



KANSAS STATEWIDE FREIGHT NETWORK TRUCK PARKING PLAN

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Kansas Statewide Freight Network Truck Parking Plan

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CHAPTER 1

EXECUTIVE SUMMARY

Overview

The Kansas Department of Transportation and the Kansas Turnpike Authority set out in 2015 to improve the state's freight competitiveness by studying and developing strategies for improving its statewide freight network's safety, efficiency and competitiveness, especially along primary and secondary freight corridors of significance, which include Interstate 70, Interstate 35 and the Kansas Turnpike.

KDOT and the KTA undertook this plan realizing that, while the Kansas economy relies on freight trucks moving goods to and from local, national and international markets, moving those goods efficiently depends greatly on how easily drivers can find safe, convenient parking.

With the need to operate cost effectively and within the constraints of federally mandated hours of service, drivers were spending up to 30 minutes – or nearly five percent of their allowable daily driving time - searching for parking. This added expense is borne by the drivers, their companies and Kansas agricultural and manufacturing interests, making all less competitive in a global marketplace driven by cost. And where appropriate parking cannot easily be found, drivers often are forced to park along the sides of highways, ramps or in the lots of closed or abandoned businesses, creating safety concerns for other motorists and themselves.

These challenges are predicted to increase in the future. Freight volumes in the U.S. are projected to grow by nearly 29 percent over the next 11 years and, with it, the number of semi-trailer trucks on the road is predicted to increase nearly 12 percent to 3.98 million units over the same period of time. By better understanding current and future freight truck parking needs in the state, Kansas positions itself to take action and adopt policies that will create a safer driving environment, better use of its parking assets and increase the economic impact of trucks being routed through Kansas to benefit from the decisions the state's transportation agencies make.

Activities

The KDOT/KTA plan set out to build that understanding by conducting an:

- Inventory of public and private truck parking locations, capacity and use;
- Assessment of physical barriers, regulations, policies and information needs affecting truck parking choices; and
- Identification of opportunities for improving parking capacity and services in ways that benefit safety, efficiency and/or economic growth throughout Kansas.

These activities were accomplished in a number of ways, including:

- Performing a statewide inventory of truck parking assets and use;
- Conducting a national review of studies regarding truck parking decision factors;
- Interviewing other agencies and stakeholders regarding truck parking;
- Surveying truckers regarding factors affecting parking decisions;
- Analyzing freight movements, trends and regulations affecting parking demand; and
- Reviewing future highway freight trends, flows and projections.

Insights

These activities resulted in a number of insights into Kansas truck parking needs and usage characteristics:

1. Peak parking times for trucks are between 12 a.m. and 4 a.m.
2. Trucks park anywhere that can accommodate them to stay within their hours of service requirements: parking lots, side roads, shoulders or ramps.
3. Parking decisions are made based on service time, lot amenities and target destination.
4. Most large legal parking facilities, especially near urban areas or the intersections of major highway-to-highway connections, are at or over capacity regularly.
5. Drivers are challenged to find legal truck parking locations in a timely manner, averaging 30 minutes of search time to locate available parking.
6. A significant number of drivers report parking in illegal locations that can be unsafe, particularly just outside urban areas.
7. Peer state and federal studies suggest that the lack of safe truck parking is a problem that will continue to increase due to the projected growth in truck freight movements.
8. Peer state and federal studies indicate that the need for expanded truck parking far exceeds available funding, which is unlikely to grow significantly in the future.
9. Drivers, peer states and the federal government identified affordable truck parking strategies: expand or improve parking at public rest areas, commercial truck stops and travel plazas; encourage creation of public-private partnership (P3s) solutions to share costs and information for parking; inform drivers about available spaces through technology and other means; and change parking enforcement rules.
10. Kansas has the opportunity to gain a “first mover” advantage by undertaking its truck parking decision-making in a regional context wherever possible. Drivers are more likely to make routing decisions favorable to Kansas in terms of efficient use of its parking assets and economic impact if they can take better advantage of regional consistency in travel costs, business process, trip-time predictability and driver services availability.

Advisory Panel

These and other insights formed the basis for developing a set of effective strategies for improving the state’s truck parking information sharing, capacity and benefits. This was done using broad-based input from freight stakeholders and through a stakeholder advisory panel, composed of key public- and private-sector freight organizations, appointed by the Kansas Department of Transportation and the Kansas Turnpike Authority.

Panel members provided plan guidance and feedback on issues, needs, results and recommendations. Among the public- and private-sector organizations that took part in the plan were: Convoy Systems, LLC; FHWA – Kansas Division; Groendyke Transport, Inc.; Kansas Dept. of Agriculture; Kansas Dept. of Commerce; Kansas Highway Patrol; Kansas Motor Carriers Association; Mid-America Regional Council; Miller Trucking Ltd.; Owner-Operator Independent Drivers Association; Petroleum Marketers & Convenience Store Association; Sauder Custom Fabrication; Triplett, Inc.; UPS; and YRC Worldwide.

With their guidance and the results of plan activities, a number of truck parking recommendations were developed for improving truck parking safety, efficiency and economic impact by deploying

static and dynamic parking information signs at areas of significant truck parking demand.

Recommendations

Recommendations reflected a focus on finding solutions that address service and geographical areas of greatest need and benefit, including:

- Locating new or improving existing public and private truck parking assets where need is greatest;
- Overcoming barriers to using existing formal/legal parking facilities in urban/rural areas;
- Identifying information and technology services to help truckers make better parking decisions; and
- Creating partnerships with public- and private-sector entities to improve parking facilities and amenities.

Specifically, the four recommendations and their related implementation strategies include:

1. Improve Parking Information and Sharing
 - a. Post parking information via static signage
 - b. Deploy a dynamic truck parking information management system (TPIMS)
2. Add or Improve Parking Assets
 - a. Expand parking lot numbers and capacity
 - b. Use excess right of way for parking
 - c. Improve geometrics for better parking
3. Explore Creating Parking Improvement Partnerships
 - a. Identify intra-agency opportunities to work with agencies to expanding parking
 - b. Investigate benefits of creating multistate, regional truck parking policies
 - c. Secure marketplace guidance as to the viability of expanding parking via P3's
4. Examine Pro-Parking Policies for Freight Trucks
 - a. Develop pro-freight truck tax policies
 - b. Develop integrated local parking policies
 - c. Explore opportunities for coordinating delivery policies to expand parking

Benefit-Cost Analysis

The first two recommendations (improve parking information and sharing, and add or improve parking assets) are prioritized based on the benefit cost analysis (BCA) conducted for each strategy. All strategies considered within the plan were evaluated on how well they improved Kansas freight truck parking and provided other benefits versus their implementation and other costs. A benefit cost ratio of 1.0 or better indicates that benefits are projected to be greater than costs.

As a result, the plan's final recommendations were organized into three tiers for implementation planning purposes, with the tiers reflecting their benefit/cost ratios:

- Tier 1 improvements are infrastructure investments which are recommended first because they involve freight corridors of significance and have a high benefit cost ratio. In the case of Tier 1 improvements, benefits are valued at being 2.5 times or greater than their costs.

- Tier 2 improvements are infrastructure investments on freight corridors of significance which have a good benefit cost ratio higher than 2.0 but lower than the 2.5 threshold set for Tier 1.
- Tier 3 improvements are infrastructure investments identified as a desired improvement but having a benefit cost ratio above 1.0 and below 2.0. Tier 3 also includes strategies related to pro-parking policies and public- and private-sector parking partnerships that are not easily quantified using a benefit/cost analysis. Such strategies are form-, time- and result-dependent and involve coordination and advocacy efforts with entities such as the state legislature, governing bodies and industry groups. While these strategies require longer lead times to implement, their deployment offers benefits to the state and its freight network at a low deployment cost since they generally align with the roles and responsibilities of existing technical, communications and government relations staff.

Based on the benefits-cost analysis, the final recommendations were broadly tiered as follows:

- **Tier 1** - Add static and dynamic parking information signs on eastern and western segments of primary freight network. Add parking capacity at selected locations in the network where parking demand is greatest and lots are at maximum capacity during peak truck parking periods.
- **Tier 2** - Add static and dynamic parking information signs on central segments of the primary and secondary freight network. Add parking capacity at selected locations where other parking alternatives do not currently exist.
- **Tier 3** - Add static and dynamic parking information signs on network segments with lower parking demand. Add parking capacity at locations where other parking options don't readily exist. Create parking partnerships with public- and private-sector entities. Develop pro-parking policies at state and regional levels.

It is noted that there is no recommendation for publicly-owned state construction of new, full-featured public truck parking facilities. This recognizes the challenge posed by the magnitude of the state's parking needs combined with the ability of private industry to deliver additional truck parking capacity and amenities. Recommendations address truck parking needs through a multi-layered approach emphasizing optimizing the use of existing parking assets through targeted capacity improvements, better sharing of parking availability information and partnerships with other public- and private-sector entities to flexibly add capacity where needed without solely relying on state action or funding.

Implementation

It also is noted that Kansas will get a jump start on implementing recommendations from the Kansas Statewide Freight Network Parking Plan, thanks to a \$25 million federal Transportation Investment Generating Economic Recovery (TIGER) grant given to Kansas and seven other Midwestern states to address critical truck parking issues. The TIGER grant was awarded to the Mid America Association of State Transportation Officials (MAASTO) to develop a multistate Truck Parking Information and Management System (TPIMS).

The TPIMS system will help truckers know in real time where safe, adequate parking is available that best meets their needs. It will disseminate parking information through various means,

including electronic message signs, traveler information websites and smartphone applications. Other MAASTO states that will receive funding include Indiana, Iowa, Kentucky, Michigan, Minnesota, Ohio and Wisconsin.

The grant will enable Kansas to proceed with pilot implementation of its signage recommendations while continuing to engage other private- and public-sector stakeholders in advancing the plan's goals for improving the safety, efficiency and economic competitiveness of the Kansas freight network.

Moreover, establishment of a regional truck parking information system promises to well position Kansas to benefit from the long-term economic benefits of improving truck parking services, regulations and opportunities. State action, combined with regional initiatives like the MAASTO TIGER grant, increase the likelihood that regional or national shippers will route their truck traffic through Kansas to take advantage of what is, in effect, superior customer service that adds to their bottom line. Performance measurements envisioned by the MAASTO TIGER grant and KDOT/KTA parking recommendations will enable the State of Kansas in the future to identify and capitalize on that economic opportunity through supportive infrastructure investments and policies.



CHAPTER 2

PROBLEM DEFINITION

Introduction

Project Description

In 2015, the Kansas Department of Transportation (KDOT) and Kansas Turnpike Authority (KTA) undertook a study of the state’s truck parking capacity, issues, trends and opportunities on the Kansas Primary and Secondary Freight Networks (**Figure 2.1**), with a special emphasis on Interstate 70, Interstate 35 and the Kansas Turnpike.

The purpose of the study was to provide data and analysis leading to development of a plan for addressing existing and potential future parking needs in ways that improve statewide freight network safety, efficiency and competitiveness. The study assessed:

- Existing public and private truck parking locations, capacity and usage;
- Physical barriers and information needs (signage, education, technology) affecting truck parking choices; and
- Opportunities for improving parking capacity and services in ways that benefit safety, efficiency and/or economic growth throughout Kansas.

Defining Truck Parking Conditions, Usage and Issues in Kansas

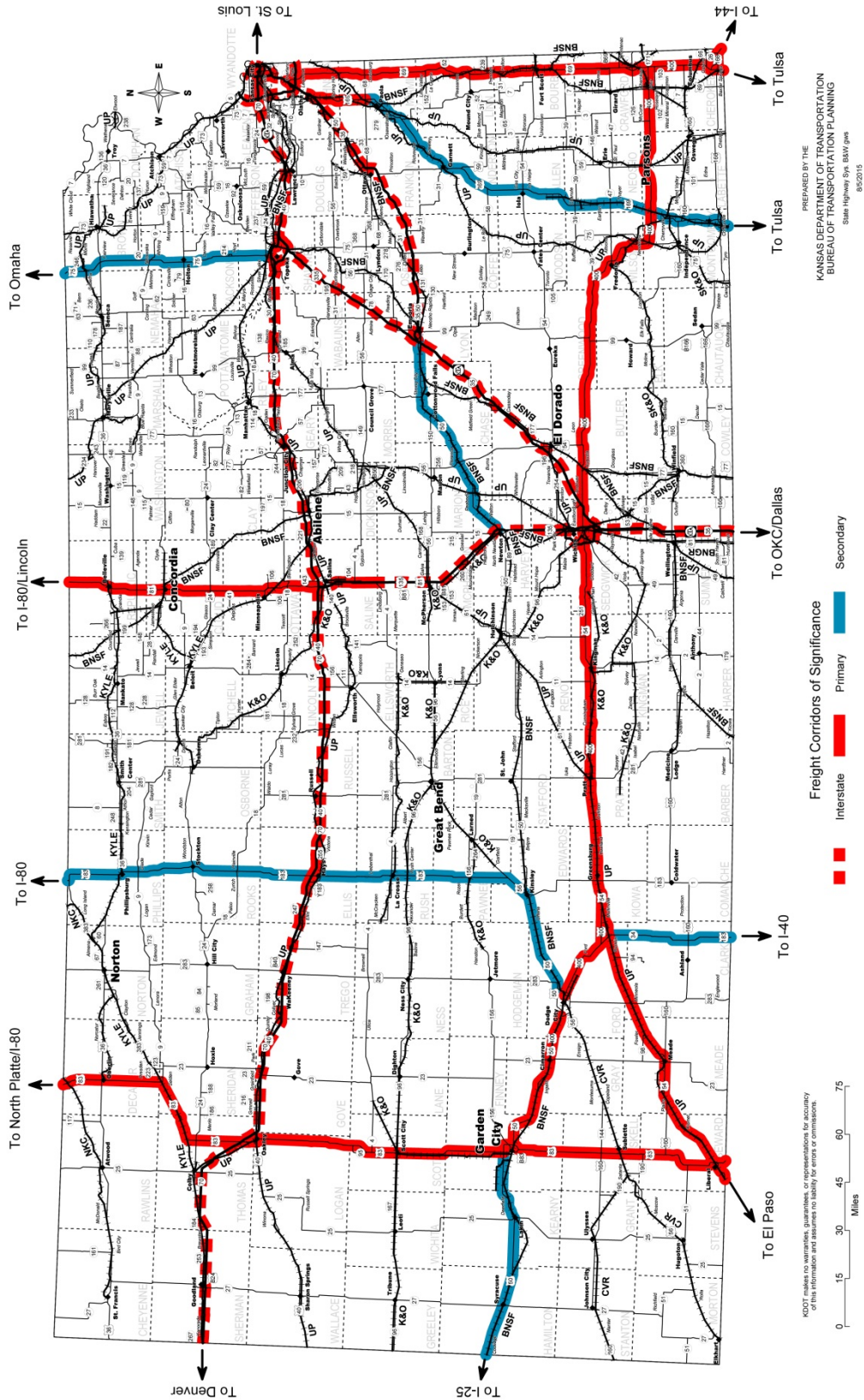
In the study, a variety of activities were conducted to better:

- Define truck parking conditions, usage and issues in Kansas;
- Describe factors determining where and when truckers choose to park in Kansas; and
- Identify existing issues and preferences shaping uses and needs for truck parking Kansas.

These activities (including a parking inventory, peer interviews, literature review and trucker surveys) and their key findings follow.

Figure 2.1 - Highway Freight Corridors of Significance

Kansas Highway Freight Corridors of Significance



Truck Parking Inventory and Usage

Introduction

A detailed truck parking inventory of the Kansas Primary and Secondary Freight Networks (see **Figure 2.1**) was completed. This inventory assessed legal/formal and illegal/informal truck parking use throughout Kansas. Data was gathered first via a desktop Google Earth aerial review to determine all legal parking facilities and the number of spaces available as well as to identify any potential illegal parking “hot spots.” This was followed by a field review of truck parking utilization and field verification of illegal parking locations. After the field observations were completed, the data was further analyzed to seek a better understanding of truck parking across the state.

Methodology

Desktop Aerial Review of Legal Truck Parking Facilities

Google Earth aerial imagery was used to identify truck parking facilities and allow an accurate count of parking spaces. Early identification of parking lots and spaces ensured thorough investigation of lots and their utilization in the field, increasing field teams’ efficiency by optimizing their routing and eliminating the need to count parking spaces on site. This also allowed much of the GIS work to be done in the office by creating a geographic database of legal parking facilities along the study corridors. Estimations of the number of truck parking spaces in legal parking areas where pavement markings were indeterminate or not present were made using visual inspection.

The legal parking geographic database created during the desktop review guided the field team and much of the information was input prior to beginning the field work. This allowed the field team to input field information into forms developed for each parking location and then have it change status and color to complete.

Field Review

Upon completion of the desktop aerial review, the field review and usage study began. The team conducted a trial run of the proposed field work procedures and methodology. This trial run was conducted on two truck parking areas along I-70 near Kansas City, Kansas, to confirm the efficiency and efficacy of the assessment approach.

The actual assessment was conducted by two two-person teams, each of which drove assigned portions of the Kansas Primary and Secondary Freight Networks. Both networks were driven by the teams during the week of March 16th – March 20th, 2015. The review was conducted overnight and collected data on the number of trucks parked at different facilities legal and illegal, formal and informal between the hours of 10 p.m. and 6 a.m.

As part of the review, one team member drove the field vehicle through parking lots, calling attention to parking utilization and other lot attributes. The data-collection member of the team entered the data into a Global Positioning System (GPS)-enabled iPad equipped with ArcGIS online. ArcGIS online is a fully web-enabled version of GIS which allowed the staff to edit the original maps. Truck parking field data was inputted as follows:

- If a truck was found parked, the team assessed whether it was a legal parking facility or not.
- The field reviewer placed a point in GIS and input the information in the predefined fields set up during the desktop review for either the parking facility or the illegally parked truck.
- The point was marked for additional review in the office if there was a question about the location that could not be determined in the field.

Figures 2.2 through 2.5 show different truck parking situations and how they were handled as far as legal/illegal and formal/informal.

Figure 2.2 shows trucks parked at a rest area; all are legally parked under our study definition. Several trucks had created informal parking spaces in a legal parking facility. This photo also represents what would be considered an over-utilized parking facility.

Figure 2.2 – Trucks Parked at Rest Area



Trucks parked legally at rest area

Figure 2.3 features a similar rest area in under-utilized conditions. As can be seen, there were trucks parked informally even with plenty of formal spaces available.

Figure 2.3 – Trucks Parked at Rest Area



Trucks create informal parking spots at an Olathe facility

Figure 2.4 shows a truck informally parked across numerous car parking stalls. Whether this is legal depends upon the business associated with the lot. A truck was classified as parking legally if it was in a restaurant or hotel parking lot; it was assumed the business was allowing this use to a customer. The truck was classified as illegal if it was parked in a retail parking lot (i.e. Wal-Mart).

Figure 2.4 – Truck Parked Illegal in a Parking Lot



Truck occupying two retail lot spaces in Wyandotte County

Trucks parked on freeway on- and off-ramps, as in **Figure 2.5**, were classified as illegal parking.

Figure 2.5 – Truck Parked on Freeway Ramp



Truck parked on a highway ramp near Gardner

Figure 2.6 illustrates the various scenarios for coding a truck-parking facility in the field. This chart shows the information which was collected, if readily available, in the ArcGIS online form for each parking location. After the assessment was made about whether a facility was a legal truck parking area, then based upon the parking area scenario a series of items were cataloged.

For a legal parking facility, the cataloging was based on answers to a number of questions:

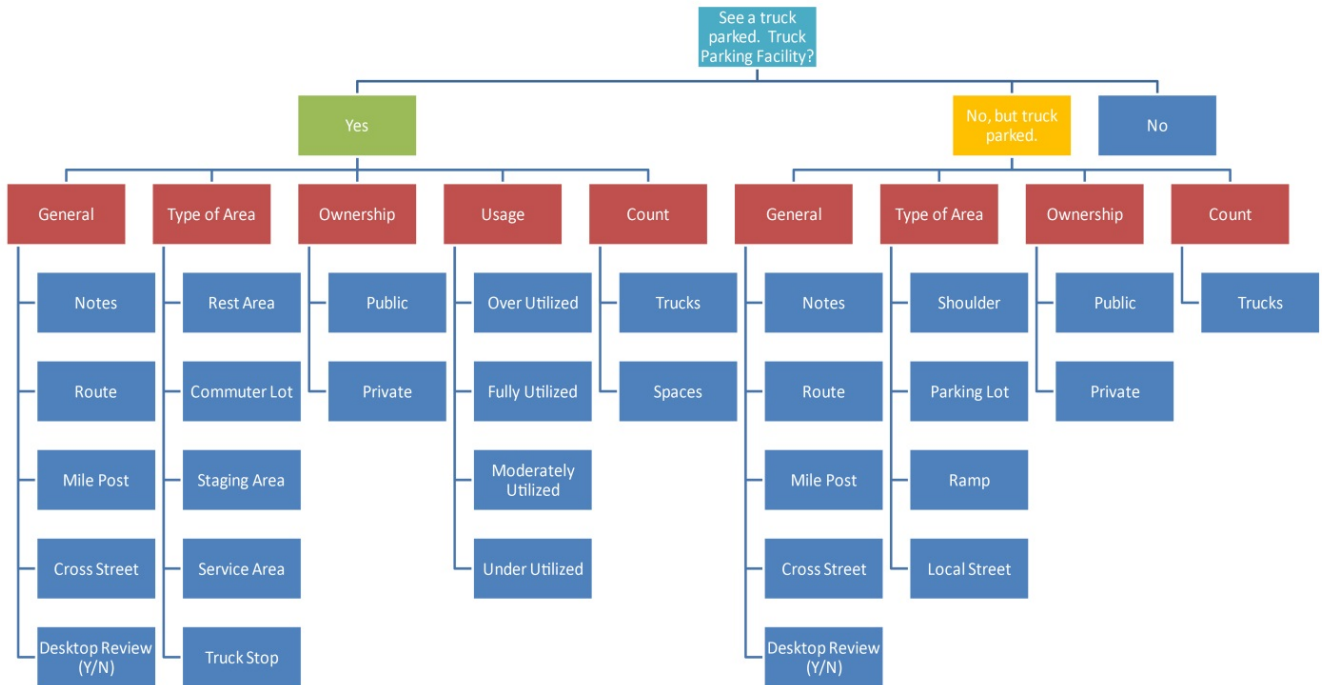
- What type of area was the facility?
- What was its overall condition?
- What amenities did the facility offer?
- Was the lot public or private?
- How utilized was it?

If the parking was illegal, then different were questions asked:

- What type of area was the parking in?
- Was the area public or private?
- How many trucks were parked there?

Figure 2.6 – Truck Parking Coding Scenarios

Kansas Freight Parking Study
 Field Inventory Checklist Criteria



In addition to **Figure 2.6**, a Parking Facility Condition Rating Matrix (**Table 2.1**) and a Parking Facility Usage Matrix (**Table 2.2**) were developed to guide the inventory of the legal truck parking facilities. These ratings were established to allow the teams in the field to make minimal subjective decisions about the condition of pavements providing uniform results from each team.

Table 2.1: Parking Facility Condition Rating Matrix

Condition Rating	Pavement	Striping	Lighting
Excellent	No signs of distress (cracking)	Clearly visible	Well Lit, video surveillance
Good	Minor cracking	Partially faded	Well Lit
Fair	Major cracking and minor potholes	Faded	Some Lighting
Poor	Major cracking and potholes	None	No Lighting

Table 2.2: Parking Facility Usage Matrix

Usage Rating	Percent Full	Description
Over Utilized	100% or greater	Drivers are creating extra parking
Fully Utilized	70% - 100%	Most spaces are filled
Moderately Utilized	40% - 70%	About half of the spaces are filled
Under Utilized	0% - 40%	Most spaces are available

Each field team had to make decisions in the field about utilization and parking facility condition which are outlined in the tables above. The team counted the trucks in each lot, then estimated the number of vacant spaces and calculated the percentage utilization before logging it in the correct usage rating category. After the field review was completed, the data was compiled and processed to help draw conclusions on the results discussed in the next section.

Field Review Results

Figures 2.9 through **2.12** show the results of the field review in map format. These maps were set up to show different things. Locations where illegally parked trucks were found were also shown. Because this graphic shows the illegal parking in addition to legal facilities, it paints a complete picture of where trucks were found parked in the state of Kansas during the study week.

Based upon the data found in the field as shown in **Figure 2.9**, some observations were made about illegal parking. First, most illegal parking was concentrated at the perimeter of the urban areas. Secondly, trucks utilized freeway on- and off- ramps heavily for parking throughout the state. When the truck traffic was on a road with at-grade intersections there was often a truck or two parked at the grain facility in each small town along the route. Finally, a majority of the publically owned facilities are along Interstate routes with only a handful located along other primary truck routes throughout the state.

Figure 2.10 shows the utilization (percent of parking spaces filled) at particular legal public and private truck parking facilities throughout the state of Kansas. It should be noted that the field team also looked at the truck parking along U.S. 50 through Hutchinson, which was not along the routes but was included at the request of KDOT. Truck parking sites along the KTA facilities were in

many cases over utilized, which means that all parking spaces were full and trucks were continuing to park by creating spaces along ramps and in drive aisles. Also the southern portion of I-135 has fully utilized facilities along it, which means parking was near 100 percent full. The final thing to note is that, in general, parking facilities were fairly full on the perimeter of urban areas throughout the state.

Figure 2.11 shows the concentration of trucks (numbers parked) at particular legal truck parking facilities. The first thing to note is the large number of trucks parked in or near urban areas. The next item to point out is that large numbers of trucks were also parked at major junctions in the freight network whether urban or rural. There were also a few routes which have very little overnight parking; these were mostly minor north/south routes through the state.

Figure 2.12 shows the utilization and number of trucks parked at a particular legal truck parking facility. As shown a majority of the large parking facilities holding 60 or more trucks were fully to over utilized throughout the state of Kansas. Looking more regionally, the southern half of the state has almost all parking facilities which can hold 30 or more trucks at least fully utilized; in the southeast region many of those facilities were over utilized. This map helps identify where most of the trucks were parking and where new facilities or larger facilities may be most needed.

There are several general trends which were noticed by the field teams and confirmed with the technical advisory panel. Those observations are discussed below:

- Many things affect a truck driver's choice about where to park. However, in general, there are two groups of truck drivers; those who want amenities enough to seek out truck stops offering them and those who just want to drive until their hours of service are up. For drivers wanting truck stops with amenities, the drivers will stop at their desired facility and create spaces if none are available. For drivers focused on maximizing drive time, they will park outside of cities where fewer obstacles exist to parking in locations allowing easy in and out movements. This is also the appeal of parking on interchange ramps; trucks can just pull to the side and then pull back on to the ramp when they start their next driving period. This can partially explain the pattern of drivers stopping outside the cities wherever they can find space and there being a notable absence of trucks in the urban areas.
- Drivers generally park where they want without regard to parking lot pavement conditions. Location was more important than whether the lot was brand new concrete or severely rutted gravel.
 - The peak time for trucks to park was observed to be between 12 a.m. and 4 a.m. Trucks park where they will be accommodated, whether a parking lot, side road or ramp. With freight tonnages expected to increase and with hours of service regulations limiting travel the truck parking situation is only expected to become more of an issue in the future.
 - Along the KTA facility it was observed that parking areas outside of the toll plazas were underutilized.

Figure 2.9 - Parking Type

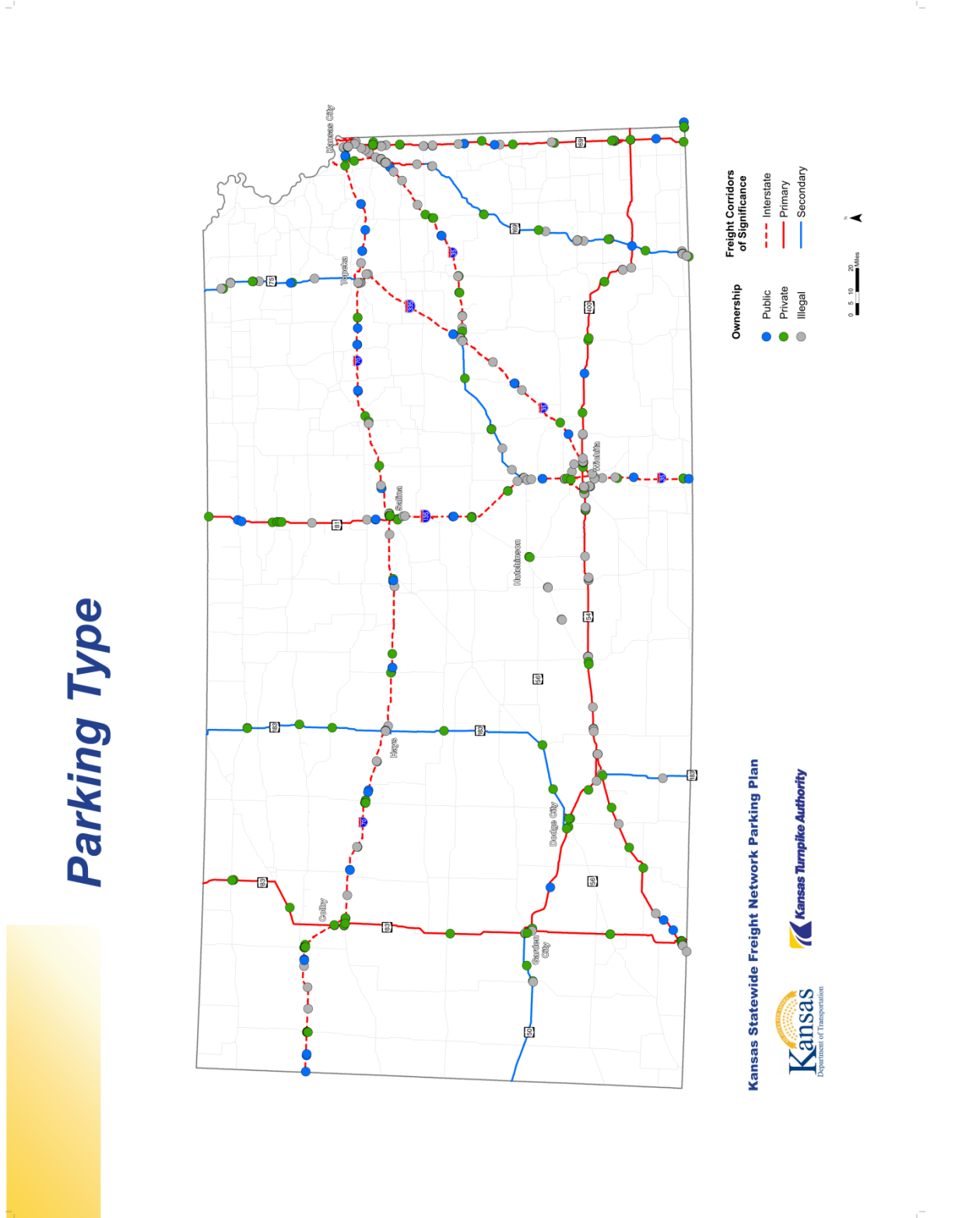


Figure 2.10 – Parking Facility Utilization

Parking Facility Utilization

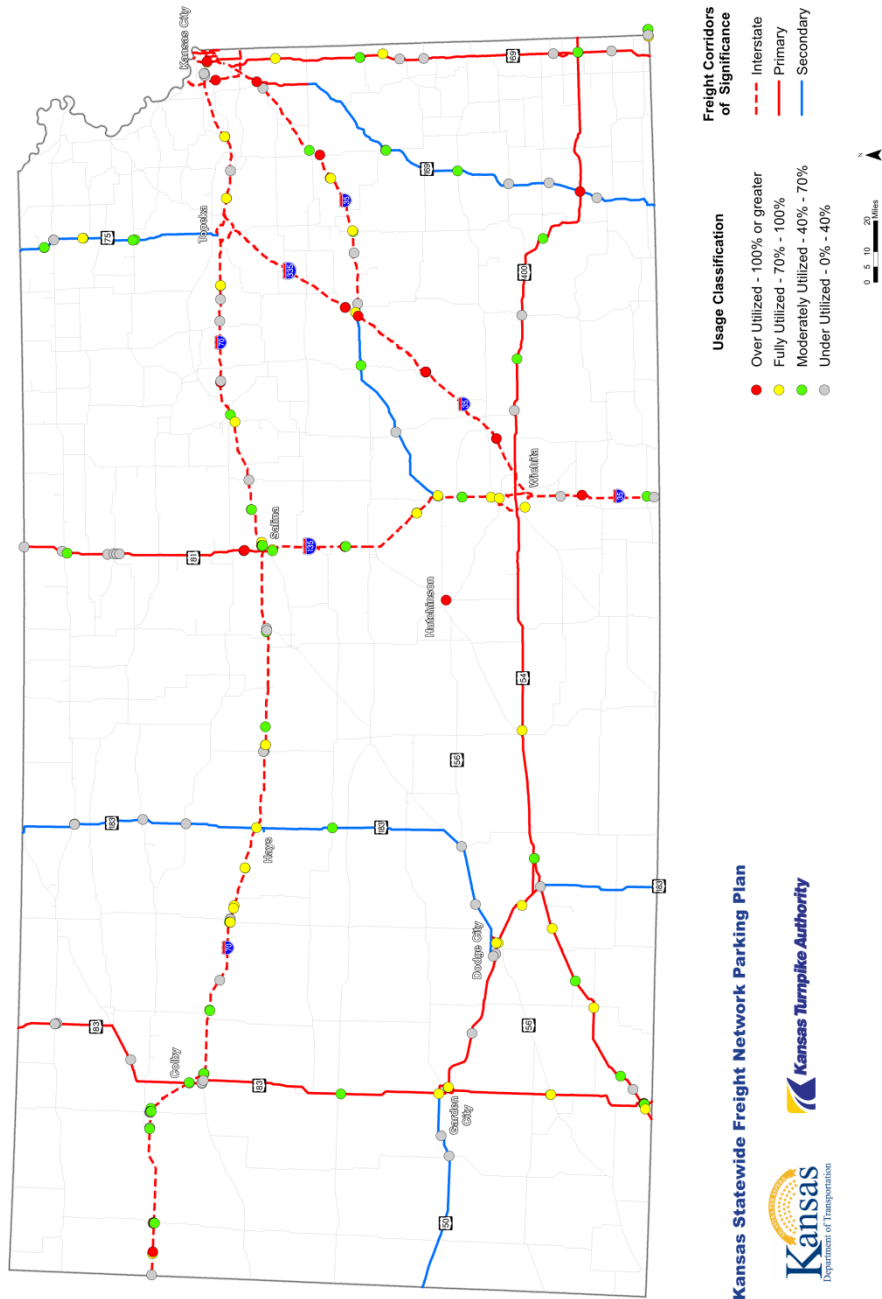


Figure 2.11 - Parking Concentrations

Truck Parking Concentrations

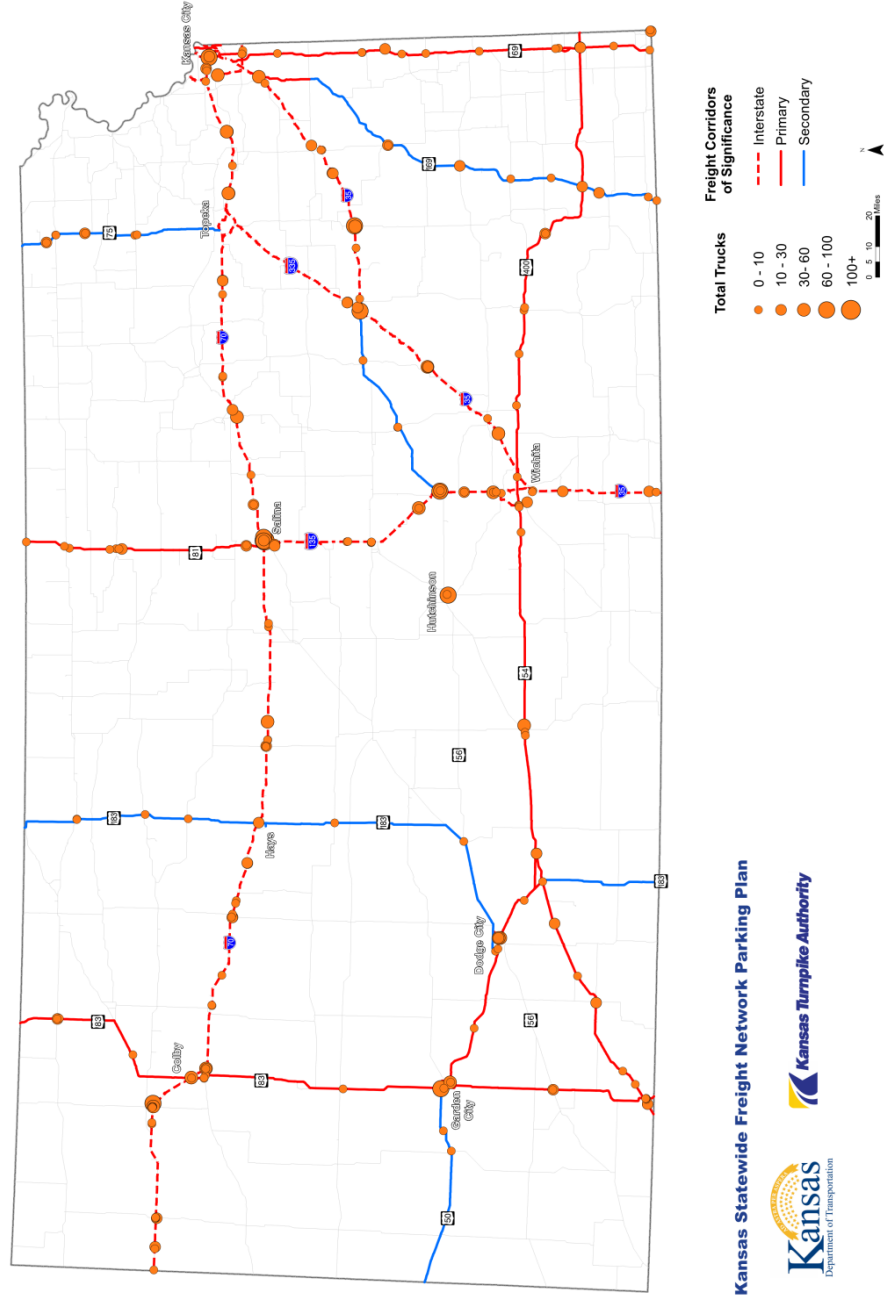
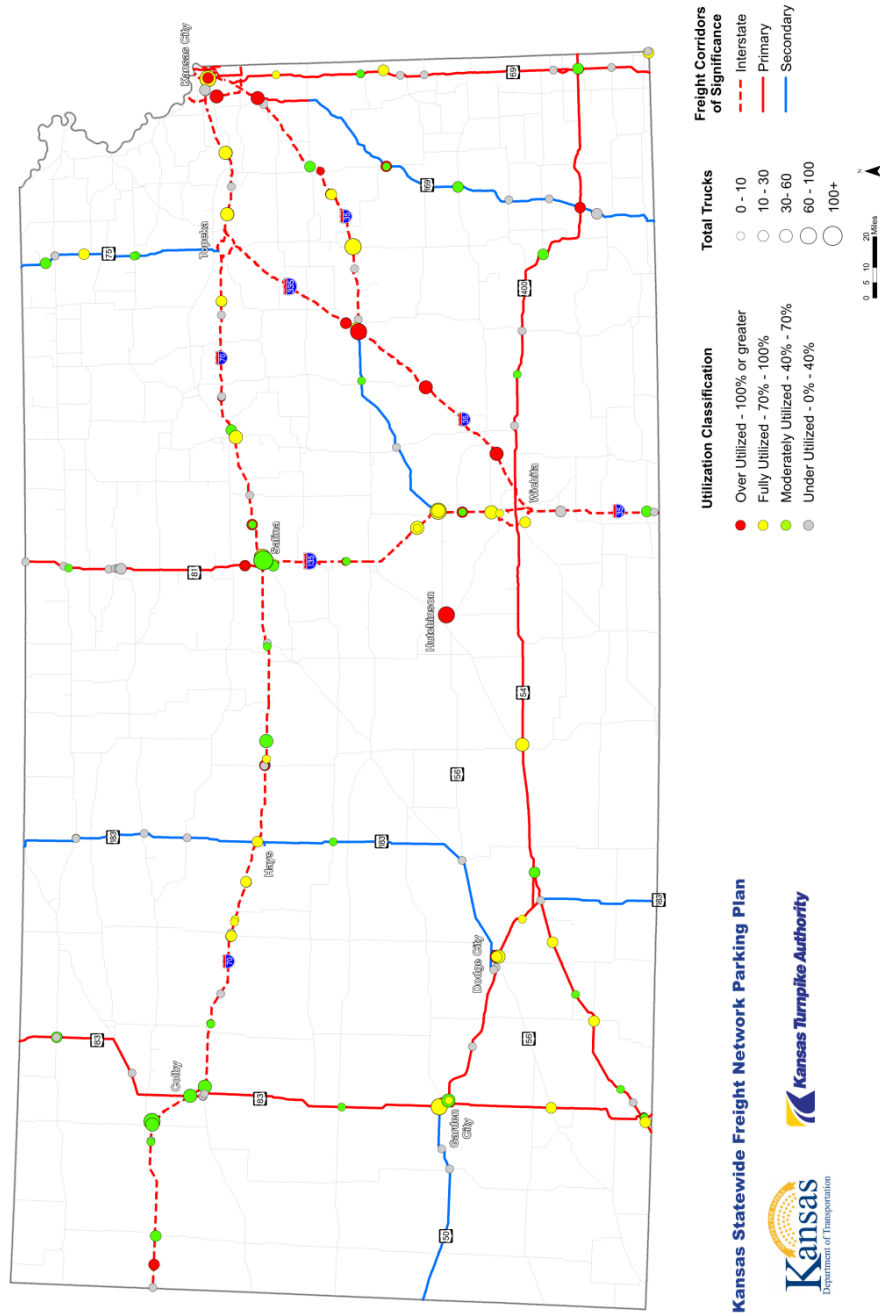


Figure 2.12 - Parking Facility Utilization and Concentration

Parking Facility Utilization & Concentration



This truck parking inventory provided numerous insights into the behavior of truck driver parking but does not paint a complete picture of what affected the driver's choice. To supplement this information, a survey of truck drivers was conducted to help understand driver behavior (see **Appendix 2.A**). Because of the short duration of the truck parking inventory, a study of GPS data from trucks was done to determine when and where drivers were parking overnight and for their thirty-minute break. This GPS data was collected and processed for four two-week windows strategically placed throughout the year to capture seasonality and is described in more detail in Chapter 3.

Literature Review and Peer Interviews

Introduction

The literature and peer review section provides a summary of reviewed studies and best practices regarding truck parking decision factors. The review was conducted through an investigation of research studies, articles, newsletters and web-sources. The review also included information gathered from peer interviews with the following organizations:

- Iowa Department of Transportation (Iowa DOT),
- Minnesota Department of Transportation (MnDOT),
- Missouri Department of Transportation (MoDOT),
- Colorado Department of Transportation (CDOT),
- Wisconsin Department of Transportation (WisDOT) and
- Mid-America Freight Coalition (MAFC).

Information presented reflects conditions as they existed at the time reviews and interviews were conducted.

Defining the Need

Mandated Hours of Service

Truck drivers must comply with the U.S. Department of Transportation's Federal Motor Carrier Safety Administration (FMCSA) mandated "hours of service" (HOS) regulations if they drive a commercial motor vehicle (CMV). The HOS Drivers Final Rule was published in the Federal Register on December 27, 2011. Effective date of the Final Rule was February 27, 2012, and the compliance date of remaining provisions was July 1, 2013. HOS regulations, as of June 2015, are as follows¹:

- 11-Hour Driving Limit: May drive a maximum of 11 hours after 10 consecutive hours off duty.
- 14-Hour Limit: May not drive beyond the 14th consecutive hour after coming on duty, following 10 consecutive hours off duty. Off-duty time does not extend the 14-hour period.
- Rest Breaks: May drive only if 8 hours or less have passed since end of driver's last off-duty or sleeper berth period of at least 30 minutes.
- 60/70-Hour Limit: May not drive after 60/70 hours on duty in 7/8 consecutive days. A driver may restart a 7/8 consecutive day period after taking 34 or more consecutive hours off duty.

The Consolidated and Further Continuing Appropriations Act of 2015 was enacted on December 16, 2014, suspending enforcement of requirements for use of the 34-hour restart.

¹ www.fmcsa.dot.gov/regulations/hours-service/summary-hours-service-regulations

The regulations are strictly enforced and violations can include state and local law enforcement fines, civil penalties on a driver or carrier and downgrading of the carrier's safety rating. To meet these regulations, commercial truck drivers need safe and convenient parking options along their route. To maximize travel time and distance, truckers often wait as long as possible to stop and rest. Without viable parking options, some truckers park wherever possible, including entrance and exit ramps or other convenient locations.

Jason's Law

Truck driver Jason Rivenburg was 12 miles away from his final destination when he needed to find truck parking. He was ahead of schedule, and as is often the case with just in time deliveries, trucks are not allowed to show up at delivery sites early. The only place he had to park was an abandoned gas station. Tragically, Rivenburg was robbed and murdered because of the unsafe location he unknowingly chose. Through the persistence of Hope Rivenburg, Jason's widow, and others, "Jason's Law" made its way into the Moving Ahead for Progress in the 21st Century Act (MAP-21) highway bill². SEC. 1401, Jason's Law, establishes a national priority for projects that address shortage of long-term parking for commercial motor vehicles on the National Highway System to improve the safety of motorized and non-motorized users and for commercial motor vehicle operators. The provision includes a research mandate to survey and assess the availability of parking facilities, the capability to provide adequate parking and rest facilities, the motor carrier traffic volume through each state, and a system of metrics to measure the adequacy of parking facilities³.

2013 Safe Truck Parking Survey

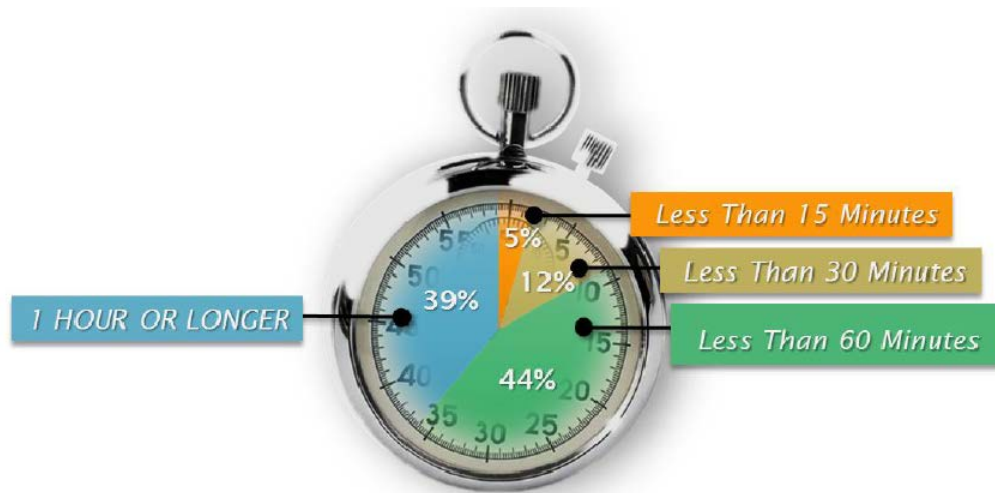
To help fulfill this research mandate, in 2013, a volunteer group including Hope Rivenburg and Desiree Wood of REAL Women in Trucking, Inc., and Andrew Warcaba & Associates conducted an independent survey of nearly 4,000 truckers nationally regarding the ability to park safely. The goal of the survey was to bring awareness to the fact that there is a significant lack of safe available commercial vehicle parking space, on or near interstates, for truck drivers who want or need to park. As shown in **Figure 2.13**, the survey revealed that eighty-three percent of the respondents routinely took longer than 30 minutes to find parking; thirty-nine percent took longer than one hour to find safe parking in order to comply with federal HOS regulations. Drivers who haven't found parking before running out of driving hours are often forced to park illegally and unsafely, often on the shoulder of the highway or an off-ramp⁴.

²<http://truckerdesiree.com/2013/05/30/2013-national-truck-parking-survey/>

³ <http://www.fhwa.dot.gov/map21/legislation.cfm>

⁴ 2013 Safe Truck Parking Survey PowerPoint by Desiree Wood, Hope Rivenburg, and Andrew Warcaba Associates

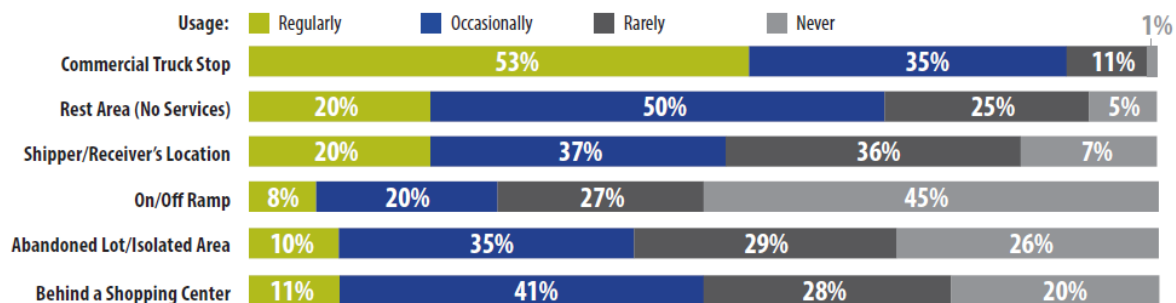
Figure 2.13 - Time Looking for Parking



Graphic courtesy of PowerPoint by Desiree Wood, Andrew Warcaba Associates and Hope Rivenburg

As shown in **Figure 2.14** below, most truckers regularly park at commercial truck stops, but still 10 percent to 30 percent of truckers park in unsafe areas such as on/off ramps, isolated areas, and behind shopping centers.

Figure 2.14 - Locations Where Truckers Normally Park



Graphic courtesy of PowerPoint by Desiree Wood, Andrew Warcaba Associates and Hope Rivenburg

Federal Reports Concerning Truck Parking

Since the year 2000, there have been several reports published by Federal agencies. The focus of the report and the conclusions are summarized below.

Commercial Motor Vehicle Parking Shortage, FHWA Report To Congress, May 2012

This report was produced to comply with a request for FHWA to study the shortage of commercial motor vehicle parking and its impact. The request was included as a Conference Report that accompanied the Consolidated and Further Continuing Appropriations Act of 2012, Pub. L. No. 112-55, 125 Stat. 552. The report updates major findings from previous studies with current estimates and forecasts of long-distance truck activity, information from the Truck Parking Pilot Grant Program and observations made by the safety enforcement community. It reported the following:

- The volume of freight nationally increased by 12 percent from 2002 to 2007.
- Based on the estimated tonnage of freight movement in 2007 and an estimated percentage of that freight traveling over 500 miles, it is estimated that nationally 173,000 trucks per day need to park during their journey.
- Based on a projected growth in freight tonnage of 11 percent by 2020, it is estimated that 190,000 long-haul trucks will need a place to park en route every day.
- Demand at an example high volume truck stop was reported to peak between 12:00 midnight and 4:00 a.m. The low point in demand was at 12:00 noon.
- Even though truck parking expansion is eligible for Federal-aid Highway Program funding, truck parking enhancements have had to compete with other high priorities such as bridge preservation. Most truck parking capacity has been provided as part of full service commercial truck stops.
- Section 1005 of SAFETEA-LU provided \$30 million for a pilot program to address truck parking shortages. Most projects funded through the program involved implementing of technology to better inform truck drivers of available parking. Some projects have added parking spaces for a total 325 new spaces nationwide.
- Demand for parking pilot program grant money exceeded available funding by eight times.
- A project awarded to the State of Florida funded construction of additional parking spaces adjacent to a privately owned and operated truck parking facility.
- Evidence indicates that a truck parking shortage remains widespread and will be exacerbated by anticipated growth in truck movements. Investments to reduce the shortage must be made to facilitate and better utilize existing capacity and provide additional capacity.

Study of Adequacy of Commercial Truck Parking Facilities, FHWA, March 2002

This study was undertaken in response to Section 4027 of the Transportation Equity Act for the 21st Century (TEA-21). The law required that a study investigate the adequacy of commercial truck parking facilities serving the National Highway System (NHS). The study used a two-pronged approach. One area of focus was on clarifying truck drivers' parking related needs and decision making process. The second focus area was comparing supply and demand of truck parking.

Based on these two areas of study, recommendations for improvements to mitigate the existing and future truck parking problems were developed. (It should be noted that this study was conducted prior to the significant change in hours-of-service requirements implemented in 2012 and 2013.) The study made the following recommendations:

1. Expand or improve public rest areas.

- Increase the number of parking spaces
- Improve geometric design of public rest areas to increase convenience for drivers using these facilities.

2. Expand or improve commercial truck stops and travel plazas.

- Increase yearly truck registration fees with the stipulation that these special funds can be used only by States on initiatives to address the truck parking issue.

- Implement a program that allows States to close rest areas in locations that are well served by private-sector business and shift funds to areas where additional development is desirable.
- Remove cost-prohibitive road improvement requirements imposed by State DOTs upon developers attempting to open new facilities.

3. Encourage the formation of public -private partnerships.

- Provide low-interest loans or grants to commercial truck stops to increase capacity.
- Construct State-owned lots adjacent to commercial truck stops and travel plazas and enter into agreements with these owners to lease or maintain the lots.
- Work with owners of commercial truck stops to help them promote the availability of parking in large lots close to the Interstate highway (e.g., provide signage on the highway).

4. Educate or inform drivers about available spaces.

- Develop Intelligent Transportation System deployments that provide drivers with real-time information on the location and availability of parking spaces. For example, investigate using cellular phones and radio frequencies to broadcast parking locations and availability to drivers.
- Investigate using mailings related to credentials administration for the International Registration Plan and the International Fuel Tax Agreement as a means of distributing information on the location and type of parking spaces within the base State to participating motor carriers.
- Publish and distribute a “trucker’s map,” in both paper and electronic format, that pinpoints parking facilities for drivers (both public and commercial), including lot capacity and space availability.

5. Explore changing parking enforcement rules.

- Implement more stringent enforcement of parking rules to remove vehicles from locations such as interchange ramps.
- Change parking limits to permit trucks more time to park at public rest areas.
- Encourage local government and business support for constructing and operating commercial truck stop and travel plaza facilities in or near their community industrial and business parks (i.e., zoning).

6. Conduct additional studies.

- Refine the results from the present study and develop more detailed assessment strategies at specific highway locations (e.g. target heavily traveled truck corridors).
- Establish a multi-State committee to evaluate alternatives and recommend solutions that would address the “staging” of trucks at certain locations in response to “just-in-time” delivery.
- Conduct additional research to further refine the demand model (e.g., to accommodate local factors that can influence demand, such as a higher rate of parking near major distribution centers).

NCHRP Synthesis 317 - Dealing with Truck Parking Demands, Transportation Research Board, 2003

The National Cooperative Highway Research Program synthesis contains a review of the successful practices used by transportation agencies to evaluate and deal with truck parking demand. The primary sources of data for the synthesis were detailed questionnaires distributed to highway maintenance engineers at state departments of transportation. Completed questionnaires were provided by 24 states. The synthesis developed the following conclusions:

- Commercial vehicle travel demand is large and growing—as is parking demand.
- Because of parking shortages and limits on stays in public facilities, truck drivers needing rest may create unsafe situations by parking on roadway access ramps and shoulders.
- Drivers are responsible for obtaining long-term rest, but no single agency or organization is responsible for providing required facilities.
- Survey results confirmed other findings that the truck parking shortage is nationwide.
- Most supply of truck parking is located in commercial truck parking lots and plazas.
- The problem is concentrated in public rest areas. Rapid increases in truck traffic, combined with a limited expansion of public rest areas, have resulted in a shortage of available truck parking in public rest areas.
- A multipronged approach is required, which includes 1) expand or improve public rest areas, 2) educate or inform drivers about available spaces, and 3) make better use of the private sector and private truck spaces.

Highway Special Investigation Report - Truck Parking Areas, National Transportation Safety Board (NTSB), May 2000

The major issue addressed by this Safety Board special investigation report is the lack of safe available commercial vehicle parking on or near interstates for truck drivers who want or need it. This report also discusses the lack of information about parking available to truck drivers and the State-enforced parking time limits. Other conclusions summarized in the report:

- Shippers, brokers and consignees frequently influence truck schedules and should be an integral part of any solution to the truck parking area dilemma.
- Testimony at the National Transportation Safety Board's four public hearings and available research indicate that not enough adequate truck parking spaces are available to accommodate traffic patterns in certain locations.
- The Federal and State governments have the responsibility to maintain highway safety and the lack of available truck parking, or truck drivers not knowing where parking would be available, can negatively impact safety.
- The prohibition against private development of rest area facilities on interstates may be an impediment to the construction of adequate truck parking.
- While existing guides and mapping programs may list the private truck stops and public rest areas, they are not all-inclusive of the available truck parking, such as alternative locations like park-and-ride lots and weigh stations.

- Some truck drivers do not have enough information on parking locations and need to be made aware of all available parking, both in advance of and during trips.
- Global positioning systems (GPS) technology, combined with electronic maps and the ability to communicate that information to truck drivers, could help drivers locate parking areas.
- Parking time limits for public rest areas can result in drivers returning to the roadway without obtaining adequate rest or parking

Best Practices

Interviews with the state DOTs and the Mid America Freight Coalition were conducted. An interview questionnaire was developed (see **Appendix 2.B**) and representatives from each organization were interviewed via telephone or email. Items discussed included truck parking issues, solutions to issues they have dealt with and best practices for evaluating the economic benefits of truck parking improvements. Studies they have completed along with other relevant data were also requested. Below is a summary of the information obtained.

Michigan

The State of Michigan is a leader in the development of smart truck parking. MDOT leveraged \$4.48 million in funding from Federal Highway Administration (FHWA) Truck Parking Facilities Discretionary Grants Program to develop and install a Truck Parking Information and Management System (TPIMS) along I-94 in southwest Michigan⁵. This corridor carries some of the highest freight volumes in the Midwest. Trucks account for approximately 23 to 30 percent of all traffic in the corridor, making it the highest concentration of commercial vehicles on interstate highways in Michigan. Truck parking is a major safety concern along the I-94 corridor. Commercial truck drivers routinely park on rest area entrance and exit ramps, in designated car parking areas, and on interstate entrance and exit ramps. Meanwhile, a significant number of truck parking spaces at private parking facilities such as truck stops are empty or underutilized. The goal of TPIMS is to identify available parking for both public and private facilities and share that information with truck drivers. To collect parking availability data detection cameras and other sensors were deployed at public rest areas and private facilities. Parking availability information is then sent to a cloud service and distributed to drivers through:

- MDOT's Mi Drive website: www.michigan.gov/drive (see **Figure 2.15**),
- Truck Smart Parking Services website: www.trucksmartparkingservices.com,
- dynamic roadside truck parking signs (see **Figure 2.16**),
- smart-phone applications, and
- and third-party data services

Features like text-to-speech were implemented in smartphone connected vehicle applications to reduce driver distraction and improve safety.

⁵ www.michigan.gov/mdot/0,4616,7-151--336551--,00.html

Figure 2.15 - Mi Drive Website

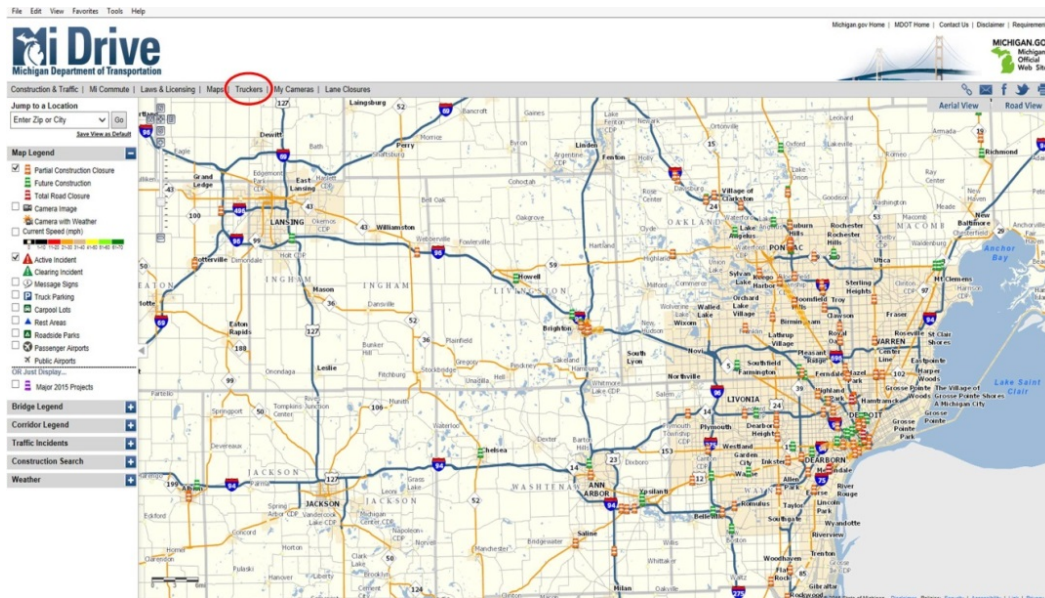
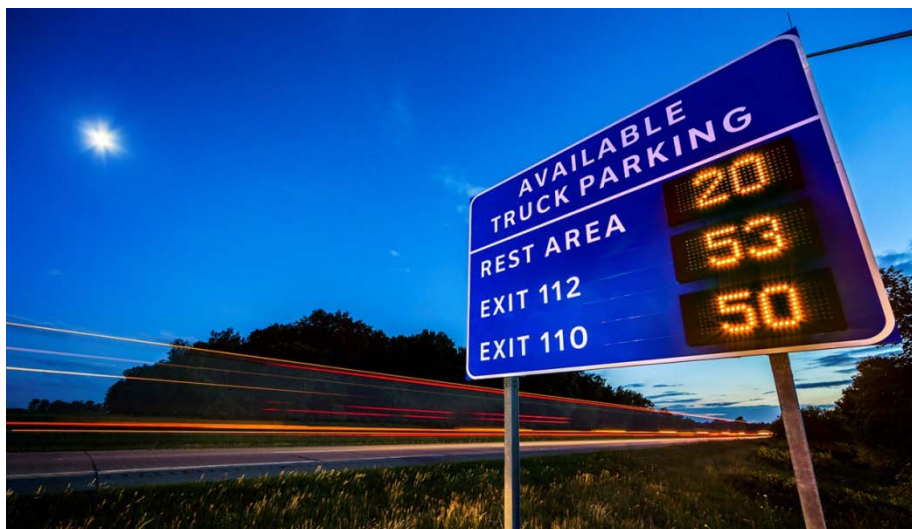


Figure 2.16: TPIMSDynamic Message Sign in Michigan on I-94



Minnesota

A peer interview was conducted with MnDOT staff on April 6, 2015. Staff provided a copy of relevant studies including the *Minnesota Interstate Truck Parking Study*⁶ (2008) and the *Truck Parking Study Phase 2*⁷ (2010). The 2008 study documented the state of truck parking issues throughout Minnesota, while examining the supply and demand of public and private commercial vehicle parking along Minnesota’s three primary Interstate corridors: I-35, I-90 and I-94.

⁶ Wilbur Smith Associates and the Center for Transportation Research and Education, *Minnesota Interstate Truck Parking Study*, MnDOT, St. Paul, MN, 2008.

⁷ Center for Transportation Research and Education Iowa State University, *Minnesota Truck Parking Study: Phase 2*, 2010.

The study revealed parking capacity issues at many of the state’s rest area facilities and concluded that further research would be necessary to identify potential remedies to improve truck parking. The Phase 2 study determined opportunities for expanding truck parking where needed. The study determined parking in urban core as the key problem. Other highlights included:

Current Truck Parking Conditions and Issues

- MnDOT inventoried the Interstate truck parking supply using various information sources: aerial photographs; Google Earth™; The Trucker’s Friend; a national truck stop directory, and direct contact with truck stops. MnDOT has about 400 public truck parking spaces.
- The inventory included field observations and usage records from the Truck Parking Capacity Usage Database maintained by the MnDOT Rest Area Program. The database uses truck count data collected by rest area maintenance crews during late night hours between 11:00 PM and 3:00 AM to count numbers of trucks parked at each facility. Overall, 20 facilities were deemed to have significant capacity issues during the busiest time of day.
- The busiest hours of day are overnight.
- The busiest days of the week are Tuesdays through Thursday.
- The busiest time of year is September through Christmas.
- There are fluctuations in these trends, particularly during the harvest season. Particularly September, October and November.
- The Statewide freight movement is projected to grow by at least 30 percent by 2030. Over 63 percent of goods (by volume) moved in Minnesota are carried by truck.⁸ The state’s busiest truck freight routes by average annual daily traffic (AADT) are I-35, I-90 and I-94.
- Truck parking amenities are limited to rest areas, mainly restrooms, vending and information. Private facilities provide amenities (showers, safety, lighted parking, patrols, etc.).
- There has been limited discussion about public private partnerships (P3s) with sharing areas with private facilities; however, these discussions are very preliminary.
- MnDOT has assessed parking usage and is in the process of evaluating use of video technology to assess and provide information on the number of available spaces.
- The biggest truck parking issue anecdotally is parking on ramps; however, MnDOT does not actively track or enforce this issue.
- Truck parking in urban areas was overwhelmingly identified as the key truck parking problem in Minnesota and was the focus of the *MnDOT Truck Parking Study Phase II*.
- In Minneapolis some drivers park on frontage roads. This is not breaking laws but there is an abundance of parked trucks – as many as 60 to 70 per night. The city is asking if trucks should be allowed to park on frontage roads. Idling trucks raise concerns with environmental issues, etc.

⁸ 2015 Statewide Freight Plan Fact Sheet, <http://www.dot.state.mn.us/planning/freightplan/index.html>

- The biggest issue with oversized/overweight truck loads involves large wind blades. They come into a rest area and occupy more than one space. Wisconsin, North Dakota and Iowa, as well as Canada, have higher truck allowance regulations than Minnesota.
- The biggest challenge with truck parking is getting the right data on demand. Minnesota is dependent on performance measures. If improvements are made, the DOT needs to benchmark targets. MnDOT is currently evaluating data sources. Data from the American Transportation Research Institute (ATRI) data could be very useful in assessing freight movement; ATRI is the non-profit research arm of the American Trucking Associations Federation.

Strategies and Solutions

- The *Truck Parking Phase II Study* identified capacity improvements including increasing the number of truck parking spaces at key locations, coordination with WisDOT in providing parking information along I-94 and improved truck parking information statewide.

Future Issues and Opportunities

- Currently assessing smart truck parking technologies similar to the Michigan TPIMS system.
- Exploring partnership with WisDOT, which also is assessing smart truck parking technologies.

Missouri

A peer interview was conducted with MoDOT staff on April 6, 2015. Staff provided a copy of relevant studies including the *Missouri State Freight Plan*⁹ (2014) as well as information on existing truck parking facilities in the state. Highlights from the interview and relevant studies include:

Current Truck Parking Conditions and Issues

- MoDOT has approximately 1,150 public truck parking spaces. 24 Interstate rest areas and 24 truck parking only spots.
- MoDOT has rest areas on Interstates 29, 35, 44, 55, 70 and 270. Truck-only facilities on Interstates 29, 35, 44, 55, 57, 70 and one on U.S. 36. I-44 and I-70 have the heaviest truck volumes by AADT.
- Truck tonnage is forecast to increase from 500 million in 2011 to 778 million in 2030, an increase of 55.6 percent.
- The highest demand for truck parking is on the fringe of the Kansas City and St. Louis metropolitan areas.
- The busiest hours of day are from 11:00 PM to 6:00 AM.
- The busiest time of year is August through December.
- There is a slight peak of truck volumes during the harvest season; however, these are short-haul trips with less demand for parking.

⁹ <http://www.mofreightplan.org/wp-content/uploads/2015/02/Missouri-Freight-Plan-Executive-Summary-FINAL-small-version.pdf>

- Truck parking amenities are limited to rest areas and welcome centers. Rest areas have restrooms, maps and picnic tables. Welcome centers have larger restrooms, tourism information, playgrounds and picnic tables. Truck-only parking facilities are limited to vault toilets and basic lighting. They are a combination concrete, asphalt and gravel.
- MoDOT has more than doubled the availability of truck parking in last decade, mostly through the conversion of closed rest areas or weigh stations.
- Truckers have expressed the need for running water and toilets. However, the most pressing need is for additional parking.
- Existing truck parking spaces are all not 100 percent utilized, however, they are over capacity on the fringes of Kansas City and St. Louis. Therefore, the issue is not the total number of spaces available in the state; it is the location of parking in relation to demand.
- Truck parking issues at the local level are typically during harvest season.
- Issues with oversize/overweight truck loads have to do with different regulations/requirements in each state. How escorts are handled, requirements, etc. This can cause increase pressure for parking and/or mobilization at the border.
- The biggest challenge with truck parking is the lack of dedicated funding to build and maintain parking facilities.

Strategies and Solutions

- MoDOT completed a Statewide Freight Plan which identifies improving the availability of truck parking as a strategic policy recommendation.
- Exploring potential opportunities to partner with private truck stops.
- Work with the Missouri Trucking Association to send e-alerts and information, surveys, etc.
- MoDOT is using groundhog sensors at some rest areas. However, with this technology, it is difficult to provide an accurate assessment of available parking.
- The 2014 Freight Study identified a number strategies and recommendations for truck parking including:
 - Study public and private truck parking spaces placement and availability (short term).
 - Partner with the Highway Patrol to develop an education and enforcement program to reduce prohibited parking where parking facilities are readily available (intermediate).
 - Use technology to provide real-time parking availability at upcoming public and private facilities (long-term).
 - Increase truck parking capacity along key corridors - public and private (long-term).

Future Issues and Opportunities

- MoDOT's ability to make future significant safety improvements is hampered by diminished funding, lack of an information system that conveys available truck parking locations to commercial drivers and the need for improved safety and security at truck parking locations.
- MoDOT has long been a leader in innovative ideas such as dedicated truck lanes.

Wisconsin

A peer interview was conducted with WisDOT staff on April 22, 2015. Staff provided a copy of relevant studies including a summary of a *WisDOT BHM CMV Parking Study (2014)* as well as information on existing truck parking facilities in the state. The highlights from the interview and relevant studies are provided below:

Current Truck Parking Conditions and Issues

- WisDOT has approximately 29 rest areas (one under construction). All rest areas are located on the primary interstate system and operate 24 hours a day, 365 days per year. There are 737 truck parking stalls at rest areas and 179 at State Patrol Safety and Weight Enforcement Facilities (SWEFs).
- Wisconsin has extensive and escalating oversize/overweight loads, wind towers in particular. The largest domestic manufacturer of wind energy components has more than 1,000 shipments. Loads can exceed 200 feet in length and 200,000 pounds in gross vehicle weight. All loads are destined for neighboring states. Permit conditions and hours of service in other states challenge safe harbor and parking problems. WisDOT has a separate oversize/overweight permit unit within the DOT.
- Major trucking corridors are between Minneapolis to Chicago and Green Bay through Milwaukee down to Chicago.
- The average duration of stay for a single CMV during the daytime is approximately one hour or less. The average duration of stay for a single CMV during nighttime/early morning hours is approximately four hours. Durations were derived in part from a video study of six rest areas along the I-90/I-94 corridor from Minnesota to Illinois on I-90 and I-94. The study collected data and video clips of CMVs parking in parking areas and nearby ramps at the top of every hour at each rest area for a duration of seven days.
- The inventory has indicated a need for additional truck parking to accommodate HOS needs and just in time deliveries.
- Lack of funding is the biggest current issue with truck parking.

Strategies and Solutions

- Current Rest Area Plan is out of date (1989). In the final stages of awarding a comprehensive study to evaluate the role and mission of all rest areas and truck scales. Truck parking is a significant consideration of this study. Technology change and more traveler resources negate the value of public rest areas for the general public. However, this is not the case for truck parking. User experiences are different. Passenger vehicles stay short periods of time; trucks need overnight parking. More truck parking is needed to accommodate HOS as well as staging for delivery windows in adjacent metropolitan area, traffic conditions to clear or waiting for dispatch direction.

Future Issues and Opportunities

- The long term solution for oversize/overweight loads is harmony in permit conditions at border crossings.
- WisDOT is evaluating a real time truck parking communication platform in cooperation with Minnesota and Michigan on the I-94 corridor. The objective is to identify for safe harbor and park, enhancing parking availability and spur on behavior changes of parking on

ramps or shoulders. Are considering integrating the private sector in the platform. Detection hardware at private sector truck stop and signage on system using cloud based communications. If full, signage would indicate spots available elsewhere. The objective to provide options to truckers and precludes need to add parking to system. WisDOT recognizes that it is impossible to build their way out of the parking problem.

- Could partner with truck stops to provide excess DOT property or right-of-way for parking. DOTs do not provide amenities found at typical truck stops (showers, retail, services, etc.).
- Private sector sponsorship is a significant opportunity. This could include sponsorships that would offset operating costs.

Colorado

A peer interview was conducted with CDOT staff on April 8, 2015. Staff provided a copy of relevant studies including the *Truck Parking Issues at State Facilities in Colorado* (2007) and statewide truck parking facilities map. The highlights from the interview and relevant studies are provided below:

Current Truck Parking Conditions and Issues

- Truck parking is available on the major interstates through the state including I-70, I-25 and I-76. These are also the busiest freight routes by AADT.
- CDOT does not actively monitor usage of truck parking.
- Some public truck parking is provided at designated pull outs. Due to the topographical issues in parts of the state, there is a lack of available space for large truck parking areas. Parking areas include restrooms. Are considering electrical hook-ups at some locations.
- There is no dedicated source of funding to build or maintain truck parking.
- There is informal truck parking on entrance and exit ramps; however, this type of parking is not actively discouraged by the state patrol as long as it is deemed safe. The state patrol would rather they be parked on a ramp than driving tired and out of hours.
- Some local jurisdictions are concerned about truck parking; however, the trucking industry typically finds alternate places to park.
- The busiest hours of day are from early evening to early morning. There is some fluctuation during harvest time.
- Lack of funding is biggest issue with truck parking. Also, in Colorado, topography divides the state providing unique different needs and challenges within each region.

Strategies and Solutions

- *2007 Truck Parking Issues in Colorado Final Report* identified the need for additional dedicated truck parking including expanding existing rest areas.
- CDOT provides public truck parking locations through a Truck Parking Guide.

Future Issues and Opportunities

- There is expected to be a statewide increase in truck freight tonnage of 70 percent by 2040. The Ports-to-Planes Corridor connecting Denver to Mexico will be a large driver of this traffic.
- CDOT is considering how to provide truck parking information through real time ITS. However, a specific timeline has not been established for this system.

Iowa

Iowa DOT staff provided a copy of their *Statewide Rest Area Management Plan* (2013). The highlights from the plan are provided below:

Current Truck Parking Conditions and Issues

- There are 40 full service rest areas in the state, all but one are open year round.
- All of the services provided at each rest area are available 24 hours per day. Amenities include parking, restrooms, picnic facilities, pet exercise areas, telephones, traveler information and Wi-Fi.
- Twenty-four hour daily traffic counts, including truck percentages, were conducted at each interstate rest area during year 2012. Rest areas on I-80 and I-380 had the highest average hourly volumes. Rest areas on I-680 had the lowest average hourly volumes. The peak traffic volumes generally occurred between 9:00 AM and 3:00 PM.
- The parking utilization for trucks was highest during the overnight hours (approximately 10:00 PM to 8:00 AM). During much of this time, the number of trucks parking at a rest area exceeded the number of available parking spaces. When parking spaces were full, trucks parked on the shoulders of the rest area entry/exit ramps or in the areas designated for cars. The peak time for truck parking generally occurred between 2:00 AM and 6:00 AM.
- The 2007 study reviewed alternative parking locations for trucks. These locations included parking only rest areas, weigh stations and Alternative Service Locations (ASLs) that provide truck parking. ASLs are businesses or public facilities near interstate service interchanges where travelers can find services similar to those provided at rest areas. Approximately 85 alternative truck parking locations were identified along Iowa interstate rest area corridors, equating to nearly 4,700 truck parking spaces.
- A review of truck travel between major freight hubs was performed to identify probable locations where truck drivers would stop to rest throughout Iowa. This review focused on truck travel within a single day from major freight hubs. The review identified 11 freight routes between major freight hubs where drivers would end their first day of travel on Iowa interstates. Probable locations for truck drivers along these routes to stop and rest were primarily located near the Des Moines metropolitan area.
- Of the services provided at rest areas, truck parking is the most over utilized service at rest areas throughout the state.
 - Truck parking demand exceeds capacity at most full service rest areas at peak times.
 - Truck parking demand exceeds capacity at over half of the parking only rest areas during peak times.

- Weigh stations are sparsely used for truck parking during overnight hours.
- Truck parking at ASLs was observed to be 70 percent to 90 percent utilized.

Strategies and Solutions

- Strategies and solutions identified in the study include a review of P3s, evaluation of parking expansion opportunities at rest areas and weigh stations, and ways to provide additional traveler information.
- Traveler information dissemination technologies are being considered to provide information on truck parking availability. Dynamic, real-time truck parking availability technologies are currently being investigated by other DOTs and FHWA. However, the study noted that these systems are still in their infancy and can be costly.

Future Issues and Opportunities

- P3's are a potential consideration to address additional truck parking needs, however, DOTs need to be mindful of several challenges: Title 23, Section 111 of the United States Code (23 USC 111) prohibits commercial development at travel information centers or rest areas. 23 USC 111 also prohibits private commercial development located on the interstate system. Additionally, businesses located at service interchanges along interstate corridors and the National Organization of Truck Stop Operators (NATSO) are strongly opposed to commercial development at rest areas because of the loss of business/revenues that they would likely incur at existing businesses along interstates. Despite the challenges listed above there are a variety of P3s that could be implemented with the appropriate legislation.
- Parking is available at weigh stations, however, many truck drivers are hesitant to use parking at weigh stations due to potential of inspection that may otherwise be avoided. Currently there are no methods available for truck drivers to park at a weigh station without the potential for being inspected upon arrival or departure of the weigh station. To ensure use of available parking at weigh stations, parking availability signage at weigh stations would need to be incorporated as well as educating drivers of the availability of parking at weigh stations.
- Park-and-ride lots could be used for truck parking during overnight hours. Coordination with the agencies controlling these lots would be necessary to determine the availability of parking at these locations, and to ensure that trucks leave the park-and-ride lot before commuters start using it in the morning. Similar challenges of providing parking at weigh stations would also exist for providing parking at park-and-ride lots including providing appropriate signage, etc.
- To address dissemination traveler information for truck parking, truck parking availability technology is currently being investigated. A review of existing programs, funding, projects and research was conducted on truck parking availability technology. There are currently several demonstration and pilot projects, funded through FHWA, that are on-going related to real-time truck parking availability technologies. However, there are no current commercial off the shelf truck parking availability systems available. Based on the work completed to date, it is difficult to estimate the costs to deploy a real-time truck parking availability system. Michigan invested \$5 million in one corridor, for example, that included deployment of a truck parking management system at public and private parking facilities. This involved using a number of high-tech methods of sharing parking availability

information, including dynamic roadside truck parking signs, MDOT's Mi Drive traffic information website, TruckSmart Parking Services website and smartphone applications. But it is reasonable to assume that costs will decrease with the economies of scale that will arise from broader deployment and standardization.

Mid-America Freight Coalition

An interview was conducted with Mid-America Freight Coalition (MAFC) staff on April 16, 2015. MAFC is a regional organization that cooperates in the planning, operation, preservation, and improvement of transportation infrastructure in the Midwest. The highlights from the interview, which mirrored findings of the truck parking literature review MAFC just completed (http://midamericafreight.org/wp-content/uploads/MAFC_TPMS_Synthesis_07012015.pdf) are provided below:

Current Truck Parking Conditions and Issues

- For the trucking industry, it is important to know what parking is available, if it is public or private and what amenities are available.
- Truckers like to plan their route as much as possible. Accurate dissemination of parking availability information is critical.
- The biggest demands on truck parking are early evening through late night.
- Overall, there is not enough truck parking on the fringes of major metropolitan areas. Just in time deliveries drive the need for parking close to major metropolitan areas.
- Long-haul truck drivers may not know areas as well as local drivers. This means they may not know where to look for parking. Additionally, parking on the fringes of metropolitan areas is often full by the time long-haul drivers approach their destinations. This may necessitate consideration of a truck parking reservations system. Another consideration with long haul truckers is the potential need to relay loads at intermediate points in order to allow both drivers to return to their respective homes, essentially, shuttling back and forth between their home parking/rest places and a swap point¹⁰. This would add additional pressure to provide additional truck parking at these points.

Strategies and Solutions

- Use ITS and other technology for the dissemination of truck parking information allowing truckers to plan their route in advance. Take advantage of opportunities for integration with truck technology systems. Evaluate possible options including dynamic message signs, websites, mobile apps, etc.
- Seek P3 opportunities to expand truck parking options.

Future Issues and Opportunities

- Need to build awareness with elected officials and the general public. Explore environmental perspective when justifying truck parking improvements. Potential

¹⁰ Truckers' Park/Rest Facility Study, ICT-R27-16, Illinois Institute of Technology, 2008

reduction of urban congestion by providing model to park outside of major metropolitan areas.

- Need to get a handle on the right corridors for prioritization of deployment. Not just about AADT. Need to overlay major truck hubs and urban centers.
- Evaluate long-haul vs. short-haul truck needs.
- Long-term future opportunities could include dedicated truck lanes. Need to evaluate how truck parking would be integrated in a future truck network.

Technical Advisory Panel

As part of the study, an advisory panel of subject-matter experts was convened to help advise KDOT and the KTA as to whether truck parking improvements – and what kind – are needed to better serve the current and projected future needs of the freight community. The advisory panel consisted of stakeholders from manufacturers, emergency services, trucking companies and other groups and industries affected by the health of freight trucking in Kansas (see **Appendix 2.C**). The intent was that members of the Technical Advisory Panel would help examine and discuss the state’s truck parking capacity, conditions, trends and opportunities, then refine emerging recommendations for improving parking safety, way finding and availability across the state based on their real-world experience (see **Appendices 2.D and 2.E**).

Methodology

The 18 members of the Technical Advisory Panel were drawn from trucking, manufacturing law enforcement, government, distributors and retailers in order to provide a broad spectrum of perspectives and advocacy around the subject of truck parking.

The first Advisory Panel meeting was held April 30, 2015 (**Appendix C – Meeting Summary and Meeting Notes**) to:

- Generate feedback about current/future Kansas truck parking trends, needs and preferences;
- Help shape recommendations for addressing truck parking needs; and
- Begin crafting effective strategies for improving the state’s freight network safety, efficiency and competitiveness.

Findings

Members of the advisory panel provided a number of insights and suggestions for follow-up in Tasks 2-4 of the study and after. They included:

- Refine truck parking inventories/utilization during the summer and fall harvest and the holiday season to better understand the influences of these events on parking needs and conditions;
- Compare fuel tax rates (and other taxes as appropriate) between neighboring states to determine how they may influence truck routing and related parking decisions;
- Determine the ratio of truck volume to needed truck parking stalls to help guide policy decisions and investments;

- Examine need for/value of local city/state partnerships to build secure long-term parking facilities for truck drivers for safety and economic development benefits, particularly in small towns;
- Explore regulatory harmonization between the states and FHWA with regards to oversize/overweight loads to determine impact on Kansas truck parking;
- Refine understanding of interplay between service hours, destination readiness to accept delivery and proximity of parking options;
- Quantify impacts of cost-per-mile for goods movement, tolling, travel-time reliability and other factors as influences on routing and truck parking needs;
- Develop criteria for determining where to locate new parking facilities;
- Consider and take into account trends (business, demographic, technological, other) affecting truck volume and parking needs;
- Identify KDOT/KTA assets that could be repurposed into parking;
- Investigate partnership opportunities with convenience stores, municipalities and others that potentially could be developed as joint-constructed/maintained lots; and
- Make sure technological solutions still accommodate legacy drivers/system.

Trucker Surveys

An electronic survey (see **Appendix 2.A**) was created and distributed to truckers operating within and through Kansas to help better identify factors affecting their decision-making process regarding parking, including parking locations, type (legal/formal versus illegal/informal), routing, regulatory requirements, costs, security, amenities, over dimensional and/or overweight loads requirements and type of ownership (public versus private).

Methodology

The electronic survey was prepared and distributed by American Transportation Research Institute (ATRI), the trucking industry's not-for-profit research institute. Questions were developed to capture demographic, vehicle, freight, routing and other influences on driver parking decision making. The survey instrument prepared for an earlier Michigan Department of Transportation study was used as a baseline for survey development to improve instrument reliability. The survey was electronically distributed to more than 25,000 members of state trucking associations from Kansas and surrounding states, as well as from the Owner Operator Independent Drivers Association. The survey was available between May 15, 2015 and June 24, 2015.

Findings

Nearly 750 completed surveys were returned by truckers who regularly travel within and through Kansas. Of those surveys returned, respondents were:

- Primarily middle-aged male drivers;
- Predominately operators of for hire, truckload rigs that they owned;
- Mostly operating on inter-regional or long-haul routes; and
- Predominately users of Kansas truck parking of up to four times a week.

Survey findings regarding truck parking issues and opportunities within Kansas included:

- 82.6 percent of respondents cited hours of service as the top reason for seeking to park;
- 78 percent require up to one hour or more to find adequate parking;
- 51.6 percent found it equally difficult to find parking in public or private rest stops;
- 48.3 percent were most likely to find parking in rural areas versus only 25 percent in metropolitan areas; and
- 27.1 percent said it was easier to find parking in Kansas versus 24 percent who said other states were easier.

It should be noted that, to date, there has been limited quantification of time-saving benefits related to the implementation of truck parking management systems. MAFC recommends, for example, that baseline (pre-implementation) and follow-up post-implementation surveys of truckers be completed to better quantify time and mileage wasted while searching for parking spaces. The value of reductions in search time and mileage could then be assessed using FMCSA and FHWA estimates of CMV operational costs.

Findings and Implications

The activities described in this chapter offered or suggested a number of insights into current and future truck parking needs as follows:

1. The truck parking inventory and usage survey found that:
 - Illegal truck parking occurs across the state with high number of illegally parked trucks just outside urban areas.
 - Truck parking sites along the KTA facilities were in many cases over utilized, which means that all parking spaces were full and trucks were continuing to park by creating spaces along ramps and in drive aisles.
 - The southern portion of I-135 has fully utilized facilities along it, which means parking was near 100 percent full.
 - In general, parking facilities were fairly full on the perimeter of urban areas throughout the state.
 - A large number of trucks were parked in or near urban areas.
 - A large numbers of trucks were also parked at major junctions in the freight network whether urban or rural.
 - There were also a few routes which have very little overnight parking; these were mostly minor north/south routes through the state.
 - A majority of the large parking facilities holding 60 or more trucks were fully to over utilized throughout the state of Kansas.
 - In the southern half of the state almost all parking facilities which can hold 30 or more trucks were at least fully utilized; in the southeast region many of those facilities were over utilized.
 - Parking lot condition was not a driving factor in where drivers parked.

- The peak time for trucks to park was observed to be between 12 a.m. and 4 a.m. Trucks were parked anywhere which is built to accommodate trucks; whether a parking lot, side road or ramp.
 - Along the KTA facility it was observed that parking areas outside of the toll plazas were underutilized. It appeared that drivers did not want to exit the Turnpike to access parking if other options were available to them.
2. Demand for truck parking in Kansas was similar to what is expected across the nation. At certain locations parking demand exceeds supply creating a parking problem that needed to be address.
 3. The Moving Ahead for Progress in the 21st Century Act (MAP-21) highway bill included Jason’s Law that made addressing storage of long-term parking for commercial motor vehicles on the National Highway System a priority.
 4. National surveys have shown that finding a truck parking location in a timely manner can be challenging and a significant number of truckers report are parking in illegal locations that can be unsafe.
 5. Several studies by Federal agencies have concluded that the lack of safe truck parking is a problem across the nation that will continue to be exacerbated by the growth in freight movement by truck.
 6. Federal studies noted that truck parking needs far exceed the available funding from existing programs which, because they are not exclusively focused on parking, often give higher priorities to other issues and needs.
 7. National studies suggest the following ideas to address the truck parking challenges: expand or improve public rest areas, expand or improve commercial truck stops and travel plazas through reduction in regulations and incentives, encourage the formation of public-private partnerships, educate or inform drivers about available spaces through technology and other means, and change parking enforcement rules (allow ramp parking, overnight parking in rest areas, etc.)
 8. Other state DOTs experience similar problems of growing truck traffic and truck parking demand exceeding supply at some locations that are often near urban areas. To address these problems the DOTs have added parking capacity and begun to use technology to provide parking availability information to truckers. Other potential strategies being evaluated include public/private partnerships. All DOTs also reported limited funding to address truck parking concerns.
 9. The interview with the Mid-America Freight Coalition provided a similar assessment of truck parking issues as the state DOTs reported. They stress the need for truckers to have information on parking availability and amenities to allow them to plan their trip. Suggested solutions included the use of technology to provide real time parking information and the need to leverage public/private partnerships. The need to educate the public and politician about the need for truck parking was also mentioned.
 10. The advisory panel convened for the project provided suggestions on things to consider when assessing the truck parking challenges and developing solutions. Unique suggestions were consideration of the impact to regulations on truck parking demand and the ability to address issues.

Based on the truck parking inventory and usage assessment and input from other studies, peer state interviews, advisory panel input and the trucking community the following implications emerged:

1. Growing parking demand in new and existing locations will strain constrained state budgets. Transportation agencies such as KDOT and the KTA see funding challenges driven by state budget issues, shifting travel patterns, more fuel-efficient vehicles and lack of long-term, sustainable federal support. In such an environment, it is unlikely that any agency can afford to build its way out of all truck-parking needs.
2. Technological solutions that improve driver decision-making regarding parking should be considered. Fleet operators and younger drivers are comfortable with using technology investments that improve their return on investment and driver quality of life. Part of the truck parking issue may be solved by giving drivers the tools to make better parking choices that result in existing assets being better utilized.
3. Public-Private Partnerships (P3s) offer potential for addressing additional truck parking needs. Having the public and private sectors share the benefits – and costs – of truck parking needs and opportunities may be an important way to provide parking the future in a timely, flexible and cost-effective manner. However, this will require identifying legal, financial and other risks and making sure they are addressed by the most appropriate party. DOTs also need to be mindful of current challenges to P3 implementation in this area. For example, *Title 23, Section 111 of the United States Code (23 USC 111)* prohibits commercial development at travel information centers or rest areas. Additionally, 23 USC 111 prohibits private commercial development located on the interstate system. Statutory hurdles aside, businesses located at service interchanges along interstate corridors, as well as the National Organization of Truck Stop Operators (NATSO), are strongly opposed to commercial development at rest areas because of the loss of business/revenues that they would likely incur at existing businesses along interstates. Absent a change in these conditions, potential P3s will need to be carefully crafted to address these restrictions and concerns while expanding parking availability and amenities.
4. Truck driver routing and parking decisions are the result of a complex formal and informal negotiation over the value of time, expense, regulation, personal preference and other considerations. State policy or investment decisions suggested by these Task 1 findings would have some impact on that negotiation. However, a key factor in how big an impact they have is whether those decisions are confined only to Kansas or take place instead in a regional or national context.
5. Routing and parking decisions are often made hundreds of miles away from where a truck finally stops. A truck driver may pull into a parking spot outside Wichita because the driver knew it was open. But the fact that the truck entered Kansas at all will be determined by many other factors. What is clear is that the likelihood of that truck crossing the Kansas border is enhanced by being able to take advantage of regional consistency in travel costs, business process, trip-time predictability and driver services availability. Given the fractured nature of those elements right now, Kansas may be able to gain a “first mover” advantage by undertaking its truck parking decision-making in a regional context wherever possible.



CHAPTER 3

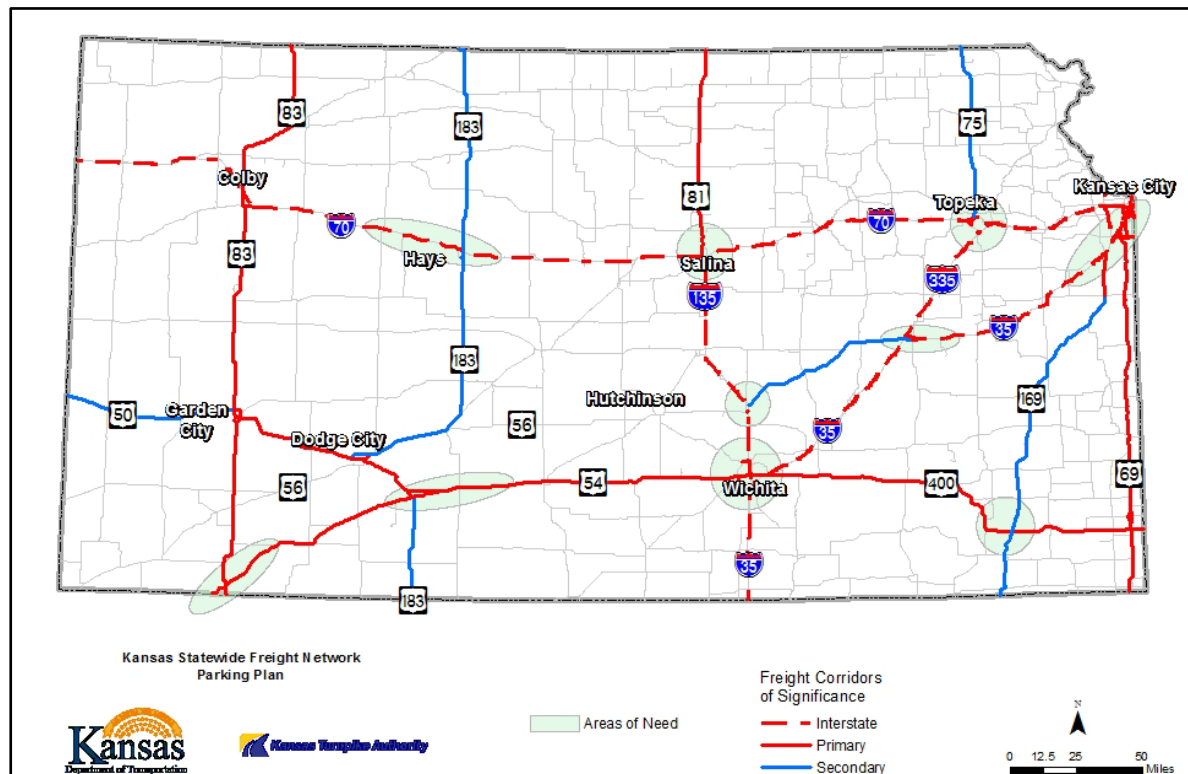
NEEDS AND OPPORTUNITIES

Needs and Opportunities

A clearer picture of Kansas Statewide Freight Network needs and opportunities came into focus as a result of the tasks undertaken and described in Chapter 2, along with insights provided by members of the advisory panel assisting with the study:

1. Most illegal parking occurred at the edges of urban areas and at major network junctions as truck drivers wrestled with often-conflicting demands imposed by shortages of appropriate parking in places of highest demand, federally mandated hours of service, requirements of just in time delivery and local and business restrictions on delivery hours.
2. Parking shortages and related issues, such as illegal parking on highway shoulders, ramps and side roads, often occurred in relatively concentrated areas or jurisdictions. For example, truck parking sites along the KTA facilities are in many cases over utilized, which means that all parking spaces were full and trucks were continuing to park by creating spaces along ramps and in drive aisles. Also the southern portion of I-135 has fully utilized facilities along it, which means parking was near 100 percent full with limited legal parking options available. As a consequence, opportunity zones for solving these issues were identified in order to focus in on the key areas to address with additional parking capacity (See **Figure 3.1**).

Figure 3.1 – Opportunity Zones for Truck Parking Improvements



3. Additionally, the larger the lot, the more likely it was to be over-utilized. This is a function of larger lots being located on more significant routes, and, as a result, more likely to be known to out-of-state or long-haul truck drivers. This factor simplifies information-based solutions by making it easier to communicate parking options to core audiences.

However, there were other factors uncovered by surveys, advisory panel insights and the literature review that affect efforts to solve the state's truck parking issues in a safe, efficient fashion that, ideally, also would contribute to the Kansas economy. Key among them is truck parking location. Lot condition was not a factor in where drivers parked, opening up a broader range of solutions to the extent that safety can be accommodated; this was also an important factor for drivers and by law given that the peak time for trucks to park is between 12 a.m. and 4 a.m.

Also affecting how location, safety and other factors play into truck parking problem-solving is the role of driver's personal decision-making about lot selection. The study team found that there are two general audiences for truck parking. One audience wants convenient and reliable parking that allows them to drive up to the limits of their hours of service requirements. The second audience wants parking with other services and amenities available during breaks.

Younger drivers generally show a preference for stopping at truck stops with amenities. These drivers search for and stop at places with the amenities they prefer, then "create" spaces if none are available. This market is effectively served by expanding private-sector parking facilities willing to provide the amenities and services they are looking for during their hours of service breaks.

For drivers who focus on utilizing their maximum time before stopping for hours of service breaks, evidence suggests they primarily want convenient access to parking designed to provide trucks with easy in and out movements. (This is the appeal of parking on interchange ramps and shoulders when legal parking isn't available; truckers can simply pull to the side to rest, then immediately return to the highway when their next driving period begins.) Given funding constraints now and in the future, this need is unlikely to be met by simply building more lots but instead opens the opportunity for innovative lot funding, driver information and delivery strategies.

In considering these factors, value was found in stakeholder advisory panel insights prompting the study team to cross-test findings and assumptions from different aspects of the study. They noted, for example, that the truck parking inventory – critical to understanding the parking uses and demands of the freight network – provided only one data point of what affects drivers' choices. The inventory was, in effect, a snapshot of the parking system needs due to its short duration and should be re-inventoried during different seasons to better understand seasonal fluctuations in parking demand.

As a result of their input, the truck parking inventory was supplemented with a study of GPS data from trucks to determine when and where drivers are parking overnight and for their thirty-minute breaks. This GPS data was collected and processed for four two-week periods over the course of a year at strategically selected times to capture any behavioral changes caused by seasonal events or shipment pattern changes.

This portion of the study was undertaken by the American Transportation Research Institute (ATRI), the trucking industry's not-for-profit research institute. In order to analyze the state's freight truck operations, ATRI utilized its proprietary truck GPS dataset to better understand freight truck operational patterns and their impacts on Kansas truck parking demands and needs (see **Appendix 3.A**).

ATRI's Freight Performance Measures (FPM) database was used to analyze Kansas freight generators, truck movements and parking habits in four different periods during 2014: March 1-15;

May 1-15; July 16-30; and October 1-15. ATRI then captured, processed and analyzed the truck GPS data from the four, two-week periods based on Kansas Census block groups covering the state's freight network and truck parking locations identified in the truck parking inventory.

Figure 3.2: Kansas Freight Network Census Blocks by Volume of Trip Origins

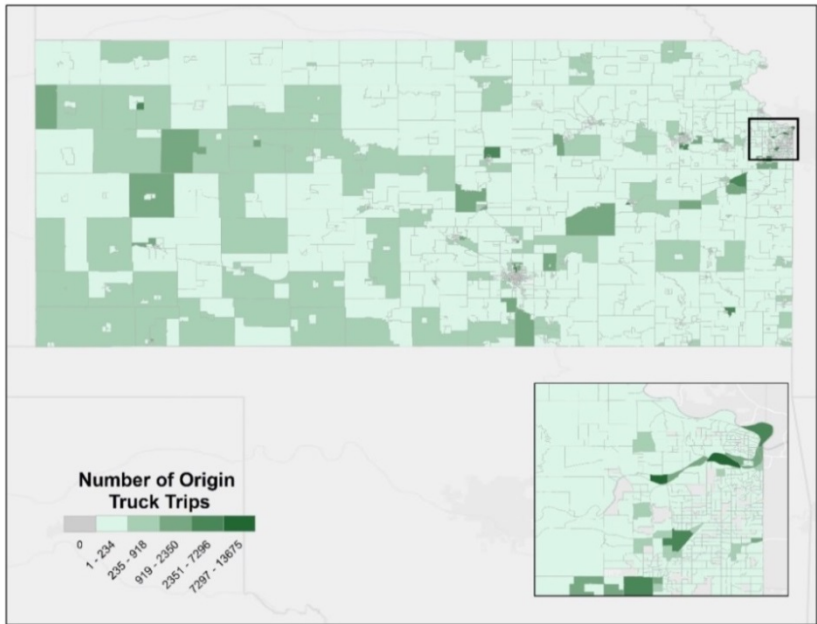
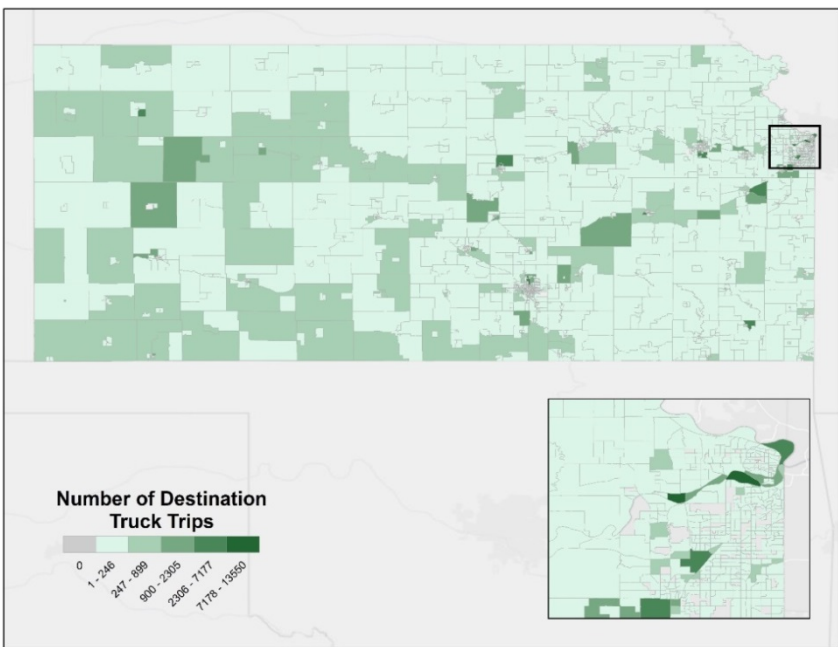


Figure 3.3: Kansas Freight Network Census Blocks by Volume of Trip Destinations



Figures 3.2 (which better reflects Kansas seasonal variations) and **3.3** confirmed the findings of other aspects of the study such as the Kansas Truck Parking Survey. This survey helped highlight driver perspectives on Kansas truck parking issues. Truck GPS data shows what truck drivers

portrayed in the survey – it is much easier to find parking in rural areas, as opposed to urban areas. As the data indicates in each month, the top rural parking locations are around small towns and rural areas, but along the primary road network. Key findings of this analysis also are important to recognize as they set the foundation for the preliminary and final recommendations discussed in Chapters 4 and 5 respectively.

Interstate communication about parking solutions is necessary

As shown in **Table 3.1**, approximately 57 percent of truck trips are through state trips. This suggests that truck parking solutions require parking information sharing outside state boundaries. It also means that to the extent that drivers find the parking solutions appealing, routing decisions that increase through traffic in Kansas will have a direct economic impact to the state in the form of apportioned registration fees and fuel taxes paid on miles driven within Kansas.

Table 3.1: Kansas Inbound, Outbound and Through Truck Trips for 2014

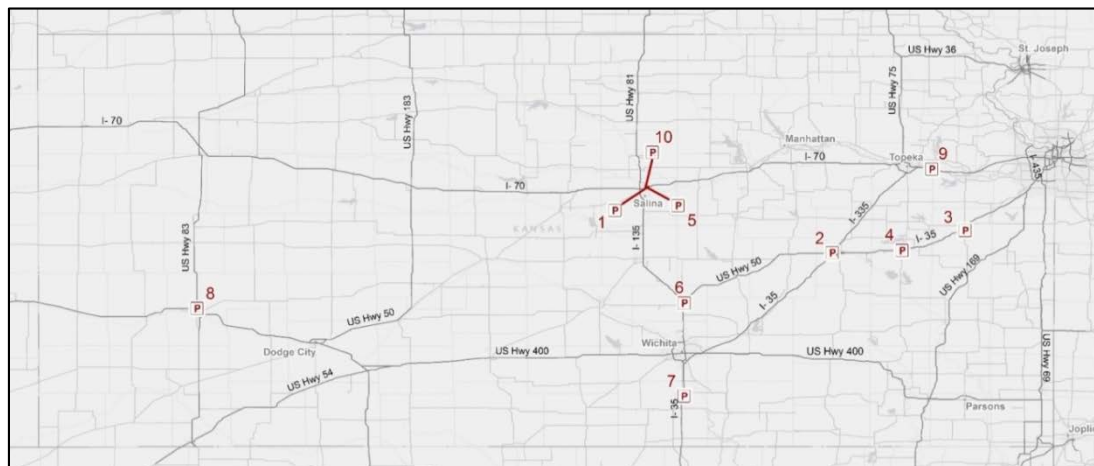
	Road / City Identifier	March, May, July, October 2014			
		Incoming	Outgoing	Through	Total
North	To North Platte / I-80	436	492	424	1,352
	To I-80	500	733	548	1,781
	To I-80 / Lincoln	1,941	2,459	2,699	7,099
	To Omaha	1,266	1,631	1,800	4,697
West	To Denver	6,510	8,425	4,861	19,796
	To I-25	1,459	506	705	2,670
South	To El Paso	4,143	4,925	3,654	12,722
	To I-40KK	167	222	237	626
	To OK City / Dallas	8,306	10,931	10,089	29,326
	To Tulsa	2,278	2,479	2,686	7,443
	To Tulsa	3,193	3,673	18,208	25,074
East	To I-44	6,316	4,474	28,502	39,292
	To US Hwy 54	608	857	681	2,146
	To Kansas City / To St. Louis	34,354	39,088	105,246	178,688
	To St. Joseph, Missouri	7,582	8,805	44,205	60,592
Totals		79,059	89,700	224,545	393,304

Geographical concentration makes issues worse, but solutions easier

The state's largest generators of truck shipments – and truck parking needs – are concentrated in a small number of communities (see **Figure 3.4**). The state's top freight generators are located in Kansas City, Edwardsville, Ottawa, Lenexa, Wichita, Salina, Olathe, Colby and Emporia. This roster

underscores why the state's top three utilized roadways - Interstate 35, Interstate 70 and Interstate 135 - are all significant arteries that carry commodities throughout the state.

Figure 3.4 – Kansas Top Parking Locations

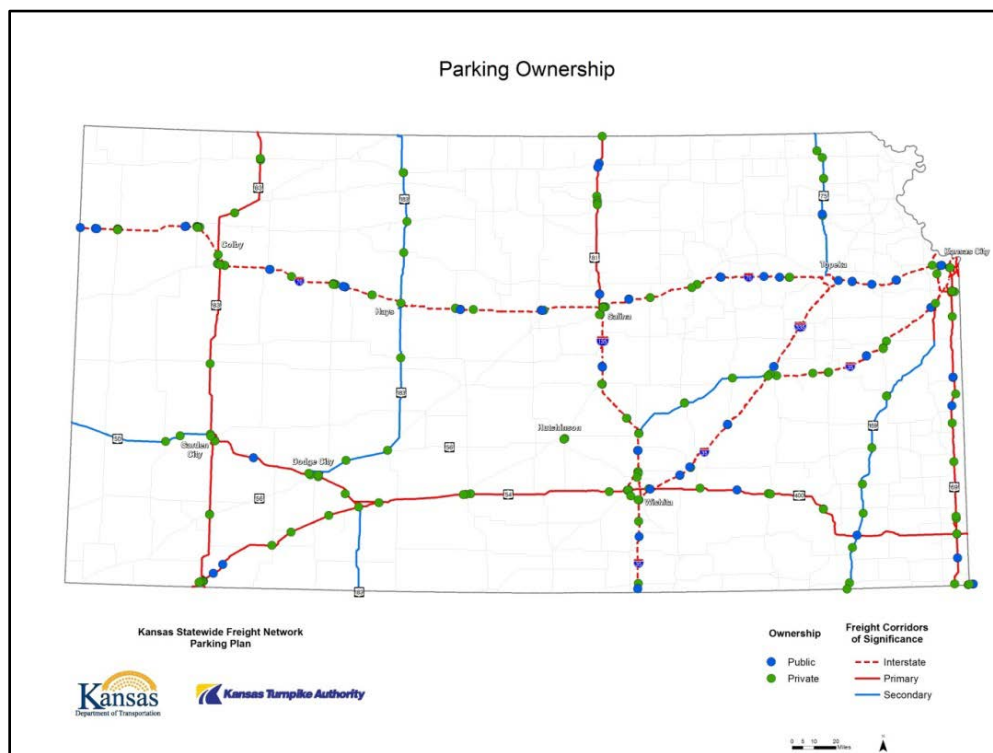


Focusing on the state freight network addresses virtually all of the parking issues

Virtually all of the state's approximately 200 private and public parking locations identified in the truck parking inventory are located on the state's freight network (see **Figure 3.5**). While nothing precludes taking action on parking issues on facilities at any location, the most significant parking issues are found along the network, making improvements there more likely to improve safety and provide economic benefit to the state.

However, it's important to note that the quality or attributes of the parking issues differ from network segment to segment. As indicated previously, sheer volume is one of the issues confronting the network serving Kansas City. On the other hand, the secondary road network in the southwestern part of Kansas also plays a vital role in truck parking operations, but its issues are different. As this area of the state is not as highly populated as the northeastern part of the state, it is more difficult for drivers to find suitable locations – whether they are busy or not - to take their 34-hour restart or 30-minute rest break.

Figure 3.5 – Kansas Public and Private Parking Locations



Future Trends and Factors

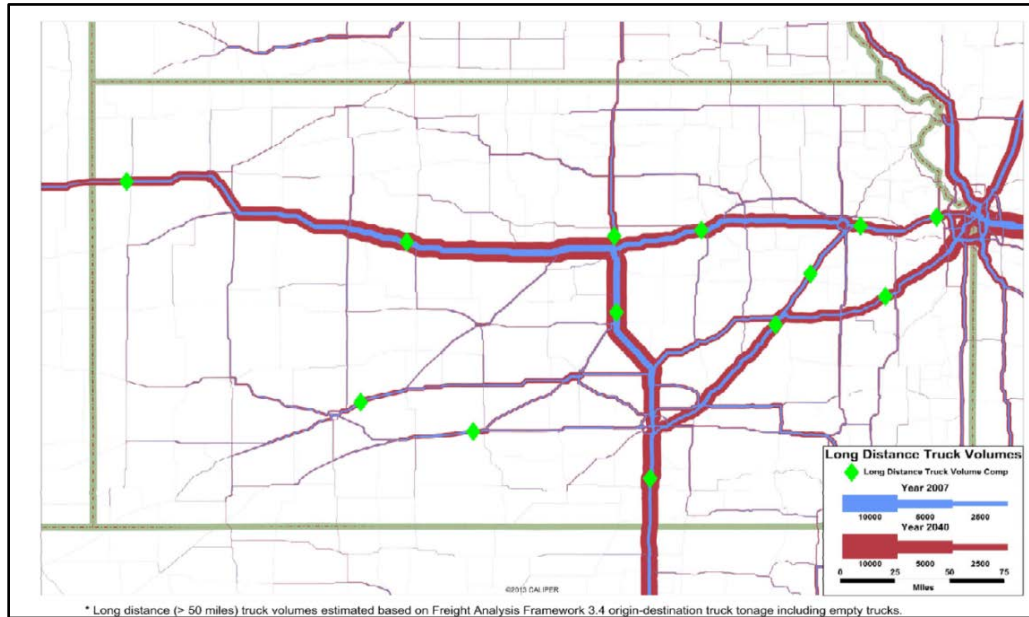
In addition to ATRI's work, the study's advisory panel also asked that future trends and factors potentially affecting Kansas truck parking solutions be considered. Among the issues and opportunities that can be reasonably expected to have an impact on current and future parking decision making are:

Future Truck Traffic Growth Projections

Trucks traveling long distances are the primary users of truck parking when truck drivers need hours-of-service rest periods. To assess the expected growth in demand for truck parking, long distance truck volume estimates developed by the FHWA Office of Freight Management and Operations are an applicable resource.

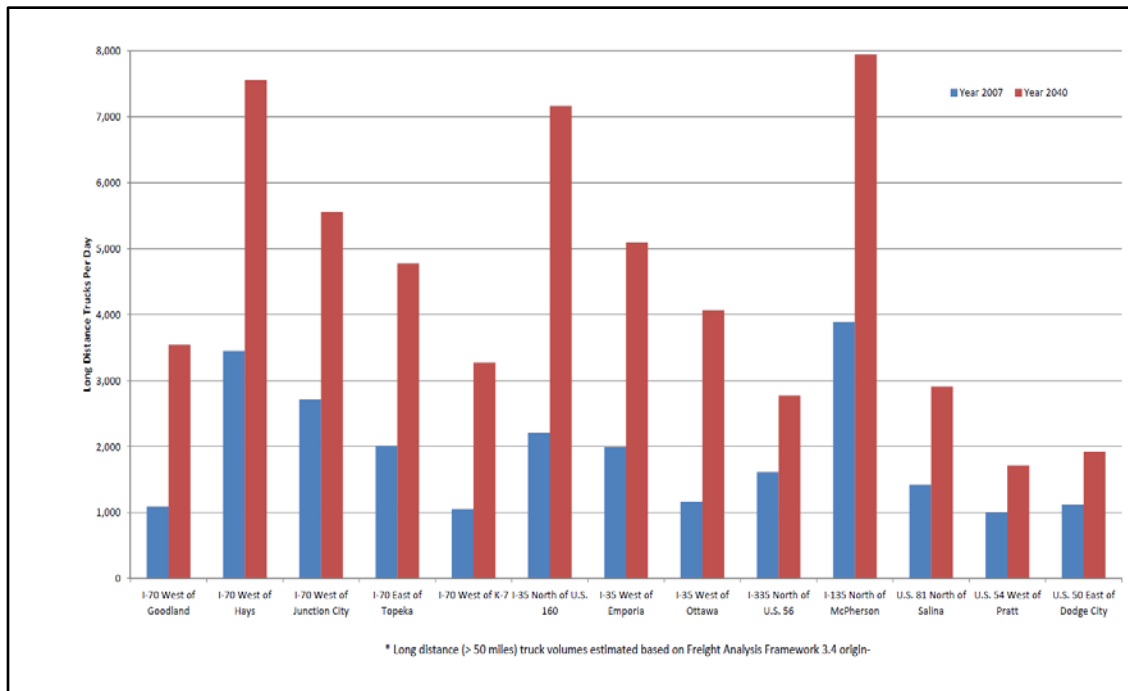
In **Figure 3.6**, ATRI identified Kansas long-distance truck volumes and distribution using data from the Federal Freight Analysis Framework, which was developed through a system of economic models used to convert forecast national consumption patterns and foreign trade into purchases among industries and then into volumes of commodities reflected in those purchases.

Figure 3.6: Kansas Long Distance Truck Volumes



From this, it was possible to extrapolate potential growth in truck volumes by freight network segments over the period from 2007 (pre-“Great Recession”) to 2040 (Figure 3.7).

Figure 3.7: Kansas Truck Volumes (2007 and 2040)



Changes in Federal Freight Planning Guidelines

The Kansas Statewide Freight Network Truck Parking Plan was conducted under the guidance of – and in compliance with - Section 118 of MAP-21, the Moving Ahead for Progress in the 21st Century Act passed in 2012 as the funding and authorization bill to govern U.S. federal surface transportation spending.

The parking study and its recommendations follow Section 118 guidance, which enables and requires state freight-related planning to:

- Take place separately from any statewide long-range transportation plan;
- Identify significant freight system trends, needs and issues;
- Describe freight policies, strategies and performance measures that will guide a state’s freight -related transportation investment decisions;
- Show evidence of consideration of innovative technologies and operational strategies, including ITS, that improve safety and efficiency of freight movement; and
- Inventory facilities with freight mobility issues, such as truck bottlenecks within the state and what strategies the state is employing to address freight mobility issues.

MAP-21 also strongly encourages states to establish a State Freight Advisory Committee to facilitate a collaborative planning process. Representatives of this advisory committee should include a cross-section of public and private sector experts and stakeholders. This step was taken by Kansas and, with the addition of an advisory panel for the parking plan, extended that concept further to:

- Advise KDOT and KTA on freight-related priorities, issues, projects and funding needs;
- Serve as a forum for discussion of state decisions affecting freight transportation;
- Communicate and coordinate regional priorities with other organizations;
- Promote information sharing between public and private sectors; and
- Participate in the development of the freight parking plan.

What is unclear at the time of this report is how the MAP-21 successor authorization bill – the Fixing America’s Surface Transportation (FAST) Act - may affect implementation of the freight truck parking plan recommendations or future planning activities.

Many of the freight planning provisions in FAST are similar to MAP-21. They can be summarized as using an advisory group to develop freight plans that in many ways mirror MAP-21 requirements. But there are some differences that impose new planning and performance requirements on KDOT as the Kansas transportation agency that receives federal funds. They include:

- ***Content of State Freight Plans***

Content of state freight-related plans will change under FAST. The composition of any such plan’s advisory group will be expanded to include representatives of the freight industry workforce. Plans themselves will need to be fiscally constrained and include, among previously mandated elements, a number of additional elements:

- Description of how the plan will improve the ability of the state to meet national freight goals;
- Consideration of any significant congestion or delay caused by freight movement and any strategies to mitigate that congestion or delay; and
- Listing of priority projects and a description of how funds made available to carry out this section would be invested and matched.

- **State Performance Targets**

If the U.S. Department of Transportation determines that a state has not met or made significant progress towards meeting performance targets, the U.S. DOT Secretary can require it to submit a biennial freight performance improvement plan that:

- Identifies significant freight system trends, needs and issues with respect to the state;
- Describes freight policies, strategies and performance measures that will guide its freight-related transportation investment decisions;
- Inventories freight bottlenecks within the state and a description of the ways in which the state is allocating the national freight program funds to improve those bottlenecks; and
- Describes the actions the state will undertake to meet its performance targets.

Other Potential FAST Act Implications

Other changes may emerge as guidance is given by the U.S. Department of Transportation regarding potential changes stemming from the FAST Act's new National Freight Program, which has a five-year authorization of about \$6.2 billion. Under this program, funds are apportioned among the states by formula, and states are encouraged to establish a freight advisory committee and develop a state freight investment plan before obligating any funds.

Further, under the proposal, the U.S. Secretary of Transportation and the states will designate a national freight network comprised of the Interstate highways and other roads, both urban and rural, that are critical to the safe and efficient shipment of freight. This designated network will guide the investment of program funds under national and state strategic plans to improve highway freight transportation. How this may affect implementation of the Kansas truck parking plan is unknown at this time.

Some freight parking improvements may become eligible for funding under the Act's Nationally Significant Freight and Highway Projects Program. This program will provide an average of \$900 million per year in grants of at least \$25 million for highway, bridge, rail-grade crossing, intermodal and freight rail projects costing more than \$100 million that improve movement of both freight and people, increase competitiveness, reduce bottlenecks and improve intermodal connectivity. Projects will be awarded competitively by the Secretary of Transportation; however, full criteria, deadlines and other important considerations are not known at this time.

Additional federal funds which may be used to implement the state truck parking plan may become available in years ahead. One provision of the FAST Act automatically increases authorized highway and public transportation investments if Congress were to add additional revenues to the Highway Trust Fund (HTF).

Finally, also unclear on the demand for truck parking is hours of service (HOS) exemptions created by FAST and whether they signal a lasting change in philosophy about future HOS regulations. The FAST Act widens a current exemption to the hours of service rule for interstate drivers of commercial motor vehicles used for construction. The new law allows those operating within a 75-mile radius to restart their work week after 24 hours of rest, rather than 34 hours, which is the standard for other drivers. (The previous allowable radius was 50 miles.) However, a state may establish its own radius between 50 and 75 miles for intrastate operation of these construction vehicles. It also codifies a recent regulatory exemption for drivers of ready mix concrete delivery vehicles, through which they are exempt from many requirements of HOS rule, provided they meet certain conditions as to radius of operation, on-duty time and drive time. Within four years after the

FAST Act takes effect, U.S. DOT is to provide a report to Congress on the safety and enforcement impacts of these and other hours of service exemptions in the new law.

Connected and Autonomous Vehicles

Autonomous vehicles – ones in which computers and sensors make all of the critical decisions and the driver becomes a dispatcher and a tertiary back-up unit – are a complicating factor in making long-term truck parking decisions.

The first issue involves timing. Estimates regarding when commercial autonomous vehicles will be deployed and adopted – likely to be deployed before passenger car equivalents – range from five years to 12 years to 35 years, depending upon the assumptions used.

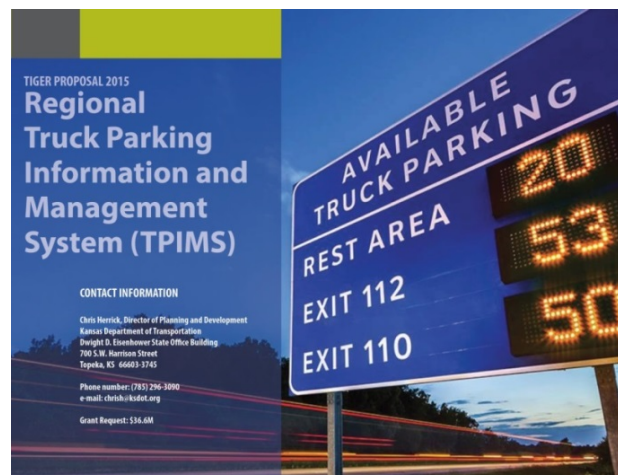
The second complicating factor involves impact. If drivers are not the critical operational component, is there a need to have truck drivers stop for them to rest? And if the trucks do, what is appropriate? Truck parking needs could significantly decline. On the other hand, they may change and expand. With autonomous trucks, freight that formerly moved by railroad could be shipped by truck “trains” that would require more and larger lots in which they could be broken down and reassembled based on final destination.

Whether autonomous vehicles are an issue or an opportunity for truck parking remains unclear and is a key topic to monitor in future freight plans and initiatives.

Federal or Multi-State Parking Authorities

Commercial vehicle travel demand is large and growing—as is parking demand. Because of parking shortages and limits on stays in public facilities, truck drivers needing rest can create safety concerns by parking on roadway access ramps and shoulders. Drivers are responsible for obtaining long-term rest, but no single agency or organization is responsible for providing required facilities. As a consequence, demand may grow for creation of a federal program or multi-state initiative or authority (such as the MAASTO TIGER Grant Partnership – see **Appendix 3.B** - or Tennessee Valley Authority, for example) to plan, fund and/or build truck parking facilities along the U.S. freight network. This offers an opportunity for Kansas to work with such a program or authority to locate facilities in places that would best serve the state’s economic interests, improve safety conditions for parked trucks and increase the likelihood of drivers routing through Kansas.

Figure 3.8: MAASTO TIGER Grant Partnership



Mandated Hours of Service Increases

Truck drivers must comply with the U.S. Department of Transportation's Federal Motor Carrier Safety Administration (FMCSA) mandated "hours of service" (HOS) regulations if they drive a commercial motor vehicle (CMV). Today that means drivers can only drive a maximum of 11 hours after 10 consecutive hours off duty. They cannot drive beyond the fourteenth consecutive hour after coming on duty following 10 consecutive hours off duty. And they may drive only if eight hours or less have passed since their last off-duty or sleeper berth rest period lasting at least 30 minutes. Regulations are strictly enforced and violations can include state and local law enforcement fines, civil penalties on a driver or carrier and downgrading of the carrier's safety rating.

As discussed above, the FAST Act widens a current exemption to the HOS rule for interstate drivers of commercial motor vehicles used for construction. The new law allows those operating within a 75-mile radius to restart their work week after 24 hours of rest, rather than 34 hours, which is the standard for other drivers. It also codifies a recent regulatory exemption for drivers of ready mix concrete delivery vehicles, through which they are exempt from many requirements of HOS rule, provided they meet certain conditions as to radius of operation, on-duty time and drive time. However, it is unclear if these new HOS exemptions created by FAST will signal a lasting change in philosophy about future HOS regulations. It seems unlikely that the regulations will be relaxed significantly for all commercial drivers and, indeed, could be further tightened in the future, creating an increased demand for safe, convenient parking. As the truck driver population changes over time and, with it, the demand for amenities at lots, this creates more opportunity for private- or P3-built lots in Kansas to deliver needed parking solutions.

Conclusion

It remains clear that demand for truck parking in Kansas is similar to what is expected across the nation. At certain locations parking demand exceeds supply creating a parking problem that needs to be addressed. It grows ever more difficult for drivers to find a truck parking location in a timely manner and, as a result, a significant number of truckers report parking in illegal locations that can cause safety concerns.

Moreover, this situation is a national and local problem that will continue to be exacerbated by the growth in freight movement by truck. Unfortunately, the amount spent on new truck parking is limited because the need far exceeds current funding availability.

Consequently, the recommendations first outlined in Chapter 4 and refined in Chapter 5 by means of benefit cost analysis and other measures track closely with those suggested in studies nationally, including:

- Expand or improve public rest areas;
- Expand or improve commercial truck stops and travel plazas through reduction in regulations and incentives;
- Encourage the formation of public-private partnerships;
- Educate or inform drivers about available spaces through technology and other means, and
- Change parking enforcement rules (allow overnight parking in rest areas, etc.).

Recommendations covered in the following chapters also recognize and address constraints Kansas must address, including:

- Growing parking demand in new and existing locations will strain constrained state budgets. Transportation agencies such as KDOT already see further funding challenges

driven by state budget issues, shifting travel patterns, more fuel-efficient vehicles and lack of long-term, sustainable federal funding support.

- Technological solutions that improve driver decision-making regarding parking make sense as a cost-effective way to give drivers the tools to make better parking choices that result in existing assets being better utilized. This is especially true if the burden of managing and upgrading such solutions can be assigned to the public- or private-sector entity most suitable for the task.
- Public-Private Partnerships (P3s) offer a mechanism for addressing additional truck parking needs. Having the public and private sectors share the benefits – and costs – of truck parking needs and opportunities is an important way to provide parking in a timely, flexible and cost-effective manner – assuming private sector concerns about government picking winners and losers in the petroleum marketers and convenience store industry can be addressed.

Bottom line, truck driver routing and parking decisions are the result of a complex formal and informal negotiation over the value of time, expense, regulation, personal preference and other considerations. State policy or investment decisions have some impact on that negotiation. However, the impact is based on whether those decisions are confined only to Kansas or take place instead in a regional or national context. How these policy decisions are made in a regional context through political collaboration and regulatory harmonization can provide Kansas with a competitive advantage that draws more truck traffic, economic impact and sustainable political support over the long run.



CHAPTER 4

SOLUTIONS: REFINEMENT AND SCREENING

Study Evaluation, Refinement and Screening

Initial truck parking strategies and tactics were identified based on input from the study's advisory panel; an inventory of public and private truck parking assets and usage; a literature review of studies regarding truck parking decision factors; interviews with peer transportation agencies regarding truck parking issues; and electronic surveys of truck parking stakeholders regarding truck-parking decisions.

Study Evaluation Process

The initial strategies and tactics were identified and screened through a three-step process:

- **Step 1: Initial Strategies Tactics:** This step included identifying a list of initial strategies and tactics. Strategies were based on needs identified by the advisory panel and an analysis of truck parking conditions, usage and issues. Tactics were identified through a selection of applicable best practices developed by peer agencies.
- **Step 2: Evaluation and Screening:** This step utilized an initial screening to define a manageable set of potential strategies and tactics for more detailed evaluation and prioritization. The screening was based on a high-level evaluation and input from the advisory panel. A "consumer reports" type ranking was established for each tactic based on the evaluation measures.
- **Step 3: Preferred Strategies and Tactics:** Using the results of Step 2, a set of preferred strategies and tactics were selected and refined for more detailed evaluation and prioritization as described in Chapter 5.

Initial Strategies and Tactics

The following strategies were developed to address specific needs identified by the advisory panel:

- Strategy 1: Improve Parking Information Sharing
- Strategy 2: Add or Improve Parking Assets
- Strategy 3: Create Parking Improvement Partnerships
- Strategy 4: Promote Pro-Parking Policies for Freight Trucks

Specific tactics were developed to implement each strategy based upon selected best practices from peer states around the country. Each tactic includes a description of the action to be taken and a high-level assessment of its impact on the following evaluation factors:

- Capital costs
- Annual operating and maintenance (O&M) costs
- Parking safety and security
- Parking notification
- Parking supply
- Economic impact
- Ease of implementation

Figure 4.1 on the following page shows a summary of the strategies and corresponding tactics considered within the study. A more detailed description of each tactic is provided in **Appendix 4.A**. The following section provides a summary of the high-level assessment of each strategy and tactic.

Figure 4.1: Summary of Strategies and Tactics

Strategies	Tactic 1	Tactic 2	Tactic 3	Tactic 4	Tactic 5
<p>Strategy 1: Improve Parking Information Sharing</p>	<p><u>Create/Distribute Truck Parking Guides</u> Provide drivers with truck parking map, parking guide and related information at credentialing, through informational campaign and other mechanisms. Distribute in paper and electronic versions (apps, website, 511, etc.).</p>	<p><u>Post Parking Info Via Multiple Signage</u> Place static parking signing at driver decision points (highway junctions, exits, parking areas) showing nearby parking options.</p>	<p><u>Offer Real-Time Dynamic Parking Information</u> Provide real-time dynamic parking information regarding public and private truck parking availability through electronic signage and on-line mechanisms.</p>		
<p>Strategy 2: Add or Improve Parking Assets</p>	<p><u>Expand Parking Lot Numbers and Capacity</u> Improve parking layouts to boost parking efficiency as part of facility maintenance and rehabilitation planning. Restripe rest areas for additional truck parking. Add capacity at existing lots. Build more lots in areas where significant over-utilization or illegal parking occurs.</p>	<p><u>Improve Longer/Larger Vehicle Parking</u> Develop plans for better accommodating overweight, oversize vehicles in current or future parking facilities.</p>	<p><u>Use Excess ROW for Parking</u> Identify KDOT/KTA facilities and ROW that can be repurposed for parking areas; develop plan and funding for repurposing.</p>	<p><u>Improve Geometrics for Better Parking</u> Improve interchange geometrics where current conditions dissuade drivers from leaving highway/ramps to seek nearby parking areas.</p>	
<p>Strategy 3: Create Parking Improvement Partnerships</p>	<p><u>Partner with Highway Patrol on Parking</u> Work with Highway Patrol and others to clarify ramp parking enforcement and communicate results to trucking community. Establish consultation program involving Highway Patrol, other agencies and truckers to identify and address enforcement issues that may affect parking decisions.</p>	<p><u>Work with Agencies to Expand Parking</u> Partner with other state agencies to open existing facilities to truck parking or expand acceptable truck parking opportunities at peak hours.</p>	<p><u>Sell Branding Rights to Fund Parking</u> Develop policies and processes for selling advertising, marketing and branding rights for lots, signage and amenities to fund improvements.</p>	<p><u>Create Regional Truck Parking Policies</u> Collaborate regionally on coordinating corridor-specific truck freight and truck parking policies and regulations to increase truck routing through Kansas.</p>	<p><u>Expand Parking Via P3s</u> Develop and implement a P3 program for building and maintaining private lots using a combination of public and private funding, maintenance and risk sharing.</p>
<p>Strategy 4: Develop Pro-Parking Policies for Freight Trucks</p>	<p><u>Develop Pro-Freight Truck Tax Policies</u> Partner with Department of Commerce, Division of the Budget, Kansas Department of Revenue and others to develop tax incentives for locating distribution centers and other generators of large truck freight volumes in Kansas. Collaborate to develop tax incentives for private investments in new or expanded parking facilities.</p>	<p><u>Develop Integrated Local Parking Policies</u> Work with local communities to adopt regulations requiring secure truck parking for industrial/warehouse development similar to car parking requirements for commercial developments.</p>	<p><u>Coordinate Delivery Policies/Parking</u> Work with major distribution centers to better coordinate policies for scheduling truck arrivals combined with opening their yards to truck parking to alleviate area parking issues.</p>	<p><u>Create Freight Parking Liaison</u> Create "Parking Liaison" role in KDOT to find partners and solutions for locally specific truck parking issues.</p>	

Strategy 1: Improve Parking Information Sharing

Strategy 1, Tactic 1: Create and Distribute Truck Parking Guides

Description

Truck parking issues can be exacerbated by drivers not knowing where formal parking areas are located and available amenities. This is easily remedied by providing drivers with a regularly updated truck parking guide that includes a truck parking map and information on the services provided at each parking location (public and private). The guide can be provided in paper and electronic forms (through social media, state websites and public- or private-sector apps). It can also be promoted during the credentialing process, through an informational campaign and other marketing mechanisms.

Capital Cost Considerations

There are modest upfront capital costs for developing, producing and distributing the guidelines.

O&M Cost Considerations

KDOT or KTA staff time to periodically update truck parking information and map.

Parking Notification

This kind of information, once produced, can be provided in paper form or to geo-location and mapping services as a truck parking information layer that includes locations and information on the services provided at each public or private parking location.

Safety and Security

The truck parking guidelines will allow truck drivers to properly plan their route and rest stops in advance, eliminating or reducing time searching for parking as they approach the end of their hours of service. This would help reduce unsafe/illegal parking by providing truck drivers with better, legal truck parking information in advance of their trip, allowing them to make informed decisions on parking and reducing the need for them to search for parking under fatigued conditions and/or at the limits of their hours of service requirements.

Additional Parking Supply

This tactic does not provide additional parking. It does potentially optimize the use of existing assets if drivers can plan shifts in their parking from over- to under-used lots. The guidelines particularly will benefit drivers who infrequently travel through Kansas or who use multiple routes within the Kansas Statewide Freight Network. While truck drivers that travel a corridor on a regular basis have knowledge of parking facility locations and the amenities provided there, truck drivers that travel along a corridor less often can benefit from the information when planning a route through Kansas.

Potential Economic Impact

Providing information about truck parking locations in the state will greatly benefit truck drivers and trucking company dispatchers by providing accurate information about the location of truck parking spaces and the type of amenities provided. This may affect routing decisions, potentially increasing the number of truckers being routed through Kansas along with the amount of time and money they spend in the state.

Ease of Implementation

This tactic can be implemented easily. KDOT and KTA staff will periodically update parking information for the guide and the online map.

Strategy 1, Tactic 2: Post Parking Info via Static Signage

Description

Parking decisions by truck drivers are made at various points during their journeys, whether hundreds of miles before their destinations, approaching exits to known facilities or at parking lots when the lack of parking slots force a decision to move on to another location. At each of these points, adding adequate signage about parking options will provide truckers with information to avoid parking unsafely or illegally. Maximizing usage of designated parking areas through informed decision making requires informing truck drivers of options at multiple decision points in their travels by using various parking-related signs. This signage can be located in other states, along the public right of way, on ramps and at the entrances and exits to public and private parking areas. For simplicity and cost effectiveness, these can be static signs providing the location, direction and distance of the nearest available alternative truck parking facilities.

Capital Cost Considerations

Capital costs would include the production and installation of static signs at strategic locations along the Kansas Statewide Freight Network.

O&M Cost Considerations

O&M costs would include the periodic repair or replacement of signs damaged by wind, accidents and other events.

Parking Notification

Truck drivers will be able to make better parking choices using information provided by the signs, including where truck parking is available, the distance to the truck parking and directional assistance in finding the parking.

Safety and Security

Signage will allow truck drivers to properly plan their route and stops in advance, reducing time spent searching for parking as they approach the end of their hours-of-service. Reductions in ramp and other illegal/informal parking choices would improve safety for truckers and other members of the motoring public by allowing truck drivers to make informed decisions on parking and reducing the need for them to search for parking under fatigued conditions and/or at the limits of their hours of service requirements.

Additional Parking Supply

This tactic adds no additional parking. However, better information about parking locations can help maximize usage of available existing parking, increasing the number of trucks parked safely and legally.

Potential Economic Impact

This tactic has limited direct economic impact. However, this tactic will help reduce illegal parking, benefiting KDOT and KTA by decreasing ramp repairs and maintenance. Law enforcement agencies will be able to focus resources on other highway incidents and violations, rather than enforcing parking regulations.

Ease of Implementation

Policy implications of referring drivers to private facilities will need to be considered, such as whether there is a need to indicate whether parking is public or private and the minimum service levels a private truck parking facility must provide to warrant installation of a sign. Legal issues related to sign placement in the right of way and the implied endorsement of a private facility stemming from signage references will need to be addressed.

Strategy 1, Tactic 3: Offer Real-Time Dynamic Parking Information

Description

This tactic would enable KDOT, KTA and potential private industry partners to monitor and report in real-time the number of available truck parking spaces at public rest areas and/or privately owned truck stops. The number of available spaces can then be communicated to truck drivers and trucking company dispatchers through a Truck Parking Information Management System (TPIMS) that includes roadside dynamic message signs and on-line traveler information sites and other smart phone applications. The TPIMS requires the deployment of vehicle counting technology and video surveillance at truck parking locations to accurately monitor truck parking availability. Roadside dynamic message signs can be a hybrid static/dynamic signs that show both public and private availability.

Capital Cost Considerations

Capital costs would include installation of dynamic real-time signs along designated corridors as well as truck counting sensors and video surveillance equipment at each truck parking location.

O&M Cost Considerations

O&M costs would include the ongoing maintenance of the equipment and ITS infrastructure as well as the monitoring, managing and disseminating the parking data.

Parking Notification

Real-time truck parking information system provides the most complete picture of available parking by location, enabling truck dispatchers and drivers to make an informed choice in planning their route and stops. This information will maximize available existing parking.

Safety and Security

Signage will allow truck drivers to properly plan their route and stops in advance, reducing time spent searching for parking as they approach the end of their hours of service. Reductions in ramp and other illegal/informal parking choices would improve safety for truckers and other members of the motoring public by allowing truck drivers to quickly and efficiently find parking without becoming fatigued at the limits of their hours of service requirements.

Additional Parking Supply

Dynamic signs do not provide additional parking supply. However, it will maximize available existing parking at public and private locations.

Potential Economic Impact

Real-time information will allow for more educated decisions to be made about what corridor to use and where to stop along the route. Trucking company dispatchers can use the on-line information or smart phone applications to assist their drivers in making decisions about where to park. Truck drivers will know where parking spaces are available at public and potentially private facilities and can make better decisions on how far they can drive given their service hour status

and need for rest. This can translate into significant economic benefits including savings in travel time and fuel.

Ease of Implementation

A combination of vehicle counting technology and video surveillance is required to accurately monitor truck parking availability. Determining truck parking availability at private truck stops can be challenging. To monitor truck parking availability at private truck stops, truck counting sensors and video surveillance equipment must be located on private property. Funding the construction and maintenance of the equipment on private property will likely require special consideration along with ROW agreements to install equipment.

Strategy 2: Add or Improve Parking Assets

Strategy 2, Tactic 1: Expand Parking Lot Numbers and Capacity

Description

The number of designated spaces for overnight truck parking can be increased by better utilizing existing pavement at parking areas through striping, signing and lighting. Inventories of truck parking on the Kansas Statewide Freight Network reveal that part of the state's parking issues arise from inefficient use or sub-optimal parking space configurations of existing parking assets. Addressing these issues first would reduce the required number of new parking areas to be constructed and highlight where the greatest remaining need is within the freight network.

Capital Cost Considerations

Capital costs would be minimal and limited to restriping, minor lighting and geometric improvements.

O&M Cost Considerations

Parking layout and striping improvements could be a regular part of facility maintenance and rehabilitation planning at existing truck parking locations. The same maintenance cycle could be used for identifying the number and location of parking slots that could be added to existing public facilities that are near or over their maximum utilization rates.

Parking Notification

None.

Safety and Security

Improved truck parking layouts would accommodate efficient traffic flow, safe pedestrian movements and potentially oversized/overweight (OSOW) loads. Special accommodations could be made for OSOW trucks including provisions for designated parking areas. Although OSOW loads are a small percentage of the total truck traffic in Kansas, their routing and parking decisions are often predetermined by regulatory and permitting considerations that can disproportionately impact specific locations, especially at the state borders. Due to the lack of uniformity of regulations among the states, truck drivers will look for "staging" areas to make adjustments (trailer configurations, weight, flags, lights, signage, escort requirements, or other requirements) before proceeding through the next state. OSOW regulatory uniformity has been discussed among the MAASTO states, however, in the interim, KDOT and KTA should continue to provide provisions for OSOW parking near the state borders.

Additional Parking Supply

This tactic provides some limited additional parking by maximizing use of existing facilities.

Potential Economic Impact

This tactic enables KDOT and KTA to more efficiently use their resources on optimizing truck parking before considering new capacity construction in areas where needs cannot otherwise be met. Once these steps are taken, strategically locating new parking facilities where they are needed most to address unmet parking demand could provide the trucking industry greater productivity and reliability as they travel along their designated routes through Kansas, and encourage more truck traffic to utilize the Kansas Freight Network.

Ease of Implementation

Improved layouts or additional spaces in existing lots are more cost effective since they leverage existing services and supporting utilities. Providing new parking spaces connected to an existing service interchange eliminates the need to add additional access to a freeway route. Property at these service interchanges can be very valuable, so the cost of additional ROW can be a challenge. In rural areas with longer distances between interchanges, truck parking turnouts can be constructed to minimize or eliminate the need for additional ROW. These truck parking turnouts would enable vehicles to park parallel to a central circulation roadway that runs adjacent to the mainline.

Strategy 2, Tactic 2: Improve Longer/Larger Vehicle Parking

Description

Kansas public and private parking lots do not generally have designated parking spaces or way-finding information on parking for longer-combination vehicles (LCVs) or OSOW vehicles. These doubles and triples are combinations of multiple trailers attached to one truck and due to length, and potentially height and weight limits, typically have special parking needs. LCVs/OSOWs also require breakdown areas where they can drop off and pick up loads since some border states do not allow them on their roadways. This strategy involves improving existing and future planned parking facilities and truck parking way-finding to better accommodate the needs of LCVs, especially OSOW vehicles. Making these changes at facilities close to state borders (e.g., Missouri and Colorado for I-70; Missouri and Oklahoma for I-35) or major regional route intersections will position Kansas to better serve and attract LCV/OSOW traffic using multi-state regional corridors, specifically I-70 and I-35, which logically tie in to the Kansas Statewide Freight Network.

Capital Cost Considerations

Capital costs would be minimal and limited to restriping.

O&M Cost Considerations

There are no additional O&M costs above what is normally required at existing facilities.

Parking Notification

None.

Safety and Security

There are safety and security concerns with dropping loads in parking facilities and leaving them unattended until the load is picked up at a later time. Providing designated parking for LCVs/OSOWs in secure and well lighted parking facilities would help address security concerns with loads.

Additional Parking Supply

Provides additional parking for LCVs/OSOWs, however, in some instances, this strategy could involve a reduction in parking spaces by accommodating longer and larger vehicles.

Potential Economic Impact

A multi-state deployment of LCV/OSOW-designated parking facilities will increase the effectiveness of the parking and way-finding for the trucking community and better help with routing decisions for longer hauls. The opportunity to build an LCV/OSOW parking network across state borders allows for better parking connectivity, standardization and route attraction. Truck drivers and trucking company dispatchers will have accurate information on Kansas Statewide Freight Network routes that accommodate LCVs/OSOWs and where along these routes there are designated LCV/OSOW parking spaces and options for dropping off or picking up loads. This may induce diversion of LCV/OSOW traffic to the Kansas Freight Network from other routes.

Ease of Implementation

Geometric design for LCV/OSOW parking spaces needs to accommodate longer and potentially larger vehicle configurations and turning radii. Spaces designated for LCVs/OSOWs would need to be monitored and enforced in order to make sure they are available for use by LCVs/OSOWs.

Strategy 2, Tactic 3: Use Excess ROW for Parking

Description

KDOT and KTA possess excess ROW areas along the Kansas Statewide Freight Network that could be converted into additional interim or long-term parking. These areas include closed weigh stations, rest areas, toll plazas and service areas, old maintenance facilities and extra land purchased during construction of the original roadway. Identifying and repurposing excess ROW near where parking demand exceeds capacity (at the edge of urban areas, for example) could provide mid- or long-term resolution of localized parking issues. On such ROW, Kansas could make relatively small-scale improvements, including pavement, striping, lighting and pit-type toilets.

Capital Cost Considerations

Capital costs would include the construction of new parking facilities. In most cases, these facilities would include only basic amenities and would be less expensive than typical truck parking facilities.

O&M Cost Considerations

There would be additional O&M costs to the state with the conversion of undeveloped ROW for new truck parking facilities.

Parking Notification

None.

Safety and Security

This tactic would include basic safety improvements such as site lighting. These areas would be truck-only with no conflicts with passenger vehicles.

Additional Parking Supply

This tactic would provide additional parking through the repurposing of excess ROW.

Potential Economic Impact

Due to their remote location, truck parking on ROW is likely to be the highest and best use for state owned tracts of land. This could also provide truck drivers with the easy on/easy off parking and restroom facilities, if desired. Areas like this can increase the desire of drivers to travel routes in Kansas thus increasing the amount of freight moving through the state.

Ease of Implementation

There are limited locations where this tactic can be applied. The land available is required to be large enough to accommodate trucks and have easy access directly to the freeway or service interchange. In other words, the excess parcels will have to be ideally situated and sized to provide maximum utilization and relief of parking demand at other locations. In addition, the elevation of the parcels and any changes in grade which are required will have to be reviewed for their practicality and impacts. These lots, once built, would require ongoing maintenance and security checks. This tactic should also be implemented in areas where it will not adversely impact truck related industries by relocating drivers from private facilities to public ones. However, this may be permissible where private facilities are already over utilized.

Strategy 2, Tactic 4: Improve Geometrics for Better Parking

Description

Drivers may be dissuaded from seeking out legal or formal parking areas because of geometric limitations involving a local access interchange, which makes access for trucks difficult or time consuming. So instead of leaving the freeway system they simply park on a ramp or at a big box store parking lot next to the interstate. Simple or more extensive changes to the interchange will increase the likelihood of trucks utilizing the services at the local access interchange. Changes that address geometric issues include improving turning radii, widening short sections of streets or adding turn lanes to improve access to public truck parking facilities. Private parking facilities could be improved through public-private partnerships (see Strategy 3, Tactic 5). This approach would involve inventorying and prioritizing such geometric needs so that they can be addressed through future special-purpose federal programs (e.g. TIGER grants, Jason's Law) or future Kansas transportation planning efforts.

Capital Cost Considerations

Capital costs would include reconfiguring existing truck parking lots to improve access and geometrics of the site to maximize parking efficiency. There are moderate to high costs associated with the improvements depending on the level of interchange or parking access geometric improvements needed.

O&M Cost Considerations

No additional O&M costs above what is normally required at existing facilities.

Parking Notification

None.

Safety and Security

Improved geometrics would have safety benefits for trucks.

Additional Parking Supply

This tactic provides additional parking by maximizing the efficiency of each site.

Potential Economic Impact

By implementing low-cost improvements, existing truck parking spots will be “unlocked” throughout the state to maximize parking capacity. Trucks will be able to easily access parking spaces they previously may have bypassed due to inconvenient movements to and from freight corridors. This tactic also opens up low-cost opportunities for local communities or businesses to fund or seek funding for making these comparatively inexpensive improvements in order to generate additional economic development opportunities. As a statewide initiative, this approach may be appealing to federal TIGER grant application reviewers given that freight improvements are increasingly receiving more extensive federal support.

Ease of Implementation

One concern is that the improvements can be seen as benefiting a certain single business or communities, so great consideration to equity should be given in considering different areas for improvement. This improvement would only help address parking needs at locations with existing lots or service stations where the interchange geometry is constraining truck traffic. This is a long term solution, as once these geometric improvements are made the interchange will be configured for truck traffic for at least the remainder of its life cycle.

Strategy 3: Create Parking Improvement Partnerships

Strategy 3, Tactic 1: Partner with Highway Patrol on Parking

Description

In some circumstances, truck parking issues arise out of driver confusion or lack of understanding about how potential law enforcement activities affect their work. For example, truckers may avoid parking at closed weigh stations for concern that they may find themselves subject to equipment or permitting enforcement. As a result, they often choose to park on highway ramps when they have no other viable alternative due to hours of service requirements – and can cause a safety concern to themselves and other motorists.

Development of a Highway Patrol/Freight Trucking Collaboration Program would create a framework in which the trucking community could have an open, collaborative dialogue with the Kansas State Highway Patrol (KHP) regarding trucking issues, particularly those involving parking. The goal of this consultation program is for both KHP and the trucking community to reach concurrence and consistency in truck parking enforcement throughout the state. This program can handle such issues as how ramp parking is allowed and in what locations, and how overnight parking at weigh stations and other facilities with an enforcement presence can be implemented.

Capital Cost Considerations

No significant capital costs are anticipated. However, this tactic would be more effective if it was paired with tactics that provide additional truck parking.

O&M Cost Considerations

This tactic would require additional KHP staff time.

Parking Notification

The KHP would help provide information to truck drivers on safe parking locations.

Safety and Security

This tactic directly addresses safety by discouraging truck parking on highway ramps.

Additional Parking Supply

This tactic provides no additional parking, however, this tactic may result in more use of underutilized parking areas including weigh stations.

Potential Economic Impact

This tactic has limited economic benefit., However, truck drivers would better understand where and how they can and cannot park in Kansas, increasing traveler safety and making them more comfortable traveling throughout the state (thus encouraging more drivers to choose Kansas routes). KHP officers benefit from the combination of clear parking guidelines and an informed, educated enforcement population.

Ease of Implementation

The success of this strategy is highly dependent upon the development of safe and convenient truck parking options. As seen in states with a focus on enforcement the central root of the problem remains – the lack of convenient truck parking options. While use of weigh stations is a consideration, according the advisory panel, most truck drivers will avoid parking in these areas due to perceived scrutiny from the KHP.

Strategy 3, Tactic 2: Work with State and Local Agencies to Expand Parking

Description

Kansas state agencies such as the Department of Wildlife and Parks build and operate parking areas at welcome centers, often at locations near the Kansas Statewide Freight Network. These parking assets and their rules of operations can, in some instances, be easily modified to allow for or increase the amount of freight truck parking that occurs there.

To test the concept, KDOT would partner with Department of Wildlife and Parks to incorporate truck parking areas in existing and new tourist information sites where deemed appropriate. Travel and Tourism currently maintains two travel information centers: one in Goodland on I-70 East Milepost 7, and one along the I-35 Turnpike 10 miles south of Wichita in Belle Plaine. Future travel information centers and other tourist sites should include designated truck parking areas where appropriate.

Capital Cost Considerations

Capital costs would include new truck parking or expansion of existing parking.

O&M Cost Considerations

This tactic may require O&M costs as part of cost-sharing agreements.

Parking Notification

Basic truck parking notification through tourist information brochures and static signage could be provided as part of this tactic.

Safety and Security

Modified parking areas would need to safely accommodate trucks.

Additional Parking Supply

Provides additional truck parking at travel and tourism sites.

Potential Economic Impact

Providing truck parking at new tourist sites will aid both truckers and the general traveling public. Often, the most visible parking areas for truckers and motorists are tourist sites. Providing truck parking at these sites will provide safe alternatives for truckers. This parking information will also provide viable alternatives to parking on ramps which can be a hazard for truckers and motorists. Additionally, cost sharing between local agencies at tourist facilities located off the state system could provide more opportunities to develop future traveler information and tourism sites.

Ease of Implementation

Implementation of this strategy is dependent upon sharing land and resources with new and existing sites. Therefore, this strategy is contingent on coordination with the Department of Wildlife and Parks and other state and local agencies to acquire land and develop these facilities. Currently, there are no plans for new tourist facilities in the state. However, in the future, if new facilities are considered, accommodations should be made for dedicated truck parking. The state may also consider partnering with local city, county and regional tourist organizations throughout the state. There may be the opportunity to jointly develop facilities near interstate interchanges with a set aside for truck parking. For the truck parking component KDOT could develop cost sharing agreements with local and state agencies for construction and maintenance of the parking lots as shared facilities.

Strategy 3, Tactic 3: Sell Branding Rights to Fund Parking Improvements

Description

States are closing rest areas or seeking sustainable, marketing-based revenue to support them in the face of budget pressures and greatly increased options for traveler rest and relief. Federal funds available for rest area improvements including provisions under Jason's Law are insufficient for state needs. In 2009, Jason Rivenburg, a commercial truck driver, sought a safe spot to rest before delivering a load early the next morning. Tragically, Jason's unfamiliarity with nearby parking options led him to park at an abandoned, unsecure gas station, which ultimately resulted in his murder. Hope Rivenburg, Jason's wife, championed "Jason's Law" which has elevated the need to solve the truck parking crisis from an industry issue to a national issue, expanding eligibility for states to use federal highway funds for truck parking projects.

Federal law prohibits states from allowing private entities to sell goods in interstate public rest areas for profit. This federal law was enacted to prevent unfair advantages for private companies that are directly accessible from the interstate over those companies that operate at an exit off the interstate. Some exceptions exist for toll roads such as the Kansas Turnpike, New York State Thruway and the Pennsylvania Turnpike. This is because these roads were built before being designated interstates, which today makes it allowable to have service areas on these Turnpikes that advertise and make revenues.

In order to provide more options for public parking facilities to have amenities similar to private truck stops, there is an opportunity for current policies and federal/state law to be modified to permit public transportation agencies to allow sponsorships at their public parking facilities in order to better fund needed parking capacity and amenity improvements. Exploring this option is aligned with the recommendation of the Alvarez & Marsal Kansas Statewide Efficiency Review, which suggested that KDOT "institute or increase sponsorship for rest stops, traveler assist hotline, roadside logo sign program and motorist assist program."

Capital Cost Considerations

This tactic requires some initial capital cost to set up the program.

O&M Cost Considerations

This tactic requires ongoing State staff support.

Parking Notification

Funding could be provided for static and potentially dynamic real-time signage. However, advertising would likely be limited to truck parking areas. Advertising on signage would likely be precluded.

Safety and Security

Funding could address safety improvements when constructing new truck parking lots or improving existing lots.

Additional Parking Supply

Some additional truck parking would be funded through the program.

Potential Economic Impact

Commercialized rest areas reduce public capital and maintenance improvement costs, increase user services and amenities; and benefit taxpayers through private-sector concessionaires' lease payments. Value-added services could also be provided such as a truck parking reservation system.

Ease of Implementation

Concerns about privatization on the interstate include the lack of control by the government and opposition from trade groups, such as associations representing private truck stops and convenience stores. These trade groups are often opposed to rest area privatization due to increased competition from businesses that are perceived to have unfair advantages. Nearby economies at interchanges may be impacted, but strong public support for privatization exists.

Strategy 3, Tactic 4: Create Regional Truck Parking Policies*Description*

Currently, there are federal truck freight policies and regulations that provide a level of consistency for the nation's trucking industry operations. However, each state also has the ability to develop and mandate their own trucking policies and regulations, making it challenging to provide regional cohesiveness beyond state borders.

This can be addressed if neighboring states collaborate regionally to form coalitions to develop corridor-specific truck freight and truck parking policies and regulations to increase truck routing through Kansas and its bordering states. This kind of approach potentially strengthens the Kansas Corridors of Freight Significance and ties in with new opportunities made available for these designated corridors through the Federal Fixing America's Surface Transportation (FAST) Act.

In the instance of truck parking, the regional coalition of states would collaborate to identify new and revised truck policies and regulations that, together, would improve truck parking availability, amenities and way-finding. This could include collaborating regionally to place Kansas freight parking signage in other states (and vice versa) where initial truck routing and parking decisions are made, coordinating on providing consistent, designated longer-combination vehicle (LCV) parking strategies and developing regional parking maps for use on websites, smart phones, informational kiosks and other applications. The MAASTO Regional Truck Parking Information Management System currently underway as a partnership between Kansas and seven other states is a prime example of a regional, multi-state problem-solving approach.

Capital Cost Considerations

None.

O&M Cost Considerations

Would require ongoing State staff support.

Parking Notification

None.

Safety and Security

Policies and regulations would need to address safety concerns.

Additional Parking Supply

None, however, consistent policies and regulations could place less strain on parking at border locations.

Potential Economic Impact

The trucking industry will have consistent operating policies and regulations along regional freight corridors of significance, which will allow for greater efficiencies in truck routing and parking decisions. Consistent policies and regulations can also grow awareness of the MAASTO region as a trucking freight hub through the Midwest, which will help attract and retain truck traffic and related businesses to Kansas and its partnering states.

Ease of Implementation

Within each partnering state, a champion and supporters for the cohesive package of trucking operational policies and regulations will have to be identified to introduce and shepherd the policies through the legislative and State DOT approval processes. In the legislature, political consensus will have to be developed and maintained during consideration and passage of the cohesive policies and regulations. Multi-state agreement on consistent truck parking policies and standardization for ease of use and way-finding will be critical. Integrating both public and private parking facilities into the regional coalition will be necessary to provide the greatest benefits to the trucking industry and its supporting services.

Strategy 3, Tactic 5: Expand Parking via Public-Private Partnerships*Description*

Public parking facilities typically include rest areas, service areas, weigh stations and other available public ROW along the Kansas Statewide Freight Network. Available ROW to expand these lots is limited, and most public facilities are unable to provide amenities such as restaurants, fuel and showers that private parking facilities offer. This stems from a lack of ongoing operations and maintenance funding, as well as federal law prohibiting states from allowing private entities to sell goods for profit in public rest areas. However, partnering with private industry gives transportation agencies an opportunity to offer these amenities and increase truck parking capacity. They can do so by delivering new or improved parking facilities on property owned and operated by private industry by combining public and private funding, maintenance and risk sharing.

Capital Cost Considerations

None.

O&M Cost Considerations

Would require ongoing State staff support.

Parking Notification

There are opportunities to develop public-private partnerships to share and disseminate real-time information on parking availability through smart phone applications, public and private websites, and way-finding signage.

Additional Parking Supply

Would provide additional parking through public-private partnerships.

Safety and Security

Parking at public and private locations would need to address safety and security.

Potential Economic Impact

Partnerships between transportation agencies and private industry can provide new or improved parking capacity and way-finding information in a faster and more cost-effective timeframe. Public partners can provide additional parking pavement cost effectively and efficiently. Private industry can provide additional amenities and ongoing facility operation and maintenance. Both partners can then share their real-time parking data in order to effectively direct truck drivers to available public and private parking capacity.

Ease of Implementation

Some commercial truck stop owners and other private entities are reluctant to add new parking capacity or use excess parking capacity for truck parking. Providing funding or other types of incentives to encourage implementation partnerships for delivering new or improved parking capacity would be beneficial. Jason's Law enables federal funding to be used to provide truckers better access to safe parking areas by building and updating parking facilities. Within the law, there are provisions for developing public-private partnerships to fund the needed parking improvements. Today, public-private partnerships are most applicable to commercial parking facilities owned and operated by private industry. Until federal law changes to allow privatization, rest areas, service areas and parking areas along interstates and other roads do not fall under the public-private partnership category because they are funded by the government.

Strategy 4: Promote Pro-Parking Policies for Freight Trucks***Strategy 4, Tactic 1: Develop Pro-Freight Truck Policies****Description*

Kansas currently has no cohesive set of tax or incentive policies designed to sustain or grow state freight truck volumes or to help adequately provide those trucks with an appropriate level of parking or other support. Members of the Truck Advisory Panel discussed that such packages potentially should be considered to incentivize the private sector to locate distribution centers and other generators of large volumes of freight truck movement in Kansas while also providing new or expanded parking and other services to the freight truck industry.

Capital Cost Considerations

None.

O&M Cost Considerations

This tactic would require ongoing State staff support for policy development and advocacy.

Parking Notification

None.

Additional Parking Supply

This strategy's potential for creating new or expanded truck parking cannot not be predicted as results would be highly dependent upon the incentives and how they are structured.

Safety and Security

This strategy's potential for creating safe, secure truck parking cannot not be predicted as results would be highly dependent upon the incentives and how they are structured.

Potential Economic Impact

This approach would focus new private-sector funding and planning resources on increasing usage of the Kansas Freight Network and providing adequate parking and other support services. Doing so, if successful, potentially could increase jobs and economic activity in the state and help the trucking industry be more productive and efficient. It may also position the state to attract businesses and services in advance of potential freight movement changes that may be produced by the Panama Canal expansion project completion in 2016, the Nicaragua Canal in the early 2020s and other future freight truck developments. However, the actual structure and promotion of such incentives would greatly determine how effective they might be in practice.

Ease of Implementation

This tactic will require developing multi-stakeholder consensus regarding the best ways to attract and support larger volumes of freight truck traffic to the Kansas Freight Network. State tax revenue implications will have to be accurately developed and communicated to build support for adoption of the tax incentive package that is ultimately developed. A champion and supporters for the incentive package will have to be identified to introduce and shepherd the incentives through the legislative approval process. In the legislature, political consensus will have to be developed and maintained during consideration and passage of the tax incentive package.

Strategy 4, Tactic 2: Develop Integrated Local Parking Policies*Description*

Many of the problematic truck parking areas in Kansas are at the edge of major urban areas. Given their locations, and that some parking solutions may need to be created or built in multiple political jurisdictions, one strategic approach is to provide affected cities and counties with help in developing locally and regionally integrated approaches to creating more freight truck parking. Cities and counties have the ability to address truck parking needs through local land use policies and regulations. Unfortunately, local parking regulations typically do not address short-term truck parking needs related to hours of service and/or just-in-time deliveries. As part of this effort, KDOT would contribute the assistance of its staff "parking liaison" (see related tactic) to assist local governments in finding the necessary partners, resources and solutions to address their freight truck parking issues.

Capital Cost Considerations

This tactic requires private investment in truck parking as part of new local policies and regulations.

O&M Cost Considerations

This tactic requires ongoing State and local staff support.

Parking Notification

Similar to Strategy 1, Tactic 1, a truck parking brochure and/or web-based parking map could be created that includes more detailed information on the location, number of spaces, guidelines and amenities for truck parking and/or staging facilities for just in time deliveries located on the fringes of major metropolitan areas and/or near warehouse and distribution centers.

Additional Parking Supply

This tactic would provide additional locally provided truck parking through new local policies and regulations. In the process, it creates more efficient use of existing parking resources, lessening the overall cost of improving the freight truck parking system.

Safety and Security

Local policies and regulations should address provisions for safe truck parking.

Potential Economic Impact

This can raise private development costs; however, for local governments this tactic provides the resources that they might not otherwise have access to when dealing with localized truck parking issues. For rural and small town areas, it provides a means of attracting and retaining owner-operators, small trucking operations, and the residents, jobs and tax revenues they offer.

Ease of Implementation

This tactic will require developing policies that fully and flexibly address local jurisdictions' freight truck parking needs and preferences while also positively affecting the Kansas Statewide Freight Network. A champion and supporters for the regulatory models and loan program package will have to be identified to advance interest and action at the local level. In the legislature, political consensus will have to be developed and maintained during consideration and passage of the loan and land bank legislative elements.

Strategy 4, Tactic 3: Create Coordinated Delivery/Parking*Description*

Truck parking issues can be exacerbated by the unanticipated consequences of truck delivery schedules and policies used by large-volume generators, such as warehousing and distribution centers, coupled with land-use, noise or other local regulations that may further limit truck parking access and capacity at final destinations. Truck drivers may go the maximum window in terms of their hours of service to get as close to their final destination as possible. However, if there are limits on when they can arrive or park at their final destinations, they are forced to park wherever they can. This can mean existing lots operate above capacity, truck drivers park illegally or they are forced to drive around on the local or highway networks due to a lack of parking. Consequently, better public- and private-sector coordination regarding such policies, or the formation of incentive programs for additional truck parking, may effectively reduce or redistribute demand on state truck parking facilities in ways that lower costs to taxpayers, improve driver safety and make Kansas a more appealing routing option.

Capital Cost Considerations

None.

O&M Cost Considerations

This tactic would require ongoing State staff support.

Parking Notification

None.

Additional Parking Supply

This tactic would create additional local truck parking at or near major distribution centers and intermodal facilities.

Safety and Security

Policies should include provisions for truck parking and staging for just-in-time deliveries.

Potential Economic Impact

Developers of major distribution centers and intermodal facilities currently are allowed to out-source their parking needs and facility costs to the State, arguing to do otherwise will unacceptably increase development costs. However, local requirements of sufficient truck parking and broad parking area lessens demand and expense on state facilities, reduces local congestion and safety concerns from drivers searching for parking and appropriately shares social and economic impacts with the businesses that, as final destinations, generate the impacts. Truck drivers will spend less time driving in urban settings looking for parking, which decreases wear and tear on those roads. Reduced truck volume on urban streets also benefits motorists by decreasing congestion.

Ease of Implementation

Truck parking needs should be carefully considered as local communities and KDOT review traffic impact studies. Local communities should consider requirements for additional truck parking and staging as part of the plan review for new distribution facilities and major commercial centers. Increases in truck parking at distribution/light industrial facilities may necessitate increased safety and security measures and enforcement. Because this is a local land use issue, there is little the state can do directly to implement this strategy. However, the state can work with local communities who have expressed an interest in addressing the truck parking problem and provide technical expertise and best practice examples from other communities around the country. Additionally, Kansas may want to consider requiring such parking practices when state transportation funding or assistance is provided to advance public or private development.

Strategy 4, Tactic 4: Create Truck Parking Liaison*Description*

Barriers to solving truck parking issues often arise because no one is empowered to bring together the multiple entities whose cooperation would be needed to solve the underlying issue. A localized truck parking shortage, for example, might be rectified if a developer could identify a potentially profitable location for a new truck stop that also solves a parking capacity issue; the same could be true if there was a knowledgeable resource that could work with a community to create a secure parking area for local owner-operators.

In such an environment, a simple fix is to create a liaison role from which a knowledgeable expert can bring together multiple parties and resources to create opportunities and clear hurdles. This is a model often used throughout local and state governments in the form of film commissions or business incubators. In the case of truck parking, this could be a KDOT position and person tasked with working with local and state public- and private-sector interests to improve freight truck parking and related issues across the state. Under other models, this could be a role undertaken by the state freight advisory committee.

Capital Cost Considerations

This tactic has upfront costs to develop program.

O&M Cost Considerations

This tactic would require ongoing dedicated State staff, potentially as much as one full-time equivalent (FTE). Staff costs could be mitigated by sharing this role with other responsibilities.

Parking Notification

None.

Additional Parking Supply

No immediate direct impact to parking supply, however, long-term, this position would better manage and coordinate existing truck parking supply and identify opportunities for new facilities.

Safety and Security

The liaison would work with local and state public- and private-sector interests to address safety and security needs for existing and future truck parking.

Potential Economic Impact

By creating a resource and forum for discussing and promoting safe and efficient truck operations in the state of Kansas, the KDOT liaison may enable local jurisdictions to make policy and investment decisions that make them more attractive to logistics-oriented businesses.

Ease of Implementation

This tactic carries staff and service marketing costs. If duties are added to those of an existing staff member, there may be impacts to both sets of responsibilities. There may be a lag time between when the position is created and when the first benefits are accrued. Working to solve the parking problems of a community or a developer, for example, may lead some to perceive the role as picking winners and losers or that those receiving assistance are getting special or favored treatment.

Strategy 4, Tactic 5: Harmonize Regional Regulations for Truck Parking

Truck routing and parking decisions can be made hundreds of miles before a truck enters Kansas. As a result, the freight truck policies, regulations and permitting of other states can negatively impact the number of freight trucks that are routed to and through Kansas. By reviewing and eliminating legislative and regulatory barriers to regional consistency, or "harmonization" along freight corridors (e.g., signage, truck parking restrictions, weight limits, etc.) Kansas can position itself to better attract and maintain higher levels of freight truck traffic. This can translate into greater - but more predictable - freight truck parking demands. Accomplishing this would require Kansas to coordinate regulatory changes with states bisected by highway corridors connecting to the Kansas Freight Network. This effort would be most effective if the focus was on harmonizing with partner states those areas of regulation and permitting that offer enough value to cause drivers, dispatchers and others to route increased volumes of truck traffic through and within Kansas. The recently awarded Federal TIGER Grant for the MAASTO Regional Truck Parking Information and Management System provides a great opportunity to apply regional consistency and harmonization truck parking information sharing across an eight-state region.

KDOT could engage the Kansas Congressional Delegation in identifying and eliminating potential barriers to the kind of regional regulatory compacts contemplated here. The Mid America Freight Coalition could also assist with an initiative to provide improved regional freight harmonization in

the MAASTO region. Since the Kansas Turnpike does not utilize federal funds, it can develop its own regulations consistent with regional regulations.

Capital Cost Considerations

None.

O&M Cost Considerations

Would require ongoing State staff support.

Parking Notification

None.

Additional Parking Supply

Regional harmonization may allow for more efficient truck parking, especially at the state borders.

Safety and Security

No direct link to safety and security, however, any modification to truck regulations would need to address safety needs.

Potential Economic Impact

Regional harmonization of freight truck regulations and permitting creates time and cost savings for the trucking industry, resulting in more freight trucks being generated within or routed through Kansas. Added truck volumes, if significant, would help generate additional jobs, economic activity and investment in the state. This, in turn, would increase support for additional parking and other resources to support higher truck volumes and the economic activity they generate.

Ease of Implementation

This tactic requires analyzing freight movements to and through Kansas to identify and prioritize corridors by: current and future truck volumes; opportunities for growth based on potential harmonization; and likelihood for success in developing regulatory partnerships with states bisected by those corridors. Working with other states will mean reconciling potentially radically different freight truck and economic development agendas. Regulatory harmonization would have to happen quickly, as the likely competitive advantages it would create will most benefit the region(s) making the first moves in this area. Existing federal trucking regulations and oversight may introduce unanticipated obstacles that will have to be worked through in tandem with other states as they arise or are identified. Most importantly, harmonization efforts will have to be focused on those regulatory and permitting issues that, if addressed, will be sufficiently important to the trucking industry as to change current routing and dispatching decision making.

Summary Evaluation

The evaluation considerations for each tactic are summarized in a “Consumer Reports” type ranking (from best to worse) based on a high-level assessment of initial capital costs, long-term annual O&M costs, parking notification, ability to address safety and security needs, ability to add additional parking supply, potential economic impact and ease of implementation. This high-level screening evaluation was qualitative and based on knowledge of previous applications of similar tactics around the country described in the previous section. The purpose of this evaluation, and advisory panel input (shown on the following pages) was to help screen the tactics down to a manageable number to carry forward into implementation. The screening analysis is shown in **Figure 4.2** on the following page.

Advisory Panel Assessment

During the second advisory panel meeting, the full list of strategies and tactics were presented and discussed. Following the discussion, the project team led the advisory panel through a prioritization exercise. Each member of the panel was provided a green dot for their highest priority, yellow dot for the next highest priority and a red dot for a strategy and tactic that they thought should not be pursued because it did not meet the current and future needs identified at the onset of the study and/or feasibility of implementation. The results of the advisory panel rating exercise are provided in **Figure 4.3** on the following page.

Figure 4.2: Evaluation Matrix

	Evaluation Measures						
	Initial Capital Cost	Long-Term O&M Costs	Parking Notification	Safety and Security	Additional Parking Supply	Potential Economic Impact	Ease of Implementation
Strategy 1: Improve Parking Information Sharing							
Tactic 1: Create and Distribute Truck Parking Guides	●	●	●	●	●	●	●
Tactic 2: Post Parking Info via Static Signage	●	●	●	●	●	●	●
Tactic 3: Offer Real-Time Dynamic Parking Information	●	○	●	●	●	●	●
Strategy 2: Add or Improve Parking Access							
Tactic 1: Expand Parking Lot Numbers and Capacity	●	●	○	●	●	●	●
Tactic 2: Improve Longer/Larger Vehicle Parking	●	●	○	●	○	●	●
Tactic 3: Use Excess ROW for Parking	●	●	○	●	●	●	●
Tactic 4: Improve Geometrics for Better Parking	●	●	○	●	●	●	●
Strategy 3: Create Parking Improvement Partnerships							
Tactic 1: Partner with Highway Patrol on Parking	●	●	●	●	●	●	○
Tactic 2: Work with Agencies to Expand Parking	●	●	●	●	●	●	●
Tactic 3: Sell Branding Rights to Fund Parking	●	●	●	●	●	●	●
Tactic 4: Create Regional Truck Parking Policies	●	●	○	●	●	●	○
Tactic 5: Expand Parking via P3's	●	●	●	●	●	●	●
Strategy 4: Develop Pro-Parking Policies for Freight Trucks							
Tactic 1: Develop Pro-Freight Truck Tax Policies	●	●	○	●	○	●	●
Tactic 2: Develop Integrated Local Parking Policies	●	●	○	●	●	●	○
Tactic 3: Coordinate Delivery Policies/Parking	●	●	●	●	●	●	○
Tactic 4: Create Freight Parking Liaison	●	●	●	●	●	●	●

Rating Scale:

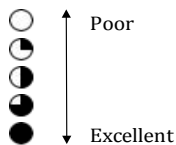














Figure 4.3: Strategies and Tactics – Advisory Panel Ratings

Strategies	Tactic 1	Tactic 2	Tactic 3	Tactic 4	Tactic 5
<p>Strategy 1: Improve Parking Information Sharing</p>	<p>Create/Distribute Truck Parking Guides Provide drivers with truck parking map, parking guide and related information at credentialing, through informational campaign and other mechanisms. Distribute in paper and electronic versions (apps, website, 511, etc.).</p> 	<p>Post Parking Info Via Multiple Signage Place static parking signing at driver decision points (highway junctions, exits, parking areas) showing nearby parking options.</p> 	<p>Offer Real-Time Dynamic Parking Information Provide real-time dynamic parking information regarding public and private truck parking availability through electronic signage and on-line mechanisms.</p> 		
<p>Strategy 2: Add or Improve Parking Assets</p>	<p>Expand Parking Lot Numbers and Capacity Improve parking layouts to boost parking efficiency as part of facility maintenance and rehabilitation planning. Restripe rest areas for additional truck parking. Add capacity at existing lots. Build more lots in areas where significant over-utilization or illegal parking occurs.</p> 	<p>Improve Longer/Larger Vehicle Parking Develop plans for better accommodating overweight, oversize vehicles in current or future parking facilities.</p> 	<p>Use Excess ROW for Parking Identify KDOT/KTA facilities and ROW that can be repurposed for parking areas; develop plan and funding for repurposing.</p> 	<p>Improve Geometrics for Better Parking Improve interchange geometrics where current conditions dissuade drivers from leaving highway/ramps to seek nearby parking areas.</p> 	
<p>Strategy 3: Create Parking Improvement Partnerships</p>	<p>Partner with Highway Patrol on Parking Work with Highway Patrol and others to clarify ramp parking enforcement and communicate results to trucking community. Establish consultation program involving Highway Patrol, other agencies and truckers to identify and address enforcement issues that may affect parking decisions.</p>	<p>Work with Agencies to Expand Parking Partner with other state agencies to open existing facilities to truck parking or expand acceptable truck parking opportunities at peak hours.</p> 	<p>Sell Branding Rights to Fund Parking Develop policies and processes for selling advertising, marketing and branding rights for lots, signage and amenities to fund improvements.</p>	<p>Create Regional Truck Parking Policies Collaborate regionally on coordinating corridor-specific truck freight and truck parking policies and regulations to increase truck routing through Kansas.</p>	<p>Expand Parking Via P3s Develop and implement a P3 program for building and maintaining private lots using a combination of public and private funding, maintenance and risk sharing.</p>
<p>Strategy 4: Develop Pro-Parking Policies for Freight Trucks</p>	<p>Develop Pro-Freight Truck Tax Policies Partner with Department of Commerce, Division of the Budget, Kansas Department of Revenue and others to develop tax incentives for locating distribution centers and other generators of large truck freight volumes in Kansas. Collaborate to develop tax incentives for private investments in new or expanded parking facilities.</p> 	<p>Develop Integrated Local Parking Policies Work with local communities to adopt regulations requiring secure truck parking for industrial/warehouse development similar to car parking requirements for commercial developments.</p> 	<p>Coordinate Delivery Policies/Parking Work with major distribution centers to better coordinate policies for scheduling truck arrivals combined with opening their yards to truck parking to alleviate area parking issues.</p> 	<p>Create Freight Parking Liaison Create "Parking Liaison" role in KDOT to find partners and solutions for locally specific truck parking issues.</p> 	

Legend:

-  1st Priority
-  2nd Priority
-  Should Not be Pursued

Note: Tactics which did not receive a dot indicated areas where the advisory panel were neutral. These tactics could potentially be pursued, however, were not a high-priority by the advisory panel.

Preferred Strategies and Tactics

The preferred list of strategies and tactics shown below were based on a high-level assessment of capital and annual O&M costs, parking notification, safety, added capacity, potential economic impact, ease of implementation and input from the advisory panel:

Strategy 1: Improve Parking Information and Sharing

- Post parking information via static signage
- Offer real-time dynamic parking information

Strategy 2: Add or Improve Parking Assets

- Expand parking lot numbers and capacity
- Use excess ROW for parking
- Improve geometrics for better parking

Strategy 3: Create Parking Improvement Partnerships

- Work with agencies to expand parking
- Create regional truck parking policies
- Expand parking via P3's

Strategy 4: Develop Pro-Parking Policies for Freight Trucks

- Develop integrated local parking policies
- Coordinate delivery policies

The advisory panel noted that the final recommendations should address:

- 1) Efficiency
- 2) Commerce and economic development potential
- 3) Safety

Based on this input, the project team further assessed and prioritized preferred Strategies 1 and 2 and associated tactics using a benefit-cost analysis that included those factors (see Chapter 5). Strategy 1 and 2 tactics involve infrastructure investments by KDOT and KTA on their owned and operated facilities. These tactics also include infrastructure improvements whose costs and benefits can be easily quantified and measured.



CHAPTER 5

RECOMMENDATIONS AND POTENTIAL IMPLEMENTATION STRATEGIES

Recommendations

This chapter extends Chapter 4's high-level review of truck parking enhancement strategies and tactics by focusing on four specific recommendations aligned with study advisory panel input and showing positive benefit-cost analysis (BCA). These recommendations are presented with detailed implementation action plans.

The four recommendations and their related potential implementation strategies include:

1. Improve Parking Information and Sharing

- a. Post parking information via static signage
- b. Deploy a truck parking information management system (TPIMS)

2. Add or Improve Parking Assets

- a. Expand parking lot numbers and capacity
- b. Use excess ROW for parking
- c. Improve geometrics for better parking

3. Explore Creating Parking Improvement Partnerships

- a. Identify intra-agency opportunities for expanding parking
- b. Investigate benefits of potentially creating regional truck parking policies
- c. Secure marketplace guidance as to the viability of expanding parking via public private partnerships (P3's)

4. Examine Potential Pro-Parking Policies for Freight Trucks

- a. Look at developing integrated local parking policies
- b. Explore opportunities for coordinating delivery policies to expand parking

The first two recommendations (improve parking information and sharing and add or improve parking assets) are prioritized based on the benefit cost analysis (BCA) conducted for each one (see **Appendix 5.A**). These recommendations involve infrastructure and ITS investments by KDOT and KTA on their owned and operated facilities. The costs and benefits for these improvements can be easily quantified and measured. For planning and advocacy purposes, specific locations for infrastructure improvements including signage, intelligent transportation systems (ITS) deployment and capacity improvements are described in text, tables and maps in this report. Additionally, recommended solutions for specific sites also are provided in a geospatial database that allows KDOT and KTA staff to display and query recommendations. The geospatial database can also be applied to an online web-interface allowing the users, stakeholders and the public to view recommendations in an interactive map.

The last two recommendations (explore creating parking improvement partnerships and examine potential pro-parking policies for freight trucks) are not easily amenable to a traditional BCA. They create multiple opportunities for a truck parking system that is likely to be safer, more efficient, better funded and more clearly tied to measurable economic development impacts. Moreover, they do not require significant capital and operating costs, at least for KDOT and the KTA. However, these partnerships and policies have other implementation hurdles. These include, but are not limited to, the need to develop a policy consensus between state, county and local governments and agencies as well as the freight industry and supporting services. Additionally, some tactics require balancing potential incentives and their benefits with their economic and budgetary impacts, a

comparison which is highly dependent upon conditions at the time potential implementation is considered. Finally, these strategies primarily consist of what are essentially consensus-building and advocacy activities, making it difficult to predict when and how such recommendations may be delivered.

Finally, a note about recommendations not shown. This plan does not recommend state construction of new, full-featured public truck parking facilities. Instead it recognizes the challenge posed by the magnitude of the state's parking needs combined with uncertainties surrounding future needs (described in Chapter 2) and transportation funding levels. The plan addresses this challenge by addressing truck parking needs through a multi-layered approach emphasizing optimizing the use of existing parking assets through targeted capacity improvements, better sharing of parking availability information and partnerships with other public- and private-sector entities to flexibly add capacity where needed in ways that don't solely rely on state action or funding.

Improve Parking Information and Sharing

One way to address the need for additional truck parking capacity is to improve the parking system's distribution of demand and utilization of existing parking. Based on observations from the truck parking inventory, there are a number of parking areas that are overcapacity; however, there are also a number of public and private parking lots that are underutilized. The location of some of these truck parking areas may not be known to truck drivers, especially if they infrequently travel through the area. Even if the location is known, truck drivers do not know if there is a spot available in advance of routing to or entering the lot. If a space is not available, truck drivers have to spend additional time looking for parking and, if they are at their maximum hours of service, may decide to park in informal or illegal locations. To address this issue, the plan recommends a system of static and real-time dynamic information signs and parking monitoring technologies to help improve the distribution of parking across multiple sites, thereby optimizing parking utilization. Static signage would provide the location and distance of public and private truck parking facilities. This is considered the lowest hanging fruit due to its low capital and maintenance costs. Dynamic information signs as part of a Truck Parking Information Management System (TPIMS) would provide up-to-date information on public and private truck parking location, distance and availability to help drivers make informed decisions. This strategy has significantly higher capital and operating costs; however, it is most effective at maximizing utilization of the existing truck parking.

Post Parking Information via Static Signage

KDOT and KTA should consider deploying static truck parking signs around select urban areas and along the non-interstate Primary Freight Network in order to alert drivers to available truck parking. At a minimum, these static signs would provide the location, direction and distance of the nearest available public and private truck parking facilities. Signs are recommended to be placed at the edges of major state metropolitan areas (e.g., Kansas City and Wichita) and in or near large cities on highways off the interstate system. As shown in **Table 5.1**, those cities include Dodge City, Garden City and Liberal. Truck parking information should be aggregated to exits or areas without referencing specific private truck stops or businesses. This avoids the issue of appearing to favor any specific private enterprise.

Static Sign Site Selection Criteria

- Non-interstate Primary Freight Network with significant truck parking supply, including multiple parking facilities. Truck parking supply would include both public and private parking facilities.

Static Sign Placement Criteria

- Signs should be placed two to five miles in advance of truck parking facility. Preferably far enough in advance to allow the driver time to make an informed decision (four miles is recommended).

Next Steps

- KDOT and KTA to finalize site selection for static sign placement.

There are long stretches of the freight network that are rural in nature and do not meet the criteria to sign a parking facility with static signage. This is due to the fact that the facility is the only parking facility in the area along that route. If signing these areas becomes a priority for the state, then a static sign is the most appropriate application. The most effective way to sign these stand-alone facilities would be with a static sign stating that “Truck parking is available in five miles. Next truck parking facility 100 miles”.

Deploy a Truck Parking Information Management System (TPIMS)

KDOT and KTA should consider deploying a truck parking information management system (TPIMS) at key locations along segments of the state’s freight network: I-70, I-35, I-335 and I-135. The system would be similar to the TPIMS deployed along I-94 in Michigan which uses vehicle detection and data collection technologies to monitor the availability of truck parking and provide real-time information to commercial vehicle operators using dynamic information signs. These signs provide real-time information about the availability of parking spaces at specific exits with public rest areas and private truck stops (monitored sites).

In October 2015, Kansas and seven other participating states within the Mid America Association of State Transportation Officials (MAASTO) region, including Iowa, Indiana, Kentucky, Michigan, Minnesota, Ohio and Wisconsin were notified that they were selected to receive \$25 million in funding from the federal TIGER VII Grant program. The MAASTO TIGER VII Grant identified an initial TPIMS deployment in Kansas and the other seven states (see **Appendix 3.B**). This initial deployment serves as a pilot project for the Kansas system. This pilot would allow the State of Kansas to test and evaluate the TPIMS before deploying to other locations within the state. The tiered recommendations identified in this section would be implemented after the initial pilot deployment, testing and evaluation.

As shown below, traffic sensors installed at the ingress and egress points of monitored sites determine the number of available spaces. Closed circuit television (CCTV) cameras installed in the lots monitor and verify the number of available spaces. Based on the Michigan experience, and discussion with this study’s advisory panel, it was decided that the information should be as specific as possible in terms of the location and number of spaces. However, truck parking information should be aggregated to exits or areas without referencing specific private truck stops or businesses. This avoids the issue of appearing to favor any specific private enterprise. The photo below shows as an example one of the five truck parking signs deployed in Michigan along I-94. This study recommends nine TPIMS deployments in Kansas along access controlled freeways.

The general locations for these deployments are shown in **Table 5.1** and **Figure 5.4**. The sites where trucks are counted are listed in **Appendix 5.A**.

Figure 5.1 – Monitoring Equipment



Figure 5.2 – Dynamic Real-Time Information Sign



Photos courtesy of the Michigan Department of Transportation

Although the initial deployment may be limited to dynamic real-time information signs, it should be noted that this system can share information through other avenues including smart phone applications and traveler information websites. The information could be disseminated within the KanDrive/511 website with a page specifically for commercial motor vehicle carriers. Dispatchers can use this information to inform their drivers of parking availability in the monitored corridors. TPIMS allows flexibility to integrate new applications in the future. KDOT and KTA may consider sharing the information with third-party application developers, develop something in-house or partner with developers. The advisory panel noted that most trucking companies require their drivers to lock their smart phones in the glove box while driving. However, others noted that these applications could be integrated within electronic systems in the cab. In either case, to ensure safe operations, applications should be Federal Motor Carrier Safety Administration (FMCSA) “one-touch” compliant by relying on hands-free voice interactive commands.

Figure 5.3 – Truck Parking Information through Mobile Applications and Websites

TPIMS information can be disseminated through smart phone applications and travel information websites.

TPIMS Monitoring Site Selection Criteria

- Must be on an interstate facility and other major highways intersecting the Primary Freight Network.
- Includes multiple truck parking areas (public and private) within a 30 minute span of one another along the freight network.
- Offers at least 30 truck parking spaces (for a private facility) or be at the same exit as a qualifying truck parking facility.

TPIMS Sign Placement Criteria

- Signs should be placed two to five miles before first exit or rest area, preferably far enough in advance to allow the driver time to make an informed routing decision (four miles is recommended).

Next Steps

- Develop a Systems Engineering Management Plan (SEMP), Needs Assessment/Concept of Operations (ConOps) and Requirements and Verification Plan to support the development of system requirements. Potential high-level function requirements are provided on the following page. As part of the SEM, KDOT and KTA should determine central software needs and costs. These costs are highly variable and were not included in the project

development costs because they are dependent on systems in place and final user requirements which have not yet been identified.

- Finalize site selection for monitored sites and dynamic information sign placement. Site selection should include discussion with private truck parking facility owners and operators. A preliminary list of recommended sites for each group is included in **Appendix 5.A**.
- Determine responsibility for monitoring sites. KDOT and KTA could monitor all sites internally, procure a private vendor(s) or develop agreements with private sites to self-report.
- Develop agreements for deployment of monitoring equipment on private sites. This would include ability to build on private property, cost sharing, access for maintenance, ability to monitor and how the information is shared. Future accommodations could be made to facilitate linkages for sharing truck parking information with other state DOTs or private third party developers.
- Determine type of communications to sites (cellular or fiber network). Note, the cost estimates for this study assume cellular to maintain consistency with MAASTO TIGER Grant analysis and assumptions. However, because the state of Kansas has a robust fiber network, it may make more sense for the state to use a fiber or mixed fiber/cellular network.

Potential High-Level Functional Requirements and Assumptions

1. The number of available truck parking spaces at monitored sites would be determined by counting entering and exiting vehicles.
2. Traffic sensors would be installed at the ingress and egress points at public and private truck parking areas to determine the number of available spaces.
3. Parking availability information at private truck stops may be collected, processed and transmitted to the KDOT/KTA central system by a private parking information service provider.
4. CCTV cameras would be used to monitor and verify truck parking availability as well as common overflow areas.
5. Each deployed site would include a local communications and data server to process and communicate data and video.
6. Communications would be established between the local communications servers and the KDOT/KTA central system.
7. Parking availability data and video from the deployed site would be transmitted over the KDOT communications network to the KDOT/KTA central system.
8. The KDOT/KTA central system would transmit parking information at monitored sites.
9. The number of spaces may be signed per exit or rest area.

10. Parking availability data would be displayed on dynamic real-time truck parking information signs upstream of the deployed sites giving drivers time to make an informed decision about parking.
11. Parking availability data would be collected, processed, displayed, and updated at intervals of no more than every five minutes.
12. Parking availability data may be provided on the KanDrive/511 website or other web platforms at the state's discretion.
13. The system may be operated by KDOT or its operations contractor from the KDOT/KTA central system. Parking count resets would be completed on a daily basis for each monitored parking area.
14. KDOT and KTA may develop agreements with private parking facility owners and operators for selected TPIMS deployment sites. At a minimum, these agreements would address cost sharing and/or provisions for the installation and maintenance of monitoring equipment and other related ITS and infrastructure improvements as well as how the information is disseminated and shared.

Improve Parking Information and Sharing Summary

Table 5.1 and **Figure 5.4** shows the route, general location, number of sites, number of existing public and private truck parking spaces, number of total truck parking spaces, number of new truck parking signs and sign type. The group number listed in the first column of **Table 5.1** matches the numbers shown on **Figure 5.4**. A detailed summary of specific sites and associated improvements is provided in **Appendix 5.A**. The recommendations in this table are not prioritized. The prioritization and phasing of these improvements are discussed in the next section.

Table 5.1 – Parking Information and Sharing Summary (Qualifying Locations, Not Prioritized)

Group	Route	Location	Initial Capital Cost (2017\$)	Annual O&M Cost (2017\$)	Annual O&M Costs through 2037*	# of Sites	# of Public Spaces	# of Private Spaces	Total # of Spaces	# of Signs	Sign Type
1	I-70	Colby/Oakley	\$ 1,756,800	\$ 79,056	\$1,176,154	8	40	415	455	4	Dynamic
2	I-70	WaKeeney	\$ 698,400	\$ 31,428	\$467,569	3	20	70	90	2	Dynamic
3	I-70	Salina	\$ 1,936,800	\$ 87,156	\$1,296,661	9	30	330	360	4	Dynamic
4	I-70	Junction City	\$ 878,400	\$ 39,528	\$588,077	4	25	80	105	2	Dynamic
5	I-70	Paxico	\$ 698,400	\$ 31,428	\$467,569	3	30	48	78	2	Dynamic
6	I-70	Topeka/Lawrence	\$ 878,400	\$ 39,528	\$588,077	4	260	0	260	2	Dynamic
7	I-35	Beto Junction	\$ 878,400	\$ 39,528	\$588,077	4	27	195	222	2	Dynamic
8	I-35	Emporia	\$ 676,800	\$ 30,456	\$453,108	2	20	90	110	4	Dynamic
9	I-135	Newton	\$ 1,036,800	\$ 46,656	\$694,123	4	20	160	180	4	Dynamic
10	US 50	Dodge City	\$ 43,200	\$ 1,944	\$28,922	2	0	133	133	3	Static
11	US 50	Garden City	\$ 57,600	\$ 2,592	\$38,562	2	0	185	185	4	Static
12	US 54	Liberal	\$ 57,600	\$ 2,592	\$38,562	4	17	45	62	4	Static
Total			\$ 9,597,600	\$ 431,892	\$ 6,425,462	49	489	1751	2240	37	

* Annual O&M costs are inflated at three percent per year from 2017 to 2037.

Figure 5.4 - Parking Information and Sharing Summary



Add or Improve Parking Assets

The need for adding parking capacity can be mitigated by improving existing truck public parking assets and encouraging improvements to private parking areas through P3's and other incentives. Maximizing parking at existing public facilities is a cost-effective and efficient solution to adding truck parking capacity. The advisory panel was clear that the state should not build and maintain new parking facilities with amenities that would compete with private truck stop owners and operators. Moreover, *Title 23, Section 111 of the United States Code (23 USC 111)* contains a clause that *"the State will not permit automotive service stations or other commercial establishments for serving motor vehicle users to be constructed or located on the rights-of-way of the Interstate System and will not change the boundary of any ROW on the Interstate System to accommodate construction of, or afford access to, an automotive service station or other commercial establishment."* Since this does not apply to the Kansas Turnpike and its service areas, the KTA has chosen to have private vendors operate commercial amenities and services. Incentivizing expansion of parking at private facilities allows owners and operators to share the costs of construction and maintenance of truck parking enabling them to focus investment on revenue generating improvements and increasing economic activity in the state. Statutory hurdles aside, businesses located at service interchanges along interstate corridors, as well as the National Organization of Truck Stop Operators (NATSO), are strongly opposed to commercial development at rest areas because of the loss of business and revenue that they would likely incur at existing businesses along interstates. Absent a change in these conditions, potential P3s should be carefully crafted to address these restrictions and concerns while expanding parking availability and amenities.

Expand Existing Truck Parking Lot Capacity

This recommendation addresses the need to add truck parking by maximizing the use of existing public truck parking facilities and rest areas. KDOT and KTA should consider evaluating existing public parking facilities and rest areas for potential repurpose; expansion and/or reconfiguration of pavement to support additional truck parking. For the purposes of this study, a high-level evaluation was performed for several rest areas throughout the state to identify cost effective ways to add truck parking. Based on this evaluation, it was determined that existing driveway loops at picnicking areas could be repurposed to allow truck parking during the overnight hours. This would involve a policy change by KDOT and KTA allowing trucks to park in these areas during designated hours. It should be acknowledged that there are perceived safety and aesthetic issues with allowing trucks in public rest areas reserved for passenger vehicles. However, based on visual observation from the truck parking inventory during overnight hours, few passenger vehicles park in public rest areas while there is a high demand by trucks. Truck drivers also tend to follow natural sleeping patterns and generally prefer to drive during the day and rest during the night. Where new capacity is added at existing public facilities the new pavement is proposed to be gravel due to the current funding challenges and in light of the uncertain future of truck parking in general.

Some states are evaluating whether it makes sense to maintain public rest areas and amenities given the ability of the traveling public to use in-vehicle global positioning systems (GPS) technology and/or smart phone applications to plan their route. Given access to this type of information, the traveling public often chooses to stop at private truck stops, convenience stores, restaurants, etc. that are able to provide more amenities and services than are offered at public rest areas. Based on discussion with the advisory panel, it is clear that in Kansas there is the desire to maintain parking at public rest areas for both passenger vehicles and trucks with basic amenities (restrooms, picnic areas, etc.) that do not compete with private truck stop owners and operators.

This recommendation balances the needs of passenger vehicles and trucks to maximize usage of public facilities at all times of day. Therefore, the striping, signage, lighting and site circulation needs to safely accommodate the safe flow and circulation of trucks and passenger vehicles into, through and out of each site. Truck parking hours would need to be signed and strictly enforced. This recommendation does not eliminate all car parking but rather utilizes some of the extra pavement and up to half of the car parking spaces to create more truck parking when passenger vehicle demand is low. This also assumes that the existing pavement in the car parking and loops is not reconstructed at the opening of truck parking in other areas but rather rebuilt as necessary at the end of the pavement's life. The pavement life may be shortened by the consistent presence of trucks. There is the potential to implement this strategy at five rest area pairs along freight corridors in Kansas. The locations are shown in **Table 5.2** and the 'key' matches those shown in **Figure 5.5**. KDOT may want to consider performing a field survey of public rest area overnight parking for passenger vehicles prior to deploying this strategy to make sure remaining passenger vehicle parking is adequate.

Some limited additional truck parking could be added at a U.S. 54 rural rest area in Bloom, Kansas where there is currently green space. This rest area was chosen because of its ability to easily accommodate trucks. Because of its remote nature, there are few public or private truck parking facilities in the area. This site was also fully utilized during the truck parking inventory.

Criteria

- Fully and over utilized public rest areas on the Primary and Secondary Freight Network were evaluated to determine if there was an inexpensive way to add additional truck parking spaces.

Next Steps:

- Review policies and regulations for public rest areas.
- Further evaluate parking demand at recommended public rest areas.

LCV/OSOW Parking

Based upon input from the advisory panel, and high-level engineering analysis, it was not found to be cost effective or practical to independently stripe or designate oversize/overweight (OSOW) and longer-combination vehicle (LCV) spaces. Additionally, as discussed in the previous chapter, this may result in a decrease in overall truck parking spaces to accommodate LCVs/OSOWs. Therefore, instead of providing specially designated LCV/OSOW spaces, the general increase in parking capacity may make it easier to find parking for these trucks. However, because of the differences in state policies and regulations regarding LCVs and OSOWs, KDOT and KTA should consider continuing to provide LCV/OSOW parking at the state borders allowing a safe place to break down the trucks and proceed on the route as truckers leave the state. This is especially needed near the Missouri border since the state of Missouri does not allow LCV's on their system.

Weigh Station Parking

Adding additional truck parking capacity at weigh stations was considered. However, the advisory panel noted that most truck drivers will not park at weigh stations due to the potential of inspection. Parking at weigh stations without the potential for being inspected upon arrival or departure of the weigh station was discussed. However, the KHP noted that they are legally bound to ticket violations.

Use Excess ROW for New Parking

Areas of excess ROW near service areas (including abandoned service areas) or public rest areas throughout the state in areas of high parking demand were evaluated to identify potential for easy, low-cost new truck parking to be added. To make this cost effective, the excess parcel had to have access to the highway and require little other work than grading, placement of gravel and lighting to open for parking. As part of the recommended implementation this is proposed at one existing service area with extra land and one abandoned service area shown in **Table 5.2** and in **Figure 5.5**. Excess ROW in other areas could be developed as part of a public-private partnership strategy (*See discussion of P3 opportunities on page 28*).

Criteria:

- Areas of excess ROW at least 3 acres in size.
- Areas adjacent to an existing truck parking facilities.
- Over utilized parking facility based upon truck parking inventory data collected.

Next Steps:

- KDOT and KTA to confirm the best locations for implementation of additional truck parking.
- KDOT and KTA to complete or procure engineering design and final plans for recommended truck parking areas.

Table 5.2 and in **Figure 5.5** shows the route, location and a quick description of the work being proposed as part of improve parking assets. **Table 5.2** has a key field which corresponds to the numbers on **Figure 5.5**. This table does not indicate the priority of any one improvement over another. The prioritization and phasing will be discussed in later sections.

Table 5.2 – Add or Improve Parking Assets Summary (Qualifying Locations, Not Prioritized)

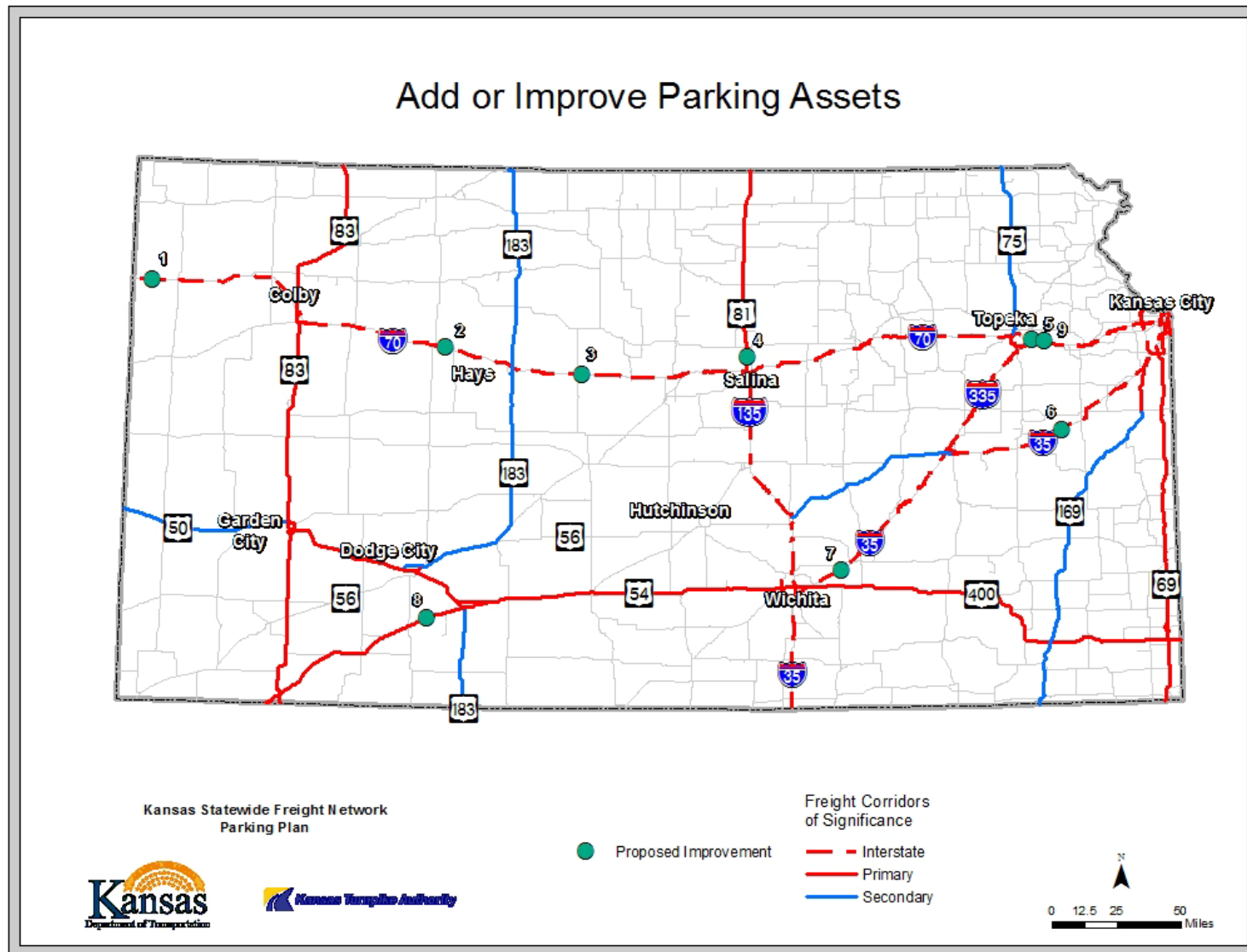
Key	Route	Location	Description of Work	Initial Capital Cost (2017\$)	Annual O&M Cost (2017\$)	Annual O&M Costs through 2037**	Current Parking Spaces	Parking Spaces Added	Proposed Total Spaces
1	I-70	Ruleton Rest Areas	Change signing, striping for parking in loop and car area.	\$120,000	\$5,400	\$80,338	20	25	45
2	I-70	Ogallah Rest Areas	Change signing, striping for parking in loop and car area.	\$120,000	\$5,400	\$80,338	20	15	35
3	I-70	Russell Rest Areas	Change signing and striping to allow parking in loop area.	\$120,000	\$5,400	\$80,338	16	18	34
4	US 81	81 Rest Areas	Change signing and striping to allow parking in car area.	\$120,000	\$5,400	\$80,338	10	14	24
5	I-470	Abandoned Topeka Service Area***	Put asphalt over concrete, open to truck parking.	\$1,187,091	\$53,419	\$794,741	0	80	80
6	I-35	Homewood Rest Areas	Change signing and striping to allow parking in loop area.	\$120,000	\$5,400	\$80,338	27	14	41
7	I-35	Towanda Service Area	Place gravel lot in area of water tower at service area.	\$412,500	\$18,563	\$276,163	27	50	77
8	US 54	Bloom Rest Area	Place gravel lot in green space for parking.	\$225,000	\$10,125	\$150,634	15	20	35
9	I-70	Topeka Service Area	Place gravel lot in excess right-of-way.	\$450,000	\$20,250	\$301,269	61	50	111
			TOTAL	\$2,874,591	\$129,357	\$1,924,499	196	286	482

*Costs for rest areas where improvements are similar were assumed to be the same at this early planning stage.

** Annual O&M costs are inflated at three percent per year from 2017 to 2037.

***The Abandoned Topeka Service Area would require milling and new asphalt in order to open for truck parking.

Figure 5.5 - Add or Improve Parking Assets



Benefit-Cost Analysis (BCA)

A BCA was completed for the improving parking information and sharing, as well as adding or improving parking assets. This BCA was performed at each deployed site, corridor or area based upon its unique needs and requirements. These individual BCAs were aggregated by tier as discussed in the phasing section of this chapter. The analysis followed the procedures set forth in the TIGER Grant BCA Resource Guide.

Costs

Expenditure of deployment costs are assumed to be in 2017. Beginning in 2018, KDOT and KTA would begin to incur operating and maintenance cost each year depending upon the number of signs and amount of parking added to the system. The total of all deployment and O&M cost over the 2017-2037 is shown discounted at 3 percent.

Costs for implementation of specific strategies at specific locations were developed for use in the BCA. For the TPIMS implementation, average bid prices from the Michigan I-94 project were used to establish a base cost per sign and per monitored site. Of the initial capital cost, 4.5 percent was assumed for establishing the cost to operate and maintain the TPIMS implementation. For the capacity improvements, statewide average bid tabs were utilized for pavement unit costs. Then the lump sum costs (engineering, construction management, and mobilization) and contingency were applied to the unit prices. This allowed for a reasonable estimate of the initial capital costs needed for these improvements.

Benefits

Calculated benefits included travel time savings and environmental benefits. For example, the travel time savings for each truck utilizing TPIMS is anticipated to be 15 minutes. As discussed in the environmental benefits section, this equates to 2 gallons of fuel saved per day. At today's prices (10/19/2015) the average gallon of diesel in Kansas is \$2.24. This is a savings of \$4.48 per driver per day. This works out to an annual savings of over \$930.00 per truck driver. Additional benefits would include improved travel time and reduced emissions.

Travel Time Benefit

Commercial Motor Vehicle (CMV) Travel Time Savings

Savings were calculated by estimating the amount of time that CMVs would no longer spend looking for safe parking if information on the number and location of parking spaces is made readily available through the TPIMS. Based on research that shows 83 percent of drivers spend more than 30 minutes looking for parking, a conservative estimate of 15 minutes of savings per applicable parking space is used for TPIMS and 5 minutes of savings per applicable parking space for static signing. The number of parking spaces over which TPIMS would be deployed at each location was adjusted to account for a utilization rate below full capacity (80 percent utilization). The product of travel time savings per parking space and the number of adjusted parking spaces provides an estimate of the travel time savings per day as follows:

$$\text{Travel time saving per parking space} \times (\# \text{ of parking spaces} \times \text{utilization rate})$$

The estimated travel time savings per day was applied to the number of days per year of assumed heavy use (208 days per year, this equates to 4 days per week) to yield an estimate for the number of hours saved per year. This result was then applied to the hourly value of travel time savings for truck drivers (Truck driver average wage is \$25.80 per the FHWA's TIGER Benefit-Cost Analysis Resource Guide) to produce an estimate of the annual travel time saving for commercial motor vehicles along the corridors where TPIMS is considered for deployment as follows:

$$\text{Savings per day} \times \text{days per year} \times \text{hourly rate} = \frac{\text{saving}}{\text{yr}}$$

This result represents the average annual benefit from reduced travel time for CMVs that are not forced to search for spaces.

Environmental Benefits

The analysis assumes that the 15 minutes of time saved equates to 12 miles and at 6 miles per gallon that 2 gallons of fuel are saved each day. This is used directly for TPIMS and capacity improvement but is divided by 3 to equate it to 5 minutes of time saved for static signs. This fuel saving was applied to the number of parking spaces (adjusted for utilization, 80 percent) as follows:

$$\text{Fuel savings per parking space} \times (\# \text{ of parking spaces} \times \text{utilization rate}) = \text{gallons saved}$$

Emissions per gallon of diesel fuel was estimated using the conversion factors obtained from the Energy Information Administration (EIA) and the Environmental Protection Agency (EPA), and the volume of each emission type was converted into metric tons, which appear in **Table 5.3** below:

Table 5.3 – Emissions Conversion Factors

Emission	Conversion
CO ₂	22.38 lbs/gallon*
VOC	0.447 grams/mile (@ 6 miles/gallon)**
NO _x	8.61 grams/mile (@ 6 miles/gallon)**
PM	0.20 grams/mile (@ 6 miles/gallon)**

Conversion factor sources:

*<http://www.eia.gov/tools/faqs/faq.cfm?id=307&t=11>

**<http://www.epa.gov/otaq/consumer/420f08027.pdf>

The estimated reduction in emissions per day was applied to the number of days per year of assumed heavy use (208 days per year, this equates to 4 days per week) to yield to estimated reduction in emissions per year. This result was then applied to the monetary value of each emission (FHWA's TIGER BCA Resource Guide) to produce an estimate of the annual emissions benefits for each type of emission for each infrastructure improvement. **Table 5.4** shows the monetary value per metric ton of each emission factor.

Table 5.4 – Emissions Monetary Value to the Public per Metric Ton

Emission	Monetary	Units
CO ₂	\$43	Per metric ton
VOC	\$1,999	Per metric ton
NO _x	\$7,877	Per metric ton
PM	\$360,383	Per metric ton

A metric ton is 2205 lbs.

Through these two methodologies the benefit to the public in dollars was computed for comparison with the cost estimate in the BCA. Prioritization based upon the BCA and other factors is discussed in the next section.

Prioritization

Improving parking information and sharing and adding or improving parking assets were prioritized based on the BCA as well as other factors including geographic location, truck traffic served, utilization of existing facilities in the area and constructability. After improving parking information and sharing and adding or improving parking assets were chosen as easy and beneficial to carry forward, the individual improvements needed to be prioritized based upon the BCA. Timelines for implementation of the tiered recommendation have not been determined but implementation of each tier is expected to be a two-year process including planning, construction and testing. **Table 5.5** shows the BCA and the rank of each individual site for improving parking information and sharing and the same with **Table 5.6** for improving parking assets.

Table 5.5 – Improve Parking Information and Sharing BCA Results

Basic Information						3 percent NPV (2017\$)				
Group	Route	Location	# of Sites	# of Spaces	# of Signs	Benefit (2017\$)	Cost (2017\$)	Ratio	Rank	Tier
11	US 50	Garden City	2	185	4	\$1,203,263	\$96,162	12.513	1	Tier 1
10	US 50	Dodge City	2	133	3	\$865,049	\$72,122	11.994	2	Tier 1
12	US 54	Liberal	4	62	4	\$403,256	\$96,162	4.193	3	Tier 1
6	I-70	Topeka/Lawrence	4	260	2	\$5,797,963	\$1,466,477	3.954	4	Tier 1
1	I-70	Colby/Oakley	8	455	4	\$10,146,436	\$2,932,954	3.459	5	Tier 1
7	I-35	Beto Junction	4	222	2	\$4,950,569	\$1,466,477	3.376	6	Tier 1
9	I-135	Newton	4	180	4	\$4,013,975	\$1,730,923	2.319	7	Tier 2
3	I-70	Salina	9	360	4	\$7,358,954	\$3,233,461	2.276	8	Tier 2
8	I-35	Emporia	2	110	4	\$2,452,985	\$1,129,908	2.171	9	Tier 2
2	I-70	WaKeeney	3	90	2	\$2,006,987	\$1,165,969	1.721	10	Tier 3
4	I-70	Junction City	4	105	2	\$2,341,485	\$1,466,477	1.597	11	Tier 3
5	I-70	Paxico	3	78	2	\$1,739,389	\$1,165,969	1.492	12	Tier 3

Figure 5.6 - Improve Parking Information and Sharing Tiers

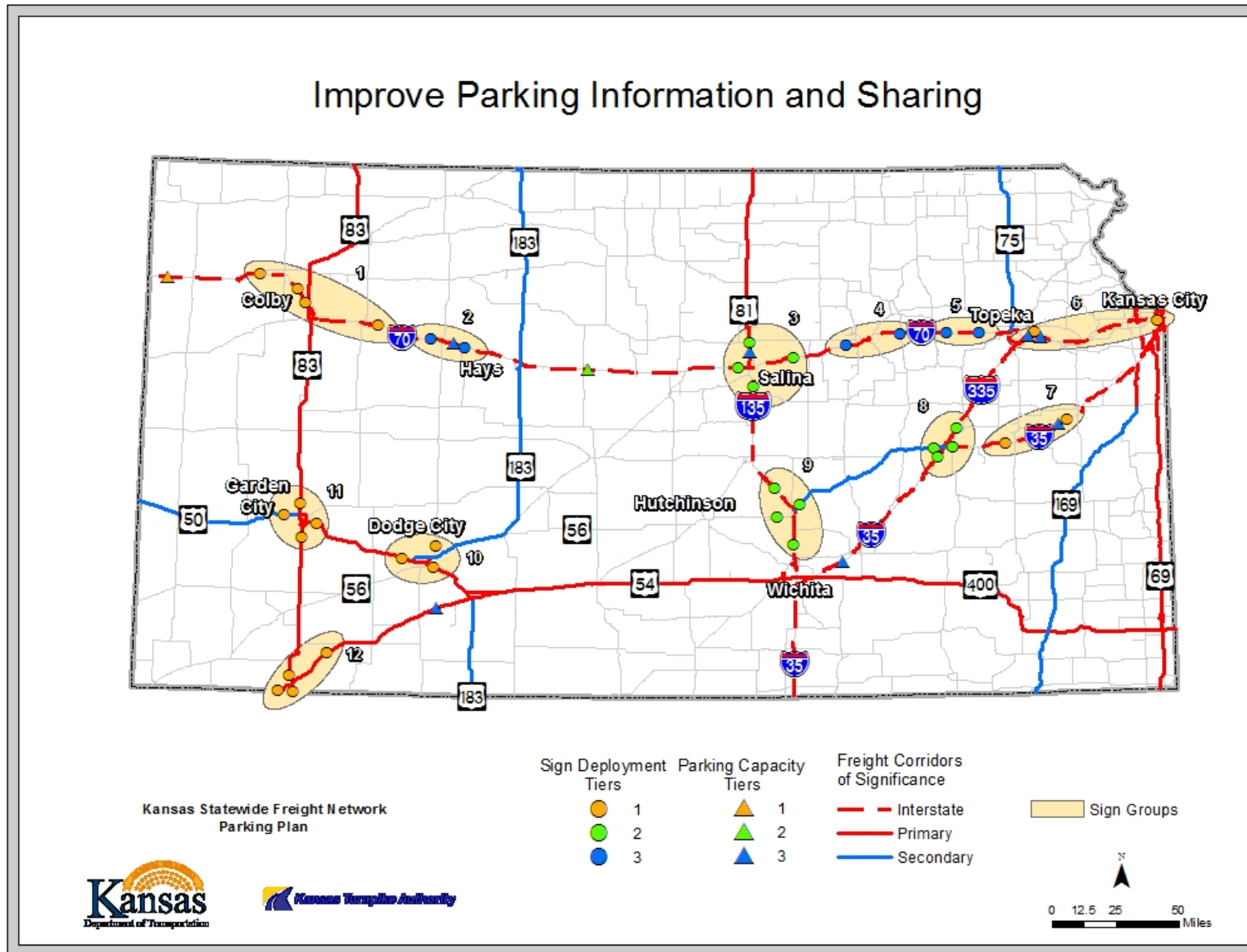


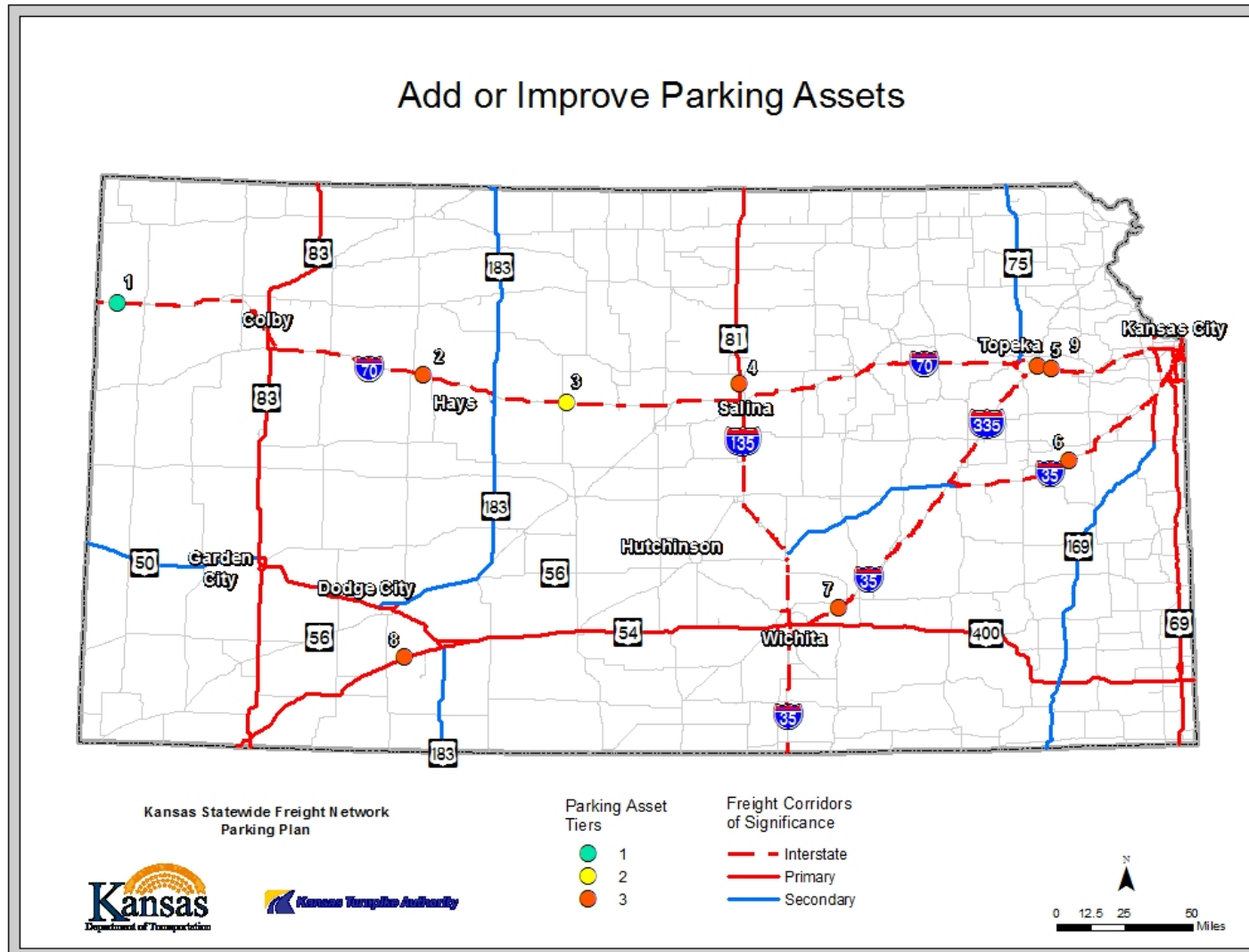
Table 5.6 – Add or Improve Parking Assets BCA Results

Basic Information					3 percent NPV (2017\$)				
Key	Route	Location	Existing Spaces	Additional Spaces	Benefit	Cost	Ratio	Rank	Tier
1	I-70	Ruleton Rest Areas	20	25	\$557,496	\$200,338	2.783	1	Tier 1
3	I-70	Russell Rest Areas	16	18	\$401,397	\$200,338	2.004	2	Tier 2
2	I-70	Ogallah Rest Areas	20	15	\$334,498	\$200,338	2.670	3	Tier 3
7	I-35	Towanda Service Area	27	50	\$1,114,993	\$688,663	1.619	4	Tier 3
4	US 81	81 Rest Areas	10	14	\$312,198	\$200,338	1.558	5	Tier 3
6	I-35	Homewood Rest Areas	27	14	\$312,198	\$200,338	1.558	5	Tier 3
9	I-70	Topeka Service Area	61	50	\$1,114,993	\$751,269	1.484	7	Tier 3
8	US 54	Bloom Rest Area	15	20	\$445,997	\$375,634	1.187	8	Tier 3
5	I-470	Abandoned Topeka Service Area**	0	80	\$1,783,989	\$1,981,832	0.900	9	Tier 3

*Costs for rest areas where improvements are similar were assumed to be the same at this early planning stage.

**The Abandoned Topeka Service Area would require milling and new asphalt in order to open for truck parking.

Figure 5.7 - Add or Improve Parking Assets Tiers



Phasing

This study's advisory panel recommended that infrastructure improvements should first be focused on interstates followed by other highways on the Primary Freight Network. With that guidance in mind, this study divides recommendations into three tiers:

- Tier 1 improvements are infrastructure investments which should be considered first because they involve freight corridors of significance and have a high benefit cost ratio. When considering any improvement, either an Improve Parking Information and Sharing or an Add or Improve Parking Assets improvement, the benefit cost ratio was assumed to be above 2.5 to be included.
- Tier 2 improvements are infrastructure investments on freight corridors of significance which have a good benefit cost ratio, typically somewhat lower than the thresholds set for Tier 1.
- Tier 3 improvements are infrastructure investments identified as a desired improvement but having a benefit cost ratio below 2.0. Additionally, this tier includes statewide policy recommendations for which a BCA is difficult to perform. This stems from the fact that, as described earlier, these policies are form-, time- and result-dependent upon consultation and advocacy efforts involving the state legislature and other jurisdictions, governing bodies and industry groups. These efforts, however, can be undertaken at any time chosen by the state and its transportation agencies (although their potential long lead times suggest that they be initiated sooner rather than later). Additionally, since these activities generally align with the responsibilities of existing technical, communications and government relations staff, the incremental cost is likely to be small.

The following tables (**Table 5.7** to **Table 5.9**) show each tier of projects for effectiveness in improving parking information and sharing. These tables show the number of existing parking spaces being signed by either dynamic or static signage.

Table 5.7 – Improve Parking Information and Sharing, Tier 1 Projects

Group	Route	Location	Initial Capital Cost (2017\$)	Annual O&M Cost (2017\$)	# of Sites	# of Public Spaces	# of Private Spaces	Total # of Spaces	# of Signs	Sign Type	Tier
11	US 50	Garden City	\$57,600	\$2,592	2	0	185	185	4	Static	Tier 1
10	US 50	Dodge City	\$43,200	\$1,944	2	0	133	133	3	Static	Tier 1
6	US 54	Liberal	\$57,600	\$2,592	4	17	45	62	4	Static	Tier 1
12	I-70	Topeka/Lawrence	\$878,400	\$39,528	4	260	0	260	2	Dynamic	Tier 1
1	I-70	Colby/Oakley	\$1,756,800	\$79,056	8	40	415	455	4	Dynamic	Tier 1
7	I-35	Beto Junction	\$878,400	\$39,528	4	27	195	222	2	Dynamic	Tier 1

Table 5.8 – Improve Parking Information and Sharing, Tier 2 Projects

Group	Route	Location	Initial Capital Cost (2017\$)	Annual O&M Cost (2017\$)	# of Sites	# of Public Spaces	# of Private Spaces	Total # of Spaces	# of Signs	Sign Type	Tier
9	I-135	Newton	\$1,036,800	\$46,656	4	20	160	180	4	Dynamic	Tier 2
3	I-70	Salina	\$1,936,800	\$87,156	9	30	330	360	4	Dynamic	Tier 2
8	I-35	Emporia	\$676,800	\$30,456	2	20	90	110	4	Dynamic	Tier 2

Table 5.9 – Improve Parking Information and Sharing, Tier 3 Projects

Group	Route	Location	Initial Capital Cost (2017\$)	Annual O&M Cost (2017\$)	# of Sites	# of Public Spaces	# of Private Spaces	Total # of Spaces	# of Signs	Sign Type	Tier
2	I-70	WaKeeney	\$698,400	\$31,428	3	20	70	90	2	Dynamic	Tier 3
4	I-70	Junction City	\$878,400	\$39,528	4	25	80	105	2	Dynamic	Tier 3
5	I-70	Paxico	\$698,400	\$31,428	3	30	48	78	2	Dynamic	Tier 3

Table 5.10 below shows the aggregate results of Improve Parking Information and Sharing for each tier as a composite. It shows the aggregate BCA for each Table of Improve Parking Information and Sharing above (**Table 5.7** to **Table 5.9**). This helps to show the approximate cost of the Improve Parking Information and Sharing by tier and compared to the benefits for each of those.

Table 5.10 – Improve Parking Information and Sharing, Tier Summary

Basic Information				3 percent NPV (2017\$)			
Location	# of Sites	# of Spaces	# of Signs	Benefit (2017\$)	Cost (2017\$)	Ratio	
Total		<u>49</u>	<u>2240</u>	<u>37</u>	<u>\$43,280,310</u>	<u>\$16,023,062</u>	<u>2.70</u>
Tier 1*	> 2.5	24	1317	19	\$23,366,536	\$6,130,354	3.81
Tier 2*	2 < x < 2.5	15	650	12	\$13,825,913	\$6,094,293	2.27
Tier 3*	< 2	10	273	6	\$6,087,862	\$3,798,415	1.60

*Based upon a 3 percent discount rate

The following tables (**Table 5.11** to **Table 5.13**) show each tier of projects for add or improve parking assets. These tables show the number of parking spaces each improvement expects to add to the facility based upon current high level estimates.

Table 5.11 – Add or Improve Parking Assets, Tier 1 Projects

Group	Route	Location	Description of Work	Initial Capital Cost (2017\$)	Annual O&M Cost (2017\$)	Current Parking Spaces	Parking Spaces Added	Proposed Total Spaces	Tier
1	I-70	Ruleton Rest Areas	Change signing and striping to allow parking in loop and car area.	\$120,000	\$5,400	20	25	45	Tier 1

Table 5.12 – Add or Improve Parking Assets, Tier 2 Projects

Group	Route	Location	Description of Work	Initial Capital Cost (2017\$)	Annual O&M Cost (2017\$)	Current Parking Spaces	Parking Spaces Added	Proposed Total Spaces	Tier
3	I-70	Russell Rest Areas	Change signing and striping to allow parking in loop area.	\$120,000	\$5,400	16	18	34	Tier 2

Table 5.13 – Add or Improve Parking Assets, Tier 3 Projects

Group	Route	Location	Description of Work	Initial Capital Cost (2017\$)	Annual O&M Cost (2017\$)	Current Parking Spaces	Parking Spaces Added	Proposed Total Spaces	Tier
2	I-70	Ogallah Rest Areas	Change signing, striping to allow parking in loop and car area.	\$120,000	\$5,400	20	15	35	Tier 3
7	I-35	Towanda Service Area	Place gravel lot in area of water tower at service area.	\$412,500	\$18,563	27	50	77	Tier 3
4	US 81	81 Rest Areas	Change signing and striping to allow parking in car area.	\$120,000	\$5,400	10	14	24	Tier 3
6	I-35	Homewood Rest Areas	Change signing and striping to allow parking in loop area.	\$120,000	\$5,400	27	14	41	Tier 3
9	I-70	Topeka Service Area	Place gravel over existing concrete; open to truck parking.	\$450,000	\$20,250	61	50	111	Tier 3
8	US 54	Bloom Rest Area	Place gravel lot in green space to allow parking.	\$225,000	\$10,125	15	20	35	Tier 3
5	I-470	Abandoned Topeka Service Area	Place asphalt over existing concrete; open to truck parking.	\$1,187,091	\$53,419	0	80	80	Tier 3

Table 5.14 below shows the aggregate results of adding or improving parking assets for each tier as a composite. It shows the aggregate BCA for each Table of Add or Improve Parking Assets above (**Table 5.11** to **Table 5.13**). This helps to show the approximate cost of this recommendation compared to the benefits for each of those.

Table 5.14 – Add or Improve Parking Assets Tier Summary

Basic Information			3 percent NPV (2017\$)		
Location	Existing Spaces	Additional Spaces	Benefit (2017\$)	Cost (2017\$)	Ratio
Total	<u>196</u>	<u>286</u>	<u>\$4,593,771</u>	<u>\$4,799,090</u>	<u>0.96</u>
Tier 1*	> 2.5	20	\$557,496	\$200,338	2.78
Tier 2*	2 < x < 2.5	16	\$401,397	\$200,338	2.00
Tier 3*	< 2	160	\$3,634,877	\$4,398,413	0.83

*Based upon a 3 percent discount rate

As a summary of the total proposed signing and capacity improvements **Table 5.9** combines both the signing and capacity infrastructure BCA to give a complete picture of each tier of improvements. As seen the Tier 1 up front capital costs and annual operations and maintenance for the first year are less than \$5 million. Each subsequent tier becomes less expensive to build but also has a lower BCA ratio.

Table 5.15 – Tier Cost and BCA Summary

	Initial Capital Cost (2017\$)	Annual O & M Cost (2017\$)	3 percent NPV (2017\$)		
			Benefit (2017\$)	Cost (2017\$)	Ratio
Tier 1	\$3,792,000	\$170,640	\$23,924,032	\$6,330,692	3.78
Tier 2	\$3,770,400	\$169,668	\$14,227,310	\$6,294,631	2.26
Tier 3	\$4,909,791	\$220,941	\$9,722,739	\$8,196,829	1.19
Total	<u>\$12,472,191</u>	<u>\$561,249</u>	<u>\$47,874,081</u>	<u>\$20,822,152</u>	<u>2.30</u>

Explore Creating Parking Improvement Partnerships

Identify Intra-Agency Opportunities for Expanding Parking

There may be benefit to KDOT and KTA partnering with other Kansas state and local agencies, governments and regional tourist organizations to identify opportunities for building and maintaining additional truck parking at or near tourist sites and information centers. Currently, there are only two traveler information centers maintained by the state. As new facilities are planned, opportunities for dedicated truck parking should be taken into consideration during the early planning stages of the project. The state should also actively partner with local tourism departments. For example, if a new local tourist information center is built or expanded near the

Primary Freight Network, the state could develop cost-sharing agreements with cities, counties and/or local tourism organizations for the construction and maintenance of the new shared parking facilities that include accommodations for trucks.

Investigate Benefits of Potentially Creating Regional Truck Parking Policies

Partnerships with neighboring states on addressing the need for consistent freight truck policies and regulations may create potential benefits for Kansas truck drivers and operations. The first step in the process is to establish an active dialogue with neighboring states. This dialogue could be informal or may take the form of a Regional Freight Coalition to develop corridor-specific truck freight and truck parking policies and regulations to increase truck routing through Kansas and its bordering states. At a minimum, this could include Missouri and Colorado for I-70 and Missouri and Oklahoma for I-35. When looking at various primary and secondary freight corridors of significance, combined with travel distance and mandated drivers' hours of service, additional states may also make sense, including Nebraska, Iowa, Arkansas or others based on freight flows into and through Kansas.

A potential regional freight coalition could work together to identify new and revised truck policies and regulations that, together, would improve truck parking availability, amenities and way-finding. This could include collaborating regionally to disseminate truck parking information through static signage and/or sharing TPIMS availability information through neighboring state DOT traveler information system websites and/or future smart phone applications. The MAASTO Regional Truck Parking Information Management System currently underway as a partnership between Kansas and seven other states is a prime example of a regional, multi-state problem-solving approach.

The regional coalition could also discuss the desire for regionally consistent freight policies and regulations, such as for designated LCV and oversized/overweight vehicles. The advisory panel noted that this inconsistency affects the transportation costs of shippers who may choose to route heavier loads on longer routes through other states and corridors. It is possible that freight movement within the region would benefit from a uniform policies and regulations.

Next Steps:

- Consider creating a Regional Freight Coalition with surrounding states to:
 - Discuss opportunities to partner or cooperate on the placement of truck parking signs and dissemination of data across neighboring states.
 - Discuss the potential for harmonization of freight policies and regulations.

Secure Marketplace Guidance as to the Viability of Expanding Parking via P3s

Consideration should be given to seeking marketplace interest in – and capacity for – pursuing P3 opportunities to develop additional truck parking. During the second advisory panel meeting, it was noted the construction and maintenance of truck parking at private truck stops and convenience stores can be a sunk cost that is unrecoverable for the owner/operator who makes money only on fuel, food and services. Additionally, due to concerns with liability, private owners and operators may be hesitant to build additional truck parking beyond what they would normally provide. However, there may be an opportunity for the state to partner with the private industry to share land and resources to build and maintain additional parking. For example, if the state has additional ROW near a private facility, it could provide this land for truck parking. The state could

enter into a cost-sharing agreement for the construction and/or maintenance of these parking areas. Another option is to offer tax or other incentives to enable truck stop owners and operators to expand their truck parking capacity in a way that makes financial sense for their businesses. This reduces or eliminates the sunk cost of parking from private industry and prevents the public from owning more parking which they must maintain. The deployment of TPIMS at private locations would require agreements with private truck stop and convenience store owners and operators. Other P3 opportunities include sharing information from the TPIMS to disseminate real-time information on parking availability through smartphone applications, public and private websites, and way-finding signage.

Criteria:

Potential P3 Opportunity Zones (see **Figure 5.8**) were identified using results of the truck parking inventory. These zones are comprised of areas with:

- Near urban areas where there is a high demand for truck parking determined by parking areas that are at fully utilized or over utilized; and/or
- Near areas with a high amount of illegal or informal parking.

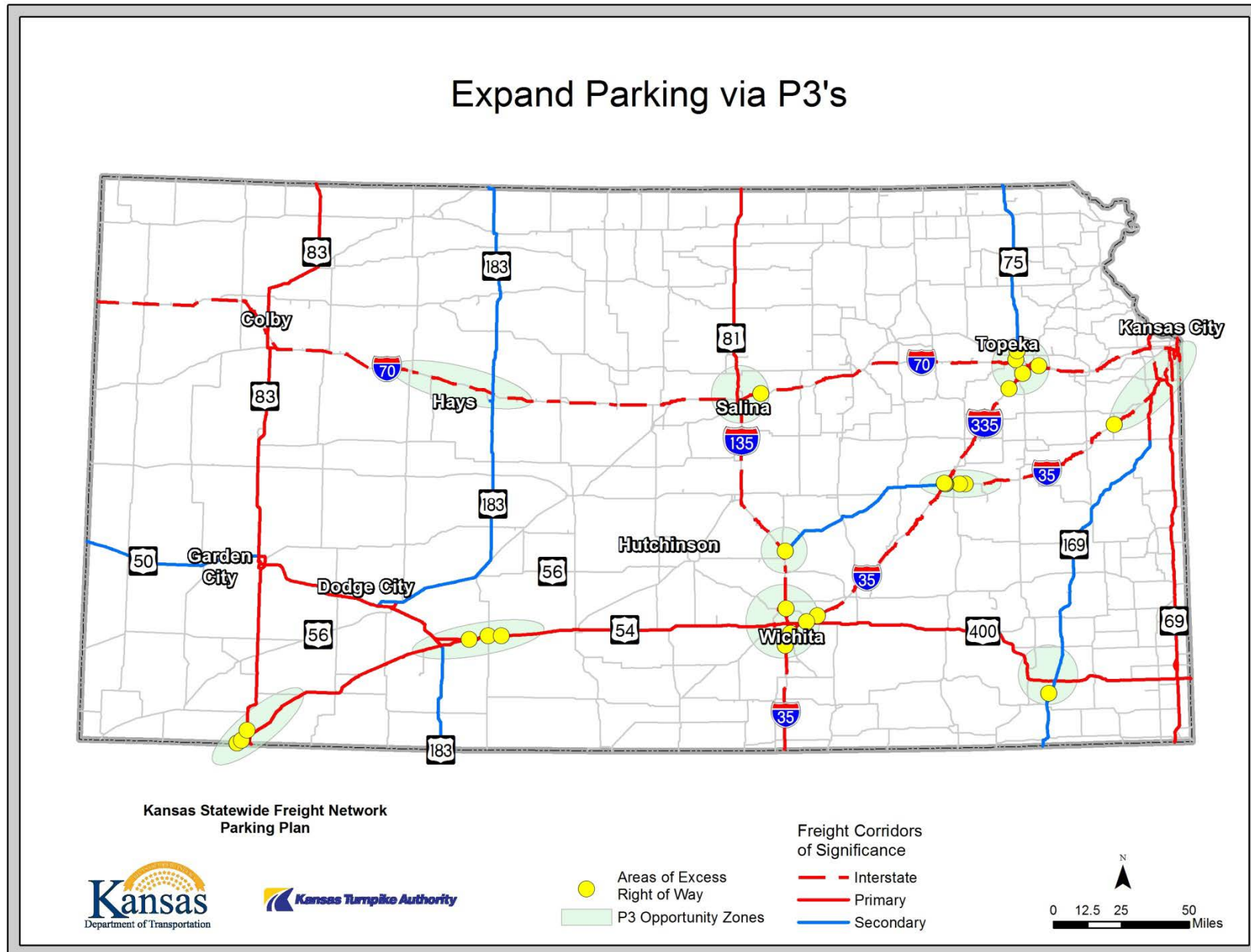
The points highlighted within the P3 zones are areas of excess ROW. The criteria for those points are:

- Excess KDOT and KTA ROW (three or more acres);
- Land must be level and at a point where access to the freeway is relatively easy to accomplish.

Next Steps:

- KDOT and KTA explore options for reaching out to private truck stop and convenience store owners and operators within the P3 opportunity zones to discuss needs and opportunities for:
 - Converting excess KDOT and/or KTA ROW adjacent to private truck stops and/or convenience stores into truck parking through P3.
 - Buying vacant or underutilized lots adjacent to private truck stops and convenience stores to convert into truck parking.
 - Negotiating cost-sharing agreements for construction and ongoing maintenance for new or expanded truck parking.
 - Assigning liability. Concerns about liability and the cost of insuring parking lots are major barriers to the public construction of new truck parking on private sites.
 - Securing insurance for work performed on private property. An example of this is construction of TPIMS parking monitoring equipment at private truck stops.
- KDOT and KTA should consider reviewing P3 enabling legislation in other states to identify best practices that could be considered in Kansas to implement Plan recommendations.

Figure 5.8 - P3 Opportunity Zones



Examine Potential Pro-Parking Policies for Freight Trucks

Consider Developing Pro-Freight Policies

Policy incentives as a means of expanding truck parking was not advanced as a preferred strategy because their ability to reliably expand parking is highly dependent on many variables involving structure, timing and promotion. Such incentives, however, comprise one of the traditional methods used by governments to incentivize private-sector actions and investments in service of policy goals. When explored, their use has to be looked at in the context of fully understanding what behaviors are needed, how corporations can best be motivated to act as desired and what the impacts of the policies would be in light of a number of factors, including budgetary needs, economic conditions and political support for the desired actions. Assessments may be further affected by specific details of the policy changes, such as the absence or presence of policy “sunsets” or date-certain termination of an incentive; magnitude of the change and its impact on other general revenue obligations.

As a consequence, it often makes sense to periodically discuss policy changes before and after infrastructure improvements have been made in order to better understand what remains to be done, when it best should be addressed and whether a public- or private-sector entity is better positioned to act.

This strategy requires balancing potential incentives and their benefits with their economic and budgetary impacts, a comparison which is highly dependent upon conditions at the time potential implementation is considered. Additionally, it requires balancing the needs for all freight modes when considering implementing a new incentive package related to truck parking and operations in order to be fair and equitable for other statewide freight needs. Some may find it counter-intuitive to propose increasing parking demand when there are parking shortages. However, finding and building support for appropriate public- or private-sector truck parking facilities, investments and policies require maintaining and strengthening a coalition for which those things are financial, organizational and legislative priorities.

Look at Developing Integrated State and Local Parking Policies, and Explore Opportunities for Coordinating Delivery Policies

These strategies were combined to address the need to develop state and local policies while proactively coordinating with local governments and private industry to address just-in-time deliveries and their impacts on parking and staging. Based on analysis of truck parking utilization in the state, experiences from neighboring states and input from the advisory panel, it is apparent that truck parking is often overcapacity near major metropolitan areas, especially near major distribution centers and intermodal facilities. This demand can be attributed to requirements for just-in-time deliveries where warehouse inventories are managed in tightly scheduled deliveries. Just-in-time delivery places demands on truck parking because drivers are only allowed in the facilities within a specific time period. Typically, drivers will get as close as possible to these facilities and look for a parking staging area to meet their specific pickup or delivery requirements.

Cities and counties have the ability to address the parking and other infrastructure requirements through local regulations. However, in most instances, local parking regulations typically pertain to longer-term employee or customer parking through ratios based on the type of development. Warehouse and distribution centers typically have low parking requirements because they typically have fewer employees per square foot compared with other commercial development. Due to the nature of in just-in-time deliveries and demand for truck parking, there may be the need to address temporary parking for truck staging within or near warehouse and distribution facilities. This can become a local issue as truckers try to find a place to park within communities near these facilities. In some cases, local regulations prohibit truck movements in certain areas. The effect of these

requirements is to force trucks to park on the fringes of these communities on ramps or frontage roads posing a safety issue.

Truck parking needs should be carefully considered as local communities and KDOT review traffic impact studies. Local communities should consider requirements for additional truck parking and staging as part of the plan review for new distribution facilities and major commercial centers. Increases in truck parking at distribution/light industrial facilities may necessitate increased safety and security measures and enforcement. Because this is a local land use issue, there is little the state can do directly to implement this strategy. However, the State can work with local communities that have expressed interest in addressing the truck parking problem and provide technical expertise and best practice examples from other communities around the country.

To address this issue, a freight truck parking working group could be created to assist city and county governments in building or expanding freight truck parking assets on or near the Kansas Statewide Freight Network. The working group would be comprised of selected representatives that could include, but not be limited to, organizations such as: KTA; Kansas Transportation, Commerce and Revenue Departments; local governments; distribution/warehousing and truck transportation companies; independent owner operators as well as fleet drivers; convenience and petroleum retailers; and such other key service, transportation, community and other stakeholders who may be significantly affected by current and future freight truck parking issues. The working group would collaborate to create model ordinances for promoting secure parking at new and existing industrial/warehouse developments. Additionally the working group could draft state legislation that would empower local government land banks to more easily aggregate blighted land for added urban truck parking and new state and/or federal loan program(s) to help local governments build secure parking areas. Additionally, Kansas may want to consider requiring such parking practices when state transportation funding or assistance is provided to advance public or private development.

Keeping Momentum Going

Form Freight Truck Parking Implementation Committee

The function of the committee would coordinate implementation efforts. There are multiple ways to realize the recommendations and literally hundreds of details that require addressing. The implementation of the truck parking recommendations may involve an active partnership between KDOT, KTA, other state agencies, local city and county governments, neighboring states, the trucking community and private industry. Most of these parties are represented by the advisory panel which could form the initial committee. However, given the nature of the recommendations, it may be necessary to include additional representation from local and county governments. Implementation subcommittees should be formed to address specific plan needs. Specific recommendations could be addressed in more detail with individual work groups.

- *Parking Information Sharing Subcommittee*
 - TPIMS deployment working group
 - Parking information management working group
- *Parking Assets Subcommittee*
 - Parking asset management working group

- ***Parking Improvement Partnerships Subcommittee***
 - Freight truck parking policy working group
 - Truck parking P3 working group
- ***Parking Policy Subcommittee***
 - Local truck parking policy working group

Funding Opportunities

Federal Funding

MAP-21

The Moving Ahead for Progress in the 21st Century law (MAP-21) established eligibility for truck parking funding to address truck parking under Jason's Law. The activities previously eligible for funding under SAFETEA-LU programs became eligible for funds under the National Highway Performance Program (NHPP), the Surface Transportation Program (STP), the Highway Safety Improvement Program (HSIP) and the freight and goods movement component of the Fixing America's Surface Transportation Act. This provides increased opportunity and flexibility to fund truck parking projects.

Projects eligible to receive funding include:

- Construction of rest areas with truck parking.
- Construction of truck parking areas adjacent to commercial truck stops and travel plazas.
- Opening existing facilities to truck parking.
- Promoting availability of publicly or privately provided truck parking on the NHS.
- Construction of turnouts along the NHS for commercial motor vehicles.
- Making capital improvements to public truck parking facilities closed on a seasonal basis to allow those facilities to remain open all year.
- Improving the geometric design of interchanges on the NHS to improve access to truck parking facilities.

ITS-based truck parking projects are being considered for inclusion in the Smart Roadside Initiative (SRI) project sponsored by FHWA and FMCSA. The goal of the program is "to investigate and identify successful deployments of truck-related roadside technologies; review relevant research; develop a concept of operations of a national system; develop a prototype based on an assessment of stakeholder/user needs, goals, expectations, operational environment, and processes; and to test the prototype." The SRI prototype is currently in the system design phase.

FAST Act Funding Increases

Many of these provisions were continued under the Fixing America's Surface Transportation (FAST) Act signed into law Dec. 4, 2015. The FAST Act reauthorizes the federal highway and public transportation programs for fiscal years (FY) 2016-2020 and stabilizes the Highway Trust Fund (HTF) during that period. As a result, increased funding will come into highway program funding. The legislation includes \$225.2 billion from the HTF for highway investment, a \$20.2 billion increase over five years compared to maintaining FY 2015 funding. About half of the increase, or \$10.7 billion, will support two new proposed initiatives—a National Freight Program and a

program of Nationally Significant Freight and Highway Projects. The remainder will provide small annual increases in core highway program funding.

This may have an impact on Kansas and the projects and initiatives it undertakes over the next half decade. Of the \$225.2 billion total, \$207.4 billion will be apportioned among the states by formula for use on highway and bridge improvements authorized by the main highway programs such as the National Highway Performance Program and the new Surface Transportation Block Grant Program. The FAST Act will provide every state a 5.1 percent increase in formula funds in FY 2016. This will be followed by annual increases ranging from 2.1 percent in FY 2017 to 2.4 percent in FY 2020 to offset the effect of projected inflation over that span of time. In effect, this means that highway investment will jump 5.1 percent in FY 2016 and then slow to rates of growth between 2.1 percent and 2.4 percent for the remainder of the bill. It also includes a provision that will automatically increase authorized highway and public transportation investment if Congress were to pass a subsequent law adding additional revenues to the HTF.

FAST Act Changes that May Benefit Truck Parking

The FAST Act retains the highway program structure enacted in MAP 21 with some changes potentially pertinent to truck parking:

- Surface Transportation Program (STP) is expanded into a “Surface Transportation Block Grant Program (STBGP)” based on the thought that most of the benefits of STP funds accrue locally and that decisions about how such funds are obligated should be determined by state and local governments, which can best respond to unique local circumstances and implement the most efficient solutions. Depending upon U.S. DOT guidance, funding under this program may be available for truck parking-related projects. The STBGP block grant program will receive the same 29.3 percent of formula funds as did the STP program under MAP-21.
- Congestion Mitigation & Air Quality (CMAQ) Program is a long-standing program focuses on reducing highway traffic congestion and improving air quality with a particular focus on states and areas that do not meet current air quality standards. The FAST Act enables CMAQ funds to now be used for attainment efforts and to maintain standards in an attainment area.
- The FAST Act creates a new initiative – the National Freight Program – which transforms the National Freight Policy provisions of MAP-21 into a new program that funds freight-related highway improvements designed to improve highway freight transportation on state and federal freight networks. Additionally, states will be able to obligate up to 10 percent of their freight program funds for improvements to freight rail or ports, which may be useful in funding parking-related projects connected with these modal facilities.
- Depending upon federal guidance, it may also be possible to look to fund truck parking-related projects through the Nationally Significant Freight and Highway Projects Program established under FAST. This program will provide an average of \$900 million per year in grants of at least \$25 million for highway, bridge, rail-grade crossing, intermodal and freight rail projects costing more than \$100 million that improve movement of both freight and people, increase competitiveness, reduce bottlenecks, and improve intermodal connectivity. Projects will be awarded competitively by the Secretary of Transportation based on criteria listed in the bill. At least 25 percent of the funds must be spent in rural areas, and the federal share of project costs will be 60 percent. While the program allows

HTF resources to be diverted to freight rail projects, it will impose a \$500 million limitation on the total amount that can be awarded over the next five years to freight and intermodal projects. It also reserves 10 percent of the annual grant awards for projects that do not meet the program's cost threshold.

Transportation Investment Generating Economic Recovery (TIGER)

The TIGER Grant program provides a unique opportunity for state DOT's to invest in road, rail, transit and port projects that achieve national objectives. In October 2015, Kansas and seven other participating states within the Mid America Association of State Transportation Officials (MAASTO) region, including Iowa, Indiana, Kentucky, Michigan, Minnesota, Ohio and Wisconsin were notified that they were selected to receive \$25 million in funding from the federal TIGER VII Grant program. The MAASTO TIGER VII Grant identified an initial TPIMS deployment in Kansas and the other seven states. This initial deployment serves as a pilot project for the Kansas system. This pilot would allow the State of Kansas to test and evaluate the TPIMS before deploying to other locations within the state. The tiered recommendations identified in this section would be implemented after the initial pilot deployment, testing and evaluation.

Local Funding

Benefit Districts

Benefit districts are a financing tool that allows cities to issue general obligation bonds for construction of public improvements and assess the cost to properties that benefit. The bonds are then retired through payment of special assessments by these benefiting property owners. Typically, benefit districts are used to build roads, sewers and other infrastructure improvements. However, if a city chooses, a benefit district could be used to build and maintain truck parking facilities to support the development of new warehouse and distribution centers.

Impact Fees

An impact fee is a charge on new development to pay for the construction or expansion of capital improvements that are necessitated by and benefit the new development. Local governments have the ability to levy impact fees for new warehouse and distribution centers that can be used to pay for truck parking.

Performance Measures

Jason's Law requires the development of metrics to measure the adequacy of truck parking. In the state of Kansas, this study took the first step with the inventory and assessment of existing parking conditions and utilization. The next step is to implement the recommendations and to periodically assess their effectiveness in achieving the needs identified by the advisory group.

In Michigan, the first state to deploy TPIMS, the MDOT has contracted with the University of Michigan Transportation Institute (UMTRI) to evaluate the effectiveness of the TPIMS improvements in terms of reliability, effectiveness, human decision factors, and safety. UMTRI's evaluation occurred in 2015 during two 6-month intervals and included a visual assessment of the deployed parking sites, and the equipment as well as trucker surveys. The results of the assessment will be available early 2016. KDOT and KTA could use this assessment as a guide for accurately measuring the effectiveness of the Kansas TPIMS deployment once the results are available. This will provide empirical data to better quantify the benefits and performance of parking utilization, safety/security and other statewide costs and benefits of TPIMS.

The following are performance measures that could be considered. This list includes considerations identified during this study and best practices in the industry:

- Parking Utilization
 - a. Are truck parking facilities effectively utilized? Is there better parking utilization and distribution on the system? Are drivers utilizing the TPIMS to inform their parking decisions?
 - b. Driver perceived parking shortages and challenges.
- Safety and Security
 - a. Based on driver experience, are truck parking facilities more safe and secure?
 - b. Reduction in illegal or informal parking.
 - c. Reduction in fatigue-related crashes.
 - d. Reduction in the reported hours of service violations.
- Benefits and Costs
 - a. Reduction in the average time looking for parking.
 - b. Do the improvements meet or exceed the projected BCA ratio identified in the study?

These measures may be evaluated through a two-step process:

- Conduct Statewide parking inventory every 3 to 5 years to understand utilization, illegal and informal parking and the changing and adapting parking needs.
- Coordination with the KHP on documenting and tracking illegal and informal parking, fatigue-related crashes and reported hours of service violations.
- Conduct a Statewide truck parking survey every 3 to 5 years. At a minimum, this survey would address metrics needed to evaluate the BCA.

Conclusion

Given the exponential growth of freight truck traffic, coupled with constrained federal and state funding, Kansas may not be able to build its way out of all truck parking needs. Therefore, this plan does not recommend the construction of new public truck parking facilities. Rather, the plan addresses truck parking needs through a multi-layered approach that includes better utilization of existing truck parking facilities, dissemination of real-time parking availability, added capacity through improvements to existing public parking facilities, and through public-private partnerships. These solutions include infrastructure improvements such as signage and additional parking, availability information systems (e.g., TPIMS), as well as local and statewide policies to address truck parking issues and needs identified through the planning process.