

NCHRP

SYNTHESIS 317

**NATIONAL
COOPERATIVE
HIGHWAY
RESEARCH
PROGRAM**

Dealing with Truck Parking Demands

A Synthesis of Highway Practice

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NCHRP SYNTHESIS 317

Dealing with Truck Parking Demands

A Synthesis of Highway Practice

CONSULTANT

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Oak Ridge, Tennessee

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Systematic, well-designed research provides the most effective approach to the solution of many problems facing highway administrators and engineers. Often, highway problems are of local interest and can best be studied by highway departments individually or in cooperation with their state universities and others. However, the accelerating growth of highway transportation develops increasingly complex problems of wide interest to highway authorities. These problems are best studied through a coordinated program of cooperative research.

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FOREWORD

*By Staff
Transportation
Research Board*

Highway administrators, engineers, and researchers often face problems for which information already exists, either in documented form or as undocumented experience and practice. This information may be fragmented, scattered, and unevaluated. As a consequence, full knowledge of what has been learned about a problem may not be brought to bear on its solution. Costly research findings may go unused, valuable experience may be overlooked, and due consideration may not be given to recommended practices for solving or alleviating the problem.

There is information on nearly every subject of concern to highway administrators and engineers. Much of it derives from research or from the work of practitioners faced with problems in their day-to-day work. To provide a systematic means for assembling and evaluating such useful information and to make it available to the entire highway community, the American Association of State Highway and Transportation Officials—through the mechanism of the National Cooperative Highway Research Program—authorized the Transportation Research Board to undertake a continuing study. This study, NCHRP Project 20-5, “Synthesis of Information Related to Highway Problems,” searches out and synthesizes useful knowledge from all available sources and prepares concise, documented reports on specific topics. Reports from this endeavor constitute an NCHRP report series, *Synthesis of Highway Practice*.

The synthesis series reports on current knowledge and practice, in a compact format, without the detailed directions usually found in handbooks or design manuals. Each report in the series provides a compendium of the best knowledge available on those measures found to be the most successful in resolving specific problems.

PREFACE

This report of the Transportation Research Board is designed to assist transportation agency administrators in identifying those practices that have been used to manage the increasing demand for truck parking. The emphasis is on identifying successful and innovative strategies that have been implemented by transportation agencies, as well as potential strategies yet to be deployed. The report examines the legislative authority governing the provision of truck parking by state transportation agencies, including federal requirements and selected state laws, to provide a framework for action. An analysis is provided of the demand for truck parking. Several case studies are discussed.

Information for this report was derived primarily from a detailed survey questionnaire that was distributed to highway maintenance engineers in all 50 states, the District of Columbia, and Puerto Rico. Responses were received from 24 transportation agencies. In several instances, the maintenance engineers supplemented their survey responses with additional documentation, including reports on the nature and magnitude of the truck parking problem, as well as master plans for documenting state strategies designed to address parking deficiencies. A literature review was also undertaken. The amount of literature on this subject is not extensive, but is adequate enough to provide the necessary background on the topic and reinforce conclusions drawn from the survey responses and interviews.

A panel of experts in the subject area guided the work of organizing and evaluating the collected data and reviewed the final synthesis report. A consultant was engaged to collect and synthesize the information and to write this report. Both the consultant and the members of the oversight panel are acknowledged on the title page. This synthesis is an immediately useful document that records the practices that were acceptable within the limitations of the knowledge available at the time of its preparation. As progress in research and practice continues, new knowledge will be added to that now at hand.

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This study was managed by Stephen F. Maher, P.E., and Jon Williams, Managers, Synthesis Studies, who worked with the consultant, the Topic Panel, and the Project 20-5 Committee in the development and review of the report. Assistance in project scope development was provided by Donna Vlasak, Senior Program Officer. Don Tippman was responsible for editing and production. Cheryl Keith assisted in meeting logistics and distribution of the questionnaire and draft reports.

Crawford F. Jencks, Manager, National Cooperative Highway Research Program, assisted the NCHRP 20-5 Committee and the Synthesis staff.

Information on current practice was provided by many highway and transportation agencies. Their cooperation and assistance are appreciated.

DEALING WITH TRUCK PARKING DEMANDS

SUMMARY

It is nationally recognized that commercial motor vehicle operators frequently cannot find adequate, safe parking for rest purposes. Many state departments of transportation are experiencing a heavy demand for commercial vehicle parking at rest areas, one that exceeds capacity. These rest areas are intended for short-term safety breaks; however, there continues to be a need for longer-term parking services in high-use corridors. Private truck stops often provide facilities that allow drivers to use them for longer-term stays to obtain adequate rest. For many of these private truck stops, demand also exceeds capacity. The purpose of this synthesis is to assist transportation agency administrators in identifying those practices that have been used to manage the increasing demand for commercial motor vehicle parking. The emphasis is on identifying successful and innovative strategies that have been implemented by transportation agencies as well as potential strategies that have yet to be deployed.

The primary data sources for this synthesis report are responses to a detailed survey questionnaire distributed to highway maintenance engineers in all states, the District of Columbia, and Puerto Rico. A review of the literature provided information that supplemented the survey data and provided background information.

Legislative authority plays a significant role in managing commercial vehicle parking. The development of parking spaces along the public roadway system of the United States has closely paralleled the development of the Interstate highway system. As originally conceived, public rest areas were designed to provide temporary rest locations for the traveling public. As the motor carrier industry has expanded, however, many public rest areas serve as long-term parking locations for long-haul commercial drivers, resulting in significant overcrowding.

Public rest areas were never meant to compete with the commercial vehicle parking industry. Legislative restrictions were placed on the amount of services provided at public rest areas to limit commercialization. A number of states, however, have expressed an interest in expanding public and private cooperation in the provision of parking and services to leverage investment dollars and improve services.

Several states have active and ongoing rest area master planning activities designed to improve services and expand parking availability. Many of these states recognize the need to address the aging infrastructure at the rest areas, through reconstruction and redevelopment of existing sites.

The synthesis conveys the magnitude of commercial vehicle parking demand and supply for the nation, including the number of public rest area spaces and spaces available at commercial truck stops and plazas. An evaluation of supply and demand indicates that a number of states are experiencing severe shortages of roadside commercial vehicle parking. These states are located throughout the nation and include those with large populations and traffic volumes as well as those with lower populations and traffic volumes. Indeed, it appears

that the extent of the parking shortfall will require a dramatic increase in supply along with improved management of existing resources.

States have implemented a number of alternative approaches to manage a growing demand for commercial vehicle parking. Several case studies are presented, and strategies are outlined. The strategies developed by these states generally have been effective in managing increasing parking demand. These include

- Expanding or improving public rest areas,
- Educating or informing drivers about available spaces, and
- Making better use of the private sector and private truck spaces.

Overall, it was found that no single entity is responsible for providing parking facilities, most parking supply is located in commercial truck parking lots and plazas, and the overcrowding problem concentrates in public rest areas. The data also point to the need for a multifaceted approach to meet the nationwide demand for effective truck parking.

Furthermore, additional research could clarify the reasons for the imbalance between truck parking supply and demand. Factors to be considered include poor accessibility to private supply due to poor geometric design; lack of information concerning the availability of spaces; and a lack of security at private locations, which inhibits their use by truckers.

INTRODUCTION

PURPOSE

This synthesis is a review of successful practices used by transportation agencies to evaluate and deal with truck parking demands. Operators of commercial motor vehicles on the nation's highways are finding it more difficult to find adequate, safe parking for rest purposes. Many state departments of transportation (DOTs) are experiencing a heavy demand for commercial vehicle parking at public rest areas; one that exceeds capacity. These rest areas are primarily intended for short-term safety breaks. Therefore, there continues to be a need for longer-term parking services in high-use corridors.

Because of the parking shortages and limits on stays in public facilities, truck drivers may be creating unsafe situations by driving without a needed short break or by parking on roadway access ramps and shoulders to obtain adequate rest. Parking illegally on shoulders and ramps is dangerous for a number of reasons. First, it limits the ability of parked vehicles to accelerate safely into the traffic stream from their parked position. Second, the presence of parked vehicles creates a conflict between exiting and parked vehicles. Third, errant vehicles may stray into the shoulder area and strike parked vehicles.

An alternative source for parking space to rest is private truck stops; however, they are not always able to provide long-term parking. Commercial truck stops and travel plazas provide parking as an incentive to stop and purchase goods and services. There is no financial incentive to provide parking as a revenue generator by these facilities, because truckers are resistant to paying additional out-of-pocket costs from a very limited operating budget. The inability of truck drivers to obtain adequate rest in public or private facilities may be a significant contributor to an increasing number of truck crashes, especially those at night involving single vehicles. The lack of available safe parking for obtaining needed rest may be part of this problem.

There is potential for state DOTs to partner with other agencies and the private sector to develop cost-effective strategies to help resolve the problem. This synthesis discusses what states are doing to address the problem of limited commercial motor vehicle parking.

BACKGROUND

The role of the federal government in addressing issues related to driver fatigue and the safety of the commercial

vehicle industry began in 1937 with the promulgation of Hours of Service (HOS) rules by the Interstate Commerce Commission (ICC) (1). These rules established limits on the number of hours that truck drivers may drive and be on duty before being required to take a mandatory rest break. Complying with these rules has created a demand for parking spaces for commercial vehicle drivers. Until the 1970s, a rough balance seemed to exist between this demand for truck parking spaces and the spaces available at public rest areas, commercial truck stops and travel plazas, and other locations. However, beginning in the 1980s, changes in the trucking industry upset this balance.

The deregulation of the trucking industry in the early 1980s led to significant changes in the way goods and products are moved throughout the United States. Before deregulation, approximately 20,000 motor carriers operated in an environment wherein the ICC issued operating authority, and entry into the industry was restricted. As of 2000, approximately 500,000 interstate motor carriers operated in the United States, and projections over the next 20 years point to continuing growth. As truck traffic on America's highways has increased, the demand for services and facilities for the trucking industry, including the demand for truck parking spaces, has increased as well.

Another significant change in the movement of goods and services was the advent of "just-in-time" delivery. Manufacturers now operate in an environment where large warehouse inventories of parts and supplies are no longer maintained but, instead, are delivered by trucks in tightly scheduled deliveries such that these inputs arrive just in time to be used in the manufacturing process. Just-in-time delivery places new demands on truck parking facilities, because trucks use these facilities as staging areas to better meet their delivery requirements. The combination of increased truck traffic and tighter delivery schedules is a primary reason for the increased demand for truck parking—a demand that has resulted in shortages of truck parking spaces in some parts of the United States.

The Federal Motor Carrier Safety Administration has estimated that driver fatigue is a primary factor in 4.5% of truck-involved fatal crashes and a secondary factor in an additional 10.5% of such crashes (2). A 1995 study conducted by the National Transportation Safety Board asserts that the most important factors in predicting a fatigue-related accident are the duration of the last sleep period, the time slept in the past 24 h, and interruptions in sleep

periods. The availability of parking for commercial vehicles can affect all of these factors.

In 1996, the FHWA funded a study entitled *Commercial Driver Rest & Parking Requirements: Making Space for Safety* (3). That study of parking along the Interstate highway system (IHS) was conducted in response to a U.S. Senate recommendation to evaluate the adequacy of places for truck drivers to stop and rest. It estimated a shortfall of 28,400 public truck parking spaces nationwide. Although a detailed survey of public rest areas was conducted, the survey of commercial truck stops and travel plazas was more cursory and relied on a statistical weighting of the 17% of commercial truck stops and travel plazas that completed and returned the survey.

That national study was followed by a number of state-specific studies documenting shortages of truck parking facilities. For example, Minnesota completed a study of public rest area usage in 1998 that estimated potential nighttime capacity problems for more than 50% of the public rest areas surveyed (4). In 1999, New York completed a study that summarized public rest area construction activities for Interstate highways in New York (5). That study led to the development of a Statewide Rest Area Plan. A Tennessee study completed in 1999 indicated that nearly 44% of truck parking on weekday evenings occurred on ramps and shoulders (6). Iowa completed a study in 1999 that observed an excess demand for parking at public rest areas, but sufficient supply at most commercial truck stops and travel plazas (7).

In 1999, the National Transportation Safety Board began an initiative to address issues related to improving the safety of trucks and buses (8). As part of this initiative, a report was published in 2000 addressing the inadequate safe, available commercial vehicle parking on or near Interstates. The report also addressed the lack of information about parking available to truck drivers and the state-enforced parking time limits.

Congress responded to this growing body of evidence that availability of truck parking was becoming a significant problem with potential safety implications and to the concerns raised about the previous studies of this issue by mandating, in Section 4027 of the Transportation Equity Act for the 21st Century (TEA-21) (9), that a study be conducted to determine the adequacy of parking facilities. The mandated study of the National Highway System (NHS) was intended as a follow-up study to the previously referenced 1996 study of the IHS and was intended to address some of the criticisms of the earlier study.

SECTION 4027 STUDY

Section 4027 requires the following:

... a study to determine the location and quantity of parking facilities at commercial truck stops and travel plazas and public rest areas that could be used by motor carriers to comply with Federal hours of service rules. The study shall include an inventory of current facilities serving the National Highway System, analyze where shortages exist or are projected to exist, and propose a plan to reduce the shortages. The study may be carried out in cooperation with research entities representing motor carriers, the travel plaza industry, and commercial motor vehicle drivers (9).

To assist in the preparation of this report, the FHWA encouraged the creation of partnerships of public- and private-sector stakeholders at the state level and provided a technical guidance document for their use in (1) conducting an inventory of current facilities serving the NHS, (2) analyzing current and projected shortages, and (3) developing plans for action at the appropriate jurisdictional levels. The FHWA provided technical assistance to the partnerships to guide them in completing these activities.

The FHWA solicited input on the truck rest parking issue through the Rest Area Forum, which the agency hosted in Atlanta, Georgia, June 29 and 30, 1999 (10). Forum participants included more than 70 state DOT and enforcement officials, representatives of the motor carrier industry, commercial truck stop operators, commercial drivers, safety advocates, and other interested parties.

In addition, on May 21, 1999, the FHWA issued a Request for Information (RFI-ST-001) to obtain feedback on how best to design, focus, and conduct the Section 4027 study. Five individuals or organizations responded. The results from the 1996 report and individual states' subsequent studies, the input from the Rest Area Forum participants, and responses to the Request for Information can be summarized in the following comments.

- Many Rest Area Forum participants and respondents to the Request for Information voiced the sentiment that we now know the problem and, therefore, should focus on solutions rather than on more studies. One significant exception is a response to the Request for Information that recommends "The TEA-21 study should count all private and public sector spaces to accurately assess the truck parking situation."
- Parking shortages are concentrated and solutions thereto should be targeted at a corridor or regional level; therefore, the analysis of shortages and development of solutions should be performed at the corridor, state, or sub-state, rather than the national level.
- Satisfying drivers' rest parking needs in corridors or regions with either real or perceived shortages in parking supply is likely to require public, private, and public-private solutions. Identifying consensus solutions among parties with competing interests is likely to be easier and more successful at the corridor, state, or sub-state level.

- A major unknown and point of contention is whether, or to what extent, public rest area and commercial truck stop parking are interchangeable. To supply parking where drivers need it, a better understanding of their parking-related needs and decision-making processes is required.

In consideration of this input, the FHWA undertook a two-pronged approach to the Section 4027 study. First, the FHWA contracted research to clarify the parking-related needs and decision-making processes of commercial drivers (11). Second, the FHWA encouraged the creation of partnerships of public- and private-sector stakeholders in 49 states (excluding Hawaii) and provided a guidance document for their use in inventorying current facilities serving the NHS, analyzing current and projected shortages, and developing plans for action at the appropriate jurisdictional levels (12). Such partnerships provided a forum for interested parties, including state and local agencies as well as the private sector, to examine the problem and formulate strategies to mitigate any problems identified. The final technical report for the Section 4027 study was published in 2001 (13).

PURPOSE AND SCOPE

The purpose of this synthesis report is to assist transportation agency administrators in identifying those practices that have been used to manage the increasing demand for commercial motor vehicle parking. The emphasis is on identifying successful and innovative strategies that have been implemented by transportation agencies, as well as potential strategies that have yet to be deployed. In some cases, the motor carrier industry is working with the private sector to make spaces available for use for long-term parking.

METHODOLOGY

The primary data sources for this report are responses to a detailed survey questionnaire distributed to highway

maintenance engineers in 50 states, the District of Columbia, and Puerto Rico. The survey questionnaire is provided as Appendix A. In several cases, maintenance engineers supplemented their survey responses with additional documentation. This information included reports describing the nature and magnitude of the truck parking problem as well as master plan documents that presented state plans to address parking deficiencies. A review of the literature provided background information that supplemented the survey data.

Responses were received from the 24 transportation agencies listed in Appendix B. The survey responses were summarized in a series of tables and are presented as Appendix C. The tabulations enabled responses to be categorized for comparative analysis and for common practices to be easily identified.

The literature review started with a topic search for sources using the Transportation Research Information Service. Material related to commercial vehicle parking was obtained from various state DOTs in response to questionnaire inquiries. The body of literature on this topic is not very extensive, but is adequate to provide the necessary background in the topic and reinforce conclusions drawn from the survey responses and interviews.

ORGANIZATION

Chapter two presents a summary of the legislative authority governing the provision of commercial vehicle parking by state DOTs, including federal requirements as well as selected state laws providing the framework for action. Chapter three provides an analysis of the extent of the commercial vehicle parking demand problem, as reflected in survey responses and other research. Chapter four contains an overview of potential solutions to the commercial vehicle parking demand challenge. Chapter five presents conclusions and proposals for further research.

LEGISLATIVE AUTHORITY

PURPOSE

This chapter highlights the various legal and administrative regulations that guide the development of public roadside rest areas. Included in this discussion are issues associated with the commercialization of rest areas, funding and operation, and rest area master planning and design. Legislation and regulations governing the planning, design, and financial elements of public rest areas are cited, along with the results of the survey conducted as part of this synthesis project.

HISTORICAL PERSPECTIVE

Rest areas have been part of the roadside system in the United States since the beginning of the federal-aid highway program. The Federal-Aid Highway Act of 1938 initiated the rest area program by providing federal funds for the construction and maintenance of facilities for public comfort and convenience. It was not until the construction of the IHS, however, that rest area design and development became relatively standardized. Rest areas were initially developed along the IHS primarily because few facilities were available at exits, particularly in rural areas. As traffic grew along the Interstate system, facilities available at exits also increased dramatically. A typical rest area contained spaces for both automobiles and commercial vehicles, with rest areas generally spaced approximately every 50 mi along primary routes.

Under the current federal HOS rules, commercial vehicle drivers participating in interstate commerce are generally permitted to drive up to 10 hours after 8 consecutive hours off duty. A driver is permitted to be on duty up to 15 hours a day, with 10 hours of driving and 5 hours of performing nondriving tasks, after which the driver must take off 8 consecutive hours. The regulations further require that, if a motor carrier does not operate commercial vehicles every day of the week, then its drivers may not drive more than 60 hours over a 7-day period. If the motor carrier does operate commercial vehicles every day of the week, then its drivers may not drive more than 70 hours over an 8-day period. At the end of each time period, drivers are required to take a 24-hour rest break, after which the “HOS clock” restarts. These regulations induce a demand for parking spaces so that drivers who must drive more than 10 hours between their origin and destination (i.e., long-haul drivers) can obtain the required 8 hours of

long-term rest. In other words, these rules typically require drivers of commercial motor vehicles to complete a period of rest while en route to a destination if drivers are unable to return home for the required rest.

Rest areas were not originally and are still not designed to serve as the primary locations for commercial vehicle drivers to obtain required long-term rest. However, many commercial vehicle drivers do use the limited spaces available at these areas for purposes of obtaining such rest. The result is overcrowding at many rest areas, particularly overnight.

COMMERCIAL VEHICLE PARKING LIMITS

A number of states discourage the use of parking areas for long-term rest by limiting the amount of time a vehicle may park at such a facility. Survey respondents were asked to indicate whether their agencies placed a time limit on parking by commercial vehicles at rest areas. In addition, respondents were asked to indicate the extent to which cities and counties in their states restrict parking on local streets. A total of 18 states responding indicated that their agencies did place a time limit on parking by commercial vehicles at rest areas. In 15 of these states, such restrictions applied to all rest areas, whereas in 3 states, such restrictions applied only to selected rest areas. In all 15 states, however, respondents indicated that parking time limits were not very strictly enforced. In addition, states indicated that when subjected to prosecution for exceeding the permitted allotted time period, drivers often face only minor fines and no violation points are added to their licenses. Ostensibly, many states are hesitant to enforce parking limits for fear of sending a tired driver back on the road.

States were asked whether their agencies allow truck parking on ramps at rest areas and/or interchanges. Five respondents indicated that their states allowed trucks to park on ramps in at least some locations. In many of these situations, drivers are not ticketed or sent back on the road as long as they are safely parked off the roadway. For the most part, however, states appear to be more inclined to prohibit parking along ramps.

Survey respondents also were asked about the extent to which cities and counties restrict parking on local streets and whether these restrictions create a problem for commercial vehicle drivers as they search for a place to park. Only six states responding indicated that local parking

restrictions appeared significant enough to be a problem to commercial vehicle drivers.

Six responding states indicated that at least some of their rest areas were closed during the winter. Furthermore, four agencies responding indicated that some rest areas were permanently closed in the last 5 years and not replaced. The most commonly cited reason for these closings was lack of operating or capital funds. Also mentioned were a lack of user demand and the goal of reducing the incidence of crime.

LIMITS TO COMMERCIALIZATION OF REST AREAS

Title 23, Section 752.3 of the Code of Federal Regulations defines a safety rest area as “a roadside facility safely removed from the traveled way with parking and such facilities for the motorist deemed necessary for his rest, relaxation, comfort and information needs.” Current Federal-Aid Highway Law (U.S. Code 23, § 111), however, limits commercialization of rest areas on the IHS.

All agreements between the Secretary and the State highway department for the construction of projects on the Interstate System shall contain a clause proving that the State will not add any point of access to, or exit from, the project in addition to those approved by the Secretary in plans for such project, without the prior approval of the Secretary. Such agreements shall also contain a clause providing 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 (14).

As authorized in 23 U.S.C. 111(b) and as provided under Section 752.5, the state may permit the placement of vending machines in existing or new safety rest areas located on the rights-of-way of the Interstate system for the purpose of dispensing such food, drink, or other articles the state determines are appropriate and desirable, except that the dispensing by any means of petroleum products or motor vehicle replacement parts shall not be allowed. Such vending machines shall be operated by the state. Some exemptions exist for these prohibitions for toll roads such as the New York State Thruway Authority and the Pennsylvania Turnpike, because these roads were built before being designated as part of the Interstate system.

The survey results presented in Table 1 indicate that many states are interested in pursuing more expanded commercialization of rest areas. A small number of agencies indicated that they had authority to work with the private sector in the planning, construction, and maintenance of rest areas. For example, the Iowa DOT entered into a public-private partnership to develop and maintain a welcome center along Interstate 35. A private developer was responsible for the maintenance and operation, with the Iowa DOT sharing the costs.

TABLE 1
NUMBER OF STATES WITH AUTHORITY TO PURSUE
SELECTED DEVELOPMENT ACTIVITIES

| Activity | No. of States Permitting Activity |
|----------------------------------------------------------------------------------|-----------------------------------|
| Partnership with private sector in planning of rest areas | 7 |
| Partnership with private sector in planning of truck parking areas | 7 |
| Partnership with private sector in constructing rest areas | 6 |
| Partnership with private sector in constructing parking areas | 3 |
| Partnership with private sector in constructing of truck parking areas | 5 |
| Partnership with private sector in operating and maintaining rest areas | 10 |
| Partnership with private sector in maintaining and operating truck parking areas | 5 |

REST AREA FUNDING

Construction and reconstruction of rest areas can be funded using a variety of federal-aid highway funding categories. Rest areas located on the IHS, as well as others located on the NHS, are eligible for funding under the NHS program. All others are eligible under the Surface Transportation Program. Interstate Maintenance funds may be used to construct new rest areas or to reconstruct existing rest areas along the IHS. Funding for all or portions of the planning, development, and reconstruction of rest areas may also be provided under other federal-aid programs, including scenic highway, safety, and transportation enhancement funds.

REST AREA MASTER PLANNING

Public rest areas were never meant to compete with the commercial vehicle parking industry. Legislative restrictions have been placed on the amount of service provided at public rest areas to limit commercialization. Under 752.5 (e) of the Code of Federal regulations, it is recommended that the state maintain a rest area system plan. The section states

This plan should include development priorities to ensure safety rest areas will be constructed first at locations most needed by the motorist. Proposals for safety rest areas or similar facilities on Federal-aid highways in suburban or urban areas shall be special case and must be fully justified before being authorized by the FHWA Regional Administrator (14).

The regulations further suggest that expansion and modernization of older facilities be considered under Section 752.5 (f).

Facilities within newly constructed safety rest areas should meet the forecast needs of the design year. Expansion and modernization of older existing rest areas that do not provide adequate service should be considered (14).

The AASHTO *Guide for Development of Rest Areas on Major Arterials and Freeways* provides guidance on the design and development of rest areas and is an important reference for rest area master planning (15).

A total of 12 agencies reported having developed a statewide master rest area policy, master plan, and/or improvement program for public rest area construction and maintenance. In 1999, the California DOT (Caltrans) developed and approved a plan for improving its rest area system. A new statewide master plan was devised in 2000, which provides for rehabilitation of the existing 88 rest area units and the development, over a specified time, of an additional 88 rest areas. Montana DOT has recently developed a comprehensive plan that addresses the long-term needs of the traveling public, a plan that is guiding the department's rest area policy decisions and priorities (16). The Montana plan represented an update to an earlier master plan completed in 1985. The 1999 update followed a three-part work effort, including

- A field inventory of rest area facilities,
- A survey of rest area users, and
- Plan development.

The result of this process was a long-term (20-year), comprehensive plan to guide the development of Montana's rest areas. This plan includes policies and recommendations to guide rest area location and development, design, operation, maintenance, stakeholder involvement, and environmental considerations.

Kentucky has developed a Rest Area Master Plan that is on track to meet the repair and maintenance needs of its rest area facilities. To expand the available spaces for commercial truck parking, Kentucky has adopted a plan that permits truckers to use weigh stations for long-term parking. Also, Maine is currently in the process of developing a complete plan, which will determine the service needs for commercial vehicle parking and explore alternatives to constructing and maintaining these facilities.

STATE LEGISLATIVE, LEGAL, AND REGULATORY AUTHORITY TO SUPPORT PLANNING, CONSTRUCTING, MAINTAINING, AND OPERATING REST AREAS

Agencies were asked to indicate whether they had the authority under state law to pursue a number of activities related to the planning, constructing, maintaining, and operating of rest area facilities. Of the 24 states responding to the survey, 12 have the authority to construct truck-only rest areas, 13 have the authority to construct roadside truck parking areas, and 10 may establish partnerships with the private sector to maintain or operate rest areas.

SUMMARY

Several states have active and ongoing rest area master planning activities designed to improve services and expand parking availability. Many of these states recognize the need to address the aging infrastructure at the rest areas through reconstruction and redevelopment of existing sites.

EXTENT OF THE PROBLEM

INTRODUCTION

This chapter provides an overview of commercial vehicle parking supply and demand for the United States. First, factors driving the need for long-term and short-term parking are described to provide a basis for understanding the demand for parking. Next, an estimate of total parking demand is presented. A state-by-state estimate of demand is presented for the IHS, as well as for demand along high truck volume routes on the remaining portions of the NHS. Following this discussion, an estimate of parking supply is presented. The information presented includes an inventory of total public spaces and commercial truck stop and plaza spaces. Finally, this chapter includes a comparison of parking supply and demand on a state-by-state basis, for the purpose of portraying the extent of parking shortages nationwide.

FACTORS INFLUENCING PARKING DEMAND

Under the current federal HOS rules, drivers participating in interstate commerce are required to rest for a period of 8 hours after driving a maximum of 10 hours. These regulations resulted in a demand for long-term parking spaces, because long-haul drivers must complete a period of rest while en route to a destination. In addition to the breaks required for achieving long-term rest, drivers also take regular short breaks for activities such as eating, refueling, or using bathroom facilities. These breaks require short-term parking spaces at locations that provide amenities to support these activities.

Although drivers are required to obtain extended rest, there is no single agency, organization, or group that is responsible for providing drivers with extended rest locations. Essentially, drivers find such locations themselves and typically rely on two primary options: commercial truck stops and travel plazas or public rest areas. Commercial truck stops and travel plazas are designed to provide drivers with an opportunity to fulfill many nonrest-related activities, whereas public rest areas provide the driver with only minimal services.

The demand for truck parking along a particular stretch of highway is determined not only by the general factors that induce demand, but also by other factors that affect the distribution of that demand. For example, the desire of truck drivers to accommodate their natural sleep cycles results in greater demand for truck parking spaces at night than during the day. In addition, tight delivery schedules associated with just-in-time delivery can result in demand

for truck parking spaces near loading and unloading facilities, because drivers use these spaces as staging areas to help ensure on-time delivery. Truckers who drive as teams are likely to have different parking requirements, because one team member can drive while the other rests. Also, some states limit parking time at public rest areas, compelling commercial drivers to seek other locations.

Taken together, these factors can result in complex demand patterns for truck parking along roadway segments. For example, HOS rules require rest periods away from home primarily for long-haul drivers; a short-haul driver will typically arrive at the destination before a mandatory rest is required. Therefore, highways with a larger proportion of long-haul drivers will typically generate a larger demand for truck parking than do other highways (relative to the total number of trucks on the road). Because short-haul drivers are not required to take an extended rest, one might expect them to take more frequent, shorter breaks, which would favor the use of public rest areas over commercial truck stops and travel plazas. Stretches of a highway that are 8 to 10 hours from a key distribution center might be expected to have higher parking demand because the HOS rules will force drivers originating travel from that center to take an extended rest before resuming driving. Alternately, an area near a significant commercial vehicle destination may have a substantial early morning parking demand as drivers use rest facilities as staging areas while waiting for the loading and unloading facilities to open.

Although these factors help determine the total demand for truck parking in an area (i.e., the latent demand), other factors help determine how that demand is distributed among the available parking locations (i.e., the demand choice). For example, drivers wanting to take a short break are more likely to choose a location for its convenience, whereas drivers taking a long break are more likely to choose a location that has more favorable amenities. Drivers taking a break for a specific activity (e.g., to take a shower) will only park at a location that supports that activity. If one stretch of highway has a shortage of parking locations, demand that cannot be met on that stretch of highway will be met by parking locations on nearby stretches of highway.

PARKING DEMAND: NATIONAL COMMERCIAL VEHICLES

As part of the Section 4027 study, a demand model was developed and applied to estimate parking demand for

corridors along the Interstate and non-Interstate portions of the NHS. This model was designed to provide an estimate of demand for public and commercial parking spaces along a segment of roadway using some simple inputs, including the volume of truck travel, the proportion of long-haul drivers, and the speed limit. Additional details concerning the modeling approach can be found elsewhere (16).

During the undertaking of the Section 4027 study, estimates of demand were developed for segments of the IHS as well as remaining segments of the NHS carrying more than 1,000 trucks per day. Daily parking demand estimates were developed for both commercial spaces and public spaces.

From the analysis, the total daily demand on Interstate highways was estimated to be 240,270 commercial vehicle parking spaces (56,355 spaces at public and 188,915 at commercial facilities), and the total demand on non-Interstate highways of the NHS was estimated to be approximately 42,030 spaces (9,645 at public and 32,385 at commercial facilities) (17).

PARKING SUPPLY: PUBLIC REST AREAS

As part of the Section 4027 study, a survey of 49 states (excluding Hawaii) was conducted to gather information on truck parking capacity at public rest areas and welcome centers. Information was obtained from all 49 state DOTs and their toll road agencies for a combined total of 1,771 public rest areas. The results for each state are summarized in Table 2.

As shown in Table 2, approximately 31,320 public, commercial vehicle parking spaces exist along the IHS and other portions of the NHS. A further analysis of the number of parking spaces at public rest areas along Interstate highways versus non-Interstate highways indicates a total of 28,400 spaces distributed along 39,963 mi of Interstate highways included in this inventory and 2,900 non-Interstate spaces distributed along 22,000 mi of non-Interstate highways.

PARKING SUPPLY: COMMERCIAL TRUCK STOP AND TRAVEL PLAZAS

As mentioned previously, commercial truck stops and travel plazas are designed to provide drivers with an opportunity to fulfill many nonrest-related activities, whereas public rest areas provide the driver with only minimal services. Commercial truck stop operators provide a number of services for trucks and typically provide extended parking to encourage drivers to use these services. In other words, commercial truck stop and travel plaza operators do not provide extended-stay parking as a primary service, but

only to encourage purchases of fuel, food, and other services. The primary data source for the inventory of commercial truck stops and travel plazas was the "Truck Stops Database" developed by Interstate America. This database includes an estimate of the number of commercial parking facilities in the United States and Canada (a total of 6,327 facilities), is updated annually, and contains information describing the number of commercial vehicle parking spaces available at a facility, as well as information about the amenities at those facilities. The results of this inventory for each state are summarized in Table 3.

This table lists the total number of commercial truck stop and travel plaza facilities identified in each state as well as the total number of parking spaces at those facilities. However, many of the private spaces are unmarked or unpaved and therefore should be considered as an approximation.

A further analysis of the number of parking spaces at commercial truck stops and travel plazas along Interstate highways versus non-Interstate highways indicates that there are a total of 253,775 spaces distributed along 39,963 mi of Interstate highways and 24,000 non-Interstate spaces distributed along 21,700 mi of non-Interstate highways.

ANALYSIS OF SUPPLY AND DEMAND

Table 4 presents an aggregate summary of commercial vehicle parking supply and demand for commercial truck stops and travel plaza and public rest areas based on the results previously discussed. In total, there is a demand for 66,000 public spaces on a daily basis compared with a supply of 31,300 spaces. On the commercial side, there is a demand for 221,300 commercial spaces compared with a supply of 277,775. These results indicate a severe shortage of public spaces and an adequate supply of commercial spaces. However, because parking demand and supply is very site specific, a state-by-state comparison of parking demand and parking supply provides some additional insight into the extent of the commercial vehicle parking problem.

To simplify the interpretation of these results, a rating system was developed to summarize the results of the supply-and-demand analysis for each state. The estimated demand divided by the estimated supply for both public and private parking spaces formed a demand/supply ratio that indicated the level of overcrowding statewide. A ratio of less than 1 indicates that demand is smaller than supply and overcrowding is not as likely, and a ratio of greater than 1 indicates that demand outstrips supply.

Because of the uncertainty of the demand and supply estimates, using 1 as an exact cutoff for indicating whether

TABLE 2
PUBLIC REST AREA FACILITIES ALONG INTERSTATES AND OTHER NHS ROUTES CARRYING
MORE THAN 1,000 TRUCKS PER DAY

| State | Parking Facilities | Parking Spaces | Weigh Stations | Imposes Time Limits |
|----------------|--------------------|----------------|----------------|---------------------|
| Alabama | 27 | 710 | | ✓ |
| Alaska | N/A | 460 | | |
| Arizona | 38 | 560 | | |
| Arkansas | 21 | 345 | | |
| California | 88 | 1,110 | | ✓ |
| Colorado | 31 | 170 | | |
| Connecticut | 20 | 360 | ✓ | |
| Delaware | 1 | 70 | | ✓ |
| Florida | 69 | 1,710 | ✓ | ✓ |
| Georgia | 31 | 1,165 | ✓ | ✓ |
| Idaho | 30 | 245 | ✓ | ✓ |
| Illinois | 54 | 1,270 | | |
| Indiana | 52 | 2,430 | ✓ | |
| Iowa | 38 | 805 | | ✓ |
| Kansas | 29 | 455 | | ✓ |
| Kentucky | 44 | 990 | ✓ | ✓ |
| Louisiana | 15 | 220 | | |
| Maine | 11 | 115 | | |
| Maryland | 11 | 295 | | |
| Massachusetts | 17 | 140 | | ✓ |
| Michigan | 75 | 1,570 | | |
| Minnesota | 40 | 535 | | ✓ |
| Mississippi | 43 | 430 | ✓ | ✓ |
| Missouri | 35 | 620 | | |
| Montana | 43 | 395 | ✓ | |
| Nebraska | 22 | 265 | | ✓ |
| Nevada | 36 | 260 | | ✓ |
| New Hampshire | 6 | 85 | | ✓ |
| New Jersey | 19 | 670 | | ✓ |
| New Mexico | 11 | 80 | ✓ | ✓ |
| New York | 36 | 1,260 | ✓ | ✓ |
| North Carolina | 37 | 645 | | |
| North Dakota | 30 | 260 | | |
| Ohio | 98 | 1,405 | | |
| Oklahoma | 63 | 770 | | |
| Oregon | 40 | 605 | | ✓ |
| Pennsylvania | 65 | 1,300 | | ✓ |
| Rhode Island | 5 | 270 | | |
| South Carolina | 49 | 820 | | |
| South Dakota | 21 | 370 | ✓ | ✓ |
| Tennessee | 30 | 770 | ✓ | ✓ |
| Texas | 105 | 655 | | ✓ |
| Utah | 24 | 240 | | |
| Vermont | 41 | 180 | | |
| Virginia | 39 | 820 | | ✓ |
| Washington | 29 | 455 | | ✓ |
| West Virginia | 21 | 510 | | |
| Wisconsin | 23 | 655 | | |
| Wyoming | 58 | 795 | | |
| Total | 1,771 | 31,300 | | |

Notes: A checkmark in the “Weigh Stations” column indicates whether the state allows parking at weigh stations, and a checkmark in the “Imposes Time Limits” column indicates whether the state imposes time limits. NHS = National Highway System; N/A = not available.

Source: Fleger et al. (13).

shortages exist is not appropriate. Instead, the demand/supply ratios were grouped into three categories of spaces—surplus, sufficient, and shortage (see Table 5). Because the estimates of truck parking supply indicated a range of parking spaces, several different supply values could be used in determining this ratio; the results in this synthesis report used the maximum estimated truck parking spaces.

Table 6 provides a state-by-state breakdown of these results. It shows the demand/supply ratio and the parking space utilization category for each state. It also shows the demand/supply ratios for parking spaces at public rest areas and at commercial truck stops and travel plazas. The Total column refers to the ratio for parking spaces at both types of facilities.

TABLE 3
COMMERCIAL TRUCK STOP AND TRAVEL PLAZA FACILITIES
ALONG INTERSTATES AND OTHER NHS ROUTES CARRYING
MORE THAN 1,000 TRUCKS PER DAY

| State | Parking Facilities | Parking Spaces |
|----------------|--------------------|----------------|
| Alabama | 100 | 6,900 |
| Alaska | — | — |
| Arizona | 60 | 8,140 |
| Arkansas | 110 | 7,520 |
| California | 125 | 7,500 |
| Colorado | 60 | 2,710 |
| Connecticut | 15 | 1,245 |
| Delaware | 10 | 325 |
| Florida | 85 | 7,340 |
| Georgia | 125 | 11,475 |
| Idaho | 25 | 1,970 |
| Illinois | 125 | 9,600 |
| Indiana | 120 | 14,530 |
| Iowa | 65 | 5,210 |
| Kansas | 55 | 4,385 |
| Kentucky | 80 | 7,190 |
| Louisiana | 115 | 9,160 |
| Maine | 20 | 1,250 |
| Maryland | 15 | 2,290 |
| Massachusetts | 20 | 1,920 |
| Michigan | 90 | 6,150 |
| Minnesota | 60 | 4,505 |
| Mississippi | 100 | 7,005 |
| Missouri | 140 | 12,275 |
| Montana | 40 | 3,085 |
| Nebraska | 50 | 2,835 |
| Nevada | 35 | 4,980 |
| New Hampshire | 15 | 700 |
| New Jersey | 35 | 3,730 |
| New Mexico | 50 | 6,325 |
| New York | 100 | 6,970 |
| North Carolina | 105 | 7,325 |
| North Dakota | 25 | 2,040 |
| Ohio | 135 | 11,475 |
| Oklahoma | 130 | 9,635 |
| Oregon | 55 | 5,705 |
| Pennsylvania | 135 | 14,505 |
| Rhode Island | 5 | 420 |
| South Carolina | 100 | 8,515 |
| South Dakota | 30 | 1,335 |
| Tennessee | 90 | 6,420 |
| Texas | 285 | 23,525 |
| Utah | 45 | 2,490 |
| Vermont | 65 | 450 |
| Virginia | 15 | 7,445 |
| Washington | 40 | 2,665 |
| West Virginia | 25 | 1,720 |
| Wisconsin | 80 | 5,975 |
| Wyoming | 50 | 3,810 |
| Total | 3,360 | 277,775 |

Notes: NHS = National Highway System.
Source: Fleger et al. (13).

TABLE 4
SUMMARY OF NATIONAL SUPPLY AND DEMAND

| Roadway System | Daily Parking Demand | | Parking Supply | |
|----------------|----------------------|------------|----------------|------------|
| | Public | Commercial | Public | Commercial |
| Interstate | 56,355 | 188,915 | 28,400 | 253,775 |
| Other | 9,645 | 32,385 | 2,900 | 24,000 |
| Total | 66,000 | 221,300 | 31,300 | 277,775 |

Source: Fleger et al. (13).

TABLE 5
DEMAND/SUPPLY RATIO CATEGORIES

| Demand/Supply Ratio | Parking Space Utilization |
|---------------------|---------------------------|
| Less than 0.9 | Surplus spaces |
| 0.9 to 1.1 | Sufficient spaces |
| More than 1.1 | Shortage of spaces |

Notes: The first category, "Surplus spaces," indicates that the number of parking spaces available is likely to exceed the peak demand. The second category, "Sufficient spaces," indicates that the peak demand and the supply of parking spaces are nearly the same. The third category, "Shortage of spaces," indicates that overcrowding is likely.
Source: Fleger et al. (13).

TABLE 6
PARKING SPACE UTILIZATION BY STATE: DEMAND/SUPPLY RATIO ALONG INTERSTATES AND OTHER NHS ROUTES CARRYING MORE THAN 1,000 TRUCKS PER DAY

| State | Public | | Private | | Total | |
|---------------------|--------|------------|---------|------------|-------|------------|
| | Ratio | Category | Ratio | Category | Ratio | Category |
| Alabama | 2.29 | Shortage | 0.79 | Surplus | 0.93 | Sufficient |
| Alaska ¹ | 0.05 | Surplus | N/A | N/A | N/A | Surplus |
| Arizona | 1.88 | Shortage | 0.43 | Surplus | 0.53 | Surplus |
| Arkansas | 5.20 | Shortage | 0.79 | Surplus | 0.99 | Sufficient |
| California | 4.10 | Shortage | 2.03 | Shortage | 2.29 | Shortage |
| Colorado | 4.55 | Shortage | 0.94 | Sufficient | 1.15 | Shortage |
| Connecticut | 1.71 | Shortage | 1.66 | Shortage | 1.67 | Shortage |
| Delaware | 2.94 | Shortage | 2.14 | Shortage | 2.28 | Shortage |
| Florida | 0.99 | Sufficient | 0.77 | Surplus | 0.81 | Surplus |
| Georgia | 1.88 | Shortage | 0.64 | Surplus | 0.75 | Surplus |
| Idaho | 3.00 | Shortage | 1.25 | Shortage | 1.44 | Shortage |
| Illinois | 2.63 | Shortage | 1.16 | Shortage | 1.33 | Shortage |
| Indiana | 1.77 | Shortage | 0.99 | Sufficient | 1.10 | Shortage |
| Iowa | 0.86 | Surplus | 0.44 | Surplus | 0.50 | Surplus |
| Kansas | 1.24 | Shortage | 0.44 | Surplus | 0.51 | Surplus |
| Kentucky | 2.23 | Shortage | 1.03 | Sufficient | 1.17 | Shortage |
| Louisiana | 9.32 | Shortage | 0.75 | Surplus | 0.96 | Sufficient |
| Maine | 1.81 | Shortage | 0.55 | Surplus | 0.66 | Surplus |
| Maryland | 2.01 | Shortage | 0.87 | Surplus | 1.00 | Sufficient |
| Massachusetts | 6.16 | Shortage | 1.51 | Shortage | 1.83 | Shortage |
| Michigan | 0.81 | Surplus | 0.69 | Surplus | 0.72 | Surplus |
| Minnesota | 1.63 | Shortage | 0.65 | Surplus | 0.75 | Surplus |
| Mississippi | 2.93 | Shortage | 0.60 | Surplus | 0.73 | Surplus |
| Missouri | 4.28 | Shortage | 0.72 | Surplus | 0.89 | Surplus |
| Montana | 1.18 | Shortage | 0.50 | Surplus | 0.58 | Surplus |
| Nebraska | 0.95 | Sufficient | 0.30 | Surplus | 0.35 | Surplus |
| Nevada | 2.62 | Shortage | 0.46 | Surplus | 0.57 | Surplus |
| New Hampshire | 0.84 | Surplus | 0.35 | Surplus | 0.40 | Surplus |
| New Jersey | 0.69 | Surplus | 0.41 | Surplus | 0.45 | Surplus |
| New Mexico | 15.62 | Shortage | 0.65 | Surplus | 0.83 | Surplus |
| New York | 1.43 | Shortage | 0.87 | Surplus | 0.95 | Sufficient |
| North Carolina | 1.98 | Shortage | 0.58 | Surplus | 0.69 | Surplus |
| North Dakota | 0.72 | Surplus | 0.31 | Surplus | 0.36 | Surplus |
| Ohio | 2.35 | Shortage | 0.96 | Sufficient | 1.12 | Shortage |
| Oklahoma | 1.41 | Shortage | 0.37 | Surplus | 0.45 | Surplus |
| Oregon | 1.89 | Shortage | 0.67 | Surplus | 0.79 | Surplus |
| Pennsylvania | 1.82 | Shortage | 0.54 | Surplus | 0.65 | Surplus |
| Rhode Island | 0.63 | Surplus | 1.35 | Shortage | 1.07 | Sufficient |
| South Carolina | 1.55 | Shortage | 0.50 | Surplus | 0.59 | Surplus |
| South Dakota | 0.54 | Surplus | 0.50 | Surplus | 0.51 | Surplus |
| Tennessee | 1.58 | Shortage | 0.63 | Surplus | 0.74 | Surplus |
| Texas | 12.70 | Shortage | 1.18 | Shortage | 1.49 | Shortage |
| Utah | 1.64 | Shortage | 0.53 | Surplus | 0.62 | Surplus |
| Vermont | 0.15 | Surplus | 0.20 | Surplus | 0.19 | Surplus |
| Virginia | 2.16 | Shortage | 0.80 | Surplus | 0.93 | Sufficient |
| Washington | 1.79 | Shortage | 1.02 | Sufficient | 1.14 | Shortage |
| West Virginia | 0.92 | Sufficient | 0.92 | Sufficient | 0.92 | Sufficient |
| Wisconsin | 0.97 | Sufficient | 0.35 | Surplus | 0.41 | Surplus |
| Wyoming | 0.56 | Surplus | 0.39 | Surplus | 0.42 | Surplus |

¹Alaska did not report the number of private parking spaces. However, the number of public spaces exceeded the estimated total demand.

NA = not available; NHS = National Highway System.

TABLE 7
PARKING SPACE UTILIZATION: NATIONAL SUMMARY OF DEMAND/SUPPLY RATIO
ALONG INTERSTATES AND OTHER NHS ROUTES CARRYING MORE THAN 1,000 TRUCKS
PER DAY

| Level of Overcrowding | States | | Total States |
|-----------------------|-------------------|-------------------------|--------------|
| | Public Rest Areas | Commercial Truck Stops* | |
| Shortage of spaces | 35 | 8 | 12 |
| Sufficient spaces | 4 | 6 | 8 |
| Surplus spaces | 10 | 34 | 29 |

*This column excludes Alaska, which did not report on the number of parking spaces available at commercial truck stops and travel plazas.
Source: Fleger et al. (13).

Table 7 shows a national summary of the results using the classification method for parking space utilization. These results provide a general sense of the level of unmet needs for commercial truck parking. A total of 35 states are rated as having a shortage of spaces at public rest areas, and 8 states are rated as having shortages at commercial truck stops and travel plazas. The combined rating (i.e., the sum of demand and supply for both public rest areas and commercial truck stops and travel plazas) shows that a total of 12 states are rated as having shortages. The results suggest a shortage of spaces in public rest areas, with a lesser shortage level at commercial vehicle parking facilities.

SURVEY RESULTS

The synthesis survey results provide further evidence of the extent of the commercial vehicle parking problem. As presented in Table 8, many of the states responding indicated that the level of demand for commercial vehicle parking has increased over the past 5 years.

TABLE 8
NATURE OF DEMAND INCREASE

| Rate of Demand | States Reporting |
|-----------------------------------------|------------------|
| Increased over the last 5 years | 20 |
| Decreased over the last 5 years | 4 |
| Remained the same over the last 5 years | 0 |

TABLE 9
LOCATION OF OBSERVED COMMERCIAL VEHICLE
PARKING

| Location | States Reporting |
|-------------------------------------|------------------|
| In public rest areas | 20 |
| At freeway interchange ramps | 17 |
| Along freeway shoulders | 14 |
| On conventional highway roadsides | 8 |
| On local streets near freeways | 8 |
| In local commercial areas | 8 |
| In private truck stops | 7 |
| At designated pullouts/vista points | 6 |
| At highway weigh stations | 5 |
| No significant problems | 2 |
| Other | 0 |

Table 9 confirms that nearly all of the reporting states are experiencing shortages in public rest areas and that these problems are spilling over to interchange ramps and freeway shoulders.

States were asked to identify problems that have been observed because of unauthorized parking. Table 10 presents the results to this question. The most frequently reported problem was shoulder damage, followed by restriction of sight distance, obstacles the in recovery zone, and litter and sanitation problems.

TABLE 10
PROBLEMS OBSERVED BECAUSE OF UNAUTHORIZED
PARKING

| Problem | States |
|------------------------------------------------------|--------|
| Shoulder damage | 21 |
| Restriction of sight distance | 19 |
| Obstacles in clear recovery zone for errant vehicles | 18 |
| Litter | 17 |
| Sanitation | 14 |
| Fuel/oil spillage | 11 |
| Soil erosion | 5 |
| Noise | 6 |
| Dust | 4 |
| Illegal activities | 4 |
| Other | 1 |

SUMMARY

This chapter has presented information regarding the magnitude of commercial vehicle parking demand and supply for the United States. Aggregate statistics that measure the number of public rest area spaces and spaces available at commercial truck stops and plazas are provided. An evaluation of supply and demand indicates that a number of states, at least in an aggregate sense, are experiencing severe shortages of commercial vehicle parking. Located throughout the nation, these states include those with large populations and traffic volumes as well as states with lower populations and traffic volumes. Indeed, it appears that the extent of the shortfall will require a dramatic increase in supply along with improved management of existing resources. The following chapter discusses how states are dealing with these shortfalls.

STATE PRACTICES AND POTENTIAL SOLUTIONS

This chapter provides a discussion of potential solutions to managing the increasing levels of commercial vehicle parking demand. Included in this discussion are the results of the nationwide survey as well as best practices pursued by selected states.

SURVEY RESULTS

Survey respondents were asked to rank the effectiveness and feasibility of a selected number of alternative strategies to address commercial vehicle parking demand. A 3-point scale was used in which a value of 3 was assigned to a rating of “high,” a value of 2 was assigned to a rating of “medium,” and a value of 1 was assigned to a rating of “low.” A weighted average score was calculated for each strategy. The results are summarized in Tables 11–13.

The strategies rated highest in effectiveness included the following:

- Establish federal assistance program targeted at truck parking (2.08).

- Encourage the development of public–private partnerships (2.08).
- Use Intelligent Transportation Systems (ITS) to expand amount of information available to truckers (2.04).
- Expand existing rest areas for truck parking by providing more truck spaces (2.00).
- Build new rest areas for trucks only (1.92).
- Build new rest areas for autos, trucks, and recreational vehicles (RVs) (1.79).

Improvement strategies rated the lowest in effectiveness were:

- Improve access to commercial truck stops (e.g., driveway design and curbing) (1.25).
- Locate law enforcement office substations at rest areas (1.21).
- Establish a rating system for commercial truck stops (1.21).
- Use park-and-ride lots (1.17).
- Eliminate parking time enforcement (1.15).

The strategies rated highest in feasibility included the following:

TABLE 11
SUMMARY OF IMPROVEMENT STRATEGY EFFECTIVENESS RATING

| Improvement Strategies | Effectiveness Score |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Establish federal assistance program targeted at truck parking | 2.08 |
| Encourage the development of public–private partnerships | 2.08 |
| Use ITS to expand amount of information available to truckers | 2.04 |
| Expand existing rest areas for truck parking by providing more truck spaces | 2.00 |
| Build new rest areas for trucks only | 1.92 |
| Build new rest areas for autos, trucks, and RVs | 1.79 |
| Permit the use of weigh stations for parking | 1.71 |
| Permit the use of federal-aid funds to maintain public rest areas | 1.63 |
| Build “pull offs” to provide parking | 1.54 |
| Redesign parking configuration at existing rest areas to provide more spaces | 1.46 |
| Reopen closed rest areas | 1.38 |
| Conduct education campaign to encourage drivers to better plan trips | 1.38 |
| Install security systems, cameras, and effective lighting | 1.33 |
| Expand existing rest areas for truck parking by permitting use of auto spaces at certain times | 1.29 |
| Construct multi-use rest area facilities that also address tourism and truck inspection (e.g., safety, size and weight, and diesel emissions testing) needs | 1.29 |
| Improve access to commercial truck stops (e.g., driveway design and curbing) | 1.25 |
| Locate law enforcement office substations at rest areas | 1.21 |
| Establish a rating system for commercial truck stops | 1.21 |
| Use park-and-ride lots | 1.17 |
| Eliminate parking time enforcement | 1.15 |

Notes: ITS = Intelligent Transportation Systems; RVs = recreational vehicles.

TABLE 12
SUMMARY OF IMPROVEMENT FEASIBILITY RATING

| Improvement Strategies | Feasibility Score |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Use ITS to expand amount of information available to truckers | 1.96 |
| Permit the use of weigh stations for parking | 1.92 |
| Expand existing rest areas for truck parking by providing more truck spaces | 1.79 |
| Build new rest areas for autos, trucks, and RVs | 1.54 |
| Establish federal assistance program targeted at truck parking | 1.50 |
| Encourage the development of public-private partnerships | 1.48 |
| Locate law enforcement office substations at rest areas | 1.46 |
| Install security systems, cameras, and effective lighting | 1.42 |
| Permit the use of federal-aid funds to maintain public rest areas | 1.33 |
| Redesign parking configuration at existing rest areas to provide more spaces | 1.33 |
| Reopen closed rest areas | 1.31 |
| Expand existing rest areas for truck parking by permitting use of auto spaces at certain times | 1.29 |
| Construct multi-use rest area facilities that also address tourism and truck inspection (e.g., safety, size and weight, and diesel emissions testing) needs | 1.25 |
| Use park-and-ride lots | 1.18 |
| Conduct education campaign to encourage drivers to better plan trips | 1.17 |
| Build "pull offs" to provide parking | 1.13 |
| Establish a rating system for commercial truck stops | 1.13 |
| Improve access to commercial truck stops (e.g., driveway design and curbing) | 1.08 |
| Build new rest areas for trucks only | 1.04 |
| Eliminate parking time enforcement | 1.00 |

Notes: ITS = Intelligent Transportation Systems; RVs = recreational vehicles.

TABLE 13
SUMMARY OF IMPROVEMENT STRATEGY COMBINED RATING

| Improvement Strategies | Combined Score |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Use ITS to expand amount of information available to truckers | 4.00 |
| Expand existing rest areas for truck parking by providing more truck spaces | 3.58 |
| Permit the use of weigh stations for parking | 3.27 |
| Establish federal assistance program targeted at truck parking | 3.13 |
| Encourage the development of public-private partnerships | 3.08 |
| Build new rest areas for autos, trucks, and RVs | 2.76 |
| Permit the use of federal-aid funds to maintain public rest areas | 2.17 |
| Build new rest areas for trucks only | 2.00 |
| Redesign parking configuration at existing rest areas to provide more spaces | 1.94 |
| Install security systems, cameras, and effective lighting | 1.89 |
| Reopen closed rest areas | 1.81 |
| Locate law enforcement office substations at rest areas | 1.76 |
| Build "pull offs" to provide parking | 1.73 |
| Expand existing rest areas for truck parking by permitting use of auto spaces at certain times | 1.67 |
| Construct multi-use rest area facilities that also address tourism and truck inspection (e.g., safety, size and weight, and diesel emissions testing) needs | 1.61 |
| Conduct education campaign to encourage drivers to better plan trips | 1.60 |
| Use park-and-ride lots | 1.38 |
| Establish a rating system for commercial truck stops | 1.36 |
| Improve access to commercial truck stops (e.g., driveway design and curbing) | 1.35 |
| Eliminate parking time enforcement | 1.15 |

Notes: ITS = Intelligent Transportation Systems; RVs = recreational vehicles.

- Use ITS to expand amount of information available to truckers (1.96).
 - Permit the use of weigh stations for parking (1.92).
 - Expand existing rest areas for truck parking by providing more truck spaces (1.79).
 - Build new rest areas for autos, trucks, and RVs (1.54).
 - Establish federal assistance program targeted at truck parking (1.50).
 - Encourage the development of public-private partnerships (1.48).
 - Locate law enforcement office substations at rest areas (1.46).
- The strategies rated lowest in feasibility were:
- Conduct education campaign to encourage drivers to better plan trips (1.17).
 - Build "pull offs" to provide parking (1.13).

- Establish a rating system for commercial truck stops (1.13).
- Improve access to commercial truck stops (e.g., driveway design and curbing) (1.08).
- Build new rest areas for trucks only (1.04).
- Eliminate parking time enforcement (1.00).

A measure was created that combined the effectiveness score and feasibility score to determine what strategies respondents believed would be most feasible and effective to implement. The results indicated that the following strategies would be the highest rated:

- Use ITS to expand amount of information available to truckers (4.00).
- Expand existing rest areas for truck parking by providing more truck spaces (3.58).
- Permit the use of weigh stations for parking (3.27).
- Establish federal assistance program targeted at truck parking (3.13).
- Encourage the development of public–private partnerships (3.08).
- Build new rest areas for autos, trucks, and RVs (2.76).
- Permit the use of federal-aid funds to maintain public rest areas (2.17).
- Build new rest areas for trucks only (2.00).

The responses to the ranking of strategies reflect a belief that among agencies the most effective and feasible way to reduce shortages is to make better use of existing resources, combined with a prudent expansion of existing public spaces. Because all of the respondents work in the public sector, it can be speculated that their responses reflect recognition that a public role is appropriate—but the resources to meet all needs are not available, and that the private sector is in a better position to provide these resources.

SUMMARY OF SECTION 4027 STUDY STRATEGIES

This section of the report presents a compilation of recommended actions for addressing commercial truck parking shortages from the Section 4027 study (18). As part of this study, states were asked to identify actions they would consider useful in solving truck parking shortages. These actions fell into the following six broad categories:

- Expand or improve public rest areas,
- Improve commercial truck stops and travel plazas,
- Encourage the formation of public–private partnerships,
- Educate or inform drivers about available spaces,
- Change parking enforcement rules, and
- Conduct additional studies.

EXPAND PUBLIC FACILITIES

The recommendations on how to expand public facilities included the following:

- Construct new public rest area facilities with additional truck parking spaces. Consider developing truck-only parking facilities. Raise the priority of public rest area construction by making it a safety-related issue.
- Add new truck spaces to existing public rest areas as part of scheduled rest area reconstruction or rehabilitation. Redesign and reconfigure rest areas to increase parking and improve commercial vehicle circulation through the lot. Also, convert parallel parking to pull-through parking for added driver convenience.
- Convert closed public rest areas into parking facilities and consider designating these facilities for truck parking only.
- Investigate the use of federal funds for maintaining public rest areas. Explore alternative financing of public rest area construction. Develop pilot projects for generating revenue to keep public rest areas open.
- Partner with other state agencies, such as the Department of Tourism, to incorporate truck parking needs in the development of new tourist information sites.
- Review and expand security at public rest areas by providing call boxes, cameras, increased law enforcement, etc.
- Identify locations where commercial vehicle parking can be combined with ports of entry, weigh stations, or police substations. Consider exempting trucks from enforcement actions to encourage the use of these sites for parking by fatigued drivers.
- Construct turnouts in rural sections of the Interstate for parallel parking by commercial trucks.
- Upgrade facilities currently closed during off-season to be open year round.
- Improve geometric design at interchanges to increase convenience to drivers choosing to exit. For example, increase turning radii, widen narrow bridges, place traffic signals where warranted, and add turning lanes to ease access and egress to commercial truck stops and travel plazas.

CASE STUDY: NEW YORK STATE

The New York State DOT (NYSDOT) has undertaken a major program to upgrade public rest areas along the Interstate system. In 1997, NYSDOT adopted a Rest Area Policy providing for facilities to meet the future needs of both automobile and commercial motor vehicle users. The policy also acknowledges the importance of providing rest areas

to address concerns about commercial motor vehicle operator fatigue. As a result of this policy, NYSDOT has increased the number of commercial vehicle parking spaces by between 200 and 300. NYSDOT is also working with a county to develop a county-owned rest area that would be located within the state-owned right-of-way, but accessed from the local road system.

Regional offices within NYSDOT were requested to prepare Regional Rest Area Plans to consider the needs of commercial motor vehicle operators. Some plans recommended the conversion of closed rest areas into commercial vehicle parking. Others proposed the construction of new rest areas on heavily used corridors. Regional plans also provided for improved signs and lighting, expanded areas for drivers and vehicles placed out of service, and state police office space at new and reconstructed sites. NYSDOT initiated multiregion corridor studies to obtain more detailed input into a Statewide Rest Area Plan. These corridor studies involved the cooperation of key elected officials, state police, and state and regional economic development officials, and they focused on safety and tourism issues such as parking, security, and inspection facilities.

NYSDOT formulated a Statewide Rest Area Plan that provided a framework for a system of rest areas. This plan reflects the Statewide Rest Area Policy and Regional Rest Area Plans and addresses a number of issues, including

- Spacing and number of rest areas—Generally, 1 hour of driving time will be used as the interval between rest area facilities.
- Motor carrier industry—Adequate commercial vehicle services, parking, and safety facilities will be provided as part of the new system of rest areas.
- Tourist information—Additional tourist information will be provided to enhance the economic development aspects of the rest area system.

EXPAND OR IMPROVE COMMERCIAL TRUCK STOPS AND TRAVEL PLAZAS

The following measures were among those recommended:

- Increase yearly truck registration fees with the stipulation that these fees can be used by states only 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 businesses and shift funds to areas where additional development is desirable.
- Remove cost-prohibitive road improvement requirements imposed by state DOTs on developers attempting to open new facilities.

ENCOURAGE FORMATION OF PUBLIC–PRIVATE PARTNERSHIPS

The recommendations on how to encourage formation of public–private partnerships included the following:

- Create working groups between public and private sectors to develop new parking, and explore options to overcome barriers to cooperation.
- Work with the private sector to redevelop or construct new public rest areas with direct access to the Interstate.
- Provide low-interest loans or grants to commercial truck stops and travel plazas to increase capacity.
- Construct state-owned lots adjacent to commercial truck stops and travel plazas, and enter into agreements 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).

CASE STUDY: CALIFORNIA

Caltrans convened the Caltrans Safety Roadside Rest Area System Team in January 1999 to develop a vision and recommendations for improving California’s Safety Roadside Rest Area System. The team included organizations representing the traveling public, commercial drivers, senior citizens, Caltrans staff responsible for safety rest areas, and several other state agencies, and was charged with addressing the following issues:

- Significant increases in the safety of roadside rest area usage,
- Lack of a comprehensive master plan update since 1985,
- Perceived low level of priority and staffing for rest areas, and
- Issues related to truck usage of the safety rest areas.

Team members met five times during the spring of 1999 to identify issues, develop goals, and draft recommendations. The recommendations were developed for consideration by Caltrans management and the California Transportation Commission (CTC).

Caltrans developed its first statewide master plan for safety rest areas in 1962. This plan included the construction of 269 safety rest area units on the state highway system at approximately 30-mi intervals. The plan was revised in 1968 and expanded to 278 units. In 1974, the department revised the plan to reduce the number of rest area units to 162 and increase the spacing to approximately 60 mi. By 1985, a total of 91 units had been constructed. However, the plan

was again revised to reduce the number of units to 104. In addition, the CTC required that the remaining 13 units be developed by the private sector with minimal state investment.

In 1997, Caltrans was directed by the CTC to explore the potential for closing existing rest areas that had become obsolete for various reasons. In response to this direction, Caltrans conducted an analysis of future demand and recommended against a strategy of closure, suggesting that a policy of rehabilitation be pursued. The CTC agreed with this recommendation, and Caltrans established the Safety Roadside Rest Area Improvement Team to support that purpose. The California Safety Roadside Rest Area Improvement Team consisted of representatives from the following organizations:

- American Association of Retired Persons;
- Automobile Club of Southern California;
- California Department of Mental Health;
- California Department of Rehabilitation;
- California Department of Transportation;
- California Commission on Aging;
- California Division of Tourism;
- California Highway Patrol;
- California Roundtable on Parks, Recreation, and Tourism;
- California State Automobile Association;
- California Trucking Association;
- Collier Interpretive Information Center Agency;
- FHWA;
- Parents Against Tired Truckers; and
- Traveler Center Services

The Safety Roadside Rest Area Improvement Team formulated the following eight recommendations:

1. Raise the priority of the Safety Rest Area System as integral to highway safety.
2. Develop an updated Roadside Rest Area System Master Plan.
3. Rescind the mandatory privatization policy.
4. Expand and formalize public and private partnerships.
5. Conduct ongoing evaluation of rest area system performance.
6. Investigate in-route truck parking capacity issues.
7. Maintain ongoing stakeholder involvement.
8. Update Safety Roadside Rest Area design standards and guidelines.

Caltrans has focused on pursuing the implementation of many of these actions. However, the most significant progress that has been made to date includes the development of a new master plan, investigation of truck parking issues, and exploration of new partnership and privatization strategies.

In response to these recommendations, Caltrans established an In-Route Truck Issues Task Force. This task force was chaired by the Traffic Operations Program and included participation by the California Highway Patrol, California Trucking Association, California Chapter of the National Association of Truck Stop Operators, the Automobile Association of Southern California, and the California State Automobile Association.

The task force has identified a privatization–partnership concept that proposes the construction of fenced, lighted parking lots built adjacent to commercial developments in the vicinity of overcrowded rest areas or where the master plan indicates unmet stopping needs. The auxiliary lots would be free to all motorists and there would be signs directing motorists from the highway and from any nearby rest area. It is envisioned that the private sector would provide restrooms, clean up litter, and provide security at these auxiliary lots through competitive, negotiated, long-term agreements. Land for these lots may be leased or purchased by the state. If implemented, this concept could alleviate the overcrowding experienced at current rest area locations.

BETTER EDUCATE OR INFORM DRIVERS ABOUT AVAILABLE SPACES

Specific recommendations offered by the states included the following:

- Educate drivers on the safety benefits of rest and encourage them to use available spaces. For example, provide safety information (e.g., through brochures and public service announcements) to both drivers and trucking companies about the relationship between driver fatigue and accidents, to encourage fatigued drivers to get off the road.
- Develop ITS deployments that provide drivers with real-time information on the location and availability of parking spaces. For example, investigate using cell 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 to distribute information on the location and type of parking spaces within the base state to participating motor carriers.
- Publish and distribute a “truckers’ map” that pinpoints parking facilities for drivers.
- Initiate a program that informs drivers of state-approved parking facilities. Such facilities may have security, lighting, and other features that will encourage drivers to use existing spaces.

- Use both static and real-time signage to provide drivers with information about the availability and location of public and private parking spaces.

CASE STUDY: MARYLAND

The Baltimore Region Freight Movement Task Force undertook a survey of commercial vehicle parking demand along high truck travel corridors in the region. The surveys conducted by the group indicated that commercial vehicles were parking illegally along Interstate routes during the night, even though an adequate supply of public rest areas, commercial truck stops, commuter park-and-ride lots, and weigh stations were available for use. In response to these observations, the region implemented a strategy to educate commercial vehicle drivers on the supply of parking. Signs were added along the I-95 corridor to advise drivers of commercial truck stops. In addition, these signs promoted the use of park-and-ride lots and weigh stations for use by commercial vehicles during overnight hours. A truckers' map was published that contained information on the location of public and private parking areas and widely distributed to the commercial vehicle driver community.

PARKING ENFORCEMENT RULES

Specific recommendations offered by the states included the following:

- Implement more stringent enforcement of parking rules to remove vehicles from unsafe locations, such as interchange ramps.
- Change parking limits to allow trucks more time to park at public rest areas and weigh stations.
- Encourage local government and business support for constructing and operating commercial truck stop facilities in or near their community industrial and business parks (i.e., zoning). The “Not in My Backyard” attitude has made it difficult to gain such local support. That attitude has become a major problem in developing new commercial truck stops and public rest area facilities near the boundaries of larger cities.
- Encourage better recognition of credit and tax incentives for companies and terminal operators that provide truck staging area facilities for pickup and delivery activities with 24-hour access, parking, sanitation, and security. This possibility could be promoted at both the state and national levels.
- Promote building requirements for future warehouse and delivery facilities to incorporate truck parking

and staging facilities as part of their development and building permit process. Encourage public-private partnerships to fund or offset the possibility of increased costs. These requirements could be promoted at both the state and local level.

CASE STUDY: KENTUCKY TRANSPORTATION CABINET

The Kentucky Transportation Cabinet developed a “safe haven” concept to permit commercial vehicle drivers to park at weigh stations during overnight hours. Currently, a total of seven weigh stations are used for this purpose, and they provide approximately 225 commercial vehicle parking spaces. Employees of the Division of Motor Vehicle Enforcement staff weigh stations that are open 24 hours a day. Under the safe haven concept, drivers are not disturbed except in the case of an emergency.

CASE STUDY: MINNESOTA

Several states suggested that additional studies were required to better understand the level of need pertaining to truck parking demand and to formulate feasible solutions. To increase the level of understanding of safety rest areas issues, the Minnesota DOT conducted several market research studies. These studies included focus groups, a statewide telephone survey, an evaluation of nighttime truck parking, and an examination of truck parking length of stay. Content included an analysis of the parking needs of commercial motor vehicle drivers. Data collected on nighttime commercial truck parking use at Minnesota's Interstate and non-Interstate rest areas have documented an increase in nighttime demand since 1975. These studies have resulted in in-depth understanding of the site-specific parking shortages and provided justification for truck parking lot expansion at high-demand rest areas.

SUMMARY

This chapter has presented a number of alternative approaches that states have implemented to manage a growing demand for commercial vehicle parking demand. Several example case studies were presented that outlined strategies adopted by states to manage the problem of commercial vehicle parking. The strategies developed by these states generally have been effective in managing increasing parking demand. These studies include strategies to make better use of existing spaces by sharing information as well as developing policies and approaches to expand the amount of spaces available for use by truckers.

CONCLUSIONS

Rapid increases in truck traffic, combined with a limited expansion of public rest areas and commercial vehicle parking, have resulted in a shortage of available parking. Because of the parking shortages and limits on stays in public facilities, truck drivers may be creating unsafe situations by parking on roadway access ramps and shoulders to obtain adequate rest. This synthesis describes approaches that respond to commercial vehicle parking demand.

The problems associated with commercial vehicle parking are evidenced by the presence of trucks parked along public rights-of-way and overflowing public parking areas. The solution to the problem lies in a multifaceted approach that includes government, the commercial carrier industry, and commercial truck stop and plaza operators. There are simply not enough public resources, nor is there a desire among public agencies, to greatly expand the level of public investment in public rest area facilities. A closer working arrangement between the private-sector providers of parking and the public sector could leverage existing resources and meet expanding needs. The following detailed conclusions reinforce the need for a coordinated approach to the problem.

- First, commercial vehicle travel demand is large and growing—and along with it an increased demand for parking.

As of 2000, approximately 500,000 interstate motor carriers operated in the United States, and projections over the next 20 years point to continuing growth. As truck traffic on America's highways has increased, the demand for services and facilities for the trucking industry, including the demand for truck parking spaces, has increased as well.

All of the states responding to the survey administered as part of this synthesis project reported that truck traffic parking demand has increased in their state over the last 5 years. Major problems cited as a result of this growth include shoulder damage, restriction of site distances, the presence of obstacles in the clear zone, and litter and sanitation problems in public rest areas. Estimates indicate a daily demand of approximately 66,000 public rest area spaces and 221,300 commercial truck stop and travel plaza spaces. This compares with a supply of 31,300 public spaces and 277,775 private truck stop and travel plaza spaces. A number of states have conducted studies that verify the presence of parking shortages, particularly along high-travel demand corridors.

- No single entity is responsible for providing parking facilities.

Under the current federal Hours of Service rules, commercial vehicle drivers participating in interstate commerce are generally permitted to drive up to 10 hours after 8 consecutive hours off duty. Drivers are responsible for obtaining long-term rest, but no agency or organization is responsible for providing required facilities. Public rest area facilities were never intended to serve as long-term rest points for travelers—either automobile or commercial traffic. These areas are generally designed to provide only a minimal amount of facilities to provide travelers with time for short-term rest and refreshment. An entire industry has developed to provide services to the trucking industry, but these businesses provide parking only as an inducement for truckers to stop and purchase various goods and services. Parking availability is generally on a first-come, first-serve basis, so truckers wanting to stop may be faced with a full commercial lot and the need to keep searching for another stopping point for rest.

- The problem is nationwide.

An analysis of parking supply and demand concludes that the problem of parking shortages is nationwide. There are, however, variations among states and travel corridors in shortages and surpluses. However, shortfalls can be observed throughout the nation because truck traffic exists nationwide. The results of the survey conducted for this synthesis confirm that finding. Responding states from throughout the nation reported shortages of parking, particularly at public rest area locations. Many states limit the time that trucks can park at rest areas, although few strictly enforce these limits. It is speculated that this is because enforcement officials do not want to send tired truckers back on the road.

- Most supply is located in commercial truck parking lots and plazas.

The data provide evidence that the amount of parking available for commercial vehicles is much greater in the private sector than in the public sector. Furthermore, most truckers prefer to use commercial parking facilities for long-term rest as opposed to using public rest areas. However, the simple provision of parking at any location will not meet the demand. Parking must be strategically located so that commercial drivers can obtain required rest in a

geographic location that supports their need to maintain a delivery schedule.

- The problem is concentrated in public rest areas.

Public rest areas throughout the nation are experiencing overcrowding, particularly during the overnight hours. Nearly all public rest areas have a limited number of commercial truck parking spaces. Over the last several decades only limited parking expansion has occurred. When such availability is compared with the significant increase in truck traffic on the nation's highways during this period, it should not be surprising that many public rest areas are overcrowded. States have undertaken actions to improve the amenities and functionality of rest areas, including developing Welcome Centers that are designed to expand some services to travelers. Although states consider the needs of truckers as part of the planning and design process, they do not develop or expand rest areas for the exclusive use of the trucker.

- A multipronged approach is required.

The results of this synthesis project suggest that state DOTs have identified a number of potential solutions to dealing with truck parking demands. One solution is to expand or improve public rest areas. For example, New York State developed a statewide program to expand and improve rest areas over the next decade in response to increased needs and deteriorating infrastructure. Participation came from a variety of stakeholders, including the trucking industry, travel plaza and truck stop operators, as well as public transportation and law enforcement agencies. The resulting document will serve as the guide for state investment to expand and upgrade rest area facilities and services. Also, the Kentucky Transportation Cabinet developed a "safe haven" program to allow truckers to use state weigh stations for long-term parking, requiring little or no additional investment.

The survey conducted for this synthesis identified strong support among responding states for the establishment of a federal assistance program targeted at truck parking. Although there is no specific information on exactly

what this program would entail, it is possible that states believe that at least some portion of such funds would be used to expand public facilities.

A second solution is to educate or inform drivers about available spaces. Evidence shows that most of the spaces available for trucks are located in private truck stops and travel plazas. In some cases, truckers could benefit from more timely and accurate information regarding the location and availability of spaces. For example, Maryland publishes and widely distributes a "Truckers' Map" that identifies the location of both public rest areas and private truck stops and travel plazas. This type of information is beneficial to truckers searching for places to stop for long-term rest. Also, survey respondents recommended the use of Intelligent Transportation System technology as a means to provide more timely and accurate information to truckers regarding space location and availability. Many believe that this would be both effective and feasible in dealing with shortages.

Another solution is to make better use of the private sector and private truck spaces. For example, the California In-Route Truck Issues Task Force identified a privatization-partnership concept that proposed the construction of fenced, lighted parking lots built adjacent to commercial developments in the vicinity of overcrowded rest areas or where the master plan indicates unmet stopping needs. The auxiliary lots would be free to all motorists and would be publicized by signs along the highway and from nearby rest areas. It is envisioned that the private sector would provide restrooms, clean up litter, and provide security at these auxiliary lots through competitive, negotiated, long-term agreements. Land for these lots might be leased or purchased by the state.

The evidence collected for this synthesis study shows that there are many more private spaces than public spaces. A better understanding of the reasons for this imbalance is required before developing specific strategies to address this imbalance. Among the factors to be considered are poor accessibility to a private supply of parking spaces because of poor geometric design, a lack of information concerning the availability of spaces, and inadequate security at private locations, which can inhibit their use by truckers.

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APPENDIX A

Survey Questionnaire

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Project 20-5, Synthesis Topic 32-01

Dealing with Truck Parking Demands

Questionnaire

It is nationally recognized that commercial motor vehicle operators frequently cannot find adequate, safe parking for rest purposes. Many state departments of transportation (DOTs) are experiencing a heavy demand for commercial vehicle parking at public rest areas that exceeds capacity. This survey is being conducted to gather information to determine what states are doing to address the problem of limited public and private truck rest facilities. Specific issues to be addressed include:

- Extent of the problem
- Rest area polices (e.g., state DOT actions, time limitations, and enforcement)
- Legislative authority (e.g., funding alternatives—partnerships, leveraging, loans)
- Communication/technology (e.g., ITS, radio, signage, and world wide web)
- Education (e.g., in-service training)
- State efforts (e.g., other solutions for meeting demand and increasing capacity using existing infrastructure)
- Security at rest areas.

The information you supply will provide valuable input to the development of a summary report of current research and practices addressing this important topic. Please return your completed questionnaire, along with any supporting documents by **August 10, 2001** to:

Jeffrey Trombly, Ph.D.
102 Cypress Lane
Oak Ridge, TN 37830

If you have any questions, please call Dr. Trombly at 865-481-8563, or email him at jtrom457@aol.com.

Below, please provide the name of the person completing this questionnaire or someone else who may be contacted to obtain needed follow-up information:

Name: _____

Title: _____

Agency: _____

Street Address: _____

City/State/Zip: _____

Telephone: _____

Fax: _____

E-mail: _____

Extent of the Problem

1. Where have shortages in commercial vehicle parking been observed? (check all that apply)

- In public rest areas
- Along freeway shoulders
- At designated pullouts/vista points
- At freeway interchange ramps
- On conventional highway roadsides
- On local streets near freeways
- In local commercial areas
- In private truck stops
- At highway weigh stations
- Other _____
- No significant problems

2. What problems have you observed due to unauthorized truck parking?

- Restriction of sight distance
- Obstacles in clear recovery zone for errant vehicles
- Litter
- Fuel/oil spillage
- Sanitation
- Soil erosion
- Shoulder damage
- Noise
- Dust
- Illegal activities
- Other _____

3. To what extent do cities and counties in your state restrict truck parking on local streets?

- None
- Somewhat, but not significantly
- Significantly enough to be a problem to commercial drivers

4. Have you seen shortages

- Increase over the last 5 years?
- Decrease over the last 5 years?
- Remain the same over the last 5 years?
- Don't know

5. Has your agency conducted or sponsored field studies documenting the extent of commercial vehicle shortages over the last 5 years?

- Yes
- No

Rest Area Policies

1. To what extent do cities and counties in your state restrict truck parking on local streets?

- None
 Somewhat, but not significantly
 Significantly enough to be a problem to commercial drivers

2. Does your agency place a time limit on parking by commercial vehicles at public rest areas?

- No
 Yes. If Yes, do these limits apply to all rest areas or selected rest areas?
 What is the time limit? _____ hours

3. How strictly are time limits enforced?

- Very strictly
 Strictly
 Not very strictly
 Does not apply—no time limit

4. What are the various penalties for overtime parking violations in rest areas, and what is the due process for the carrier in regarding citation/protest resolution?

5. Does your agency allow truck parking on interchange ramps?

- Yes
 No

6. Has your agency developed a statewide master rest areas policy, master plan, and/or improvement program for public rest area construction and maintenance?

- No
 Yes. If Yes, what year was the plan developed?
 Statewide Rest Area Policy _____
 Rest Area Master Plan _____
 Rest Area Improvement Program _____

Please describe the status of implementation of this plan in the space below.

7. Are all rest areas operated by your agency opened year round?

- Yes
 No. If No, when and why are rest areas closed?
 Closed during winter season
 Other _____

8. Has your agency closed rest areas in the last 5 years and not replaced them at a new location?
- No
 Yes. If Yes, why were rest areas closed? (check all that apply)
- Lack of user demand
 - Lack of operating funds
 - Lack of capital funds
 - Reduce incidence of crime
 - Other, please describe _____
9. Has your agency constructed new rest areas or expanded commercial vehicle parking at existing rest areas in the last 5 years?
- No
 Yes. If Yes, how many new rest areas: _____ and how many spaces _____
how many new commercial vehicle parking spaces: _____
10. What is the length of stay for truck parking you use for rest area design capacity?
- 20 minutes
 - 30 minutes
 - 1 hour
 - 2 hours
 - Other _____
11. Does your state's legislative/legal regulatory authority permit (yes or no):
- Flexibility in the percentage of rest area parking devoted to trucks?
 - Construction of truck-only rest areas?
 - Construction of roadside truck parking areas?
 - Partnership with the private sector in planning of rest areas?
 - Partnership with the private sector in planning truck parking areas?
 - Partnership with the private sector in constructing rest areas?
 - Partnership with the private sector in constructing parking areas?
 - Partnership with the private sector in constructing truck parking areas?
 - Partnership with the private sector in maintaining/operating rest areas?
 - Partnership with the private sector in maintaining/operating truck parking areas?
12. For which of the following do you maintain a current master plan?
- Rest areas
 - Roadside truck parking areas
13. What is your projected 5-year expenditures for:
- New rest areas? \$ _____
Existing rest area rehabilitation/expansion? \$ _____
Truck parking areas? \$ _____

14. How many truck parking spaces do you estimate these expenditures will add?

New rest areas _____
 Existing rest area rehabilitation/expansion _____
 Truck parking areas _____

15. Do you have examples/analysis or safety issues caused by trucks parked adjacent to highways?

___ Yes
 ___ No

Improvement Strategies

1. Presented here is a list of actions that may be implemented to expand the amount of available parking or improve the utilization of existing parking for commercial vehicles. Please rate the “Effectiveness” of these strategies in solving the parking shortage problem your state and the “Feasibility” of implementing these strategies in your state. Rate “Effectiveness” and “Feasibility” using a rating of “High,” “Medium,” and “Low.” Please feel free to add any strategies that you do not see on this list.

| Strategy | Effectiveness in Solving Shortage Problem | Feasibility of Implementation |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------|
| Build new rest areas for trucks only | | |
| Build new rest areas for autos, trucks, and RVs | | |
| Expand existing rest areas for truck parking by providing more truck spaces | | |
| Expand existing rest areas for truck parking by permitting use of auto spaces at certain times | | |
| Redesign parking configuration at existing rest areas to provide more spaces | | |
| Build “pull offs” to provide parking | | |
| Eliminate parking time enforcement (If your state does not have a time restriction, enter N/A) | | |
| Permit the use of weigh stations for parking | | |
| Locate law enforcement office substations at rest areas | | |
| Establish a rating system for commercial truck stops | | |
| Improve access to commercial truck stops (e.g., driveway design, curbing, etc.) | | |
| Install security systems, cameras, and effective lighting | | |
| Encourage the development of public-private partnerships | | |
| Use park-and-ride lots | | |
| Reopen closed rest areas | | |
| Permit the use of federal-aid funds to maintain public rest areas | | |
| Use ITS to expand amount of information available to truckers | | |
| Conduct education campaign to encourage drivers to better plan trips | | |
| Construct multi-use rest area facilities that also address tourism and truck inspection (e.g., safety, size and weight, diesel emissions testing) needs | | |

| | | |
|----------------------------------------------------------------|--|--|
| Establish federal assistance program targeted at truck parking | | |
| | | |
| | | |
| | | |
| | | |

2. Generally, how often do your state rest area and truck parking managers communicate or meet with the following stakeholders regarding rest area and truck parking? (S = seldom or not at all, O = occasionally or every few years, F = frequently, annually, or more often).

- Truck stop operators association
- Trucking association
- Highway law enforcement
- Local agency transportation planners
- Traffic safety organizations
- Automobile associations

PLEASE PROVIDE ANY ADDITIONAL COMMENTS BELOW:

Thank You!

Please enclose any information you may have on:

- Rest area parking demand versus capacity parking along roadway shoulders or at interchanges, and rest area use
- Commercial vehicle parking policies and plans
- Rest area master plans
- Any other relevant material.

APPENDIX B

List of Survey Respondents

| | | |
|-------------|---|----------------|
| California | • | Montana |
| Connecticut | • | Nebraska |
| Delaware | • | New Hampshire |
| Florida | • | New Jersey |
| Georgia | • | New York |
| Idaho | • | Ohio |
| Illinois | • | Oklahoma |
| Indiana | • | South Carolina |
| Iowa | • | Tennessee |
| Kansas | • | Texas |
| Kentucky | • | Wisconsin |
| Maine | • | Wyoming |

APPENDIX C

Tables of Survey Responses

Extent of the Problem

| 1. Where have shortages in commercial vehicle parking been observed? | Yes | No | Total |
|-----------------------------------------------------------------------------|------------|-----------|--------------|
| In public rest areas | 20 | 4 | 24 |
| Along freeway shoulders | 14 | 10 | 24 |
| At designated pullouts/vista points | 7 | 17 | 24 |
| At freeway interchange ramps | 17 | 7 | 24 |
| On conventional highway roadsides | 8 | 16 | 24 |
| On local streets near freeways | 8 | 16 | 24 |
| In local commercial areas | 8 | 16 | 24 |
| In private truck stops | 7 | 17 | 24 |
| At highway weigh stations | 5 | 19 | 24 |
| Other: _____ | 0 | 24 | 24 |
| No significant problems. | 2 | 22 | 24 |

| 2. What problems have you observed due to unauthorized truck parking? | Yes | No | Total |
|------------------------------------------------------------------------------|------------|-----------|--------------|
| Restriction of sight distance | 20 | 4 | 24 |
| Obstacles in clear recovery zone for errant vehicles | 18 | 6 | 24 |
| Litter | 17 | 7 | 24 |
| Fuel/oil spillage | 11 | 13 | 24 |
| Sanitation | 14 | 10 | 24 |
| Soil erosion | 5 | 19 | 24 |
| Shoulder damage | 21 | 3 | 24 |
| Noise | 6 | 18 | 24 |
| Dust | 4 | 20 | 24 |
| Illegal activities | 4 | 20 | 24 |
| Other: _____ | 2 | 22 | 24 |

3. To what extent do cities and counties in your state restrict truck parking on local streets?

| | Yes | No | Total |
|------------------------------------------------------------|------------|-----------|--------------|
| None | 2 | 22 | 24 |
| Somewhat, but not significantly | 14 | 10 | 24 |
| Significantly enough to be a problem to commercial drivers | 5 | 19 | 24 |

4. Have you seen shortages:

| | |
|----------------------------------------|----|
| Increase over the last 5 years? | 20 |
| Decrease over the last 5 years? | 4 |
| Remain the same over the last 5 years? | 0 |
| Don't know | 0 |

5. Has your agency conducted or sponsored field studies documenting the extent of the commercial vehicle parking shortages over the last 5 years?

| | |
|-----|----|
| Yes | 16 |
| No | 8 |

Rest Area Polices

1. To what extent do cities and counties in your state restrict truck parking on local streets?

| | |
|------------------------------------------------------------|----|
| None | 3 |
| Somewhat, but not significantly | 11 |
| Significantly enough to be a problem to commercial drivers | 6 |

2. Does your agency place a time limit on parking by commercial vehicles at public rest areas?

| | |
|---------------------|----|
| No | 6 |
| Yes | 18 |
| All rest areas | 15 |
| Selected rest areas | 1 |

3. How strictly are time limits enforced?

| | |
|------------------------------|----|
| Very strictly | 0 |
| Strictly | 0 |
| Not very strictly | 18 |
| Does not apply—no time limit | 3 |

4. What are the various penalties for overtime parking violations in rest areas, and what is the due process for the carrier in regarding citation/protest resolution?

5. Does your agency allow truck parking on interchange ramps?

| | |
|-----|----|
| Yes | 5 |
| No | 18 |

6. Has your agency developed a statewide master rest areas policy, master plan, and/or improvement program for public rest area construction and maintenance?

| | |
|-----|----|
| No | 11 |
| Yes | 12 |

7. Are all rest areas operated by your agency opened year round?

| | |
|-----------------------------|----|
| Yes | 18 |
| No | 6 |
| Closed during winter season | 6 |
| Other: _____ | 0 |

8. Has your agency closed rest areas in the last 5 years and not replaced them at a new location?

| | |
|-----------------------------------------------------------------|----|
| No | 20 |
| Yes. If Yes, why were rest areas closed? (check all that apply) | 4 |

| | |
|---------------------------|---|
| Lack of user demand | 1 |
| Lack of operating funds | 2 |
| Lack of capital funds | 2 |
| Reduce incidence of crime | 1 |
| Other, please describe: | 3 |

9. Has your agency constructed new rest areas or expanded commercial vehicle parking at existing rest areas in the last 5 years?

| | |
|-----|----|
| No | 9 |
| Yes | 15 |

10. What is the length of stay for truck parking you use for rest area design capacity?

| | |
|-------------|---|
| 20 minutes | 6 |
| 30 minutes | 4 |
| 1 hour | 0 |
| 2 hours | 3 |
| Other _____ | 5 |

11. Does your state's legislative/legal/regulatory authority permit

| | |
|-----------------------------------------------------------------------------------|----|
| Flexibility in the percentage of rest area parking devoted to trucks? | 18 |
| Construction of truck-only rest areas? | 12 |
| Construction of roadside truck parking areas? | 13 |
| Partnership with the private sector in planning of rest areas? | 7 |
| Partnership with the private sector in planning truck parking areas? | 7 |
| Partnership with the private sector in constructing rest areas? | 6 |
| Partnership with the private sector in constructing parking areas? | 3 |
| Partnership with the private sector in constructing truck parking areas? | 4 |
| Partnership with the private sector in maintaining/operating rest areas? | 10 |
| Partnership with the private sector in maintaining/operating truck parking areas? | 5 |

12. For which of the following do you maintain a current master plan?

| | Yes | No | Total |
|------------------------------|-----|----|-------|
| Rest areas | 13 | 9 | 22 |
| Roadside truck parking areas | 3 | 18 | 21 |

13. What is your projected 5-year expenditure for

New rest areas \$ _____

Existing rest area rehabilitation/expansion \$ _____

Truck parking areas \$ _____

14. How many truck parking spaces do you estimate these expenditures will add?

New rest areas _____

Truck parking areas _____

15. Do you have examples/analysis or safety issues caused by trucks parked adjacent to highways?

Yes 8
 No 13

Improvement Strategies

1. Presented here is a list of actions that may be implemented to expand the amount of available parking or improve the utilization of existing parking for commercial vehicles. Please rate the “Effectiveness” of these strategies in solving the parking shortage problem your state and the “Feasibility” of implementing these strategies in your state. Rate “Effectiveness” and “Feasibility” using a rating of “High,” “Medium,” and “Low.” Please feel free to add any strategies that you do not see on this list.

Improvement Strategies

| Strategy—Effectiveness | High | Medium | Low | No Response | N/A | Total |
|------------------------------------------------------------------------------------------------|------|--------|-----|-------------|-----|-------|
| Build new rest areas for trucks only | 9 | 6 | 7 | 2 | 0 | 24 |
| Build new rest areas for autos, trucks, and RVs | 4 | 13 | 5 | 2 | 0 | 24 |
| Expand existing rest areas for truck parking by providing more truck spaces | 7 | 12 | 3 | 2 | 0 | 24 |
| Expand existing rest areas for truck parking by permitting use of auto spaces at certain times | 2 | 5 | 15 | 2 | 0 | 24 |
| Redesign parking configuration at existing rest areas to provide more spaces | 2 | 9 | 11 | 2 | 0 | 24 |
| Build “pull offs” to provide parking | 6 | 5 | 9 | 4 | 0 | 24 |
| Eliminate parking time enforcement (If your state does not have a time restriction, enter N/A) | 1 | 1 | 10 | 2 | 10 | 24 |
| Permit the use of weigh stations for parking | 4 | 12 | 5 | 3 | 0 | 24 |
| Locate law enforcement office substations at rest areas | 2 | 3 | 17 | 2 | 0 | 24 |
| Establish a rating system for commercial truck stops | 2 | 3 | 17 | 2 | 0 | 24 |
| Improve access to commercial truck stops (e.g., driveway design, curbing, etc.) | 1 | 7 | 13 | 3 | 0 | 24 |

| | | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---|----|----|
| Install security systems, cameras, and effective lighting | 3 | 4 | 15 | 2 | 0 | 24 |
| Encourage the development of public-private partnerships | 7 | 14 | 1 | 2 | 0 | 24 |
| Use park-and-ride lots | 2 | 4 | 14 | 3 | 1 | 24 |
| Reopen closed rest areas | 2 | 2 | 8 | 2 | 10 | 24 |
| Permit the use of federal-aid funds to maintain public rest areas | 4 | 9 | 9 | 2 | 0 | 24 |
| Use ITS to expand amount of information available to truckers | 7 | 12 | 2 | 2 | 0 | 24 |
| Conduct education campaign to encourage drivers to better plan trips | 3 | 5 | 14 | 2 | 0 | 24 |
| Construct multi-use rest area facilities that also address tourism and truck inspection (e.g., safety, size and weight, diesel emissions testing) needs | 1 | 7 | 14 | 2 | 0 | 24 |
| Establish federal assistance program targeted at truck parking | 10 | 8 | 4 | 2 | 0 | 24 |

Improvement Strategies

| Strategy—Feasibility | High | Medium | Low | No Response | N/A | Total |
|------------------------------------------------------------------------------------------------|------|--------|-----|-------------|-----|-------|
| Build new rest areas for trucks only | 1 | 1 | 20 | 2 | 0 | 24 |
| Build new rest areas for autos, trucks, and RVs | 5 | 4 | 12 | 2 | 0 | 24 |
| Expand existing rest areas for truck parking by providing more truck spaces | 6 | 9 | 7 | 2 | 0 | 24 |
| Expand existing rest areas for truck parking by permitting use of auto spaces at certain times | 2 | 5 | 15 | 2 | 0 | 24 |
| Redesign parking configuration at existing rest areas to provide more spaces | 2 | 6 | 14 | 2 | 0 | 24 |
| Build “pull offs” to provide parking | 3 | 1 | 16 | 4 | 0 | 24 |
| Eliminate parking time enforcement (If your state does not have a time restriction, enter N/A) | 0 | 1 | 11 | 2 | 10 | 24 |
| Permit the use of weigh stations for parking | 10 | 5 | 6 | 2 | 1 | 24 |
| Locate law enforcement office substations at rest areas | 5 | 3 | 14 | 2 | 0 | 24 |
| Establish a rating system for commercial truck stops | 0 | 5 | 17 | 2 | 0 | 24 |
| Improve access to commercial truck stops (e.g., driveway design, curbing, etc.) | 0 | 5 | 16 | 3 | 0 | 24 |
| Install security systems, cameras, and effective lighting | 4 | 4 | 14 | 2 | 0 | 24 |
| Encourage the development of public-private partnerships | 1 | 11 | 9 | 2 | 0 | 24 |

| | | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|---|----|----|---|----|----|
| Use park-and-ride lots | 2 | 2 | 16 | 3 | 1 | 24 |
| Reopen closed rest areas | 2 | 1 | 9 | 2 | 10 | 24 |
| Permit the use of federal-aid funds to maintain public rest areas | 2 | 6 | 14 | 2 | 0 | 24 |
| Use ITS to expand amount of information available to truckers | 5 | 15 | 2 | 2 | 0 | 24 |
| Conduct education campaign to encourage drivers to better plan trips | 1 | 4 | 17 | 2 | 0 | 24 |
| Construct multi-use rest area facilities that also address tourism and truck inspection (e.g., safety, size and weight, diesel emissions testing) needs | 1 | 6 | 15 | 2 | 0 | 24 |
| Establish federal assistance program targeted at truck parking | 3 | 9 | 9 | 3 | 0 | 24 |

2. Generally, how often do your state rest area and truck parking managers communicate or meet with the following stakeholders regarding rest area and truck parking? (S = seldom or not at all, O = occasionally or every few years, F = frequently, annually, or more often)

| | F | O | S |
|--------------------------------------|----------|----------|----------|
| Truck stop operators association | 4 | 3 | 13 |
| Trucking association | 8 | 3 | 9 |
| Highway law enforcement | 9 | 4 | 7 |
| Local agency transportation planners | 5 | 2 | 13 |
| Traffic safety organizations | 7 | 2 | 11 |
| Automobile associations | 2 | 6 | 12 |

Abbreviations used without definition in TRB Publications:

| | |
|---------|--------------------------------------------------------------------|
| AASHO | American Association of State Highway Officials |
| AASHTO | American Association of State Highway and Transportation Officials |
| ASCE | American Society of Civil Engineers |
| ASME | American Society of Mechanical Engineers |
| ASTM | American Society for Testing and Materials |
| FAA | Federal Aviation Administration |
| FHWA | Federal Highway Administration |
| FRA | Federal Railroad Administration |
| FTA | Federal Transit Administration |
| IEE | Institute of Electrical and Electronics Engineers |
| ITE | Institute of Transportation Engineers |
| NCHRP | National Cooperative Highway Research Program |
| NCTRP | National Cooperative Transit Research and Development Program |
| NHTSA | National Highway Traffic Safety Administration |
| SAE | Society of Automotive Engineers |
| TCRP | Transit Cooperative Research Program |
| TRB | Transportation Research Board |
| U.S.DOT | United States Department of Transportation |