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The Market for Private Toll Projects in the United States

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EXECUTIVE SUMMARY

This report surveys the market for privately financed and operated toll highways, bridges, and tunnels. This market is developing because traditional public-sector funding is inadequate for the level of investment needed over the next decade or more; the Federal Highway Administration (FHwA) puts the shortfall at between $13 and $42 billion per year.

Three principal market opportunities exist: new urban congestion-relief tollways, new or rebuilt intercity toll roads, and new or rebuilt bridges and tunnels. The urban market is driven primarily by the potential of offsetting the $34 billion per year in time and fuel wasted by current levels of traffic congestion. The intercity market is driven primarily by the need of trucking firms for time and cost savings, and access for over-100,000-lb. truck-trailer combinations. The primary bridge opportunity lies in rebuilding some of this nation's thousands of deficient bridges.

This report identifies and quantifies those urban areas with the greatest traffic congestion costs, and those states with the highest fractions of deficient highway and bridge conditions. It also identifies those states where legislation to facilitate private toll projects has been enacted or is being considered.

Prior to enactment of the 1991 federal surface transportation act, private tollway projects worth $10-15 billion were already being envisioned at the state level. The total value of toll projects being considered prior to the 1991 act's passage was some $28 billion. Now that the 1991 act has opened up the market for rebuilding existing highways, bridges, and tunnels as private toll projects, the potential market is much larger. If states took full advantage of the new act's provisions, an additional $19 billion per year of private investment could be generated, closing the basic funding gap identified by FHwA. Over a decade, this would put an upper bound on the size of the private tollway market at $190 billion.

At least nine engineering, construction, and development firms are pursuing the private tollway market, along with at least 11 major investment banking firms. In surveys carried out for this project, these firms identified as key success factors for private tollway projects (1) local political support, (2) minimal environmental problems, and (3) state enabling legislation. Since privatization of transportation infrastructure is still a novel idea to most people, there is a need for significant public-information and lobbying efforts to create a favorable climate of opinion and political environment for such projects.

SECTION I

INTRODUCTION AND SUMMARY

A.Basic Themes

The U.S. highway system today suffers from two principal problems: urban traffic congestion and deteriorating physical conditions. Some 70 percent of all urban Interstates are congested during rush hours, and the problem worsens year by year. Deferred maintenance has left a huge backlog of highway repair and rehabilitation; some 39 percent of all U.S. bridges are classed as "deficient" by the Federal Highway Administration.

Overall, FHwA estimates that we should be investing $46 billion a year in highways, just to maintain present conditions, and preferably $75 billion a year to restore the system to acceptable condition and levels of maintenance. Actual spending is in the vicinity of $33 billion per year, and the Intermodal Transportation Efficiency Act of 1991 (ISTEA) will at best make possible only a small increase in public-sector spending.

The new federal act relies on the private sector to fill a portion of this investment gap via privatization or public/private partnerships in highways, bridges, and tunnels. Toll roads are making a comeback in this country, as documented by the International Bridge, Tunnel & Turnpike Association. And private toll projects are under way or seriously being considered in 10 states and Puerto Rico. Today's toll roads charge rates considerably higher than the traditional 2-5 cents/mile typical of older, eastern tollways. Typical intercity toll rates for new tollways are 7-10 cents/mile, while recent urban tollway projects average 10-20 cents/mile. These higher rates make certain projects attractive as private ventures.

B.Private Tollway Markets

There are three principal markets for private toll projects, each of which must be considered separately:

(1)urban congestion-relief tollways

(2)intercity toll roads

(3)toll bridges and tunnels.

The urban market is a function of major changes that have taken place in lifestyles and commuting patterns during the past 20 years. The suburbanization of employment locations, and rising rates of car ownership, have made suburb-to-suburb commuting the dominant pattern in most metro areas. The existing urban road network is often poorly suited to handle this pattern of trips, creating a need for new, less-congested capacity. In addition, the major growth in rush-hour trips has been in non-work trips -- many of which may be shiftable to off-peak hours via "congestion pricing" during rush hours. These factors create the urban congestion-relief tollway market.

The Texas Transportation Institute puts the annual cost of urban traffic congestion in the top 39 metro areas at $34 billion. The greatest degree of urban traffic congestion is in the West, with the Northeast ranking second. The intensity of urban congestion is greatest in the Los Angeles, San Francisco, Washington, D.C., Chicago, and Miami metro areas. The metro areas with the greatest annual cost of congestion are Los Angeles, New York, San Francisco, Chicago, and Washington, D.C. (A complete ranking of the 39 metro areas is provided in Section III.)

The key factor for intercity toll roads is the truck shipping market, which now predominates intercity freight transportation. To attract trucking to a toll road, it must offer higher pavement quality (which can lower operating costs as much as 10 cents/mi.) and time savings. In addition, a major competitive factor is accommodating large combination vehicles (LCVs) weighing over 100,000 lbs. These much more productive heavy vehicles are banned from most Interstates and in the East are accommodated only on selected toll roads.

There are two potential private intercity tollway markets for trucks. One is the niche market for new routes, offering time savings and/or access for LCVs compared with existing routes. These market niches can only be identified by detailed investigation of particular opportunities. The other -- potentially much larger -- market is the rebuilding of existing deteriorated highways. Alaska, Mississippi, Missouri, Oregon, Rhode Island, Tennessee, and Wisconsin have significantly greater mileage of poor-condition highways than other states, and may therefore be least able to afford to rebuild their highways without private-sector investment.

As is the case with intercity highways, the bridge and tunnel market consists of both a niche market for selected new facilities and a much larger potential market for rebuilding and rehabilitating deficient bridges. Some 28 percent of the bridges on the federal-aid highway system are deficient, as are 53 percent of the bridges that are not part of the federal-aid system. Some states are in much worse shape than others, such as Connecticut, Montana, West Virginia, Kentucky, Mississippi, and Puerto Rico.

C.Key Success Factors

Thus far at least nine major engineering and construction firms and 11 investment banking firms have taken initial steps into the private tollway market. Five states have passed enabling legislation (Arizona, California, Florida, Texas, and Virginia), three of them in 1991, and bills have been seriously considered in Illinois and Minnesota. Missouri has a law permitting nonprofit corporations to develop toll projects, and existing laws in Colorado and Puerto Rico permit private toll projects. A project is also being studied in Mississippi.

Our survey of the participating firms (conducted prior to passage of the federal reauthorization bill) yielded estimates of the minimum potential domestic market for private toll projects of $10-15 billion over the next 10 years. There was general agreement among the developers and the financiers that the most important factors in the success of such projects are:

(1)local political support

(2)minimal environmental problems

(3)private tollway enabling legislation.

The existing private tollway laws embody some positive and some negative features, and in general there is a strong need for legislative action to create a more positive climate for private tollways, at both federal and state levels. A major step forward, said respondents, would be to remove (or at least relax) the present ban on charging tolls on federally aided projects, and to permit private-sector participation in the financing and operation of such projects.

These objectives were largely accomplished by ISTEA, which permits federal funding for both new and rebuilt toll bridge, tunnel, and highway projects that can be privately owned. The only exception is highways that are part of the Interstate system (except for three congestion pricing demonstration projects in urban areas); unless such highways are already tolled, they may not be privatized or converted to tolls (though bridges and tunnels on the Interstate system may be). To make use of these very positive federal provisions, state enabling legislation (or at least implementing regulations) will have to be developed.

Three national organizations have developed handbooks outlining the principal policy issues which need to be addressed to facilitate private tollway projects. The most on-target of these is the legislative agenda produced by the Privatization Council, which provides detailed recommendations for federal, state, and local measures. Other useful ideas will be found in the guidebooks produced by the California Engineering Foundation and the American Road & Transportation Builders Association.

SECTION II

U.S. HIGHWAYS - AN OVERVIEW

A.Introduction

The Federal Highway Administration (FHwA) has established the standard typology of highways used in the United States. Figure 2-1 shows the basic classification system used by FHwA, with its basic division between Rural and Urban roads, with further subdivisions into Arterial, Collector, and Local.

Table 2-1 shows how total U.S. highway mileage breaks down into these categories. It also reveals that local governments are the owners of the large majority of all highway mileage, even though state governments own all of the Interstate and most of the arterial mileage. The Federal Government, while providing a considerable portion of the funding for major highways, actually owns a very small portion of the highway system --principally rural roads on federal lands.

Table 2-2 shows the relative importance of the Interstate and arterial portions of the highway system, in terms of total lane-miles and millions of annual vehicle miles traveled (VMT). In 1989, Interstates and principal arterial carried 42.1 percent of rural VMT and 57.2 percent of urban VMT.

Today's highway system is characterized by several serious problems. Urban roads are plagued by traffic congestion, as shown in Table 2-3. In 1986 FHwA developed a methodology for estimating national traffic congestion and its costs, using data from the Highway Performance Monitoring System (HPMS) database. Using 1984 data, the model projected 6,907 million vehicle-hours of delay in the year 2005. When these projections were recalculated several years later, based on 1987 data, the year 2005 total delay was found to be 11,008 million vehicle-hours -- an increase of nearly 60 percent.[1]

A second major problem is deteriorating pavement conditions, a consequence of deferred maintenance. Table 2-4 summarizes the latest FHwA data, showing that 25 percent of the Interstate system's miles are rated as being in only fair or poor condition. For bridges, the situation is even worse (Table 2-5), with 28.6 percent of the Interstate system's bridges either structurally deficient or functionally obsolete. Overall, some 39 percent of the nation's bridges fall into one of these deficient categories.

FHwA has devoted considerable effort to estimating the cost of refurbishing the nation's highway and bridge system. The agency uses two scenarios: (1) Maintain Current (1989) Overall Conditions and Performance, and (2) Improve Overall Conditions and Performance. Table 2-6 summarizes the total annual cost of these two scenarios over the next two decades, $45.7 billion/year and $74.9 billion/year, respectively. This compares with actual capital investment of only $33 billion in 1989, the most recent year for which FHwA data are available. Thus, current investment levels are far below those necessary even to maintain the existing highway network in good repair, let alone what would be necessary to improve its capacity and performance. The shortfall is between $13 billion and $42 billion per year.

ISTEA, while increasing total federal surface transportation spending, will probably end up providing some $35 billion for transit over its six-year life. That would leave $116 billion for highways. That would make $19.3 billion/year available for highways, compared with the $14.2 billion in federal highway spending in 1989. But spending only $5 billion more per year will make only a dent in the $13-42 billion annual shortfall.

B.U.S. Toll Roads

Toll roads began in the United States as private, for-profit companies. The first one was chartered in 1792, to connect Philadelphia and Lancaster, Pennsylvania. By 1800, 72 turnpike companies had been chartered in nine northeastern states, with Connecticut and New York leading the way.

From the beginning, the turnpikes were significantly regulated, generally via their state-granted charters. Economist Daniel Klein notes that the typical character granted the company eminent domain powers and sometimes protection against parallel, competing routes.[2] But in exchange, it tightly regulated toll rates, specified the location of toll gates (generally too far apart, facilitating toll evasion), and granted many exemptions from tolls to categories of local travelers. These conditions led most turnpikes to be unprofitable.

By contrast, early private toll bridges were generally a commercial success. The first, Boston's Charles-River Bridge, opened in 1786 and gave its investors a 10.5 percent return in each of its first six years. By 1798, some 59 bridge companies had been chartered in the northeastern states. Though a number failed, many were profitable. In sharp contrast to the turnpikes, the toll bridges did not face a large toll-evasion problem, nor were exemptions from paying tolls generally a part of their charters. And in contrast to the turnpikes, they were able to obtain rate increases when their revenues fell below expectations.

Private turnpike companies continued to be organized throughout the first half of the 1800s, despite the evidence that most would be unprofitable. Klein and others have concluded that most of the investors were local people who would receive other economic benefits (land-value increases, for example) from the improved transportation provided by the road. There were also social pressures to invest in the turnpike companies. Klein and Majewski also note that, like most other contemporary corporations, the turnpike companies were funded entirely with equity, in contrast to the debt-financed turnpike "trusts" in England during the same period.[3]

By the middle of the 19th century, most of the turnpike companies had gone bankrupt. Starting in 1825, state-chartered (and often subsidized) canals provided a serious competitive alternative. Between 1825 and 1845 turnpike mileage dropped considerably, with additional competition coming from the emerging (state-subsidized) railroad industry. Legislatures seldom granted toll rate increases or permitted changes in operating conditions to curtail "shunpiking" (toll evasion). Most turnpikes eventually reverted to the public through abandonment. The stock by that time had become worthless, and the owners were generally eager to be relieved of the burden of maintaining the road. What had begun as a fully private venture, became -- by default -- a primitive form of Build-Operate-Transfer.

The 20th century in this country has been characterized primarily by indirect financing, principally via gasoline taxes, and public-sector provision of highways. The first federal-aid highway legislation, in 1916, required that roads constructed with federal aid must be toll-free. When the Interstate highway program was being debated in the 1950s, some economists, notably Milton Friedman, proposed a national tollway network, but automobile and trucking associations prevailed. The program continued the federal opposition to tolls, as well as providing for a 90 percent federal share of capital costs.

States, however, were free to make use of toll financing on their own. During the 1940s, the second wave of U.S. toll roads began, with the creation of the Pennsylvania Turnpike.[4] Others, including the New York Thruway, the Maine Turnpike, and Florida's Sunshine State Parkway, followed. In some cases, by the time the Interstate program was ready to begin, the preferred route was already occupied by a state-built toll road. In most such cases, federal policy permitted the tollway to be incorporated into the Interstate system. There were 2,687 miles of toll roads as part of that system, as of 1989. Table 2-7 provides a state-by-state breakdown of toll roads and bridges in the United States as of 1989, as compiled by The Road Information Program.

Toll rates vary considerably, based in part on how long ago the facility was built and financed. Table 2-8 provides 1989 figures on the range of toll rates being charged on existing facilities in that year, based on date compiled each year by the International Bridge, Tunnel & Turnpike Association. Toll roads planned for the 1990s generally have higher rates, especially in urban areas. Table 2-9 shows the toll rates planned for specific urban and rural (inter-city) toll road projects.

For the most part, these toll roads have been built as 100 percent toll-financed projects, so the toll rates shown are ones that have been found sufficient to pay for the cost of building and operating the road. Some recent toll projects, e.g. E-470 in Denver and the Transportation Corridors Agency projects in Orange County, California, rely on a mixture of local tax revenues and tolls. Proposed federal surface transportation legislation would provide up to 35 percent federal grant funds to toll projects, thereby reducing the amount of capital to be raised from investors. Such blended financing would permit more projects to go forward than would be found feasible based solely on toll revenues.

The process for developing a toll road varies from state to state. The most common pattern is the creation of a toll road authority as a separate public agency, with the power to issue bonds, to construct the project, and to operate it. Examples include the Illinois State Toll Highway Authority, the Pennsylvania Turnpike Commission, and the Texas Turnpike Authority. Toll agencies may sometimes be bi-state (e.g., the Port Authority of New York and New Jersey) or county-level (e.g., Orlando-Orange County Expressway Authority). In some cases, a state transportation department will itself embark on tollway projects; recent examples include the state DOTs of Delaware, Florida, and Minnesota.

Table 2-9

Toll Rates on Planned Toll Roads

Opening DateNameLocationToll Rate

(cents/mile)

Urban

1991E-470 (1st section)Denver9.4

1992Kilpatrick Tpk.Okla. City8.3

1992Creek Tpk.Tulsa7.1

1993Dulles Toll Rd. Ext.Northern Virginia10.7

1994Seminole County Exprswy.Orlando12.5

1994Central ConnectorOrlando12.5

1995NW Hillsborough Exp.Tampa8.4

1995San Diego Expwy.San Diego10.0

1996Rt. 91 Orange LanesOrange Co., CA15.0*

* average of peak and off-peak rates

Rural

1992Cherokee Tpk.Oklahoma336.8

1994I-95-Myrtle BeachS. Carolina705.0

1995Tijuana-EnsenadaMexico80010.8

1997Polk ParkwayFlorida2510.0

1997Mid-State TollwayCalifornia4010.0

Source: Reason Foundation, Los Angeles, California

In each case, the agency conducts or contracts for engineering and traffic studies to determine a potential project's estimated revenues and costs. If it appears feasible, after further refinement of the analyses, bonds for construction are issued. The (tax-exempt) bonds may be purely revenue bonds (backed only by project revenues), limited obligation bonds (backed by a combination of toll revenues and some tax sources), or general obligation bonds (backed by the full faith and credit of the government in question). Construction is competitively bid, following normal government procurement processes. Upon completion, the project is opened and operated by the toll authority or transportation department.

The traditional federal hostility to tolls was eased somewhat in the 1987 highway bill. That legislation provided for 35 percent federal funding to be made available for nine pilot toll projects that would be part of state (not Interstate) highway systems. The projects were required to be publicly owned and operated. The strong interest in those pilot projects, together with concern over the shortfall in highway investment from traditional sources, led the FHwA to include greatly expanded provisions for toll roads in the Administration's proposed 1991 surface transportation reauthorization bill. In addition to generalizing the pilot toll-road program of the 1987 law (i.e., making 35 percent federal funding available for non-Interstate toll projects in all states), it called for private finance, development, and operation (but not ownership) of toll roads and permission for large urban areas to use congestion pricing on existing congested freeways.

The final version of the bill, as signed by President Bush in December 1991, goes much further. It would permit federal funds to be used for:

1)Construction of new toll highways, bridges, and tunnels (except on the Interstate system);

2)Rebuilding existing toll highways, bridges, and tunnels (including those on the Interstate system);

3)Rebuilding existing free (non-Interstate) highways as tollways;

4)Rebuilding existing free bridges and tunnels as toll facilities (including those on the Interstate system);

5)Demonstrating congestion pricing in five urban areas.

Any of these projects may be privately owned, as long as the state highway agency has a contract with the firm in question providing for ongoing oversight. For bridges and tunnels, the federal share can be up to 80 percent of the project cost; for highways, the ceiling is 50 percent. In addition, states have the option of making the federal funds available as loans rather than as grants, which may lead to creation of revolving loan funds.

SECTION III

POTENTIAL DEMAND FOR PRIVATE TOLL PROJECTS

Interviews with investment banking and engineering/construction firms already in the private toll market identified three basic market segments in which privatization projects are being pursued. These are:

(1)Urban tollways, primarily for the purpose of congestion-relief. Prime examples would be the two private projects being developed under AB 680 in California's Orange County.

(2)Intercity tollways, passing through largely undeveloped land, generally to connect important population or business centers. Prime examples are the proposed Chicago-Kansas City Tollway and the proposed Camino Falcon project in Texas.

(3)Bridges and tunnels, either adding new connectors across geographical obstacles or rebuilding existing ones. Examples include the Channel Tunnel and the proposed Jordan Bridge in Virginia.

Each type of project is driven by different demands; hence, each will be discussed in a separate subsection below.

A.Urban Congestion Patterns

In 1987 the Eno Foundation for Transportation released a landmark study on the changing commuting patterns of the 1980s.[5] This was the first major report that documented the shift of job locations to the suburbs, with the result that the primary form of commuting has become suburb-to-suburb (rather than the traditional pattern of suburb to central business district). Other key factors in this change include a major shift away from other modes (transit, walking, work-at-home) to auto commuting, especially single-occupant vehicles. Vehicle ownership soared during the two decades from 1960 to 1980, facilitating the decentralization of both jobs and housing.

Pisarski's report carries a number of implications for transportation facilities. The road system in metropolitan areas has tended (like the transit systems) to be radially oriented and thus poorly matched to the suburb-to-suburb pattern of today's commuting. In the absence of adequate local commuting highways, the area's Interstate facilities tend to be used for commuting -- and therefore to be overloaded. Pisarski refers to "competition between the needs of the local commuter and the needs of long-distance interstate travel" on these roads. He also notes that the new patterns of jobs and housing "will serve to reduce the importance of the `peak hour' and `peak direction' as the driving forces in system design and integration."

Paradoxically, the shift of jobs to the suburbs and the resulting change in commuting patterns has thus far helped to offset the growth in vehicles and trips, by making many commuting trips shorter in distance. Peter Gordon has found that average auto commute time in 1985 was less than its value in 1980 in 18 of the 20 largest cities, as shown in Table 3-1.[6]

The greatest increase in rush-hour traffic has come not from commuters but from non-commuters -- primarily trips for school, social, and recreational purposes. Table 3-2 shows the changing breakdown of work and non-work trips between 1977 and 1983 in major metro areas. As can be seen, work trips actually decreased slightly in the A.M. peak, while non-work trips grew 40 percent during that congested time of day. The major growth in work trips was during off-peak hours. Overall, in 1983 (the latest year for which these particular data are available) 54.7 percent of the trips in the A.M. peak in major metro areas were non-work trips. And an even more startling 72.2 percent of trips in the P.M. peak were non-work trips. These figures imply that direct pricing during rush hours -- "congestion pricing" -- may be effective in shifting discretionary trips out of the peak period, as well as encouraging some drivers to ride-share.

Whatever their composition, urban trips have resulted in extensive traffic congestion. The most comprehensive assessment of urban traffic congestion has come from the Texas Transportation Institute, which is halfway through a six-year study measuring mobility and congestion. Their current estimate is that the annual congestion cost in 39 metro areas was $34 billion as of 1988, as measured by the cost of travel delay, fuel wasted, and insurance.[7]

Table 3-3 breaks down the daily vehicle miles traveled (DVMT) for the 39 metro areas included in the TTI study. As can be seen, the region with the greatest percentage of peak-period VMT on congested freeways is the Western region, at 59%. Cities with especially high levels include Washington, DC (65%), Chicago (55%), Miami (60%), Atlanta (45%), Houston (70%), Dallas (55%), Austin (55%), Phoenix (60%), Los Angeles (75%), San Francisco/Oakland (80%), and Seattle (70%).

Table 3-4 shows the cities arrayed in accordance with a computed 1988 roadway congestion index, reflecting both freeway and major arterial congestion. Those metro areas at the top of this list would represent prime areas of demand for congestion-relief. A slightly different ranking is given in Table 3-5, which takes into account the differing costs in the various metro areas and then ranks them in accordance with total annual congestion cost.

Although the Anaheim/Santa Ana metro area was not included in TTI's database, it would have ranked high on the lists of intensity and cost of traffic congestion. The entire four-county metro Los Angeles region (Los Angeles, Orange, Riverside, and San Bernardino Counties) is one of the most congested in the United States. It is hardly surprising to find that five new urban toll road projects are located in Orange County alone: three public toll roads being developed by the Transportation Corridors Agencies and two private toll roads under AB 680.

What Price Relief?

How much are drivers in congested urban areas willing to pay to eliminate congestion delays? Apogee Research, in a study of the potential for toll financing in Minnesota cites national survey data indicating that 74 percent of those experiencing congestion delays would pay $0.50 or more per day to eliminate those delays, 62 percent would pay $1.00 or more per day, and 37 percent would pay $2.00 or more.[8] Apogee found that Minnesota drivers are significantly less willing to pay extra to eliminate congestion, with only 8 percent willing to pay $2.00 per day, for example.

These results need to be kept in perspective, however, since what is relevant for assessing the

feasibility of supplemental, congestion-relief tollways is not the willingness of all drivers to pay extra, but only the willingness of a sufficient fraction of drivers to make the project work. Since the average commute distance is under 10 miles (each way), the $2.00 or more that 37 percent of drivers would be willing to pay each day equates to at least 10 cents per mile. In fact, since a portion of that 10-mile journey is not on congested facilities, the rate per mile of congestion avoided could easily work out to be as high as 15 cents per mile. And this is on a national-average basis, for those drivers in urban areas now experiencing traffic congestion (i.e., in the metro areas listed in the TTI tables).

There is already evidence that willingness to pay is significantly higher in the more severely congested metro areas. In 1988 a detailed demand study was carried out for the E-470 toll road project in Denver.[9] Four different trip types were assessed: work, non-work, non-home-based, and airport. The lowest-valued trip type (non-work) was found to be worth $4.21 in tolls per hour of travel time saved, while the highest-value type (airport trips) was worth $31.41 per hour saved. Using these data in a logit model, the researchers found that the revenue-maximizing toll rate would be between 20 and 25 cents per mile.

Researchers at the University of California, Berkeley made detailed studies of congestion on San Francisco Bay Area freeways in the mid-1970s.[10] Based in part on assumed values for people's time, they calculated optimal peak-hour congestion tolls for urban freeways of 26.7 to 38.5 cents per mile, and congestion tolls for suburban/urban freeways of 8.1 to 10.6 cents/mile. In 1988, Federal Reserve Bank of San Francisco economist Randall Pozdena updated the Keeler and Small work, estimating peak-hour tolls of 65 cents/mile on urban freeways, 21 cents/mile on urban/suburban freeways, and 17 cents/mile on fringe suburban freeways.[11]

It should be noted, again, that the Keeler/Small and Pozdena numbers are estimates of what would need to be charged if pricing were to be implemented on all freeways in the metro area. Of necessity, these numbers are based on an average value of people's time. A supplemental private tollway aimed at the most time-sensitive drivers could conceivably charge more than these rates (although this point is still a matter of controversy among toll road planners).[12]

Actual rates charged on a project may depend, in part, on political and marketing conditions. The E-470 project is not, at this point, planning to charge 20-25 cents/mile, despite that result emerging from the analysis as the revenue-maximizing toll. Likewise, the San Joaquin Hills Toll Corridor in Orange County plans to charge 20 cents/mile, despite a Wilbur Smith Associates demand study showing that 26 cents/mile would produce greater revenue.[13] Both of these projects are government-run tollways, however. Private toll road operators may be under less pressure to charge prices lower than the traffic would bear.

B.Inter-City Toll Highways

A second type of project is the more-traditional toll road connecting point A to point B, in order to facilitate travel by autos and trucks between those two points. From a commercial (privatization) standpoint, the market for inter-city roads is driven primarily by truck traffic. For example, although commercial vehicles constitute only 21 percent of the traffic on the Indiana Toll Road and 25 percent of the traffic on the Ohio Turnpike, they account for 63 percent and 65 percent, respectively, of the revenues of those two representative toll roads. This is due to the typical toll road pricing structure, which charges for both weight and distance. The recent feasibility study of the proposed Chicago-Kansas City Tollway recognized that attracting truck traffic was the key factor in this facility's commercial viability.[14]

Since World War II, intercity trucking has grown from carrying only one-fourth of all intercity freight tonnage to some 40 percent by 1986.[15] There has been a substantial modal shift to trucking from railroads, fueled in no small part by the development of the Interstate highway system. Indeed, Apogee Research has noted that the trucking industry has become increasingly dependent on roads of Interstate quality.[16] Five-axle combination trucks (18-wheelers) in 1986 accounted for 20 percent of vehicles traveling on rural Interstates, up from only 9 percent in 1970. Between 1980 and 1984, combination truck traffic grew by 40 percent, more than twice as fast as all other traffic, according to Apogee's analysis.

Alan Pisarski points out that the composition of freight traffic is changing.[17] As shown in Figure 3-1, ton-miles per capita continue to increase, as Americans continue to demand more goods and services. But ton-miles per million dollars of GNP continue to decline (Figure 3-2), reflecting the ongoing shift toward a service-sector-dominant economy. Pisarski cites Department of Commerce studies indicating that freight shipments will increasingly trend toward low-bulk, high-value items, traveling over somewhat shorter distances, as production continues to decentralize. Timely shipping will be especially important for this type of freight, as much of it relates to just-in-time inventory systems. Likewise, high-value freight shifts from rail to truck in part to minimize shipping damage; well-maintained roads are important in retaining this advantage of truck shipment.

Source: Travel Demand in the 1990s, by Alan E. Pisarski, Highway Users Federation, January 1991

Segments of the Freight-Driven Market

The freight-driven market for privatized intercity toll roads consists of two components. Despite the completion of the Interstate system, there are still niche markets where new highways can offer significant time savings and upgraded service levels. Recently proposed projects of this sort include the Front Range Toll Road in Colorado, the Chicago-Kansas City Tollway, and the Camino Falcon in Texas. The other market opportunity is rebuilding (and possibly upgrading) existing highways which have fallen victim to deferred maintenance. The latter market may ultimately be much larger than the former, given the large backlog of highway repair and rebuilding needs (see below) in comparison with the niche-market nature of new intercity highways.

Table 3-6 provides the latest available FHwA figures showing state-by-state rural Interstate deficient mileage. Certain states -- notably Alaska, Tennessee, Mississippi, Missouri, Oregon, Rhode Island, and Wisconsin -- have significantly higher pavement deficiencies than others. Conditions on non-Interstate rural highways will tend to be worse in those states, as well, though FHwA has not published data breaking this out.

Apogee points out that roads in poor condition (pavement serviceability index of 2.5) increase the operating costs for a large combination truck by 5.4 cents/mile over the costs of operating on a road in good condition (PSI of 4.0); the difference between very good condition (PSI of 4.5) and very poor condition (PSI of 2.0) works out to 9.5 cents/mile.[18] Since these numbers are in 1982 dollars, the real costs in today's dollars will be considerably higher.

Whether the project is a new toll road or the conversion of an existing highway, certain key factors can be critical in attracting truck traffic -- especially heavy-weight combination trucks. The Chicago-Kansas City Tollway study explored this question in some detail. It noted that in contrast with the present federal limit of 80,000 pounds on most Interstates, only 11 relatively low-population Western states permit gross weights greater than 105,500 pounds, as shown in Figure 3-3. The only roads which permit such heavy vehicles in the East are toll roads: the Massachusetts Turnpike, the New York Thruway, the Ohio Turnpike, the Indiana Toll Road,

the Kansas Turnpike, and Florida's Turnpike. Hence, the market opportunity for private tollways is to offer an expanded market for such heavy-weight vehicles.

Source: *Overview Report: Chicago/Kansas City Tollway Feasibility Study*, Howard Needles Tammen & Bergendoff and Price Waterhouse, January 1990.

To configure an intercity toll road for heavy combination trucks, the following features are required:

- Added pavement thickness, typically between 1.0 and 1.5 inches.
- Stronger bridge design, such as AASHTO equivalent HS-31.
- Wider pavement and/or flatter turning radii for interchange ramps, weigh stations, and rest areas.
- Truck climbing lanes and/or minimum truck speed limits.
- Maximum 3 percent grades.
- Longer merging and weaving lanes at high-volume interchanges.

Additional design features that would help to attract truck traffic would be non-stop toll collection via AVI (automatic vehicle identification) and weigh-in-motion systems. Both types of capability are now commercially available.

C.Bridges and Tunnels

As was the case with intercity highways, there are two distinct markets for bridge and tunnel privatization projects. In niche markets, entirely new facilities may be needed (e.g., the proposed Southern Crossing of the San Francisco Bay and the proposed toll-tunnel systems beneath Paris and other European capitals). But by far the larger market in the United States will be the rehabilitation of existing bridges that are victims of deferred maintenance or have become obsolete due to their low capacity or out-of-date design.

Tables 3-7 and 3-8 provide a state-by-state inventory of bridges. Table 3-7 inventories bridges on the federal-aid system and Table 3-8 inventories other bridges. These tables show that some 28 percent of bridges on the federal aid system nationwide are defined as deficient. Nearly equal numbers of bridges are considered structurally deficient and functionally obsolete. The picture is far worse off the federal-aid system, with 53 percent of all these bridges rated as deficient, a majority of which are structurally deficient.

This huge inventory of bridges needing repair, rehabilitation, and replacement represents a significant potential market. A number of transportation experts have proposed some form of temporary privatization as a feasible way of rapidly increasing the capital investment in bridges. Former UMTA Administrator (and now head of the Toll Road Corporation of Virginia) Ralph Stanley has set forth one such plan, known as the Bridge Corps.[19] The basic idea would be for a private firm or consortium to receive a franchise to take over, rebuild, and operate the bridge as a toll facility for a sufficient period of years to recover the capital costs plus a return on investment, after which the franchise would terminate and the tolls would be removed.

New bridge and tunnel projects represent special cases which must be individually sought out. Because their costs are generally much greater than the costs of highways, bridges and tunnels must be in high-demand locations in order to be capable of self-support solely from tolls. On

the other hand, public acceptance of tolls for such projects is high. A number of privately owned toll bridges currently exist in the United States, with the largest and best-known being the Ambassador Bridge linking Detroit with Windsor, Ontario.

New bridge and tunnel projects, carried out as Build-Operate-Transfer ventures, are under way in England, Ireland, Canada, Hong Kong, and Australia -- but thus far not in the United States, except for Puerto Rico. In Europe, the newest private-tunnel concept is congestion-relief toll tunnels beneath portions of major cities. Projects are under way in Marseilles, Lyon, and Oslo and plans exist for such tunnels in Amsterdam, Rotterdam, Paris, and London. The Reason Foundation is researching the feasibility of such projects for U.S. cities.

SECTION IV

POLITICAL ENVIRONMENT FOR PRIVATE TOLLWAYS

A.Fiscal Stress and the Privatization Trend

State governments as of 1992 are in serious trouble. Prior to taking actions required under their state balanced-budget requirements (in 49 of the 50 states), planned expenditures for FY 1991 exceeded revenues by more than $15 billion, according to data compiled by the National Conference of State Legislatures.[20] In most cases, projections for FY 1992 were even worse.

Table 4-1 provides a state-by-state breakdown. As can be seen, states with deficits of 7 percent or more include California, Connecticut, District of Columbia, Florida, Maryland, Michigan, New Hampshire, New Jersey, North Carolina, Puerto Rico, Rhode Island, and Virginia. States likely to be in this condition in FY 1992 include California, Connecticut, Delaware, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Texas, Vermont, and Virginia.

NCSL points out that in 1990 and 1991 states enacted record tax increases. Their estimate of $16 billion of new taxes to close the FY 1991 budget gaps is the largest state tax increase since 1971 in percentage terms. NCSL Fiscal Program Director Ronald Snell explains that the states' deteriorating fiscal condition is not due simply to the 1991 recession -- though this was a significant factor. States have been increasing spending faster than they have increased revenues, leading to what are termed "structural" deficits. The long-term trend throughout the 1980s has been a gradual deterioration in state financial strength, as evidenced by smaller and smaller year-end balances. Snell predicts that the 1990s will be an extremely difficult time for state/local finances, even after the current recession is over.

NCSL's assessment is seconded by Gerald H. Miller, until recently executive director of the National Association of State Budget Officers.[21] According to Miller, many states are on a spending path which could only be maintained via 10 percent annual increases in revenues. Such increases in revenues seem unlikely. State and local taxes and fees, which reached a historic high level in 1978 (the year in which the "tax revolt" is considered to have begun), have gradually climbed back to those levels, as shown in Table 4-2. Observers such as *Governing's* Eileen Shanahan raise the specter of a new tax revolt if taxing and spending increase much beyond this level.

The fiscal pressures on state and local government have spurred a major trend toward privatization. A 1988 survey by the International City Management Association of 4,870 local governments found that fiscal pressures were the most important reason for contracting with private firms for the provision of services. State governments, too, are looking increasingly to privatization. A 1989 survey by Deloitte & Touche found that among the important reasons

given for privatizing previously government-provided services were citizen demands for new services, budget cutbacks, and reaching state limits on credit (volume caps on tax-exempt bonds) -- see Figure 4-1.

Governors such as William Weld in Massachusetts, Stan Stevens in Montana, Lawton Chiles in Florida, and Douglas Wilder in Virginia have endorsed privatization as a way of doing more with less. In other states (such as Arizona, Connecticut, North Dakota, Ohio, Rhode Island, and Utah), legislatures have taken the lead, creating task forces or policy boards to identify functions which could be privatized.

Among the more recent privatization trends is to obtain new infrastructure by means of public-private partnerships, typically using the Build-Operate-Transfer mechanism, involving a long-term franchise of 20 to 40 years. New wastewater treatment plants have been developed in such communities as Auburn, Alabama and Chandler, Arizona by this method, and it has become common in the field of waste-to-energy plants. In addition, privatized correctional facilities now exist in 11 states; while some of the facilities are simply being operated by a private contractor, many are examples of B-O-T procurement and operation of new facilities.[22] The most recent type of infrastructure to be privatized is highways, as discussed in the following subsection.

Though originally considered a "conservative" or Republican concept during much of the Reagan era, privatization has increasingly become a bipartisan (or non-partisan) issue. It is today being championed by moderate Democrats such as Chicago mayor Richard M. Daley, Jr. and New York City Council president Andrew Stein, by Democratic governors such as Lawton Chiles (Florida) and Douglas Wilder (Virginia), by moderate Republicans like Massachusetts governor William Weld -- as well as conservative Republican governors like Tommy Thompson (Wisconsin) and John Engler (Michigan). In a decade likely to be characterized by continued fiscal stress, privatization is likely to be seen as a mainstream tool of responsible, cost-effective government.

B.State Private Tollway Legislation to Date

Five states have thus far enacted legislation to authorize private toll projects: Arizona, California, Florida, Texas, and Virginia. In addition, legislation has been proposed and discussed in Illinois, Missouri, and Minnesota, and projects have also been proposed in Colorado and Mississippi. Puerto Rico is proceeding with several projects without having enacted special legislation.

The principal provisions of the five existing legislative measures are as follows: Arizona's Highway Privatization Act, enacted in 1991, authorizes two pilot projects on a Build-Transfer-Operate basis and two on a Build-Operate-Transfer or Build-Own-Operate basis. Like the California and Virginia laws, after which it was modeled, it calls for projects to be proposed by the private sector, with the winners to be selected by the Arizona Department of Transportation (ADOT). No state funds can be used, and no state guarantees are to be offered, but the state will make available its power of eminent domain, if required for right-of-way acquisition. Uniquely among the private tollway laws thus far, Arizona's is the first to offer tollway users the opportunity to receive a refund of gasoline taxes paid for miles driven on the tollways. No regulation of toll rates is provided for, only a ceiling on the rate of return which a private firm may earn on such a project (with any excess revenues to go into a state highway fund).

California's AB 680, enacted in 1989, authorizes four pilot toll projects, of which at least one must be in Northern California. The projects are to be developed on a B-T-O basis. No state or federal funds may be used, but the legislation is silent on local financial assistance; that omission has led to controversial proposed legislation in 1991 to forbid any financial or

right-of-way assistance to AB 680 projects. The California Department of Transportation (Caltrans) may exercise its power of eminent domain on behalf of a tollway project if private efforts to acquire right of way are not sufficient. Toll rates are to be unregulated, but each franchise agreement will include a ceiling on rate of return, with any excess revenues to be paid into the state highway fund.

Florida's CS/HB 175 was enacted in May of 1991. It grants the Florida Department of Transportation (DOT) the right to enter into agreements with private firms for "the construction and operation of privately owned and financed transportation facilities." The brief legislation includes no provision for reversion of ownership to the state, making Florida's the first full-fledged Build-Own-Operate program. However, it requires separate legislative approval of each such project and also provides that the "amount and use of toll or fare revenues may be regulated by the department to avoid unreasonable costs to users of the facility." In addition, it requires each project to comply with all DOT "rules, policies, procedures, and standards," which might be taken to mean DOT's procurement regulations. It does provide for DOT use of eminent domain on behalf of an approved project, and permits the use of some state funds in cases of "overriding state interest." The private sector will be able to submit unsolicited proposals, but the process cannot begin until DOT has developed its implementation rules, no later than January 1, 1992.

Texas's HB 749 was enacted in June 1991. It makes the Texas Turnpike Authority (TTA) the lead agency for private tollways, but requires coordination with the new State Transportation Department for any such tollways that would become part of the state highway system. The new law authorizes the TTA to enter into agreements with toll road corporations for private or joint (TTA-private) tollway projects. Private projects could apparently be carried out on either a B-O-T or B-T-O basis, with the state maintaining ownership at all times. No state or TTA funds or guarantees are to be offered, except for joint-venture projects. HB 749 requires TTA to negotiate provisions in the franchise agreements regarding toll rates, but does not require rate regulation, per se. Allowable projects could include tollways affecting other U.S. or Mexican states. Surplus revenues from one private or TTA turnpike project may be transferred to other TTA turnpike projects, consistent with applicable bond covenants.

Another provision of HB 749 repealed Texas's old (1913), never-used private toll road statute, Article 15281, which had been controversial because it granted the power of eminent domain to toll road corporations. But the repeal provides that toll road companies formed prior to June 1, 1991 continue to exist with the rights and powers provided in the repealed statute. Each company must specify the particular route it was created to develop; as of June 1, 1991, nine such firms were known to exist. They include developer Ralph Durden's Camino Falcon, Inc. and four Dallas-area subsidiaries of Ross Perot, Jr.'s National Tollroad Authority, Inc.

Virginia's Highway Corporation Act was passed in 1988. It permits private developers incorporated as public service corporations to develop, own, and operate tollways on a B-O-T basis. Projects must be approved by the Virginia Department of Transportation (VDOT), and the toll rates and rate of return are regulated by the State Corporations Commission (SCC). Title to the project must return to the state 10 years after the project debt has been repaid. The law makes no provision for use of eminent domain powers on behalf of a private tollway, but under existing state law counties may exercise such powers for firms pursuing public-service projects regulated by the SCC.

C.Initial Private Tollway Projects

1.California Projects

Four projects have been authorized under AB 680; franchise agreements for all four were signed in January 1991. These projects are the following:

Mid-State Toll Road

This project is the most traditional of the four. It will be 85 miles long, ultimately 6 lanes, running northward from I-580 near Sonol to I-80 near Vacaville. It is a rural, inter-city project with significant land-development potential. The project is a joint effort of Parsons Municipal Services (and subsidiaries) with two financial partners, Banque Nationale de Paris and Westpac Banking Corp. Cofiroute will be the toll-road operator. The estimated cost is $1.2 billion. The expected toll rate is 10-12 cents/mile for autos. The consortium's financial plan assumed local government financial participation for 15 to 20 percent of the cost. The estimated completion date for the first (40-mile) section is 1997.

S.R. 125/San Diego Tollway

This project is a short rural route which will open up a largely undeveloped portion of San Diego County. It will extend 10 miles, northerly from S.R. 905 (Otay Mesa Rd.) near the Mexican border to S.R. 54, with four lanes initially and up to 10 lanes ultimately as the area develops. It will connect with a toll road being developed on the Mexican side of the border, and will serve a proposed binational airport straddling the border. The consortium consists of Parsons Brinckerhoff Development Group, Fluor Daniel, Transroute (as toll operator), and a financial partner. The original financial firm, Prudential-Bache Capital Funding, is expected to be replaced by another financial firm. The planned toll rate is 10 cents/mile, and AVI will be used in toll collection. The cost is $400 million and the estimated completion date is the end of 1995.

S.R. 91 Orange Lanes

This project is a pure congestion-relief facility, consisting of two lanes each way built in the median of the existing Riverside Freeway (Rt. 91). Its initial length will be 10 miles, with possible future extensions in both easterly and westerly directions. It will be the world's first AVI-only toll road, with no toll booths at all. The toll lanes will be open to both qualifying high-occupancy vehicles (HOVs) -- initially at no charge -- and vehicles paying tolls. Congestion pricing will be employed, with a peak charge of 20 cents/mile and off-peak charge of 10 cents/mile. The consortium is led by CRSS Commercial Group, with Howard Needles Tammen & Bergendoff and a number of other firms as consortium members. Citicorp is the financial member, and Italy's Autostrade is the toll operator. The cost is $88.3 million and the estimated completion date is 1994.

Santa Ana Viaduct Express (S.R. 57)

The most ambitious project is this 11.2 mile, 4-lane elevated extension of the Orange Freeway (Rt. 57) from the Santa Ana Freeway (I-5) southward to the San Diego Freeway (I-405) and S.R. 73. It will be constructed above the flood-control channel of the Santa Ana River. This is a congestion-relief project, and will also make use of congestion pricing, though planned toll rates have not yet been announced. The consortium is led by the Perot Group. First Boston is the financial member and Amtech Systems Corp. is the toll operator. The cost is $700 million, and the estimated completion date is 1997. This project will use AVI and will be limited to cars and other light vehicles only.

2.Virginia Project

This 15-mile project will be the first private tollway in modern times to begin construction. It is primarily a congestion-relief facility, with significant land development potential, extending northwesterly from Dulles Airport to Leesburg,

Virginia, as an extension of the existing (state-owned) Dulles Toll Road. The developer is the Toll Road Corporation of Virginia, with Goldman, Sachs as the financial advisor and either Autostrade or Cofiroute as toll operator. The project received its approvals from the State Corporation Commission in the spring of 1991. Goldman, Sachs is currently seeking to place the project's financing. Ground-breaking is now expected in mid-1992, with a completion date late in 1994. Total cost is estimated to be $390 million.

3.Puerto Rico Projects

The Puerto Rico Highway Authority issued an RFP in 1990 for a $75 million B-T-O toll bridge linking San Juan with its nearby international airport. Late in the year, the Authority selected Dragados y Construcciones for the project. The right of way is being provided by the Commonwealth. No public funds will be used, but the Commonwealth might guarantee the revenue levels on which the project's financing will be based. There will be no regulation of the toll rates charged. The Highway Authority has also identified $325 million worth of toll road projects it wants developed, and has prequalified three firms to develop proposals.

4.Camino Falcon Project (Texas)

A 200-mile intercity private toll road linking Laredo to Corpus Christi, a distance of 200 miles, has been proposed by Texas developer Ralph Durden. The east-west route would connect to the Camino Real toll road linking Monterrey, Mexico to Nuevo Laredo, the sister city of Laredo, Texas. Its primary purpose would be to speed freight traffic from Mexico to the port at Corpus Christi. The $300 million project would be developed under Texas's 1913 private toll road law, which grants tollway developers the power of eminent domain. Durden's company, Camino Falcon, Inc., has hired Howard Needles Tammen & Bergendoff to conduct a feasibility study of the project.

5.Front Range Toll Road (Colorado)

Colorado law already permits private companies to build, own, and operate toll roads, subject to regulation of the toll rates by counties through which the road passes. The Front Range Toll Road Co. was incorporated several years ago to build a 210-mile, intercity toll road linking Pueblo and Fort Collins. The north-south route would parallel congested I-25, but would pass to the east of (rather than through the center of) Denver; it would also provide access to the new Denver airport. The $1.3 billion project is contemplated as a multi-purpose utility corridor, offering the possibility of pipelines, rail service, and fiber-optic right of way. The company has held discussions with Transroute about becoming involved with the project, but few other details have been released.

6.Chicago-Kansas City Tollway (Illinois, Missouri)

As discussed above in Section III, this 521-mile, $2.1 billion project is aimed primarily at providing a "truck bridge" across the Midwest, permitting heavy trucks to continue from Eastern toll roads to those Western states that also permit heavy combination vehicles. A $400,000 federally funded feasibility study by Howard Needles Tammen & Bergendoff and Price Waterhouse in 1989 concluded that the project would be feasible if it could incorporate certain existing highway segments and receive other favorable treatment by the state governments of Illinois and Missouri. Further action awaits the necessary enabling legislation in both states.

D.Agency Relationships

1.The Development Process

Private tollways are still a relatively new concept in most states, as the preceding discussions have made clear. Hence, there is no generally accepted standard model for implementing the development process. But the general steps which must take place are relatively straightforward. One recent summary is contained in the new manual for public/private partnerships published by the American Road & Transportation Builders Association.[23]

Project Initiation

Generally highway needs are identified by the state agency, either a highway/transportation department or a toll road authority. In some cases (e.g., California's AB 680 process), the lead agency instead invites the private sector to identify needed projects. In either case, some criteria must exist to determine whether or not the project might be a good candidate for privatization, rather than conventional development.

Create Appropriate Environment

Both the state agency and private sector proponents must then work to create the proper political environment to permit the project to go forward as a privatization effort. If there is not already suitable legislation on the books, it must be drafted. The need for private-sector involvement in highway infrastructure must be explained via various levels of public-information efforts, in order to build a political consensus.

Consideration of Alternative Structures

The legislative provisions must be tailored to the specific situation existing in the state in question. A single agency should be given the principal role in managing the process of project development, but the choice of agency will depend on the specifics. Numerous suggested legislative provisions to facilitate privatization can be found in the Privatization Council's legislative initiatives handbook.[24]

Project Solicitation

There will generally be a two-step process, beginning with a Request for Qualifications, followed at a later date by a Request for Proposals from the pre-qualified firms or teams. The RFP can be either for a specific project identified by the lead agency (as in Puerto Rico) or for project proposals that meet certain criteria (as in Arizona, California, and Florida). In either case, the state agency should make use of specific, objective criteria for evaluating the proposals.

Team Creation

A development team generally is formed prior to the time of the RFQ, and will usually include a developer/owner, a financier, an engineering firm, a legal firm, a construction contractor, a public relations firm, a toll-analysis firm, and a toll operating company. Several of these capabilities may, of course, exist within a single firm.

Project/Team Selection and Negotiation

The lead state agency will select project proposals that meet its selection criteria and negotiate the appropriate franchise or development agreements.

Design and Analyze Project

This often-lengthy step encompasses the initial project design and environmental review process. This stage can be costly and of high risk, since it is not certain that the project will go forward unless and until the environmental hurdles are cleared successfully.

Final Design and Construction

This stage involves the completion of design work, which may overlap the startup of construction if the design/build method is employed. It also involves going to the financial markets for the project's financing.

Operation

This stage occurs when the state agency signs off on the construction work and accepts the project as ready for operation. At this point, title would transfer in a B-T-O project. In many cases, the project would become part of the state highway system at this stage.

Figure 4-2 illustrates the roles and responsibilities of the private sector and a state agency, as they exist in California's AB 680 process. A typical time frame for a large project is illustrated in Figure 4-3, taken from the Chicago-Kansas City Tollway project.

2.Agencies in Key States

Arizona

The lead agency in Arizona is the Arizona Department of Transportation (ADOT). There is no toll authority, since Arizona does not have any toll roads or bridges. ADOT held a day-long seminar in September 1991 on the new law, explaining its plans and obtaining feedback from the private sector. The agency appears to be fully committed to the new program, which is strongly backed by Gov. Symington and ADOT's new director, Charles Cowen. An ambitious schedule was presented, calling for issuance of Requests for Qualifications early in 1992 and completion of the competitive process for the four projects by early 1993.

California

The California AB 680 process was illustrated in Figure 4-2, and has been the subject of numerous articles and conference presentations during 1990 and 1991. Since the original legislation provided only for four demonstration projects, which have already been awarded, future business prospects will depend on whether or not the legislature amends the law to expand its scope to additional projects. While Caltrans has been an enthusiastic proponent of privatization, the legislature has been willing to tamper with the law at the behest of anti-tollway members, and its future must be considered uncertain at this point.

Florida

The Florida legislation, newly passed, is the least complete of those now on the books, leaving a great deal to be determined by the Florida Department of Transportation, which was given until January 1, 1992 to develop implementation procedures. FDOT has not been seen as enthusiastic about privatization, so it is not clear how workable its interpretation of the law will turn out to be. Another potential problem is the need for each project to receive the approval of the legislature. Most of Florida's many toll roads have been built by local authorities which receive no state tax funds, such as the

Orlando-Orange County Expressway Authorities. They were established for the express purpose of bypassing FDOT's cumbersome rules and regulations, and have generally done an excellent job. These county authorities, though not very familiar with privatization, would be an alternative to FDOT for exploring privatization projects, especially if FDOT's implementation procedures turn out to be unfavorable.

Texas

The Texas Turnpike Authority has been given the lead responsibility for private tollway projects in Texas. TTA has a good reputation for toll projects, and is viewed as being positive about privatization. In addition, the new law permits the nine "grandfathered" firms to pursue their projects, subject to regulations to be developed by the new Texas Transportation Commission by January 1, 1993. The grandfathered projects are granted the power of condemnation and the right to cross railroads, highways, and state lands, and to set their own tolls. The new law also permits "transportation corporations" (an existing form of public-private partnership) to use the new private toll road law. Those which are located in or adjacent to counties of 1.5 million or more population may also be granted the powers listed in the 1913 law.

Virginia

Virginia's situation is more cumbersome than most. Projects may be proposed by the private sector, rather than being developed only in response to RFPs. But several different agencies play key roles in the approval process. The Virginia DOT initially viewed private projects (or at least the first private project) as rivals. VDOT argued before the Commonwealth Transportation Board that it should build the Dulles Toll Road Extension, rather than the private firm. Only after the governor made it clear that he supported the privatization did VDOT back off. After receiving CTB approval, a private toll project must then receive approval of its financial plans and toll rate structure from the State Corporations Commission, which will be its ongoing regulatory agency. The SCC is Virginia's public utility regulator, so most of its expertise is in traditional utilities, rather than transportation infrastructure.

Illinois

For several years, Illinois state senator Richard Luft has been seeking to pass legislation to authorize private toll roads, so as to permit the Chicago-Kansas City Tollway project to proceed. Several bills have passed one or both houses of the legislature, only to be withdrawn or fail to receive the governor's signature. The most recent version, SB 381, would have made the Illinois State toll Highway Authority the lead agency for private ("investor-owned") toll highways, in contrast to previous bills which had largely ignored this agency. But to Luft's surprise, the bill was defeated in the House, due to heavy opposition by environmentalists, because the bill made no explicit provision for environmental impact statements (and the Toll Highway Authority is not generally required by state law to produce such statements). The Toll Highway Authority backed away from the bill, not wishing its exemption from EIR requirements to be changed. Hence, the bill has been rewritten again to make the Illinois Commerce Commission the lead agency. The basic model is for investor-owned toll road companies to be treated much the same as railroads, pipelines, and electric utilities, with permanent ownership of their projects and traditional public utility regulation.

Missouri

The other key state for the Chicago-Kansas City project has not enacted the necessary legislation, either. In 1990, the legislature passed a limited measure permitting nonprofit

corporations to own and operate certain toll facilities and to finance them with tax-exempt debt. One project has been proposed, the Lake of the Ozarks bridge. Otherwise, state law currently does not allow for toll roads, either public or private. A number of bills to change this situation have been introduced in recent years but not enacted. In May, the legislature passed a joint resolution providing for a statewide referendum on toll roads, for November 1992 (or at any special election the governor may call prior to that date). If approved, the referendum would amend the state constitution and allow for creation of a state toll road authority. It would not explicitly legalize private toll roads, and legislation to permit such projects would probably still be needed.

Minnesota

There has been considerable private-sector interest in this state during the past year, but thus far there is no privatization law, and existing state law prohibits tolls except on bridges (of which there are only four). Sen. Keith Langseth and Rep. Henry Kalis introduced a bill in 1990 that would allow for the development of private toll roads. The bill was defeated, due largely to the strong opposition of the Speaker of the House. The new Speaker is reportedly even more strongly opposed to private toll roads than his predecessor. Yet interest remains strong, in part because a January 1991 report of the State Transportation Study Board identified full-service transportation needs for the next 20 years of $63 billion, of which only $38 billion is expected to be available from state and federal sources. The report recommended increased use of public/private partnerships as one way of closing this gap.

SECTION V

KEY FACTORS FOR SUCCESSFUL PROJECTS

A.What Leading Private Firms Think

To assess the factors which affect project success, Reason Associates conducted a survey of eight investment banking firms and eight engineering/development firms which are already involved in the private tollway field to some degree.

The engineering firms (and the projects on which they have a major role) are:

- Parsons Brinckerhoff (PB) -- SR 125
- Howard Needles Tammen & Bergendoff (HNTB) -- SR 91
- Parsons Corporation (PC) -- Mid-State tollway
- CRSS, Inc. (CRSS) -- SR 91
- Kiewit (K) -- Dulles Toll Road Extension
- Fluor Daniel (FD) -- SR 125
- Perot Group (PG) -- SR 57
- Toll Road Corporation of Virginia (TRCV) -- Dulles Toll Road Extension.

Since the survey was conducted, Morrison Knudsen Corp. (MK) has also announced its

interest in the private tollway market.

The investment banking firms included in the survey are the following:

- Goldman, Sachs (GS)
- Morgan Stanley (MS)
- Manufacturers Hanover (MH)
- First Boston (FB)
- Babcock & Brown (BB)
- Toronto Dominion (TD)
- Westpac Banking (WB)
- Bank Nationale de Paris (BNP)

Since the survey was conducted, Smith Barney (SB) has also created a privatization group with an interest in private tollways. Two other investment bankers were sent the questionnaire but declined to participate. Lehman Brothers declined for proprietary reasons, and Salomon Brothers declined on grounds that they have just begun to explore the private infrastructure market. Among the engineering firms, only Parsons Brinckerhoff declined to take part.

All respondents were asked for their estimate of the size of the domestic market for private toll projects. Not all had made (or were willing to disclose) such an estimate, but the engineering firms' estimates were in the $10-15 billion range over the next decade. The investment bankers had a shorter time horizon; the general range of estimates was $2.5-5.0 billion over the next three to five years. Interestingly, the investment bankers projected an overseas market of twice that size over the next five years.

The respondents generally agreed that the principal markets are for urban congestion-relief tollways, intercity/rural toll roads, bridge rehabilitation, and new bridges/tunnels (in that order), but with slightly stronger interest in intercity and suburban-relief roads among the investment bankers.

Not all respondents were able (or willing) to identify the states they considered most promising, but of those designating states, the states discussed in this report -- Arizona, California, Colorado, Florida, Illinois, Minnesota, Missouri, Texas, and Virginia -- were the only ones cited (except that one investment banker mentioned Hawaii and one mentioned New York). California, Virginia, and Texas were the most frequently mentioned states. The engineering firms all see the entire domestic market as their principal focus for tollway projects, with only two citing possible non-domestic interest (and one of these listed only Canada). The investment bankers all consider the overseas market to be part of their field of interest.

Several financially oriented questions were asked, to be answered based on the firms' experience to date on actual projects. The key criteria for financeability were stated as (1) evidence of sufficient demand, (2) likelihood of environmental approval, and (for some firms) (3) multiple revenue sources. Required return on equity ranged from 17 percent to 35 percent, with an average of 23.6 percent among the engineering firms and from 12 percent to 50 percent among the investment bankers (depending on the type of financing involved) with an average of 19.6 percent. The required coverage ratio cited by engineering firms averaged 1.6,

with a range of 1.2 to 3.0. The investment bankers cited ranges from 1.2 to 2.25, with an average of 1.45. There was no common ground on the question of value capture, with firms either considering it important or thinking it should be avoided. Those not thinking value capture important want to consider only projects which can be self-supporting from toll revenues.

All were asked an open-ended question on the biggest problems in implementing a successful private toll road. The engineering and investment banking firms gave very similar answers, citing political and regulatory hurdles, especially garnering environmental approval.

In an effort to prioritize the various factors making for a successful private toll project, respondents were given a list of factors and asked to allocate 100 points among them. The resulting success factors, listed in the order they were ranked by the engineering firms, were as follows:

Success Factor Engineering Investment

Firms Bankers Combined

Local political support14.715.029.7

Minimal environmental problems14.415.029.4

Private tollway legislation10.815.025.9

Public acceptance12.013.525.5

High demand/high toll prospect10.713.023.7

Right of way availability10.99.019.9

High early traffic13.15.518.6

Development potential6.64.511.1

Pro-growth sentiment3.96.09.9

Complexity of construction2.93.56.4

Clearly, two key themes run through these responses. Projects must make fundamental economic sense, but they must also exist in a favorable political and policy climate.

B.Inputs from Major Organizations

During 1991, three important organizations have published what amount to handbooks on public/private partnerships in transportation. The most cogent and useful of these comes from the Transportation Task Force of the Privatization Council and is aimed primarily at legislators. A second document is the recommendations from the California Engineering Foundation's November 1990 policy development conference on public/private partnerships in transportation. The third is a handbook from the American Road & Transportation Builders Association. Each document discusses the types of public/private mechanisms available, but their principal focus is on key policy factors which will facilitate or block such projects.

1.Privatization Council

This handbook clearly identifies a number of legislative provisions which are considered "most likely to discourage private involvement." The provisions are:

•Requiring legislative approvals of individual projects (as in the new Florida law);

•Requiring posting of excessive bonds that may be forfeited for reasons not entirely within the project developer's control;

•Requiring excessive private insurance;

•Allowing relatively uninhibited competition from future (but not yet identified) government transportation projects (which is addressed in the AB 680 franchise agreements);

•Ad hoc regulation of toll rates or rate of return, particularly by a public utilities commission (thus far, only Virginia has opted for utility-type regulation, but Illinois is moving in that direction);

•State prohibitions against local government financial involvement in the project (as in Sen. Lockyer's bill currently pending in the California legislature);

•Requiring private infrastructure developers to use government subcontracting and procurement methods (as might be inherent in Florida's new law - and as ARTBA is actually recommending, due to pressure from its small-contractor members);

•Implying that government selection/negotiation bypasses regular environmental rules;

•Prohibiting the start of construction until after the government has approved very detailed design specifications.

The report spells out 39 specific federal, state, or local legislative measures which would help make privatization projects more feasible. Among the most important, it singles out the following:

(1)Allowing the private sector to propose projects which it believes to be financially viable. Thus far, all the recent state privatization measures except those in Puerto Rico take this approach.

(2)Active government assistance in planning, permitting, and land acquisition. The states vary in the degree of this type of support.

(3)Government provision of law enforcement services (either contributed or by contract). This is the approach being taken in states with private tollway laws.

(4)Exemption/deferral of local property taxes until project debt is retired. This has been proposed in Illinois, but otherwise is not being done.

(5)Establishing a trust fund with sales tax receipts on supplies, equipment, etc. used in the project, for secondary credit support. This has been proposed in Illinois but is otherwise not being done.

(6)Delaying bills for services provided by government until after construction financing is arranged. This is not currently being done, to the best of our knowledge.

(7)Some limitations on tort liability. This is not currently being done, except to the extent that B-T-O may inherently limit liability compared with ownership models of privatization.

(8)Free or discounted use of government right of way. This is being used in several AB 680 projects, though it is threatened by Sen. Lockyer's bill. Also being considered in Illinois.

(9)Allowing ancillary commercial development on the project site to produce additional revenues. This idea is generally accepted.

2.California Engineering Foundation

The CEF conferees deliberated in six workshop groups, each of which identified problems and potential barriers and proposed policy changes that would open the door for greater involvement by the private sector. Many of the specific policies overlap with those proposed by the Privatization Council's handbook. A summary of the findings, by subject area, is as follows:

•Government Process: Existing environmental reviews, cross-cutting federal regulations, public-utility regulation, and government procurement practices can be major barriers to private-sector development and operation of transportation projects.

•Liability Management: The degree of liability exposure is considered greater than for other privatized activities, and insurance coverage may not be adequate.

•Tax Policy: The (possible) lack of access to tax-exempt financing and lack of tax incentives are seen as problems.

•Capital Flow: While sufficient capital is available for privatized projects, the biggest obstacle is costs incurred between the start of a project and its environmental clearance.

•Project Development: A key factor in project success is a cooperative relationship with a lead government agency and streamlined procedures.

•Project Revenues: Government will have to be involved in a number of areas, including enforcement of toll collections, zoning, and value capture.

Overall, the workshops produced 36 specific recommendations for legislation or policy changes aimed at facilitating the development of public/private projects. Nine summary recommendations, capturing the major thrust of the detailed points, were developed as follows:

(1)State governments should encourage more privatized projects. This is intended to mean not spelling out a small number of demonstration projects, as in California and Arizona, but creating a general authorization, as in Florida, Texas, and Virginia.

(2)State governments should pay for environmental review. This would reduce the need for very high-risk spending by project developers (since the money would be a total loss if the project then fails to receive environmental approval). State responsibility for this part of the process might also produce more-objective environmental reviews.)

(3)State governments should extend tort liability protection to private projects. The idea is to put privatized projects on a level playing field with state-owned highways.

(4)State governments should protect developers from legislated or agency-mandated cost increases. Examples include new safety standards implemented after a project is developed, as well as the cost of state law-enforcement services.

(5)States should actively encourage private transportation funding. To reduce the perceived riskiness to the capital markets, states could embrace joint public-private funding and possibly participate in other ways, via loans or tax incentives.

(6)Shared risk between the public and private partners should be clearly defined. Risk allocation mechanisms should be devised among the insurance industry, the state, and the private developer.

(7)The Urban Mass Transportation Administration should designate park-and-ride facilities as being for public use. This is intended to make those facilities more amenable to privatization.

(8)State laws should designate private projects as first choice. In other words, future policy should be that projects which can be self-supporting should be done by the private sector.

(9)State governments should eliminate sunset laws for private projects. The fairly standard 35-year franchise is considered to be arbitrarily short, and therefore a deterrent to investment.

3.American Road & Transportation Builders Association

ARTBA's handbook provides a thorough discussion of the issues involved in public/private transportation projects, but does not produce detailed lists of barriers or success factors. Especially useful are its Sections 2 (Legal Issues) and 6 (Risk Management) discussions. The handbook is prefaced by a Statement of Policy, which represents the official ARTBA view of the overall public policy measures which should guide this new field. They are as follows:

(1)States should be authorized to contract with private firms to finance, design, construct, and/or operate new or existing toll projects on the federal-aid highway system. ARTBA apparently does not endorse private ownership of such projects.

(2)When public funding is involved, the projects should be carried out in cooperation with federal and state transportation agencies, and government "open competitive bidding" laws should apply. This would negate the benefits of design/build methods, and reflects ARTBA's small-contractor constituency, which is strongly opposed to design/build.

(3)ARTBA supports a 35 percent federal share for public/private projects, with states given maximum flexibility to commingle these funds with local, state, and private funds.

(4)Private transportation projects should be allowed to share federally financed right of way and airspace at no cost.

(5)Public/private ventures should be given access to both the tax-exempt bond market and accelerated depreciation. Both of these provisions applied to public/private environmental infrastructure projects prior to the Tax Reform Act of 1986.

Section VI

POTENTIAL PRIVATIZATION PROJECTS

This section presents three estimates of the possible domestic market for private tollway projects in the decade of the 1990s. The initial, most conservative, estimate is based on projects currently being discussed as privatization projects, in 10 states. This estimate does not take into account the possible impact of the new federal surface transportation act's privatization provision. A second, more speculative, estimate, is based on a review of all potential toll road projects currently identified as in the planning process, whether public or private, on the assumption that some fraction of the public projects might end up being done as private or public/private projects. An even larger figure is based on estimates of the market for highway and bridge rehabilitation as privatized projects, assuming that states take advantage of the provisions in ISTEA.

Table 6-1 lists the privatized projects currently under discussion in the 10 states in question. In each case, the type of project and the estimated cost (from published estimates) is given. Altogether, these projects total $11.303 billion, which is consistent with the market size range identified in the surveys reported in Section V. Of this total, the largest share ($5.978 billion) is urban/suburban congestion-relief tollways, and the other main component ($5 billion) is intercity tollways. Only $325 million represents new bridges and tunnels. No rehabilitation/reconstruction projects are currently identified as privatization candidates, though this may change depending especially on the federal highway program reauthorization bill.

Table 6-2 provides a larger possible universe of projects, drawn principally from the International Bridge, Tunnel & Turnpike Association database of proposed toll projects, supplemented by Reason Associates research. The total value of these projects is approximately $28.5 billion. It should be noted, again, that this list of projects does not reflect the potential impact of the 1991 federal legislation, which may lead to additional proposals for new tollway projects.

Since federal law has been changed to permit the rehabilitation of aging federal-aid highways and bridges as privatized toll facilities, there is now a potentially large rehabilitation market, as well. As noted in Section I, total annual public-sector highway investment is currently in the vicinity of $33 billion/year, and is unlikely to exceed $38 billion/year under ISTEA -- if the funds are all spent on public-sector projects. As noted in Section II, FHwA estimates the gap between needs and spending as between $13 billion and $42 billion per year.

If states take full advantage of the new law, the total amount of U.S. highway investment will expand significantly. As noted in Section II, the exact amount of funds made available for highways depends on how states use their new flexibility to allocate a portion of the federal funds between highways and transit. A reasonable mid-range estimate is that $35 billion of the $151 billion will be spent on transit, leaving $116

Table 6-1

Identified Private Tollway Projects

Value

StateProject($ millions)Type

AZPhoenix/Maricopa1,000Urban/congest.

County freeway plan

CASanta Ana Viaduct Express700Urban/congest.

San Diego Expressway400Urban/congest.

Orange Lanes -- Rt. 9188Urban/congest.

Mid-State Tollway1,200Intercity

COFront Range Toll Road1,300Intercity

Berthoud Tunnel250Bridge/Tunnel

FLOrlando Beltway1,000Urban/congest.

ILChicago/Kansas City Tollway2,200Intercity

MNMpls.-St. Paul Beltway2,340Urban/congest.

Suburban starter segment160Urban/congest.

MSJackson Airport toll road60Urban/congest.

MOLake of the Ozarks Bridge25Bridge/Tunnel

TXCamino Falcon300Intercity

VADulles Toll Road Ext.230Urban/congest.

Jordan Bridge50Bridge/Tunnel

Total:$11,303

billion for highways over the act's six-year period. Of this total, $72.7 billion would be available for non-Interstate highway projects (which are eligible for privatization) with the other $43 billion earmarked for Interstates. If we assume that 10 percent of the latter is for bridge and tunnel projects (which *are* eligible for privatization), then a total of $77 billion would be available for privatization projects.

Under ISTEA, states may use federal funds for up to 50 percent of project costs on private toll highways and up to 80 percent on privatized bridge and tunnel projects. Assuming that states seek to leverage federal funds by requiring 75 percent private capital matched by 25 percent federal, a Reason Foundation study estimated that private investment of $19 billion per year

would be generated.[25] If (a) states maintain their existing $19 billion of annual highway investment, (b) federal investment increases to the projected $19 billion/year (one-sixth of $116 billion), and (c) the private sector puts in another $19 billion/year, that would increase total annual highway/bridge investment by 50 percent.

Hence, the privatization provisions of the 1991 act have the potential to close the investment gap identified by FHwA of $13 billion per year -- if the states take full advantage of its privatization provisions. At $19 billion per year, the decade-long market for private highways, bridges, and tunnels would total $190 billion. This figure would include both major reconstruction of existing facilities and development of entirely new projects.

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Table 2-1

1989 Mileage by Functional System and Jurisdiction

Jurisdiction

Functional SystemFederalStateLocalTotal

Rural

Interstate033,378033,378

Other Principal Arterial13280,69112880,951

Minor Arterial1,522144,6921,113147,327

Major Collector4,180208,806223,198436,184

Minor Collector12,23170,262211,931294,424

Local160,124168,6771,801,6592,130,460

Subtotal178,189706,5062,238,0293,122,724

Urban

Interstate011,471011,471

Other Freeway & Expressway597,1923317,582

Other Principal Arterial9435,39316,00251,489

Minor Arterial6519,78854,89374,746

Collector488,02870,39878,474

Local76015,029514,226530,015

Subtotal1,02696,901655,850753,777

Total179,215803,4072,893,8793,876,501

Source: FHwA 1991 *Conditions and Performance Report*.

Table 2-2

Lane-Miles and Highway Travel Comparison

Lane-MilesTravel

(millions of annual vehicle miles)

Functional System	1983	1989	Annual Change (%)	1983-89 Change (%)
Rural				
Interstate	131,976	134,969	0.37	144,733
Other Principal Arterial	201,424	205,818	0.36	139,962
Minor Arterial	309,034	308,266	-0.04	133,421
Major Collector	867,549	880,650	0.25	156,786
Minor Collector	574,554	586,998	0.36	43,806
Local	4,442,784	4,260,920	-0.69	81,825
Subtotal	**6,527,311**	**6,377,621**	**-0.39**	**700,533**
Urban				
Interstate	53,386	61,854	2.48	191,149
Other Freeway & Expressway	30,817	33,739	1.52	86,790
Other Principal Arterial	150,892	170,977	2.10	255,327
Minor Arterial	172,395	188,218	1.47	188,467
Collector	153,118	167,699	1.53	86,593
Local	912,270	1,060,030	3.02	53,140	247
Subtotal	**1,472,878**	**1,682,517**	**2.24**	**948,573**	**1,258**
Total	**8,000,189**	**8,060,138**	**0.12**	**1,649,106**	**2,107**

Source: FHwA 1991 *Conditions and Performance Report*.

Table 2-3

System Performance, 1989

(percent of peak-hour travel)

System	Congested[1]	Highly Congested[2]	Total

Urban Interstate18.4%51.2%69.6%

Other Urban

Arterials14.1%29.2%43.3%

Urban Collector

8.4%11.0%19.4%

[1]Congested: V/C = 0.8 to 0.95

[2]Highly Congested: V/C > 0.95

A volume to capacity ratio (V/C) of 0.8 means that traffic volume has reached 80 percent of the capacity of the facility. Congestion begins to occur at about that point. A V/C ratio of 0.95 means that traffic has almost reached the saturation point of the facility, at which point (V/C of 1.0) "gridlock" occurs.

Source: 1991 FHwA *Conditions and Performance Report*.

Table 2-4

Pavement Conditions, 1989

Poor*LowHighGoodTotal

Fair*Fair

Interstate

Miles4,2287,0107,51926,09244,849

(% system)(9.4)(15.6)(16.8)(58.2)(100)

Other Arterials

Miles21,763114,54960,327165,456362,095

(% system)(6.0)(31.6)(16.7)(45.8)(100)

Collectors

Miles239,448255,73280,329233,572809,081

(% system)(29.6)(31.6)(9.9)(28.9)(100)

Totals

Miles 265,439377,291148,175425,1201,216,025

(% system)(21.8)(31.0)(12.2)(35.0)(100)

* Poor is defined for all roads as present serviceability rating (PSR) less than or equal to 2.0, 2.5 for the Interstate. Low fair is less than or equal to 2.5, 3.0 for the Interstate System.

The combination of "poor" and "low fair," or about 642,000 miles, means that in 1989 almost half of all arterial and collector mileage was at or near the point at which vehicle operating characteristics (and user costs) are significantly impaired by deteriorated conditions. Even with the stabilization of the deteriorating trend in pavement conditions, the magnitude of pavements that remain in poor or low fair condition, combined with the continuing deterioration of other pavements currently in high fair or good condition, mean that each year about 100,000 miles of arterials and collectors must have some type of pavement improvement to restore their serviceability.

Source: FHwA 1991 *Conditions and Performance Report*.

Table 2-5

Bridge Deficiencies, 1990

Functional SystemStructurallyFunctionallyTotalTotal

DeficientObsoleteDeficienciesBridges on

the System

Interstate3,84811,36015,20853,183

Other Arterial15,98923,50239,491124,615

Collector33,05623,56656,622164,300

Local81,17933,328114,507234,567

Total134,07291,756225,828576,665

Since 1984, the number of structurally deficient bridges on arterials and collectors has increased by 25 percent. Between 1988 and 1990, the number of structurally deficient bridges decreased on the Interstate and other arterials but, because of an increase in structural deficiencies on collector bridge, there was an overall increase of about 1.5 percent. The number of bridges rated as functionally obsolete increased on the Interstate and other arterial highways and decreased on collectors between 1988 and 1990 because of the redefinition of certain types of deficiencies.(2)

Source: FHwA 1991 *Conditions and Performance Report*.

Table 2-6

Summary of *Annual* Highway and Bridge Investment Requirements

1990-2009

(Billions of 1989 Dollars)

Cost to MaintainCost to Improve

Functional System	1989 Conditions	1989 Conditions and Performance	and Performance
Rural Highways			
Interstate	3.0	3.3	
Other Principal Arterial	2.5	3.7	
Minor Arterial	2.9	3.7	
Major Collector	4.6	5.4	
Minor Collector	1.9	3.0	
Local Roads	0.2	0.2	
Rural Subtotal	**15.1**	**19.3**	
Urban Highways			
Interstate	5.0	11.7	
Other Freeway & Expressway	2.6	4.7	
Other Principal Arterial	6.0	13.1	
Minor Arterial	5.3	10.3	
Collector	3.7	6.0	
Local Roads	3.8	3.8	
Urban Subtotal	**26.4**	**49.6**	
Urban and Rural Subtotal	**41.5**	**68.9**	
Bridge	4.2	6.0	
Total Annual Highway	**45.7**	**74.9**	
and Bridge Requirements			

Source: FHwA 1991 *Conditions and Performance Report*.

Table 2-7

Toll Roads and Bridges

Roads	Annual revenues (miles)	Bridges	Annual Revenues (millions)	Are they Dedicated?

California9$104.8(yes)

Delaware930.7(yes)

Florida5434205.0(yes)

Georgia4.21.6(yes)

Illinois256208.0(yes)

Indiana157355.7(yes)

Kansas23332.0(yes)

Kentucky428.418.2(yes)*

Louisiana3N/A(yes)

Maine10540.0(partial)**

Maryland826(a)107.0(yes)

Massachusetts1421109.4(yes)

Michigan29.6(yes)

Minnesota2(b)N/A(yes)

Missouri32.8(partial)

Nebraska2.6(yes)

New Hampshire8432.3(yes)

New Jersey358.525(a)1,000.0(yes)

New York660 401,000.0+(partial)

North Dakota1(b)N/A(yes)

Ohio24182.0(yes)

Oklahoma487 48.9(yes)

Oregon12.0(yes)

Pennsylvania47010311.4(yes)

Rhode Island2(c)N/A(yes)

Texas44.316N/A(yes)

Virginia83.32107.0(yes)

Washington11.0(yes)

West Virginia8830.0(yes)

Totals4,475.7134$3,538.0

*revenues pay bond interest and principal

**$8.7 million annually to state highway fund

(a)includes 2 tunnels

(b)privately owned and operated

(c)operated by the Rhode Island Turnpike and Bridge Authority

Source: The Road Information Program, Washington, D.C.

Table 2-8

Toll Road Rates

Average Rate Per Mile for Passenger Cars

StateRange of Average Rates/Mile

Delaware8.9 cents

Florida1.0- 12.5 cents

Illinois2.6- 2.9 cents

Indiana3.0 cents

Kansas3.0 cents

Kentucky1.7- 2.3 cents

Maine3.1 cents

Maryland2.4 cents

Massachusetts2.9- 6.3 cents

New Hampshire3.2- 5.6 cents

New Jersey2.2- 2.3 cents

New York3.1 cents

Ohio2.0 cents

Oklahoma2.3- 2.4 cents

Texas7.2- 8.8 cents

Virginia2.1- 5.7 cents

West Virginia4.3 cents

Source:International Bridge, Tunnel and Turnpike Association, "Toll Rates Survey," October, 1989.

Table 3.1

Change in Auto Commuting Times, 1980-1985,

in Largest 20 MSAS

AutomobileSignificance of

Commuting Time (Min.)Difference

19801985(t-value)

New York28.1 26.3-1.97*

Los Angeles23.722.1-4.03**

Chicago25.423.9-2.44**

San Francisco23.121.3-2.14*

Philadelphia23.721.9-3.15**

Detroit23.119.9-6.11**

Boston22.020.4-2.20*

Dallas22.622.70.10

Washington, D.C.26.925.0-3.21

Houston26.524.0-2.48**

Miami22.920.6-3.10**

Cleveland22.119.5-3.68**

Atlanta24.723.3-1.87*

St. Louis22.620.9-2.21*

Seattle22.020.5-1.70*

Minneapolis19.617.6-3.79**

San Diego20.319.5-0.85

Baltimore25.724.7-0.78

Pittsburgh22.221.5-0.52

Phoenix21.822.40.73

**Significant at 0.01 level

*Significant at 0.05 level

Source:*The Commuting Paradox: Evidence from the Top Twenty*, Peter Gordon, Harry W. Richardson, and Myung-Jin Jun, School of Urban & Regional Planning, University of Southern California, October 1989, based on the 1980 Population Census and 1985 American Housing Survey.

Table 3.2

Work Trips vs. Non-Work Trips

in Major Metropolitan Areas

(Billion)

19771983Percent Change

Work Trips

A.M. Peak3.1133.025-2.8%

P.M. Peak2.3542.373 0.8%

Off-Peak2.5533.208+25.6%

Non-Work Trips

A.M. Peak2.6023.651+40.3%

P.M. Peak5.0096.176+23.3%

Off-Peak15.34719.484+27.0%

Peak Trips

A.M. Peak5.7156.676+16.8%

% Non-Work45.5%54.7%

P.M. Peak7.3638.549+16.1%

% Non-Work68.0%72.2%

Total Peak13.07815.225+16.4%

% Non-Work58.2%64.5%

Source:Professor Peter Gordon, U.S.C. (compiled from U.S.D.O.T. Nationwide Personal Transportation Study data tapes)

Table 3.2

Work Trips vs. Non-Work Trips

in Major Metropolitan Areas

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Peak Trips

A.M. Peak5.7156.676+16.8%

% Non-Work45.5%54.7%

P.M. Peak7.3638.549+16.1%

% Non-Work68.0%72.2%

Total Peak13.07815.225+16.4%

% Non-Work58.2%64.5%

Source:Professor Peter Gordon, U.S.C. (compiled from U.S.D.O.T. Nationwide Personal Transportation Study data tapes)

Table 3.3

1988 Congested Daily Vehicle-Miles of Travel

Urban Area	Daily Vehicle-Miles of Travel[1]		Percent of Peak-Period[1,2] VMT on Congested Roads		Peak Period Congested DVMT[1,3]		
	Frwy. (1,000)	Prin. Art. Str. (1,000)	Frwy. (%)	Prin. Art. Str. (%)	Frwy. (1,000)	Prin. Art. Str. (1,000)	Frwy. & Prin. Art. Str. (1,000)
Northeastern Cities							
Baltimore, MD	13,920	9,160	25	35	1,570	1,440	3,010
Boston, MA	22,720	12,860	45	40	4,600	2,310	6,910
New York, NY	78,010	49,710	55	80	19,310	17,900	37,210
Philadelphia, PA	16,680	22,120	25	75	1,880	7,460	9,340
Pittsburgh, PA	7,380	10,630	20	60	660	2,870	3,530
Washington, D.C.	23,600	18,800	65	85	6,900	7,190	14,090
Midwestern Cities							
Chicago, IL	31,970	26,070	55	65	7,910	7,620	15,530
Cincinnati, OH	9,750	3,440	30	25	1,320	390	1,710
Cleveland, OH	12,670	5,010	25	30	1,430	680	2,110
Detroit, MI	22,020	21,670	40	60	3,960	5,850	9,810
Indianapolis, IN	7,750	3,940	10	20	350	350	700
Kansas City, MO	12,220	4,490	5	25	270	510	780
Louisville, KY	6,040	2,860	5	55	140	710	850
Milwaukee, WI	7,140	4,730	30	35	960	740	1,700
Minn.-St. Paul, MN	16,420	5,300	30	55	2,220	1,310	3,530
Oklahoma City, OK	6,620	3,450	10	35	300	540	840
St. Louis, MO	17,390	11,470	15	55	1,170	2,840	4,010
Southern Cities							
Atlanta, GA	22,970	9,790	45	65	4,650	2,860	7,510

Memphis, TN	3,950	4,050	10	35	180	640	820
Miami, FL	7,890	13,740	60	70	2,130	4,330	6,460
Nashville, TN	5,250	5,390	25	40	590	970	1,560
Tampa, FL	3,440	4,070	25	60	390	1,100	1,490

Table 3.3

1988 Congested Daily Vehicle-Miles of Travel

Urban Area	Daily Vehicle-Miles of Travel[1]		Percent of Peak-Period[1,2] VMT on Congested Roads		Peak Period Congested DVMT[1,3]		
	Frwy. (1,000)	Prin. Art. Str. (1,000)	Frwy. (%)	Prin. Art. Str. (%)	Frwy. (1,000)	Prin. Art. Str. (1,000)	Frwy. & Prin. Art. Str. (1,000)
Southwestern							
Albuquerque, NM	2,230	3,390	20	35	200	530	730
Austin, TX	5,220	2,070	55	45	1,290	420	1,710
Corpus Christi, TX	1,510	1,440	10	5	70	30	100
Dallas, TX	22,380	8,150	55	30	5,540	1,100	6,640
Denver, CO	10,490	10,450	50	50	2,360	2,350	4,710
El Paso, TX	3,320	3,110	20	5	300	70	370
Fort Worth, TX	11,150	4,200	40	30	2,010	570	2,580
Houston, TX	27,100	10,190	70	50	8,540	2,290	10,830
Phoenix, AZ	5,550	16,680	60	80	1,500	6,000	7,500
Salt Lake City, UT	4,080	1,910	15	40	280	340	620
San Antonio, TX	9,050	4,990	40	15	1,630	340	1,970
Western Cities							

Los Angeles, CA	102,140	78,240	75	50	34,470	17,600	52,070
Portland, OR	7,100	3,280	40	60	1,280	890	2,170
Sacramento, CA	8,420	6,660	45	50	1,710	1,500	3,210
San Diego, CA	25,040	8,850	45	30	5,070	1,190	6,260
San Fran-Oak, CA	40,370	13,540	80	60	14,530	3,660	18,190
Seattle-Everett, WA	17,190	8,820	70	55	5,410	2,180	7,590
Northeastern Avg.	27,049	20,546	39	63	5,819	6,530	12,349
Midwestern Avg.	13,633	8,401	23	42	1,821	1,958	3,779
Southern Avg.	8,698	7,405	33	54	1,587	1,979	3,566
Southwestern Avg.	9,279	6,051	40	35	2,155	1,277	3,432
Western Avg.	33,375	19,896	59	51	10,412	4,053	14,915
Total Avg.	16,874	11,247	37	46	3,822	2,864	6,686
Maximum Value	102,140	78,240	80	85	34,472	17,896	52,076
Minimum Value	1,510	1,440	5	5	68	32	100

Source:Texas Transportation Institute Analysis and Local Transportation Agency References

Notes:[1]Daily vehicle-miles of travel

[2]Represents the percentage of daily vehicle-miles of travel on each roadway system during the peak period operating on congested conditions

[3]Daily vehicle-miles of travel multiplied by peak-period vehicle travel and percent of congested DVMT

Table 3.5

Component and Total Congestion Costs by Urban Area for 1988

Urban Area	**Annual Cost Due to Congestion ($ Millions)**							Rank
	Recurring Delay	**Incident Delay**	**Recurring Fuel**	**Incident Fuel**	**Delay and Fuel Cost**	**Insurance**	**Total Delay, Fuel, and Insurance**	

Los Angeles, CA	2,060	2,420	350	410	5,240	1,640	6,880	1
New York, NY	1,270	2,440	200	380	4,290	1,760	6,040	2
San Fran-Oak, CA	760	960	130	160	2,010	340	2,340	3
Chicago, IL	530	620	90	100	1,340	540	1,880	4
Washington, D.C.	480	820	80	130	1,510	220	1,730	5
Philadelphia, PA	290	380	40	60	770	780	1,550	6
Detroit, MI	340	550	50	90	1,030	470	1,510	7
Houston, TX	420	570	70	90	1,150	310	1,470	8
Boston, MA	260	750	40	120	1,170	120	1,280	9
Miami, FL	230	290	40	50	610	430	1,040	10
Dallas, TX	250	430	40	70	790	170	960	11
Seattle-Everett,	270	360	50	60	740	60	800	12
Atlanta, GA	260	290	40	50	640	100	730	13
San Diego, CA	240	160	40	30	470	110	570	14
Pittsburgh, PA	110	160	20	20	310	250	570	14
Baltimore, MD	100	180	20	30	330	190	520	16
Phoenix, AZ	220	200	40	30	490	40	520	16
Denver, CO	140	140	20	20	320	70	400	18
Fort Worth, TX	90	160	20	30	300	80	380	19
Minn-St. Paul, MN	130	120	20	20	290	70	360	20
St. Louis, MO	110	120	20	20	270	80	350	21
Sacramento, CA	100	80	20	10	210	100	300	22
Cleveland, OH	70	50	10	10	140	140	290	23
Portland, OR	70	120	10	20	220	50	270	24

Table 3.5

Component and Total Congestion Costs by Urban Area for 1988

Urban Area	Annual Cost Due to Congestion ($ Millions)	Rank

	Recurring Delay	Incident Delay	Recurring Fuel	Incident Fuel	Delay and Fuel Cost	Insurance	Total Delay, Fuel, and Insurance	
San Antonio, TX	80	80	10	10	180	70	250	25
Nashville, TN	50	60	10	10	130	40	170	26
Milwaukee, WI	60	60	10	10	140	30	160	27
Tampa, FL	50	60	10	10	130	30	160	27
Austin, TX	60	60	10	10	140	10	160	27
Cincinnati, OH	60	50	10	10	130	20	150	30
Memphis, TN	20	20	0	0	40	70	120	31
Kansas City, MO	30	50	0	10	90	20	110	32
Oklahoma City,	30	30	0	0	60	30	90	33
Indianapolis, IN	20	30	0	0	50	20	80	34
Louisville, KY	20	20	0	0	40	30	70	35
Albuquerque, NM	20	20	0	0	40	10	60	36
Salt Lake City, UT	20	10	0	0	30	20	60	36
El Paso, TX	10	10	0	0	20	20	50	38
Corpus Christi, TX	0	0	0	0	0	10	20	39
Northeastern Avg.	420	790	70	120	1,390	550	1,950	
Midwestern Avg.	130	160	20	30	330	130	460	
Southern Avg.	120	140	20	20	310	130	440	
Southwestern Avg	120	160	20	30	320	70	390	
Western Avg.	580	680	100	120	1,480	380	1,860	
Total Avg.	240	330	40	50	660	220	880	
Maximum Value	2,060	2,440	350	410	5,230	1,760	6,870	
Minimum Value	0	0	0	0	10	10	20	

Source: Texas Transportation Institute Analysis and Local Transportation Agency References

Table 3-6

Deficient (PSR </= 2.5) Interstate Mileage for 1987

State	Rural Miles	Rural Percent Deficient	Urban Miles	Urban Percent Deficient	Total Miles	Total Percent Deficient
Alabama	622	0.2	258	0.0	880	0.1
Alaska	1,041	42.0	48	37.5	1,089	41.8
Arizona	1,044	12.6	117	18.8	1,161	13.3
Arkansas	419	4.3	123	4.9	542	4.4
California	1,416	8.7	973	7.3	2,389	8.1
Colorado	790	5.4	152	7.9	942	5.8
Connecticut	109	0.9	233	1.7	342	1.5
Delaware	0	NA	41	0.0	41	0.0
District of Columbia	0	NA	122	5.0	122	5.0
Florida	966	9.1	388	0.8	1,354	6.7
Georgia	884	17.2	359	9.5	1,243	15.0
Hawaii	5	0.0	34	0.0	39	0.0
Idaho	534	15.5	71	14.1	605	15.4
Illinois	1,418	3.4	516	8.3	1,934	4.7
Indiana	851	5.3	266	4.9	1,117	5.2
Iowa	643	13.4	131	22.9	774	15.0
Kansas	707	11.3	163	9.8	870	11.0
Kentucky	579	0.7	173	9.8	752	2.8
Louisiana	532	9.4	177	8.5	709	9.2
Maine	313	8.3	53	23.6	366	9.0
Maryland	169	0.0	225	0.4	394	0.3
Massachusetts	172	0.0	391	5.5	563	4.1
Michigan	766	11.7	442	0.0	1,208	7.4
Minnesota	688	4.5	212	0.5	900	3.6

Mississippi56340.912331.768639.2

Missouri84037.733745.71,17740.0

Montana1,1358.34628.31,1819.1

Nebraska4442.0372.74812.1

Nevada5039.1420.05458.4

New Hampshire18011.7427.122210.8

New Jersey1262.42674.53933.8

New Mexico89912.19920.299812.9

New York8581.364112.81,4996.2

North Carolina5992.22063.48052.5

North Dakota53226.7398.257125.4

Ohio8474.871816.41,56510.2

Oklahoma72321.920429.992723.6

Oregon58437.513225.071635.2

Pennsylvania1,14711.13764.01,5239.3

Rhode Island2133.34920.47024.3

South Carolina6736.71175.17906.5

South Dakota6360.0420.06780.0

Tennessee78841.227422.31,06236.3

Texas2,2823.992613.63,2086.7

Utah7521.21370.08891.0

Vermont3003.72015.03204.4

Virginia76719.62925.11,05915.6

Washington5140.22402.57540.9

West Virginia3892.1900.04791.7

Wisconsin46727.611112.657824.7

Wyoming8640.0504.09140.2

Total33,11111.611,21711.144,32811.5

Source: 1987 *Highway Statistics*.

Table 3.7

Count of Deficient Bridges by State

On Federal-Aid System

As of June 30, 1988

Bridges InNon-DeficientStructurallyFunctionallyDeficientPercent

StateInventoryBridgesDeficientObsoleteBridgesDeficient

Nebraska5,1003,7608055351,34026

Nevada80271416728811

New Hampshire1,24295216212829023

New Jersey4,2182,9199013981,29930

New Mexico2,7342,25625822047818

New York8,8173,4564,7705915,36161

North Carolina5,5563,8672321,4571,68930

North Dakota1,7821,09515852968739

Ohio12,27110,0762,0381572,19518

Oklahoma8,5115,3011,2141,9963,21038

Oregon3,7523,32324618342911

Pennsylvania10,8487,0622,6741,1123,78635

Rhode Island56647371229316

South Carolina4,2373,44723255879019

South Dakota2,7512,29325320545817

Tennessee7,4984,9651,1371,3962,53334

Texas26,07621,3181,3153,4434,75818

Utah1,5721,4757126976

Vermont1,29985816327844134

Virginia6,8505,2398048071,61124

Washington4,0342,8176365811,21730

West Virginia3,3281,6801,1654831,64850

Wisconsin6,3514,1721,7384412,17934

Wyoming1,9021,76251891407

Puerto Rico1,0065819233342542

Total274,583197,39137,30039,89277,19228

Source: June 1991 report of the Secretary of Transportation to the United States Congress on *The Status of the Nation's Highways and Bridges: Conditions and Performance and Highway Bridge Replacement and Rehabilitation Program 1989*.

Table 3.7

Count of Deficient Bridges by State

On Federal-Aid System

As of June 30, 1988

Bridges InNon-DeficientStructurallyFunctionallyDeficientPercent

StateInventoryBridgesDeficientObsoleteBridgesDeficient

Alabama7,7414,6641,0082,0693,07740

Alaska578531389478

Arizona4,5264,255721992716

Arkansas5,9524,2573351,3601,69528

California14,63612,6865221,6282,15014

Colorado3,5702,96445415260617

Connecticut2,6029026401,0601,70065

Delaware47540147277416

District of Columbia2101644514622

Florida6,1115,0801289031,03117

Georgia8,0535,1898582,0062,86436

Hawaii664509847115523

Idaho1,6741,4431587323114

Illinois10,6668,4861,6944862,18020

Indiana7,2724,9717331,5682,30132

Iowa7,1925,2777411,1741,91527

Kansas10,7747,5677952,4123,20730

Kentucky4,9532,7622341,9572,19144

Louisiana5,9764,1938619221,78330

Maine1,2781,0661456721217

Maryland2,7861,7214436221,06538

Massachusetts3,7582,5471,0781331,21132

Michigan5,8554,6449632481,21121

Minnesota5,1484,29353532085517

Mississippi7,5274,3671,4621,6983,16041

Missouri8,8635,4631,9341,4663,40038

Montana2,4401,1289112,2113,1253

Table 3.8

Count of Deficient Bridges by State

Off Federal Aid System

As of June 30, 1988

Bridges InNon-DeficientStructurallyFunctionallyDeficientPercent

StateInventoryBridgesDeficientObsoleteBridgesDeficient

Montana2,1927694041,0191,42365

Nebraska10,7433,2896,8316237,45469

Nevada27120034377126

New Hampshire1,33049536047583563

New Jersey1,77997445135480545

New Mexico70543915211426638

New York8,5092,0585,6398126,45176

North Carolina10,5993,7998755,9256,80064

North Dakota3,5011,1471,8015532,35467

Ohio16,90913,1062,4561,3473,80322

Oklahoma14,4704,7747,0152,6819,69667

Oregon2,8562,15033137570625

Pennsylvania11,6096,4883,3161,8055,12144

Rhode Island1369327164332

South Carolina4,6493,66470727898521

South Dakota4,0711,3391,4071,3252,73267

Tennessee11,0486,1923,2291,6274,85644

Texas18,2387,8435,2575,13810,39557

Utah9717101917026127

Vermont1,36649634053087064

Virginia5,8023,1298031,8702,67346

Washington2,8642,22028436064422

West Virginia3,1858421,6307132,34374

Wisconsin6,6123,3582,2401,0143,25449

Wyoming92438826926753658

Puerto Rico6793665425931346

Total303,127141,96298,52662,639161,16553

Source: June 1989 report of the Secretary of Transportation to the United States Congress on The Status of the Nation's Highways and Bridges: Conditions and Performance and Highway Bridge Replacement and Rehabilitation Program 1989.

Table 3.8

Count of Deficient Bridges by State

Off Federal Aid System

As of June 30, 1988

State	Inventory	Bridges Deficient	Obsolete Bridges	In Non-Deficient	Structurally Deficient	Functionally Deficient	Percent
Alabama	7,793	3,192	941	1,533	4,474	57	
Alaska	2	2	1	5	8	4	29
Arizona	1,097	9	5	6	8	5	31
Arkansas	7,065	2,939	1,261	2,865	4,126	58	
California	7,425	3,854	1,144	2,427	3,571	98	
Colorado	3,858	1,796	1,543	308	2,062	53	
Connecticut	1,474	463	213	807	1,016	1	
Delaware	263	162	32	69	101	38	
District of Columbia	272	43	03	11	258	1	
Florida	4,077	2,893	482	702	1,842	1	
Georgia	6,173	2,999	662	512	3,123	17	
Hawaii	379	258	31	901	213	2	
Idaho	2,071	1,224	024	418	1,434	1	
Illinois	14,762	9,587	619	1,556	5,535	17	
Indiana	10,245	4,890	374	2,281	5,535	29	
Iowa	18,673	8,212	599	5,216	10,210	46	
Kansas	14,874	5,348	591	4,935	9,352	66	
Kentucky	7,638	3,701	973	3,295	4,269	68	
Louisiana	8,163	3,544	098	1,521	6,195	57	
Maine	1,305	750	295	126	455	42	
Maryland	1,788	981	260	547	780	45	
Massachusetts	1,206	494	636	736	767	1	
Michigan	4,726	2,626	654	352	1,044	1	
Minnesota	7,846	5,003	376	1,467	4,233	6	
Mississippi	9,467	3,434	959	865	2,462	1	

Missouri14,8193,15410,4131,25211,66579

Table 4.1

Revised State Fiscal Problems for FY1991 and FY1992

(Prior to State Action)

State	Projected Deficit for FY1991 (Millions)	Percent of Original Budget	Projected Deficit for FY1992 or New Biennium (Millions)
Alabama	$89.70	2.5	
Alaska	no deficit		
Arizona	$95.00	2.7	
Arkansas	$8.00	0.4	
California	$3,800.00	8.6	($9,000)
Colorado	no deficit		
Connecticut	$746.90	11.6	($2,508); (83.2) if governor's plan goes through
Delaware	$43.00	3.5	($180)
District of Columbia	$300.00	9.3	
Florida	$878.00	7.8	
Georgia	$359.00	4.6	
Hawaii	no deficit		
Idaho	no deficit		
Illinois	$500.00	3.9	
Indiana	$91.80	1.8	($980) 1991-93 biennium
Kansas	undetermined amount		
Kentucky	no deficit		
Louisiana	no deficit		($921)
Maine	$110.00	6.7	($356)
Maryland	$553.00	8.8	($192)
Massachusetts	$850.00	6.2	($1,800) governor has proposed a 13% budget reduction
Michigan	$1,137.00-$1,200.00	11.3 -11.9	non-projected
Minnesota	$197.00	2.8	($682)

Mississippi	$106.00	6.2	
Missouri	$250.00	5.5	
Montana	no deficit		
Nebraska	$40.00	2.8	($20) preliminary

Table 4.1

Revised State Fiscal Problems for FY1991 and FY1992

(Prior to State Action)

State	Projected Deficit for FY1991 (Millions)	Percent of Original Budget	Projected Deficit for FY1992 or New Biennium (Millions)
Nevada	no deficit		
New Hampshire	$45.00	7.1	($130)
New Jersey	$703.00	7.9	($812)
New Mexico	no deficit		
New York	$1,000.00-$1,300.00	3.5 -4.5	($6,500)
North Carolina	$750.00-$780.00	10.0 -10.4	($980) on a continuation budget
North Dakota	no deficit		
Ohio	$477.00	3.8	($1,650) 1991-93 biennium
Oklahoma	no deficit		
Oregon			
Pennsylvania	$673.00 -$1,000.00	5.5- 8.1	($2,500) rough estimate
Puerto Rico	$300.00-$350.00 preliminary	7.3- 8.6	
Rhode Island	$241.00	15.7	
South Carolina	$132.00	3.7	

South Dakota	no deficit		
Tennessee	$180.00	4.8	
Texas	no deficit		($4,500) 1991-93 biennium
Utah	no deficit		
Vermont	$48.00	7.3	($120) rough estimate
Virginia	$707.00	11.3	($967); 14.3% of GE revenue estimate
Washington	no deficit		
West Virginia	no deficit		
Wisconsin	no deficit		($712) 1991-93 biennium
Wyoming	no deficit		($9.4)

Source: National Conference of State Legislatures, June 10, 1991

Table 4.2

The Seeds of Tax Revolt?

Taxes and Charges As a Percentage of Personal Income

Fiscal Years 1978-1989

StateState and Local

Taxes andTaxes and

YearTaxesChargesTaxesCharges

19787.107.9412.0814.25

19796.947.7711.3713.56

19806.787.6011.0213.20

19816.677.5010.8513.08

19826.497.3310.5912.82

19836.467.3310.6813.04

19846.977.8511.3013.73

19856.997.8711.2813.68

19866.917.8211.2413.66

19877.047.9511.4813.92

19887.047.9511.5714.08

19897.037.9811.5614.14

Source: Center for the Study of the States, Rockefeller Institute, Albany, New York.

Table 6.2
Privatized Toll Road Project
Summary Project Listing

State	Number of Projects	Total Project Mileage	Cost ($ mm)
Arizona	1	30	1,000.0
California	10	194	6,556.3
Colorado	3	293	2,287.0
Delaware	5	46	470.5
Florida	10	106	1,888.7
Georgia	8	69	558.6
Illinois	10	668	4,385.0
Maryland	2	74	2,000.0
Michigan	5	44	341.7
Minnesota	5	50	720.0
Missouri	1	1	25.0
Mississippi	1	5	58.0
North Carolina	20	241	2,687.0
New Hampshire	1	12	160.0
New Jersey	3	10	227.0
New York	1	10	300.0
Ohio	4	0	0.0
Pennsylvania	3	138	2,460.0
South Carolina	6	102	1,205.0
Texas	4	178	664.0
Virginia	3	302	349.0
West Virginia	1	4	60.0
Project Totals	**107**	**2,575**	**28,402.8**

Source: Reason Foundation, August 1991

Table 3.4

1988 Roadway Congestion Index Value

Urban Area	Freeway/Expressway		Principal Arterial Street		Roadway[3] Congestion Index	Rank
	DVMT[1] (1,000)	DVMT/[2] Ln-Mile	DVMT[1] (1,000)	DVMT/[2] Ln-Mile		
Los Angeles, Ca	102,140	20,590	78,240	6,520	1.52	1
San Fran-Oak, CA	40,370	17,360	13,540	6,620	1.33	2
Washington, D.C.	23,600	15,850	18,800	8,250	1.32	3
Chicago, IL	31,970	14,500	26,070	6,940	1.18	4
Miami, FL	7,890	13,710	13,740	6,800	1.18	4
Seattle-Everett WA	17,190	15,080	8,820	5,980	1.17	6
Houston, TX	27,100	15,140	10,400	5,150	1.15	7
San Diego, CA	25,040	14,770	8,850	5,460	1.13	8
Boston, MA	22,720	15,040	12,860	4,780	1.12	9
New York, NY	78,010	13,430	49,710	6,990	1.10	10
Atlanta, GA	22,970	13,920	9,790	6,570	1.10	10
Detroit, MI	22,020	13,430	21,670	6,160	1.09	12
Philadelphia, PA	16,680	11,910	22,120	6,850	1.07	13
Portland, OR	7,100	13,150	3,280	6,250	1.05	14
Tampa, FL	3,440	11,860	4,070	6,500	1.03	15
Sacramento, CA	8,420	12,470	6,660	6,340	1.03	15
Dallas, TX	22,380	13,360	8,150	4,810	1.02	17
Phoenix, AZ	5,550	10,670	16,680	5,790	1.00	18
Nashville, TN	5,250	11,930	5,390	5,890	0.99	19
Denver, CO	10,490	12,200	10,450	5,690	0.99	19
St. Louis, MO	17,390	11,710	11,470	6,570	0.98	21
Cleveland, OH	12,670	12,800	5,010	4,510	0.97	22
Austin, TX	5,220	12,430	2,070	4,920	0.96	23
Milwaukee, WI	7,140	12,200	4,730	4,770	0.94	24

Table 3.4

1988 Roadway Congestion Index Value

Urban Area	Freeway/Expressway		Principal Arterial Street		Roadway[3] Congestion Index	Rank
	DVMT[1] (1,000)	DVMT/[2] Ln-Mile	DVMT[1] (1,000)	DVMT/[2] Ln-Mile		
Baltimore, MD	13,920	11,500	9,160	5,260	0.92	25
Albuquerque, NM	2,230	11,130	3,390	4,840	0.90	26
Cincinnati, OH	9,750	11,540	3,440	4,320	0.88	27
Minn.-St. Paul MN	16,420	11,440	5,300	4,530	0.88	27
Louisville, KY	6,040	10,690	2,860	5,610	0.87	29
Fort Worth, TX	11,150	11,150	4,200	4,860	0.87	29
Memphis, TN	3,950	10,390	4,050	5,030	0.86	31
San Antonio, TX	9,050	11,040	4,990	4,660	0.86	31
Indianapolis, IN	7,750	10,760	3,940	4,640	0.84	33
Pittsburgh, PA	7,380	7,770	10,630	6,020	0.81	34
Oklahoma City,	6,620	9,390	3,450	5,260	0.78	35
El Paso, TX	3,320	9,490	3,110	3,860	0.74	36
Kansas City, MO	12,220	9,090	4,490	4,300	0.72	37
Salt Lake City, UT	4,080	8,490	1,910	5,460	0.72	37
Corpus Christi, TX	1,510	8,160	1,440	4,500	0.70	39
Northeastern Avg.	27,050	12,580	20,550	6,360	1.06	

Midwestern Avg.	13,630	11,590	8,400	5,240	0.92
Southern Avg.	8,700	12,360	7,410	6,160	1.03
Southwestern Avg.	9,280	11,200	6,050	4,960	0.90
Western Avg.	33,380	15,570	19,900	6,190	1.21
Total Avg.	16,870	12,350	11,250	5,600	0.99
Maximum Value	102,140	20,590	78,240	8,250	1.52
Minimum Value	1,510	7,770	1,440	3,860	0.70

Source:Texas Transportation Institute Analysis and Local Transportation References

Notes:[1]Daily vehicle-miles of travel.

[2]Daily vehicle-miles of travel per lane-mile

[3]See Equation 1

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