way to support financial sustainability. One concept being encouraged is the creation of new neighborhoods based on Traditional Neighborhood Design. This would increase connectivity and support walking, biking and transit travel.

Increased Travel Demand

As the population and employment increases and spreads throughout the region, the demand on the transportation system will also increase. A regional travel demand model was used to assess future travel patterns on major roads in the 5-County region. The model made use of the land use and population growth assumptions determined by the Mid-America Regional Council and by the Lawrence-Douglas County Metropolitan Planning Organization.

Table ES-2 shows the increase in vehicle-hours traveled, vehicle-miles traveled, and the lane-miles of congestion between 2010 and 2040. The congestion on the road network more than doubles over this time period.

Table ES-2: Increase in Travel Demand From 2010 to 2040

	2010 Base Year	2040 Existing System + Committed T-WORKS projects
Peak Hour Vehicle-Hours Traveled (VHT)	137,980	236,659
Peak Hour Vehicle-Miles Traveled (VMT)	6,170,068	9,136,945
Congestion LOS>E (Lane-Miles)	1,033	2,499

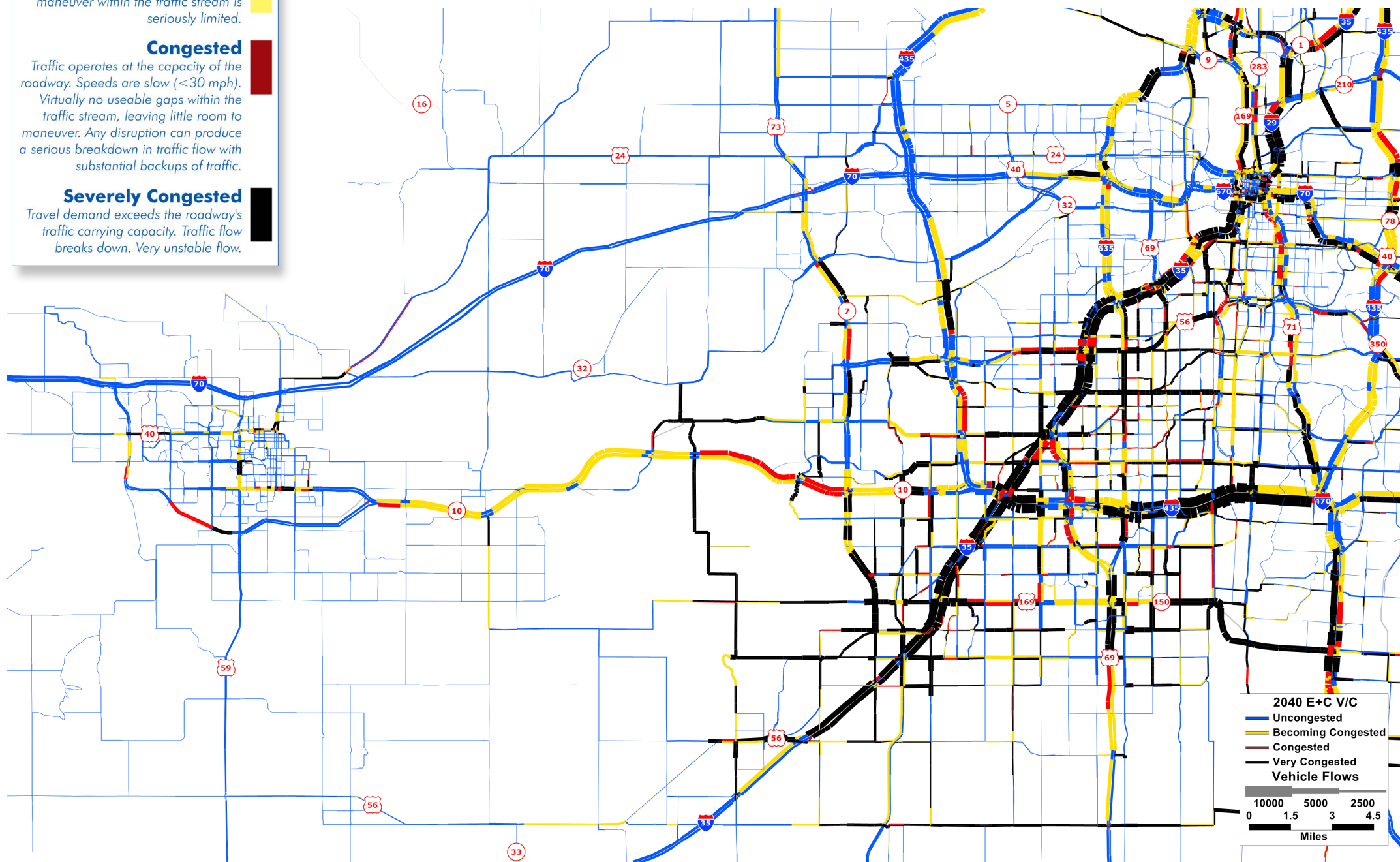
A future view of the 5-County region's roadways shows the demand for travel on many of the major highways and some arterial streets to be near, at, or over their traffic-carrying capacity during peak periods.

Figure ES-7 shows the travel demand model results for the evening peak period level of congestion in the year 2040. The 2040 model assumes the existing roadway network plus those projects that are included in the T-WORKS transportation program (2010-2020). The roadways shown in red indicate segments that are at Level of Service (LOS) E. LOS E is the capacity of the roadway and is characterized by low travel speeds and a very limited ability for drivers to change lanes. Motorist delay is very high and travel times are unreliable, impacting both commuters and freight movement. Black lines show where demand exceeds LOS E, there are too many vehicles for the road to carry and traffic comes to a stop.

LEGEND

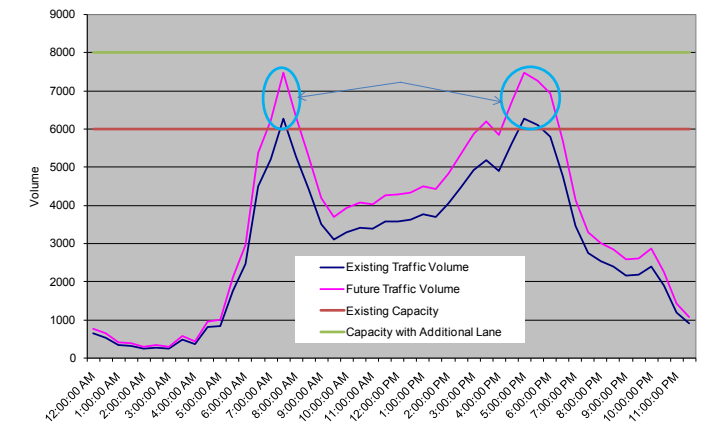
- Not Congested**
 Speeds are at or near the speed limit. Ability to maneuver within the traffic stream varies from unimpeded to somewhat restricted.
- Moderately Congested**
 Speeds begin to decline. Freedom to maneuver within the traffic stream is seriously limited.
- Congested**
 Traffic operates at the capacity of the roadway. Speeds are slow (<30 mph). Virtually no useable gaps within the traffic stream, leaving little room to maneuver. Any disruption can produce a serious breakdown in traffic flow with substantial backups of traffic.
- Severely Congested**
 Travel demand exceeds the roadway's traffic carrying capacity. Traffic flow breaks down. Very unstable flow.

Figure ES-7: 2040 PM Peak Hour Volume to Capacity Ratio for Existing Conditions plus T-WORKS Projects



As future transportation investment decisions are made, the when, where, and why congestion occurs must be considered. Figure ES-8 shows typical directional hourly traffic volumes on the I-35 Corridor. *The point illustrated by the graph is that existing roadways have adequate capacity except during the times when commuters are using these facilities.*

Figure ES-8: I-35 Peak period roadway congestion in 2040



Source: 5-County Travel Demand Model

This leads to two questions: Are there other transportation strategies that would effectively handle commuters without widening the roadway? And, how do we move more people and goods in fewer vehicles? The 5-County region should take advantage of the lessons learned in peer Midwestern cities by developing a more balanced transportation system that includes transit and active modes of transportation in addition to maintaining and developing the system of highways and major streets. A regional transit system serves broader desired outcomes than just mobility. It would address social equity allowing seniors to “age-in-place” and provides transportation for the transit-dependent. It also meets the desired outcomes of choice, environment, public health, and livability that are sought by the region’s residents and stakeholders.

Increase in Truck Traffic

While truck volumes are growing throughout the region, the development of the BNSF intermodal facility north of I-35 in Edgerton is anticipated to be a major destination and generator of regional freight rail and truck traffic. Traffic studies completed for this development have forecasted the combined intermodal and logistics activity to generate about 17,000 trips a day when it is fully developed. Just the intermodal site is expected to generate 7,000 truck trips per day when fully developed with 85 percent of these trucks traveling northeast on I-35.

Changes in Vehicle Technology

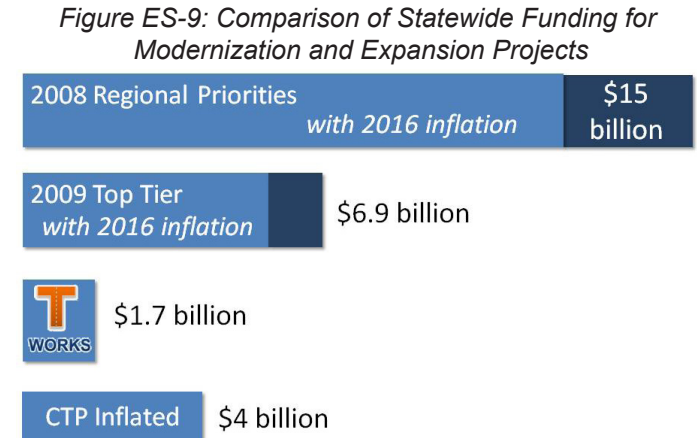
Technology is being used to make vehicles smarter, safer, and connected. In-vehicle communication with satellites is becoming common (e.g. in-vehicle navigation systems). In August 2012, the United States Department of Transportation launched the first connected vehicle technology test in the U.S. This test of 3,000 vehicles in Ann Arbor, Michigan is evaluating the effectiveness of vehicles communicating with other vehicles and the road. Connected vehicle technology has the potential to increase the capacity of existing roadways. As vehicles communicate with each other, they can travel with less space between them, thereby allowing the existing number of lanes to carry more traffic.

Changes in Vehicle Fuel Mileage

In 2011, the federal government changed fuel efficiency standards for passenger vehicles and light trucks starting with the model year 2017 that require vehicles to have higher gas mileage. With these changes, it is expected that gas tax revenues will decrease sharply. The gas tax revenues flow to the federal and state governments for transportation projects, meaning fewer dollars could be available for transportation improvements in the future.

Changes in Transportation Funding

Figure ES-9 shows a comparison of statewide funding for expansion and modernization projects in Kansas. The top bar represents all the projects communities listed as needs during the 2008 Local Consult meetings, a total of \$15 billion. Those projects were prioritized and in 2009 a list of top tier projects costing \$6.9 billion was developed. T-WORKS will fund \$1.7 billion of expansion and modernization projects (\$880 million in the 5-County region) and while it will address many transportation needs, there are many more that will not be funded. This is in comparison to the CTP (the previous funding program) which when inflated to 2016 dollars had \$4 billion available for modernization and expansion transportation projects.



Source: Kansas Department of Transportation

FUNDING ASSUMPTIONS FOR THE 5-COUNTY STUDY

In order to estimate the amount of funding that may be available for transportation projects during the decades 2020-2030 and 2030-2040, the study team assumed the continuation of state transportation programs similar in size to T-WORKS. In doing this, the study team used a baseline of \$1.2 billion that is available for expansion, modernization, modes, and other categories of transportation projects in the 5-County region during the years 2010-2020. This baseline was adjusted for inflation with the result that \$1.32 billion would be available during the years 2020-2030 and \$1.48 billion during 2030-2040.

FUTURE ROLE OF ROADWAYS

The 5-County region has a robust system of interconnected freeways, other highways, and arterial streets which create its transportation network. The roadway system serves commuter trips, freight movement, transit, bicycle and pedestrian trips, and provides links to activity centers. Highways and arterial streets will continue to be the backbone of the future transportation system. Due in part to funding limitations, the future will see a broader range of strategies implemented on the roadway system in addition to key capacity improvement projects. These will include Transportation System Management (TSM) strategies like ramp metering and expanding the KC Scout ITS traffic management system, and active lane-use control. Also, Transportation Demand Management (TDM) strategies such as providing Park & Ride facilities and expanding transit service will provide residents with more transportation options and help address peak period congestion.

FUTURE IMPACTS OF FREIGHT MOVEMENT

The 5-County region is a vital national freight hub due to a strong goods movement transportation network with relatively few bottlenecks. Kansas City is considered the second largest rail center in the nation and is served by five Class I rail carriers. The region is also one of the top five trucking centers. The construction of the BNSF Intermodal Facility in Edgerton, along with associated development, will have a significant impact on the movement of goods by truck in the region. When fully operational, the intermodal facility will generate over 7,000 truck trips per day with the majority of those trucks moving north on I-35.

FUTURE ROLE OF PUBLIC TRANSIT

Transit will play an important role in the future transportation system for the 5-County region, particularly in moving commuters during the morning and evening peak travel periods. An enhanced transit system will improve the movement of travelers both regionally and locally, connecting them to major activity centers such as universities, hospitals, shopping areas, sports arenas, and major employment centers. Enhanced transit will serve not only commuters, but also those travelers who are transit dependent (i.e. young, old, low income, disabled, or otherwise unable to drive).

FUTURE ROLE OF BICYCLE AND PEDESTRIAN FACILITIES

Bicycle and pedestrian facilities are an integral part of a future transportation system. As land use changes to more mixed development and as more of the population focuses on a healthier lifestyle, there is a growing need for alternatives to automobile travel. While bicycle and pedestrian facilities will not fully address the needs of people traveling regionally, the regional system needs to accommodate and plan for these types of facilities to eliminate the barriers created by natural features and major highways and to support regional transit service.

FUTURE ROLE OF ECONOMIC DEVELOPMENT IN TRANSPORTATION

Transportation investments have a significant impact on economic development. Future transportation investment decisions should continue to consider economic impacts.

REGIONAL FRAMEWORK FOR DECISION MAKING

Transportation investment decisions should take into account the vision for the region’s future transportation system that was developed by local officials, technical staff, and other transportation stakeholders in Phase 1 of the 5-County Regional Transportation Study. The shared vision of stakeholders in the region states that:

“The future 5-County transportation system should...”

- Provide efficient movement of people and goods
- Provide users with the choice to utilize multiple modes of transportation
- Support a strong regional economy
- Be safe and reliable
- Be financially efficient and affordable
- Enhance the environment
- Improve public health
- Allow every citizen to participate fully in society
- Enhance the quality, livability, and character of communities

Framework for Investment Decisions

To accomplish this vision, 9 Desired Outcomes were developed to guide decisions for future transportation investments within the funding limitations for transportation infrastructure and services.

A regional framework for transportation investment decisions was developed with guidance from the Stakeholder Advisory Panel. Decisions should follow the framework shown in Figure ES-10 and described below:

- 1. Maintain existing transportation facilities and services before giving consideration to other expenditures:** Within this framework, maintaining and operating the existing roadways, bridges, transit services, and bicycle/pedestrian facilities comes first. Maintenance is the number one priority of residents and stakeholders in the 5-County region and maintenance first has been a practice of KDOT.

Recommended practices include:

- Maintain existing infrastructure and services before considering system expansion. Funding maintenance and operation of existing transportation systems must be provided before investments in other strategies.
- Consider life-cycle costs when making investment decisions. The life-cycle costs to maintain an improvement must be considered when making transportation investment decisions.

- 2. Manage travel demand and the operation of the transportation system before considering more costly strategies:** Within this framework, the next step is to consider a wide variety of lower-cost strategies that can maximize the efficiency of the existing system and reduce the demand for use.

Recommended practices include:

- Maximize the efficiency of existing roadways through the use of Transportation System Management (TSM) strategies such as ramp metering, variable speed limits, traffic signal optimization, and access management.
- Reduce the travel demand on existing roadways through the use of Transportation Demand Management (TDM) strategies such as park & ride facilities, transit services, ride sharing, and bicycle facilities.
- Expand programs that address non-recurring congestion such as the KC Scout traffic management system, motorist assist programs, and incident management plans.

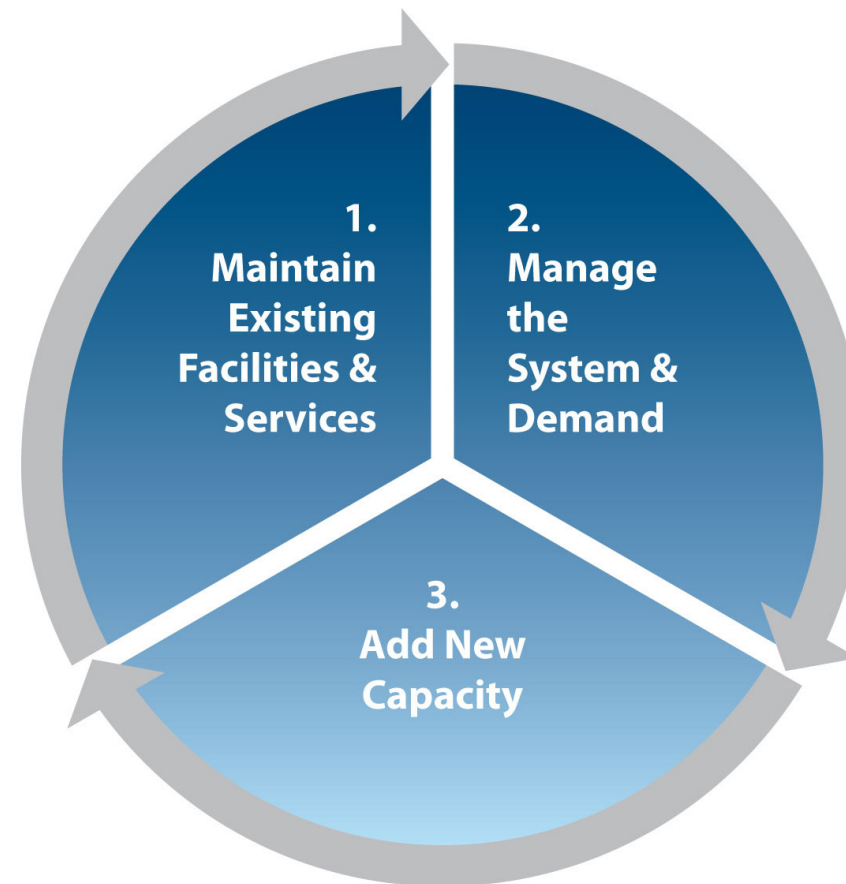
- Manage lanes rather than build new lanes. Strategies include active lane-use control that can incorporate the use of the shoulder as a driving lane during peak traffic periods, High-Occupancy Vehicle (HOV) lanes and High-Occupancy Toll (HOT) lanes.
- Focus on correcting bottlenecks before considering widening a roadway. Many times congestion can be traced to an operational or geometric feature at a given spot. Geometric improvements focused on these spots can often have significant impacts on traffic flow.

- 3. Add new capacity to the transportation system:** The final step within this framework, after maintaining and managing the transportation system, is the consideration of new infrastructure and service capacity improvements. Within this framework it is understood that new capacity improvements lead to new maintenance and system management costs.

Recommended practices include:

- Consider HOV/HOT operation during peak periods when additional lanes are recommended on freeways. The ability to widen existing roadways is becoming more difficult. HOV/HOT lanes provide more flexibility to increase the throughput of persons.
- Develop a right-of-way preservation program. Preserving right-of-way for future improvements can result in large cost savings in the long term.
- Develop a program to supplement local funds for the improvement of routes that parallel a highway. Improvements to the local street system can encourage drivers making short distance trips to stay off highways and thereby provide some congestion relief.

Figure ES-10: Framework for Transportation Investment Decisions



EVALUATION OF THE RECOMMENDED STRATEGIES

The recommended strategies were evaluated using criteria based on the 9 Desired Outcomes developed by the Stakeholder Advisory Panel. The analysis made use of the 5-County Travel Demand Model, GIS information, cost/benefit data and local land use plans.

The strategies were based on one of four broad categories:

- **Operation and Maintenance:** Operation and maintenance of existing roadways and transit services is a critical “baseline” strategy for all corridors.
- **Transportation Systems Management:** These strategies seek to enhance traffic flow and reduce congestion through better management and operation of the existing transportation facilities.
- **Transportation Demand Management:** These strategies seek to address transportation needs by reducing the number of vehicles during the peak travel periods.
- **Capacity Improvements:** These strategies increase a roadway’s capability to carry higher traffic volumes through added general purpose lanes or through managed lanes.

Table ES-3 shows the estimated costs by strategy type and decade of implementation.

Table ES-3: Funding Requirements for Recommended Strategies

Strategy Type	Decade		Total
	2020-2030	2030-2040	
Operation & Maintenance	Varies*	Varies*	Varies*
Transportation System Management	\$ 93,056,000	\$ 6,775,000	\$ 99,831,000
Transportation Demand Management	\$ 114,224,500	-	\$ 114,224,500
Capacity – General Purpose Lanes	\$ 1,113,134,655	\$ 1,169,832,700	\$ 2,282,967,355
Capacity – Managed Lanes	-	\$ 305,714,200	\$ 305,714,200
All Strategies	\$ 1,320,415,155	\$ 1,482,321,900	\$ 2,802,737,055

*Funding for the operation and maintenance of existing transportation infrastructure and services typically comes from a separate source than that for the implementation of new strategies. KDOT’s average annual maintenance cost for pavements and bridges in the 5-County region was approximately \$13.5 million for the years 2001 through 2011. Maintenance costs can vary considerably from year to year.

EVALUATION PROCESS

The process for evaluating the corridor strategies included these steps:

- A “triple bottom line” approach, recommended in Phase 1, requires consideration of economic, environmental, and societal factors when making transportation investment decisions.
- An evaluation matrix was created through a series of meetings with the Core Team, Corridor Strategies Working Group, and Stakeholder Advisory Panel. One or more criteria were identified for each of the 9 Desired Outcomes that best defined the regional philosophy for that outcome.
- The Stakeholder Advisory Panel and public officials from all five counties determined weights that were applied during scoring of the strategies. These weights represented the importance of each of the 9 Desired Outcomes.
- Each corridor strategy was scored and then all strategies were placed in highest to lowest order based upon total score.

EVALUATION CRITERIA

The criteria use for each of the 9 Desired Outcomes are:

- **Mobility:** Degree in which a strategy supports the movement of people and goods.
 - Year 2040 volume to capacity ratio
 - Change in number of congested roadway miles
 - Change in the number of vehicle-hours traveled
- **Safety:** Degree in which a strategy would lead to reduced crash rates and severity.
 - Similar process to that used for T-WORKS
- **Regional Prosperity:** Improved economic competitiveness through reliable transportation.
 - KDOT provided a TREDIS (Transportation Economic Development Impact System) analysis
- **Efficient Use of Financial Resources:** Evaluation of the affordability of transportation investments.
 - Benefit/cost analysis based upon a reduction in the number of crashes and a reduction in travel costs
- **Choice:** Degree in which strategy provides for choice in mode of transportation.
 - Travel time in automobile compared to transit
 - Transit ridership as determined by the travel demand model
 - Degree to which strategy connects various modes
 - Degree to which transit and bicycle facilities are provided
- **Environment:** Degree to which a strategy enhances the environment
 - Impacts to sensitive natural resources
 - Reduction in air and water pollution, carbon emissions
 - Reduction in consumption of energy, fuel, and non-renewable resources
 - Uses land in a sustainable manner

- **Public Health:** Considers public health by improving traffic safety, improving air quality, and promoting physical activity.
 - Criteria from the outcomes: Safety, Environment and Choice were used to evaluate Public Health benefits.
- **Social Equity:** Considers the investment benefits and impacts on all population groups.
 - How well equitable access is provided for all groups
 - How many home or business displacements
 - Satisfies Environmental Justice requirements
- **Livability:** Integration of transportation with community desires.
 - Increases modal options
 - Encourages active transportation
 - Supports the development/redevelopment of activity centers
 - Improves connectivity and cohesion within the community

RECOMMENDED STRATEGIES

The recommended strategies were selected primarily based upon how well they addressed the 9 Desired Outcomes as indicated by their total score. Strategies that were not selected likely had a high cost, were alternatives to another strategy, or had a low score.

The recommended corridor strategies were presented to the Stakeholder Advisory Panel, Corridor Strategies Working Group, and officials in each of the five counties. These groups provided feedback on how well the strategies address regional transportation needs.

The recommended strategies assumed a funding level similar to T-WORKS and adjusted for inflation.

The recommended strategies for the 5-County region are shown in maps and tables on the following pages.

Transportation System Management (TSM) Strategies

Figure ES-11: Map of Transportation System Management Strategies

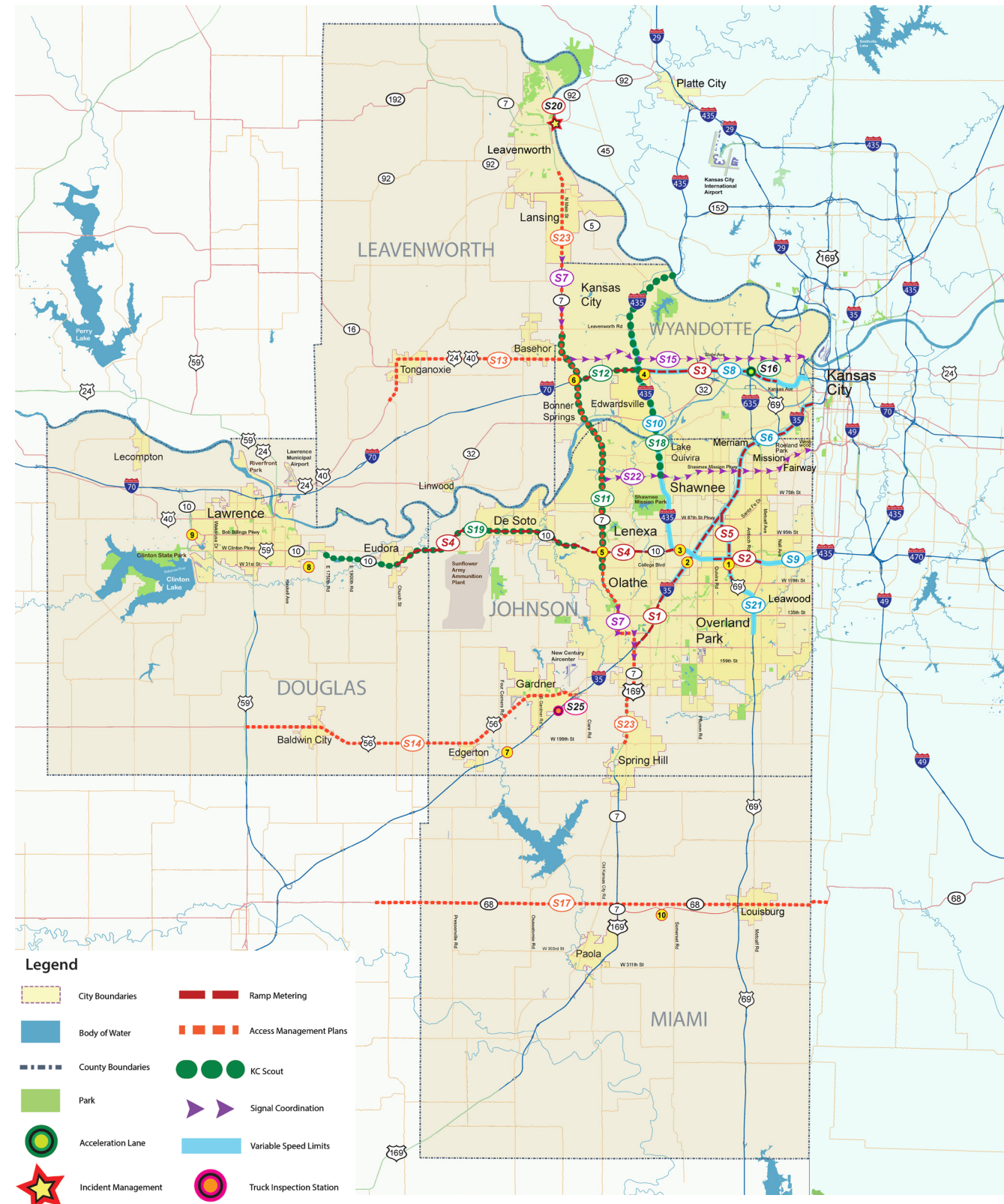


Table ES-4: Transportation System Management Strategies

ID	Corridor	Strategy	Total Cost*	2020-2030	2030-2040	Total Score
S1	I-35	Ramp metering north of K-7	\$2,900,000	\$2,900,000		569
S2	I-435 E-W	Ramp metering between Quivira Road and Metcalf Avenue	\$700,000	\$700,000		551
S3	I-70	Ramp metering between K-7 and 18th Street	\$700,000		\$700,000	543
S4	K-10	Ramp metering between Church Street and Ridgeview Road	\$1,500,000	\$1,500,000		540
S5	I-635, I-35, US-69	Ramp metering from 119th Street to I-35	\$600,000	\$600,000		520
S6	I-35	Variable speed limits from 127th Street to the KS/MO state line	\$2,100,000	\$2,100,000		501
S7	K-7	Signal coordination from 4H Road to Parallel Parkway and from W. Harold Street to 159th Street	\$1,000,000	\$1,000,000		493
S8	I-70	Variable speed limits from I-435 to the KS/MO state line	\$1,400,000		\$1,400,000	491
S9	I-435 E-W	Variable speed limits K-10 to KS/MO line	\$1,100,000		\$1,100,000	487
S10	I-435 N-S	Variable speed limits Parallel Pkwy to K-10	\$1,500,000		\$1,500,000	482
S11	K-7	Expand KC Scout between Parallel Parkway and College Blvd	\$2,200,000	\$2,200,000		479
S12	I-70	Expand KC Scout ITS: K-7 to I-435	\$500,000	\$500,000		469
S13	US-24/40	Access management: Follow the US 24/40 Corridor Management Plan	\$10,000,000	\$10,000,000		450
S14	US-56	Access management: Follow the US-56 Corridor Management Plan	\$10,000,000	\$10,000,000		447
S15	State Avenue	Traffic signal optimization from 130th Street to 38th Street	\$1,000,000	\$1,000,000		444
S16	I-635, I-35, US-69	Lengthen acceleration lanes at I-635 and I-70 interchange	\$10,600,000	\$10,600,000		441
S17	K-68	Access management: Follow K-68 Corridor Management Plan	\$10,000,000	\$10,000,000		434
S18	I-435 N-S	Expand KC Scout ITS System from KS/MO state line to Midland Drive	\$2,200,000	\$2,200,000		430
S19	K-10	Intelligent Transportation Systems (ITS) from E. 1750 Road to Cedar Creek Road	\$2,500,000	\$2,500,000		427
S20	K-92/M-92	Incident management on bridge	\$2,000,000	\$1,000,000	\$1,000,000	424
S21	I-635, I-35, US-69	Variable speed limits on US-69 from 143rd Street to I-35	\$1,000,000		\$1,000,000	422
S22	Shawnee Mission Parkway	Traffic signal optimization from Hilltop Drive to Rainbow Boulevard	\$1,000,000	\$1,000,000		418
S23	K-7	Access management: Follow K-7 Corridor Plan	\$10,000,000	\$10,000,000		416
S24	K-10	Variable speed limits on K-10 from K-7 to I-435	\$600,000			412
S25	I-35	Construct new truck inspection stations	\$23,100,000	\$23,100,000		409
S26	175th, 199th and 223rd Streets	Access management	\$10,000,000			404
S27	K-10	Incident management	\$2,000,000			398
TOTAL			\$112,200,000	\$92,900,000	\$6,700,000	

Recommended Strategy

*Total Cost is in 2020 dollars and includes costs for constructing/implementing the strategy and 10 years of operation and maintenance costs.
 **Benefit Ratio is determined by dividing the Total Score of the strategy by the Total Cost in \$millions. It provides a way to compare strategies.

Transportation Demand Management (TDM) Strategies

Figure ES-12: Map of Transportation Demand Management Strategies

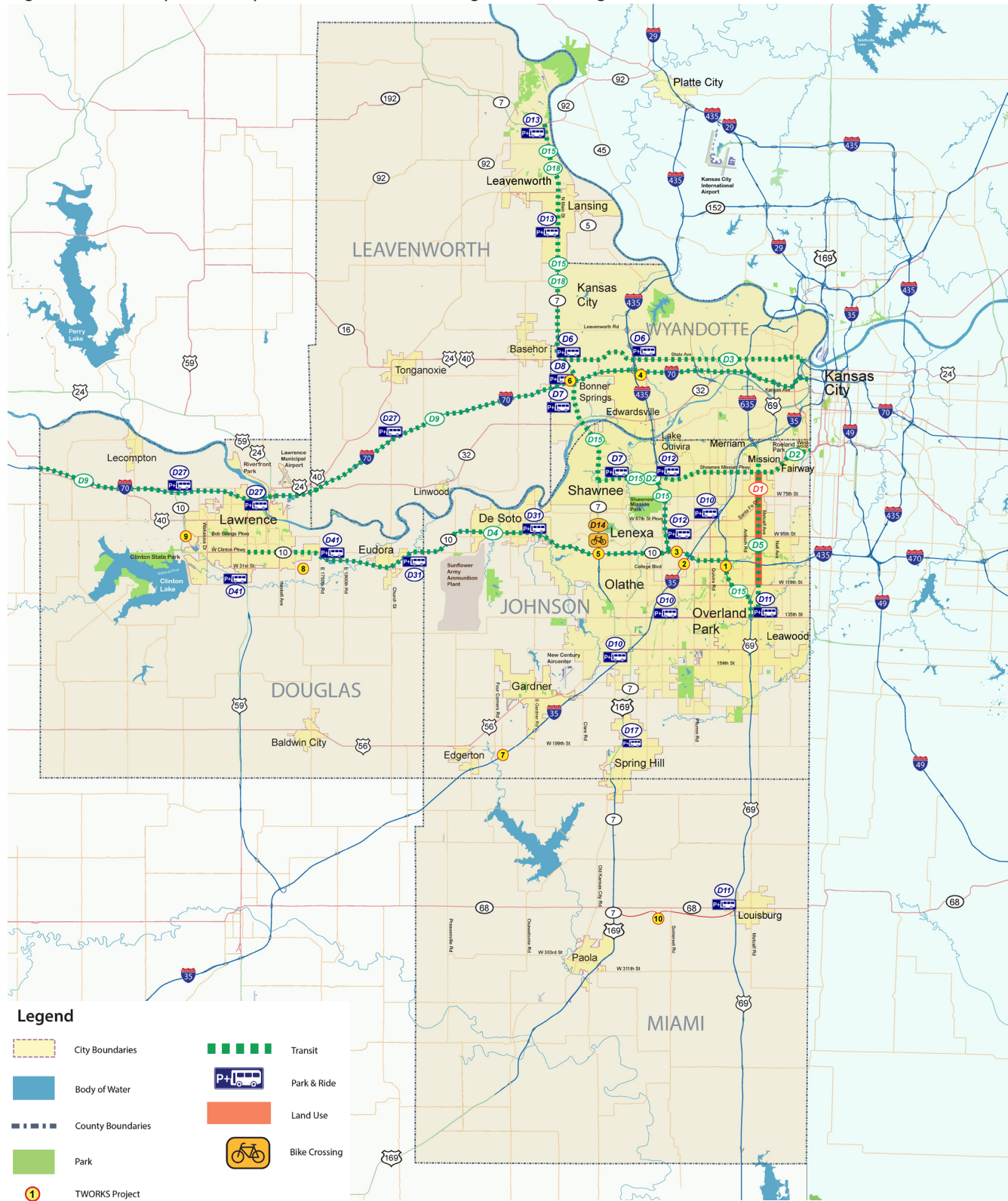


Table ES-5: Transportation Demand Management Strategies

ID	Corridor	Strategy	Total Cost*	2020-2030	2030-2040	Total Score
D1	Metcalf Avenue	Redevelopment per Vision Metcalf Plan	\$1,000,000	\$1,000,000		556
D2	Shawnee Mission Parkway	Expand transit service	\$9,500,000	\$9,500,000		545
D3	State Avenue	Expand transit service	\$14,400,000	\$14,400,000		520
D4	K-10	Expand operating hours/service for transit K-10 Connector Service	\$10,100,000	\$10,100,000		514
D5	Metcalf Avenue	Expand transit to Bus Rapid Transit service	\$9,500,000	\$9,500,000		510
D6	State Avenue	Construct Park & Ride facilities near K-7 and I-435	\$1,000,000	\$1,000,000		485
D7	K-7	Construct Park & Ride facilities near Shawnee Mission Pkwy and in Bonner Springs	\$735,000	\$735,000		481
D8	I-70	Construct Park & Ride facility at K-7	\$735,000	\$735,000		474
D9	I-70	Transit service connecting Topeka, Lawrence, Kansas City (KS) and Kansas City (MO)	\$22,300,000	\$22,300,000		470
D10	I-35	Construct Park & Ride facilities near US-69, K-7 and Santa Fe	\$1,500,000	\$1,500,000		465
D11	I-635, I-35, US-69	Construct Park & Ride facilities near 135th and K-68	\$1,100,000	\$1,100,000		455
D12	I-435 N-S	Construct Park & Ride facilities near Shawnee Mission Parkway, and near 95th Street	\$1,500,000	\$1,500,000		448
D13	K-7	Construct Park & Ride facilities near 4H Road and near northern junction of K-7 and K-92	\$1,500,000	\$1,500,000		442
D14	K-10	Construct bicycle path across K-7 on Prairie Star Pkwy to connect existing paths	\$1,100,000	\$1,100,000		441
D15	K-7	Commuter transit service connecting Leavenworth / State Avenue / I-70 / Shawnee Mission Parkway / College Blvd	\$11,100,000	\$11,100,000		440
D16	US-24/40	Construct paved shoulder with rumble strips for bicycle use from US-59 to Tonganoxie	\$45,400,000			435
D17	K-7	Construct Park & Ride facilities near Spring Hill	\$700,000	\$700,000		435
D18	K-7	Peak and off-peak transit service connecting Leavenworth/Lansing and State Ave/I-70	\$11,200,000	\$11,200,000		434
D19	I-35	Commuter transit service from BNSF Intermodal Facility, additional service Bus on Shoulder to downtown KCMO.	\$11,000,000			433
D20	I-435 E-W	Bicycle / pedestrian facilities: Consider on all new or reconstructed bridges over I-435 (strategy not shown on TDM map)	\$1,600,000	\$1,600,000		431
D21	I-70	Bicycle / pedestrian facilities: Consider on all new or reconstructed bridges over I-70 (strategy not shown on TDM map)	\$1,600,000	\$1,600,000		428
D22	I-35	Bicycle / pedestrian facilities: Consider on all new or renovated bridges over I-35 (strategy not shown on TDM map)	\$1,600,000	\$1,600,000		420
D23	K-7	Transit commuter service connecting Paola to I-35	\$4,000,000			419
D24	K-10	Expand Park & Ride facilities at KTA Lecompton Toll Plaza	\$500,000			418
D25	State Avenue	Bicycle and pedestrian facilities	\$12,000,000			417

Recommended Strategy

*Total Cost is in 2020 dollars and includes costs for constructing/implementing the strategy and 10 years of operation and maintenance costs.
 **Benefit Ratio is determined by dividing the Total Score of the strategy by the Total Cost in \$millions. It provides a way to compare strategies.

Capacity Strategies

Figure ES-14: Map of Capacity Strategies

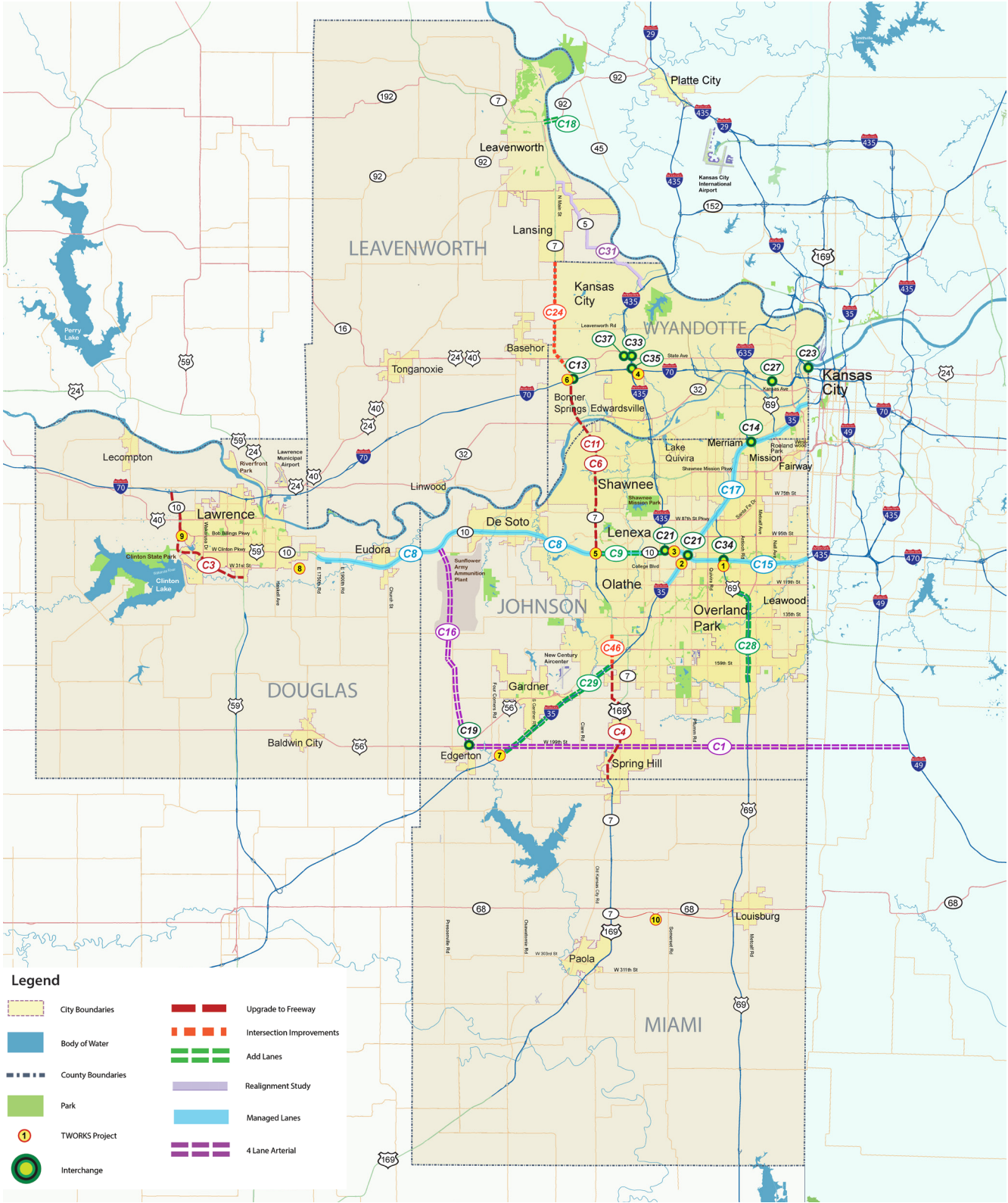


Table ES-6: Capacity Strategies

ID	Corridor	Strategy	Total Cost*	2020-2030	2030-2040	Total Score
C1	175th, 199th and 223rd Streets	Widen 199th Street from a 2-lane to a 4-lane arterial street from US-56 to I-49/US-71	\$196,350,000	\$98,175,000	\$98,175,000	614
C2	175th, 199th and 223rd Streets	Widen 175th Street from a 2-lane to a 4-lane arterial street from I-35 to I-49/US-71	\$156,400,000			586
C3	K-10	Upgrade K-10 to a 4 lane freeway from I-70 to US-59	\$98,500,000	\$98,500,000		549
C4	K-7	Upgrade K-7 to a 4-lane freeway from 215th St to north of 175th St, arterial street improvements on Lone Elm Road to I-35	\$60,500,000	\$60,500,000		542
C5	I-35	Construct HOV/HOT lanes from 127th to KS/MO state line	\$1,500,000,000			538
C6	K-7	Upgrade K-7 to a 6-lane freeway from Kansas Avenue to K-10, bike/ped crossing over Kansas River	\$215,000,000		\$78,500,000	529
C7	K-10	Widen K-10 to 6 lane freeway from E. 1750 Road to I-435	\$195,800,000			528
C8	K-10	Widen K-10 to 6-lane freeway from E. 1750 Road to I-435 with high occupancy toll lanes (HOT)	\$205,600,000		\$164,600,000	527
C9	K-10	Widen K-10 to 8-lane freeway from K-7 to I-435, K-10 remains 4-lane west of K-7	\$82,200,000	\$41,100,000	\$41,100,000	514
C10	K-7	Upgrade K-7 to a 6-lane freeway from K-10 to I-35	\$714,000,000			497
C11	K-7	Upgrade K-7 to a 4-lane freeway from 43rd Street to K-10	\$46,200,000	\$46,200,000		488
C12	175th, 199th and 223rd Streets	Widen 223rd Street to a 4-lane arterial from K-7/US-169 to I-49/US-71	\$146,400,000			474
C13	I-70 K-7	Construct phases 4 , 5, 6, 7 and 10 of the reconfigured I-70/K-7 interchange	\$245,200,000	\$141,400,000	\$103,800,000	469
C14	I-35	I-35 and I-635 interchange improvements	\$210,000,000	\$105,000,000	\$105,000,000	466
C15	I-435 E-W	Active lane use control including "hard shoulder running" and potential HOT or HOV lane during peak hours from K-10 to KS/MO state line	\$47,000,000		\$47,000,000	466
C16	Western JO Co. N-S Arterial	Construct 4-lane arterial along Sunflower Rd/Edgerton Rd/ Evening Star Rd from US-56 to K-10	\$136,500,000	\$68,250,000	\$68,250,000	460
C17	I-35	Active lane use control including "hard shoulder running" and potential HOT or HOV lane during peak hours from 127th to KS/MO state line	\$94,000,000		\$94,000,000	453
C18	K-92/M-92	Widen Centennial Bridge over the Missouri River 4 lanes w/ toll	\$53,300,000	\$53,300,000		446
C19	US-56	New interchange at US-56 and 199th Street	\$26,300,000	\$26,300,000		438
C20	I-70	Reconfigure I-70 and I-635 interchange	\$210,000,000			438
C21	I-435 E-W, K-10, I-35	Construct remaining phases of I-435 / I-35 / K-10 Gateway project	\$310,800,000	\$77,700,000	\$233,100,000	437
C22	K-92/M-92	Widen Centennial Bridge over the Missouri River Bridge to 4 lanes	\$51,700,000			436
C23	I-70	Reconfigure I-70 and Lewis & Clark Viaduct Interchange	\$200,000,000	\$50,000,000	\$150,000,000	435

Recommended Strategy

*Total Cost is in 2020 dollars and includes costs for constructing/implementing the strategy and 10 years of operation and maintenance costs.
 **Benefit Ratio is determined by dividing the Total Score of the strategy by the Total Cost in \$millions. It provides a way to compare strategies.

Capacity Strategies, continued

ID	Corridor	Strategy	Total Cost*	2020-2030	2030-2040	Total Score
C24	K-7	Expressway intersection enhancements from Lansing to State Ave.	\$21,000,000	\$21,000,000		434
C25	US-24/40	Widen US-24/40 to 4 lanes from US-59 to K-16	\$85,700,000			431
C26	I-70	Active lane control including "hard shoulder running" (using the shoulder as a driving lane) and potential HOT or HOV lane during peak hours from K-7 to KS/MO state line	\$88,200,000			429
C27	I-70	Reconfigure I-70 and 18th Street interchange as partial cloverleaf	\$10,500,000	\$10,500,000		429
C28	I-635, I-35, US-69	Widen US-69 to 6 lanes from 119th street to 167th street, includes interchange at 159th St (See C65)	\$68,300,000	\$5,000,000	\$63,300,000	428
C29	I-35	Widen I-35 to 6 lanes from Homestead Lane to Lone Elm Road	\$64,700,000		\$64,700,000	426
C30	I-435 E-W	Convert general purpose lanes to HOV / HOT lanes from K-10 to KS/MO state line	\$9,000,000			424
C31	K-5	Realign K-5 from K-7 to I-435 (conduct study)	\$84,000,000	\$400,000		421
C32	I-435 N-S	Active lane use control including "hard shoulder running" and potential HOT or HOV lane during peak hours from K-10 to I-70	\$58,800,000			421
C33	I-435 N-S	Reconfigure the I-435 and State Avenue interchange	\$10,500,000	\$10,500,000		416
C34	I-635, I-35, US-69	Construct remaining phases of US-69 and I-435 interchange (Brown project, Blue project, and Yellow project)	\$203,700,000	\$63,000,000	\$140,700,000	415
C35	I-435 N-S	Add fly over ramp northbound to westbound on I-70 and I-435 interchange	\$52,500,000		\$52,500,000	412
C36	US-56	Intersection improvement at US-56 and 199th street	\$5,300,000			409
C37	State Avenue	New interchange at State Avenue and Village West Parkway	\$21,000,000	\$21,000,000		407
C38	I-70	Reconfigure I-70 & I-435 interchange	\$210,000,000			407
C39	K-92/M-92	Widen Missouri 92 or Missouri 45 to 4 lanes, includes 4-lane bridge	\$131,700,000			404
C40	I-70	Reconfigure I-70 and Turner Diagonal interchange	\$157,500,000			404
C41	US-24/40	Widen US-24/40 to 4 lanes from US-59 to K-32 and from County Road 1 to K-16	\$32,100,000			404
C42	I-435 N-S	Reconfigure I-435 and Parallel Parkway interchange	\$15,800,000			398
C43	Potential Outer Loop	Widen County Road 1 to 4 lanes from I-70 to Tonganoxie	\$32,100,000			398
C44	K-7	Leavenworth/Lansing bypass: 2-lane west of Leavenworth connecting K-5 to US-73/K-7	\$123,500,000			396
C45	K-7	Upgrade K-7 to 4-lane freeway from Lansing to State Avenue	\$98,300,000			396
C46	K-7	Arterial street enhancements to existing K-7 in Olathe	\$47,300,000	\$47,300,000		395
C47	K-10	Reconstruct the K-10 and I-70 interchange	\$157,500,000			391
C48	K-68	Expand K-68 to a 4-lane highway from Old Kansas City Road to Metcalf Ave (in Louisburg)	\$71,400,000			390

Recommended Strategy

*Total Cost is in 2020 dollars and includes costs for constructing/implementing the strategy and 10 years of operation and maintenance costs.
 **Benefit Ratio is determined by dividing the Total Score of the strategy by the Total Cost in \$millions. It provides a way to compare strategies.

ID	Corridor	Strategy	Total Cost*	2020-2030	2030-2040	Total Score
C49	Metcalf Avenue	Intersection capacity improvements	\$21,000,000			385
C50	US-56	Realign US-56 along 199th Street from Edgerton to I-35	\$62,800,000			384
C51	State Avenue	Intersection capacity improvements	\$21,000,000			372
C52	Shawnee Mission Parkway	Intersection capacity improvements	\$21,000,000			370
C53	K-10	Construct interchange at K-10 and Prairie Star Pkwy	\$18,900,000			364
C54	Potential Outer Loop	Construct new freeway from I-70 north to K-7/US-73 northwest of Leavenworth	\$317,100,000			363
C55	K-92/M-92	Intersection capacity improvements	\$2,100,000			362
C56	I-70 K-7	Construct phases 8 and 9 of reconfigured I-70/K-7 interchange	\$60,000,000			358
C57	K-68	Intersection Capacity Improvements	\$16,800,000			351
C58	K-10	Construct interchange at K-10 and Clare Road	\$18,900,000			351
C59	I-70	Widen to 6-lane freeway (KTA) from Lawrence to K-7	\$171,700,000			343
C60	K-68	Construct Louisburg Bypass: 2-lane with interchange at US-69, 4-lane from Old KC Road to US-69	\$95,700,000			342
C61	175th, 199th and 223rd Streets	Widen 223rd Street to a 4-lane arterial from K-7/US-169 to US-69	\$60,700,000			340
C62	US-56	Widen US-56 to 6 lanes from Moonlight Road to I-35	\$14,300,000			338
C63	K-10	Construct interchange and collector-distributor road at K-10 and Lone Elm Road	\$28,400,000			330
C64	Potential Outer Loop	Construct new freeway connecting US-69 to I-49/US-71 in Missouri	\$520,600,000			325
C65	I-635, I-35, US-69	Construct new interchange at US-69 and 159th Street (See C28)	\$18,900,000			323
C66	Potential Outer Loop	Construct new freeway connecting I-70 to K-10	\$338,700,000			298
C67	Potential Outer Loop	Construct new freeway connecting K-10 to I-35	\$674,100,000			264
C68	Potential Outer Loop	Construct new toll road connecting I-70 to K-10	\$359,700,000			255
C69	Potential Outer Loop	Construct new freeway connecting I-35 to US-69	\$846,900,000			248
C70	Potential Outer Loop	Construct new toll road connecting K-10 to I-35	\$705,600,000			233
C71	Potential Outer Loop	Construct new toll road connecting US-69 to I-49/US-71 in Missouri	\$541,600,000			230
C72	Potential Outer Loop	Construct new toll road connecting I-35 and US-69	\$867,900,000			205
TOTAL			\$12,866,550,000	\$913,225,000	\$1,463,625,000	

*Total Cost is in 2020 dollars and includes costs for constructing/implementing the strategy and 10 years of operation and maintenance costs.
 **Benefit Ratio is determined by dividing the Total Score of the strategy by the Total Cost in \$millions. It provides a way to compare strategies.

FINDINGS AND CONCLUSIONS

Phases 1 and 2 of the 5-County Regional Transportation Study analyzed the future transportation needs and identified potential strategies to address those needs. Through this stakeholder-driven process two key points were identified.

Financial resources are limited: The costs to add capacity to the roadway system is high and the needs are great, therefore a wider range of strategies must be considered that extend the service life of the existing system while directing more expensive improvements to key locations.

The future brings change: Vehicle technology, road management technology, and the transportation needs of population groups are changing quickly and future transportation investment decisions must consider these changes.

In addition, the 5-County Regional Transportation Study arrived at a number of findings and conclusions that are noted in Table ES-7.

Table ES-7: Study Findings and Conclusions

Desired Outcome	Findings	Conclusions
Mobility	<ul style="list-style-type: none"> A statistically significant survey of residents in the 5-County region showed that maintenance of roads within cities was the most important issue during the next 10 years. Maintenance of roadways between cities ranked as the third most important issue. 	<ul style="list-style-type: none"> Maintenance of existing streets and highways should continue to be funded and delivered before other strategies are considered.
	<ul style="list-style-type: none"> A survey of residents in the 5-County region showed that traffic flow on highways and major roads was the second most important issue to address over the next 10 years. 	<ul style="list-style-type: none"> Transportation investments must address congestion on the region's roadways.
	<ul style="list-style-type: none"> Vehicle technology is changing and will increase the number of vehicles per lane. 	<ul style="list-style-type: none"> Roadway travel lanes will have higher capacity in the future.
	<ul style="list-style-type: none"> The Kansas City metropolitan area has more lane-miles of freeway and more lane-miles of arterial streets per 1,000 population than other peer cities such as Dallas/Fort Worth, TX, Denver/Aurora, CO, Minneapolis/St. Paul, MN, and St. Louis, MO. 	<ul style="list-style-type: none"> Other major metropolitan areas are developing a more balanced transportation system or accept higher congestion.
	<ul style="list-style-type: none"> Annual hours of delay per automobile commuter in the Kansas City metropolitan area is less than other peer cities such as Dallas/Fort Worth, TX, Denver/Aurora, CO, Minneapolis/St. Paul, MN, and St. Louis, MO. 	<ul style="list-style-type: none"> Other metropolitan areas have more congestion than the Kansas City metropolitan area.
	<ul style="list-style-type: none"> The congested lane-miles of roadway in the 5-County region will increase from approximately 1,000 lane-miles in 2010 to approximately 2,500 lane-miles in 2040 without future transportation investments. 	<ul style="list-style-type: none"> Federal, state and local transportation funding programs are a critical need for the future. A wide variety of transportation strategies will be needed to address congestion.
	<ul style="list-style-type: none"> Peer cities such as Dallas/Fort Worth, TX, Denver/Aurora, CO, Minneapolis/St. Paul, MN, and St. Louis, MO are using a variety of transportation strategies to address growing congestion 	<ul style="list-style-type: none"> A variety of strategies, such as Transportation System Management, Transportation Demand Management, and new Capacity, should be considered as decisions are made regarding transportation investments.
	<ul style="list-style-type: none"> Recurring congestion occurs on the region's major roadways during peak commute times. For the rest of the day, roadways have adequate capacity for year 2040 traffic. Commuters are repeat travelers. 	<ul style="list-style-type: none"> Fund and encourage other transportation options for the morning and evening commute.
	<ul style="list-style-type: none"> Non-recurring congestion due to crashes and vehicle breakdowns, construction/maintenance activities, and other incidents have a significant impact on traffic flow, particularly in the Kansas City metropolitan area. KC Scout reported 7,373 incidents on the metro area's freeways. With the benefit of the KC Scout traffic management system, it took an average of 22 minutes to clear incidents and six minutes to restore normal traffic flow. 	<ul style="list-style-type: none"> The KC Scout traffic management system provides significant benefits to the area and should be expanded, along with motorist assist, along key Kansas highways.
	<ul style="list-style-type: none"> Some freeways, such as segments of I-35 and I-435, have limited potential for more right-of-way which will make it difficult to construct additional lanes. Forecasted growth in rail traffic indicates an increase of 36% from 2007 to 2030. The BNSF Intermodal Facility will become a major generator of freight rail and truck traffic. Just the intermodal site is expected to generate 7,000 truck trips per day when fully developed. 	<ul style="list-style-type: none"> Look at strategies such as active lane use control, use of the shoulder as a driving lane during peak periods, and HOV/HOT lanes for these freeway segments. A significant increase in truck volumes, particularly on I-35, is expected. Most of the trucks will use the roadway system during non-peak hours of the day. This volume of trucks will overload the capabilities of the vehicle inspection stations on I-35.

Desired Outcome	Findings	Conclusions
Safety	<ul style="list-style-type: none"> • KDOT’s Strategic Highway Safety Plan (SHSP) seeks to drive strategic investments that reduce traveler casualties and the emotional and economic burdens of crashes, utilizing the 4Es (education, enforcement, engineering and emergency medical services). • The “Destination Safe” Coalition is a regional transportation safety program that includes four of the five counties included in this study (minus Douglas County). The Coalition provides a means for various community sectors (law enforcement, engineers, safety advocates, public health officials, citizens, trauma room nurses, transit coordinators, public works managers, emergency services providers, bike/ped advocates, local officials, planners and others) to discuss transportation system safety in the Kansas City region. • Many of the crashes on the region’s freeway system are related to congestion. 	<ul style="list-style-type: none"> • Continue to implement the recommendations of the SHSP and the Destination Safe Coalition. • Implement strategies that reduce congestion.
Regional Prosperity	<ul style="list-style-type: none"> • The 5-County region is the fastest growing region in Kansas. A number of high impact developments are being constructed or are planned that will impact the transportation system. • The average household in the Kansas City metropolitan area spends between 14% and 27% of their income on transportation costs. • Funding for transportation facilities is often not considered when planning for major developments. • Transportation investments have a significant impact on the state’s economy by providing more reliable travel times, logical access to businesses and by creating jobs. 	<ul style="list-style-type: none"> • Transportation decisions must include an understanding of the impacts of planned developments. • Land use decisions must include an understanding of transportation issues. • As fuel costs increase, household budgets are impacted and different decisions will be made regarding how the transportation system is used. • Coordination between land use planning and transportation planning is critical. Steps should be taken to enhance coordination. • Continue the practice of including economic impacts in the decision making process for transportation investments.
Efficient Use of Financial Resources	<ul style="list-style-type: none"> • Transportation needs outweigh available transportation funding. • Fuel prices have a significant impact on traveler behavior. As fuel prices significantly increase, travelers reduce travel by personal vehicle and increase their use of transit, carpooling, trip chaining and bicycling. • A study by the Mid-America Regional Council determined that if 40% of the region’s population growth were accommodated in existing centers along established corridors, the region could save over \$3 billion in infrastructure costs. • Fuel efficiency standards for passenger cars and light trucks will require higher gas mileage. 	<ul style="list-style-type: none"> • Lower cost system management and demand management strategies need to be considered as part of an overall transportation investment plan. • With the assumption that fuel costs will increase in the future, more transportation options are desired and should be planned and implemented. • Continued sprawling development patterns come with a high cost for transportation and other infrastructure. • Alternate sources of revenue will need to be developed within the timeframe that was studied.
Choice	<ul style="list-style-type: none"> • The Kansas City metropolitan area has by far the fewest public transportation miles per capita (47 miles per capita) than other peer cities such as Dallas/Fort Worth, TX, Denver/Aurora, CO, Minneapolis/St. Paul, MN, and St. Louis, MO (91-229 miles per capita). • A survey of residents in the 5-County region shows 53% of respondents would use transit if a more extensive regional system were in place. • The region is served by five transit agencies. • The K-10 Connector transit service that connects Lawrence and Overland Park has a daily ridership of nearly 700. Cost per mile is approximately nine cents compared with 55 cents per mile for travel by automobile. • “Bus-on-Shoulder” (BOS) transit is operated along I-35 in Johnson County when mainline traffic is traveling below 35 mph. Since the inception of BOS there has been a 12% increase in ridership on this route. 	<ul style="list-style-type: none"> • As other cities in the Midwest have grown, they have developed transportation systems that offer more choices to travelers, particularly commuters. • There is a desire in the region for a more robust transit system. • Expand ongoing efforts to coordinate these systems to develop a regional transit system. • Making transit options more attractive will bring more “choice riders” to this mode of transportation. • Continue support for regional transit services such as the K-10 Connector and potential service along I-70.

Desired Outcome	Findings	Conclusions
Environment	<ul style="list-style-type: none"> A survey of residents in the 5-County region shows that 87% think that water quality and air quality are important considerations in planning for transportation improvements. 	<ul style="list-style-type: none"> Future investment decisions should enhance air and water quality.
	<ul style="list-style-type: none"> The 5-County region had numerous days during 2012 when the air quality did not meet national standards. 	<ul style="list-style-type: none"> Future investment decisions should enhance air quality.
	<ul style="list-style-type: none"> Sprawling development patterns lead to increasing environmental impacts. 	<ul style="list-style-type: none"> Future investment decisions should enhance natural resources.
Public Health	<ul style="list-style-type: none"> A survey of residents in the 5-County region shows 68% believe that transportation projects should promote healthy lifestyles like biking and walking. 	<ul style="list-style-type: none"> Transportation investment decisions should include appropriate active transportation improvements such as bicycle and pedestrian facilities.
	<ul style="list-style-type: none"> Lack of all-day transit in many areas makes it difficult for some citizens to have adequate access to medical facilities. 	<ul style="list-style-type: none"> Future transportation investments should add capacity to existing transit and paratransit services to meet the needs of a growing aging population.
	<ul style="list-style-type: none"> There is a concern for air quality impacts on health in the region. 	<ul style="list-style-type: none"> Future investment decisions should enhance air quality.
Social Equity	<ul style="list-style-type: none"> A survey of residents in the 5-County region shows 35% of respondents don't believe that the existing transit service meets the residents' basic needs. 46% of the respondents don't believe transportation services for the elderly and disabled are adequate. 	<ul style="list-style-type: none"> There is a desire in the region for a more robust transit system.
	<ul style="list-style-type: none"> A survey of residents in the 5-County region showed that 9% of respondents are dependent on transit or friends and relatives for transportation. 	<ul style="list-style-type: none"> A significant percentage of residents have need for transportation options other than a personal automobile.
Livability	<ul style="list-style-type: none"> The Kansas City metropolitan area has lower population per square mile of land area (260) than other peer cities such as Dallas/Fort Worth, TX, Denver/Aurora, CO, Minneapolis/St. Paul, MN, and St. Louis, MO (305 to 714 people per square mile). 	<ul style="list-style-type: none"> Less dense development presents many challenges including the need for longer roads, more congestion, and the ability to develop transit. Park & Ride lots or structures should play a role in the future transportation system.
	<ul style="list-style-type: none"> Many communities are planning city centers with compact spaces, mixed-use development, and localized resources which can minimize the need for longer distance commuting. 	<ul style="list-style-type: none"> The future transportation system will need to consider changing development patterns and provide more multimodal options.
	<ul style="list-style-type: none"> The National Household Travel Survey shows that the 16 to 34 year old age group wants to live in a more urban environment and have different desires for transportation. In 2009, people in this age group drove 23% fewer miles in their cars, using transit more, took 24% more bicycle trips and walked to destinations 16% more than did 16 to 34 year olds in 2001. 	<ul style="list-style-type: none"> While these are national trends, these changes in transportation user's preferences should be part of the discussion as the future transportation system is planned.
	<ul style="list-style-type: none"> Bicycle and pedestrian facilities are an integral part of a future transportation system. As land use changes to more mixed development and as more of the population focuses on a healthier lifestyle, there is a growing need for alternatives to automobile travel. 	<ul style="list-style-type: none"> As land use patterns change, the transportation system must change as well. Many cities have adopted Complete Streets policies that address multiple modes of transportation.

