

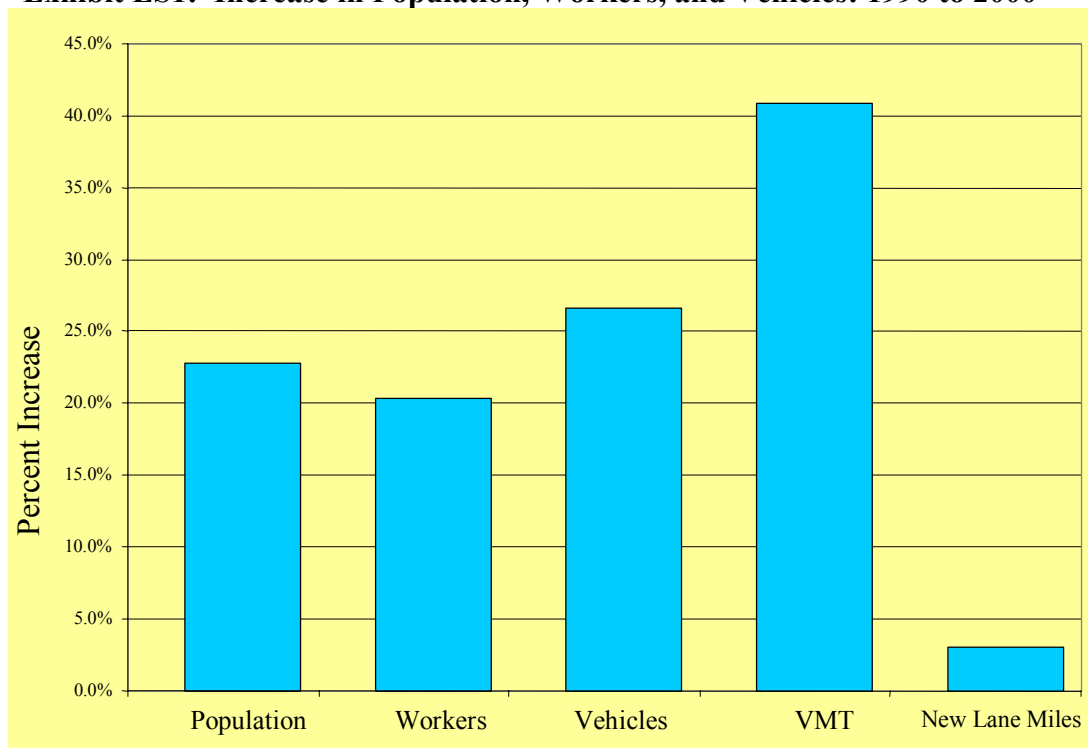
EXECUTIVE SUMMARY

The Key Findings

1. Traffic congestion has a negative effect on economic growth. Investment in new roadways will generate economic, safety and environmental benefits as well as reduce congestion. The largest transportation problem now and well into the foreseeable future is the movement of people, goods and services from point to point within the urban areas. Failure to solve these problems will likely have significant economic consequences to the State.
2. Texas' population will increase from 20.8 million in 2000 to 29.6 million in 2025. Ninety percent of the growth, or almost 8 million more people, will live in Texas' metropolitan areas, where 15 million people lived in the year 2000.
3. Traffic congestion is getting worse. From 1990 to 2000, Texas' population grew 23 percent, the number of vehicles increased 23 percent, the number of workers grew by 23 percent, vehicle miles traveled increased by 41 percent, and TxDOT spending increased by 45 percent. The number of lane-miles increased by only 3 percent, causing congestion to rise by 126 percent.
4. From 1990 to 2000 traffic congestion has cost Texas 2.6 billion hours of delay (costing \$40 billion) and 4.5 billion gallons of wasted fuel (costing \$5.6 billion), bringing the total cost of delay to \$45.6 billion. During this same period TxDOT spent only \$37.4 billion on maintenance and new construction. While the number of workers during the 1990s increased by 19 percent, the number of workers commuting by more than 45 minutes grew by more than 50 percent.
5. Based on current highway construction and maintenance spending trends, \$140 billion will be spent over the next 25 years. Under this scenario, delay time caused by congestion will increase over 350 percent by 2025.
6. The State has lost 15 years of purchasing power in terms of its ability to fund roadway improvements from the gasoline tax.
7. To maintain existing congestion levels would require the annual addition of almost 900 lane-miles to the State system in the metropolitan areas included in this report. To meet the 1.15 Travel Time Index scenario would require 1,500 lane-miles to be added to the system annually.
8. Over the next 25 years, the cost to reduce traffic congestion in the State from the current 1.30 to a 1.15 Travel Time Index is \$78 billion more than is expected to be spent assuming current trends. These additional expenditures would reduce delay time by 20 billion hours (saving \$311 billion), save 31 billion gallons of fuel (worth \$43 billion) for a total of \$354 billion in savings over 25 years. Additional benefits include 120,000 additional permanent jobs, reducing emissions by 775,000 tons of hydrocarbon pollutants, improved safety and increases in productivity that total an estimated \$157 billion. The aggregate value of these benefits totals \$511 billion versus a cost of \$78 billion to achieve them.

9. The improvement costs included in this report are average estimates from across the State and may not be representative of any particular project. They do however provide a reasonable estimate of mobility improvement costs. The analysis indicates that achieving the 1.15 Travel Time Index goal would cost \$335 more per year per household in 2025 than current trends. To simply maintain the present level of congestion will require \$167 more per year per household. These costs are more than offset by travel time delay reductions and lower fuel consumption benefits of \$2,118 per year per household at the 1.15 Travel Time Index standard.
10. The goal of maintaining current congestion levels costs less than 1 cent per mile more for every mile driven than current expenditures. Further reducing the travel time penalty to only 15 percent more travel time than free-flow trips (a Travel Time Index of 1.15) will require less than 2 additional cents per mile. Seen as a toll, this would amount to 16 cents more than current trends to make a 10-mile work trip.
11. The principal strategies for reducing congestion must respond to increased demand by improving the flow of personal and commercial traffic on roadways where virtually all trip volume occurs. The potential solutions are many and varied, but their common, shared purpose must be to improve mobility and reduce congestion. Solutions must include new roadways, roadway expansions, improved traffic management and computer-based technological advances.
12. No other form of public investment that is both economically and socially feasible can do as much to reduce air pollution.
13. It will cost significantly less to solve these problems than do nothing and suffer the consequences.

Exhibit ES1: Increase in Population, Workers, and Vehicles: 1990 to 2000



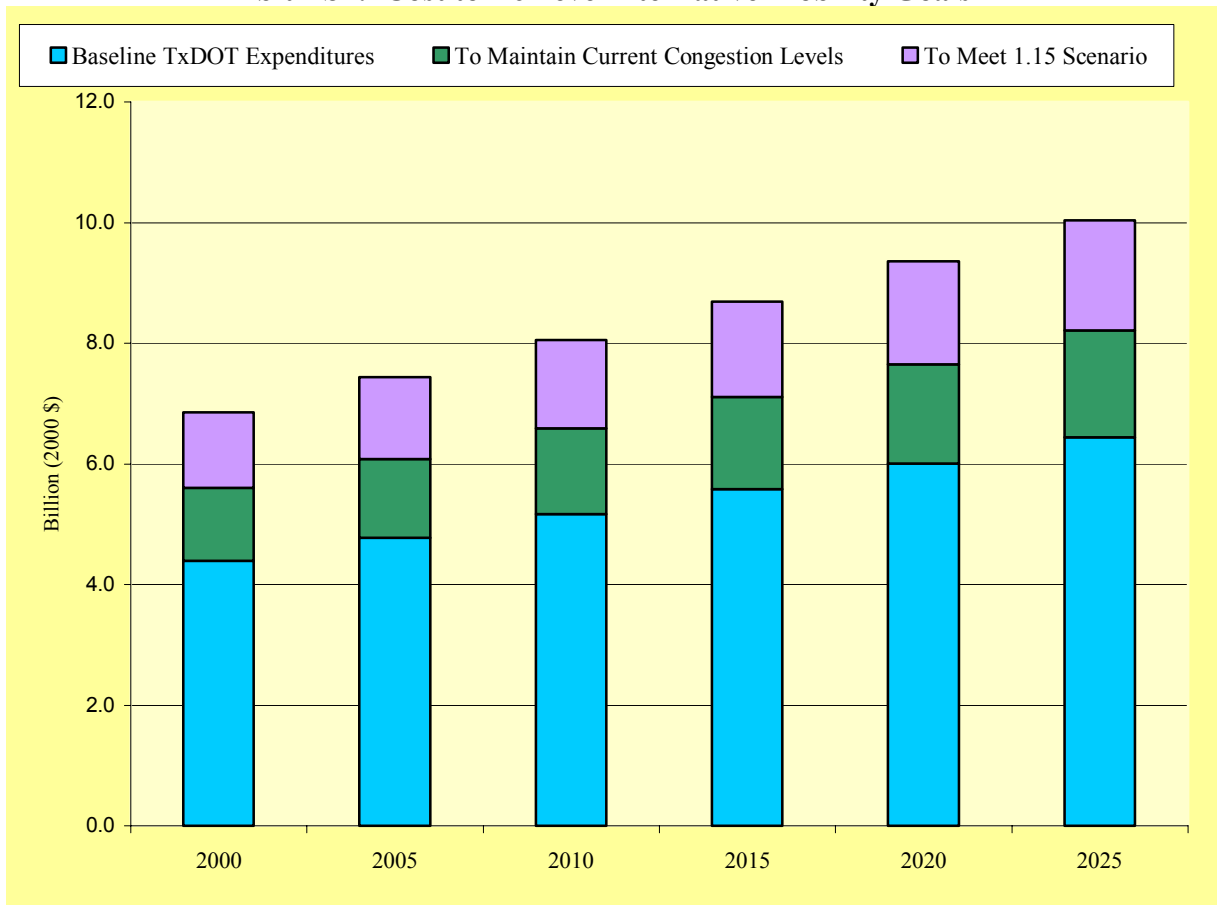
Recommendations

This report is intended to establish a process whereby vision and needs drive the process of transportation improvement. Toward that end, specific performance objectives are proposed. It becomes critical then that improvement toward whatever objectives are adopted be measured on a regular and consistent basis. With respect to roadway performance and management it is recommended that:

1. Reducing congestion and improving urban mobility in Texas require strategies that improve the flow of roadway traffic. This will include new roadways and roadway expansions, but it will also mean improved traffic management, computer-based technological advances, public transportation, and other strategies.
2. The State should adopt a 25-year goal of reducing the Travel Time Index in all areas to 1.15. A trip taken during peak periods should take no more than 15 percent longer than during non-peak periods. As of 2000, these indexes in Houston, Dallas/Fort Worth, San Antonio and Austin ranged from 1.38 to 1.23. To accomplish this, urban mobility must be a major focal point of transportation planning at the State level. The State highway system represents an estimated two-thirds of urban transportation volume in the State's metropolitan areas where 90 percent of all population growth in the State is projected to occur. As a result, the major transportation challenge will be maintaining mobility within the urban areas.
3. A detailed plan to accomplish this goal in the most effective, efficient and expeditious manner should be created by the Texas Department of Transportation (TxDOT) in conjunction with local and regional planning authorities throughout the State. These plans should not be constrained to spending based on the currently available revenue streams.
4. A long-term plan to finance and construct the necessary improvements should be developed by State and local agencies taking into consideration the fact that the cost of doing nothing is substantially more than the additional \$78 billion it will cost over the next 25 years to expand and improve the transportation system. The financing plan should consider myriad methods including the use of local option taxes or fees, local and State borrowing programs, etc., based on the specific needs of each area.
5. State, TxDOT and Federal policies should be modified to motivate and allow local areas to fund as much of the solution as possible and to achieve maximum efficiencies by coordinating projects and quickly embracing and adopting solutions that will help achieve the goal. Local areas that fund large or disproportionate amounts of their local solutions should be guaranteed that their ongoing TxDOT funding will not be reduced because they achieve lower congestion levels than other areas of the State.

6. Accountability will be a key to success. The selection of particular mechanisms for reducing congestion (adding general purpose lanes, bus rapid transit, carpooling, intelligent transportation systems, etc.) should be determined through a fair and unbiased evaluation of the congestion-reducing abilities vs. costs of each option. Projects should each be evaluated using a **Delay Reduction Index** to measure the amount of congestion per dollar each option will yield to determine their cost effectiveness in reaching the objective. TxDOT should continue to publish the annual District and County Statistics (DISCOS) book in its historical form, but should expand the data to include key measurements that will allow a clear picture of urban mobility and congestion, progress made toward accomplishing the adopted goals, and will delineate local and state funding of projects and other pertinent performance measures. An independent third party should complete an annual evaluation and report card to measure progress, compare action and results to the long-term plan, and to ensure all participants are accountable toward achieving the goal. This plan should be delivered to the Governor, TxDOT, local and regional planning authorities and others.

Exhibit ES2: Cost to Achieve Alternative Mobility Goals



SUMMARY

Introduction

Transportation is crucial to the economy and standard of living in Texas. The most serious transportation threat to the State is the continuing delay in passenger and freight travel activity brought about by congested road facilities. Further, the problem is most critical in the State's major metropolitan areas. This challenge threatens to increase to dramatic levels in the future unless timely, substantial responses are undertaken. As a result, the Governor's Business Council has prepared this study of the future metropolitan transportation needs as well as the costs and benefits of meeting those needs.

The purpose of the Governor's Business Council study is:

to establish a process whereby vision, needs and accountability drive the process of transportation improvement, rather than currently or traditionally available resources. This is to start a "how we can fulfill our vision" process instead of a "what does the status quo allow" process.

This focus on a defined vision and needs represents an important addition to current practice; from a financially constrained process to one based upon defining minimum performance standards and then seeking the resources to accomplish the objectives.

The future economic performance in Texas will be enhanced by a program that reduces travel delay hours in the State's largest urban areas and assures that other areas across the State maintain their current mobility. A key finding is that it costs significantly less to solve the problem than to do nothing and suffer with increased congestion.

The Importance of Reducing Metropolitan Traffic Congestion

The central issue in regard to road conditions in Texas today is highway congestion. This study takes as its goal addressing the needs of reducing highway congestion in the State. Urban traffic conditions have deteriorated substantially in urban areas, where two-thirds of Texans live, as traffic volumes have increased significantly more than roadway capacity improvements. Now, travel demand exceeds roadway capacity for several hours of a typical day in the larger urban areas. The size of the road system must increase to respond to dramatic population and business growth. Its quality of service must improve to meet the needs of an increasingly affluent society with high values of time for both people and goods and to assure a vigorous business climate and quality of life.

This study has as its dominant focus the needs for highways now and in the future in Texas. Highway-oriented travel, to meet the social and economic needs of both passengers and freight activities, are the centerpiece of transportation in Texas – as in the rest of the nation and world. While the consideration of alternatives to highways is very appropriate in almost every context, it is recognized that the prospects for serious contributions to travel needs in the future by non-highway alternatives are limited to a

few travel “markets.” Issues in the future will almost certainly center on the nature of the technologies in road vehicles, perhaps alternative fuels, and the nature of construction, finance or even ownership of roads. Most of the principal options are considered briefly here, but specific considerations of alternatives will be a part of the detailed studies in each metropolitan area as the broad statements of need are refined and turned into specific projects. Those alternatives may include a range of treatments including public transportation, travel demand management, access management, telecommuting, shifting work hours, carpool/parking priority, all of which can contribute to increasing the efficiency of existing roadways.

There are other highway needs to be sure. Among these are: adequate highway system maintenance, enhanced safety, system reliability and air quality concerns. All of these are addressed, completely or in part, by improving traffic flows.

I. Transportation and Demographics

Texas is now the nation’s second most populous state and is growing rapidly. It is expected that the population will increase from 20.9 million in 2000 to 29.6 million in 2025. Nearly 90 percent of this increase will be in the largest metropolitan areas (Austin, Dallas-Fort Worth, Houston, and San Antonio) and the Border (Brownsville, El Paso, and Laredo) that are the focus of this report. At the same time, employment is projected to grow even faster than population. Moreover, incomes are rising in Texas, and as affluence increases, travel patterns change.

At the same time, Texas, like all other states, is almost fully dependent on roadways and personal vehicles. The number of workers in Texas increased by approximately 1.5 million from 1990 to 2000 – 1.3 million of them drove alone to work and 200,000 traveled in carpools. Thus, the road system absorbed the growth in travel demand in the last ten years. Only working at home made a significant additional contribution to meeting the needs of new workers. The latest U.S. Census indicates that more than 92 percent of work trip travel is by personal vehicle. This includes 77.7 percent driving alone and 14.5 percent in carpools. Area-wide transit use is small at 1.8 percent and is exceeded by both walking to work and by working at home. Transit carries over 15 percent of trips to downtowns in the major Texas cities however, and peak period travel in buses and carpools are equal to or greater than two freeway lanes in several corridors with high-occupancy vehicle lanes. The traditional downtown, however, includes less than 10 percent of the area-wide jobs, an indication of the many strategies needed to address the mobility challenges.

During the 1990s, average work trip travel time in Texas increased 3.2 minutes, from 22.2 minutes to 25.4 minutes, mirroring the national trend. Work trips are important because their concentration at peak hours causes much of the recurring traffic delay in urban areas. **However, non-work trip travel is increasing at an even greater rate than work trips, and this travel is even more dependent upon personal vehicles than work trip travel.**

II. Transportation and the Texas Economy

The Texas economy has also grown strongly and is projected to grow even more rapidly in the future. Presently, Texas represents approximately eight percent of the U.S. gross domestic product. It is expected that this will rise to 10 percent by 2025. Further, employment is projected to grow at a faster rate than the population.

And, while the national and state economies are expected to experience strong growth, international trade can be expected to grow even faster. Already, the North American Free Trade Agreement has resulted in strong trade increases, especially with Mexico. Most international commerce with Mexico crosses the international border in Texas. The U.S. Department of Transportation projects a near doubling of freight traffic, largely by truck, over the next 20 years. Given its extraordinary growth and strategic geographical position, the Texas figure could be substantially higher.

It is clear, based upon the continuing population increase, increasing affluence, increasing employment and economic trends that travel demand will continue to increase strongly in Texas. How well the State can respond to these challenges will in no small measure be a function of its ability to develop and maintain a competitive transportation infrastructure.

III. The Costs and Benefits of Reducing Urban Traffic Congestion

The urban areas included in this study represent 68 percent of the population, 56 percent of vehicle travel, 68 percent of registered vehicles, but over 95 percent of the travel delay. To further exacerbate the problem, these same areas are expected to absorb 80 percent of the population growth over the next 25 years. Congestion already costs Texas residents, travelers, and businesses lost time, wasted fuel and dollars. Addressing the mobility needs will require additional resources; this report outlines the cost but also estimates the substantial returns that can be derived from this investment.

As can be seen in the graph below, the rapid growth of Texas' metropolitan areas in the last decades has outpaced the growth in lane-miles of roadway. Such growth challenges all public services. The provision of other public services such as schools, hospitals, police, fire, and social services must also keep pace with growth. Highways that advance the ability of other services to meet their challenges must similarly keep pace.

Exhibit S1: Increase in Population, Workers, and Vehicles: 1990 to 2000

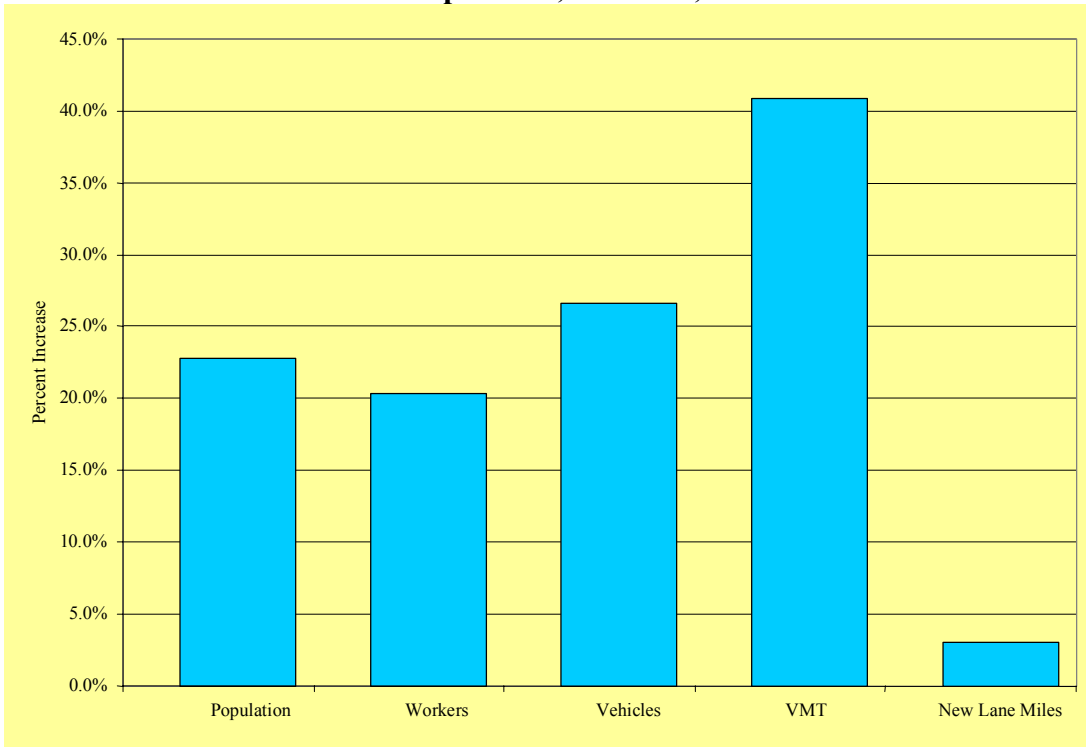
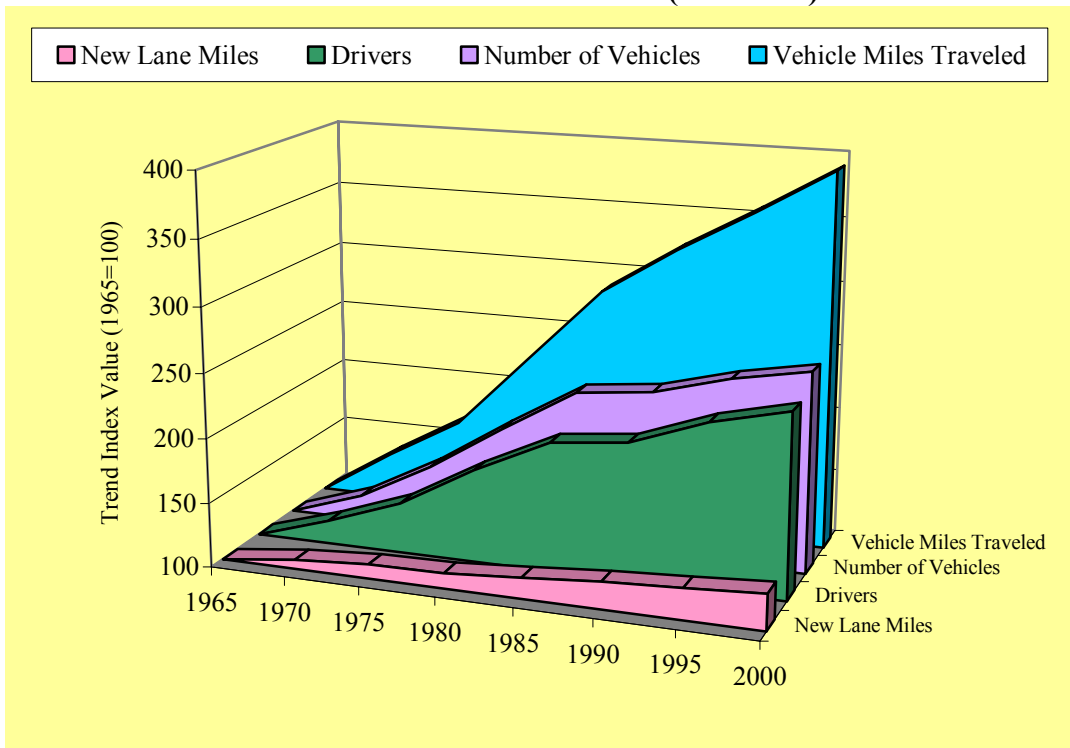


Exhibit S2: Index of Vehicle Miles Traveled, Number of Vehicles, Driver and Lane-Miles of Road in Texas (1965=100)



As a part of its annual national *Urban Mobility Report*, the Texas Transportation Institute uses the Travel Time Index, which estimates the extent to which peak period travel times are retarded by traffic congestion. A Travel Time Index of 1.00 indicates that there is no congestion-related time penalty – that a 30-minute trip in uncongested conditions would take 30 minutes during the peak period. A Travel Time Index of 1.50 indicates that a 30-minute trip in uncongested conditions would take 50 percent longer, or 45 minutes during peak period.

The graphic below shows the long-term trend in congestion in Texas’ largest metropolitan areas. That congestion growth trend, in almost all cases exceeded the national trend. In the metropolitan areas considered in this research, the cost of congestion over the last 10 years alone represents a value to Texas and Texans of:

- 2.6 billion hours of delay (\$40 billion),
- 4.5 billion gallons of wasted fuel (\$5.6 billion) and
- \$46 billion total in increased travel time and fuel (almost \$2,500 per person in constant 2000 \$).

In sum, during the last decade, the cost of congestion on our State’s highways was more than was spent by the State on our highways. A portion of the wasted money, if spent on roadways, would have helped substantially to reduce the lost time and wasted fuel and the consequent air pollution.

Exhibit S3: Congestion Levels for Large Urban Areas in Texas

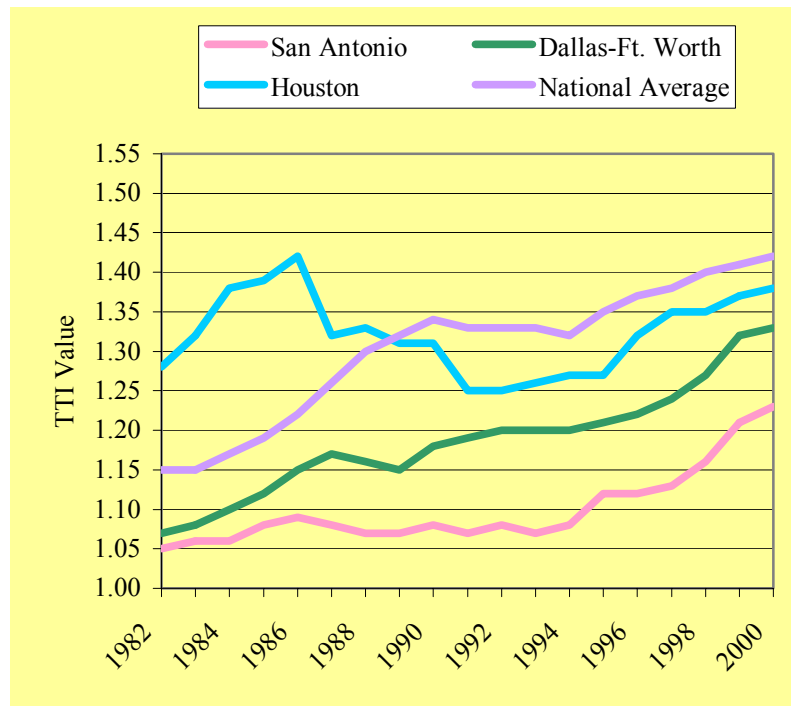
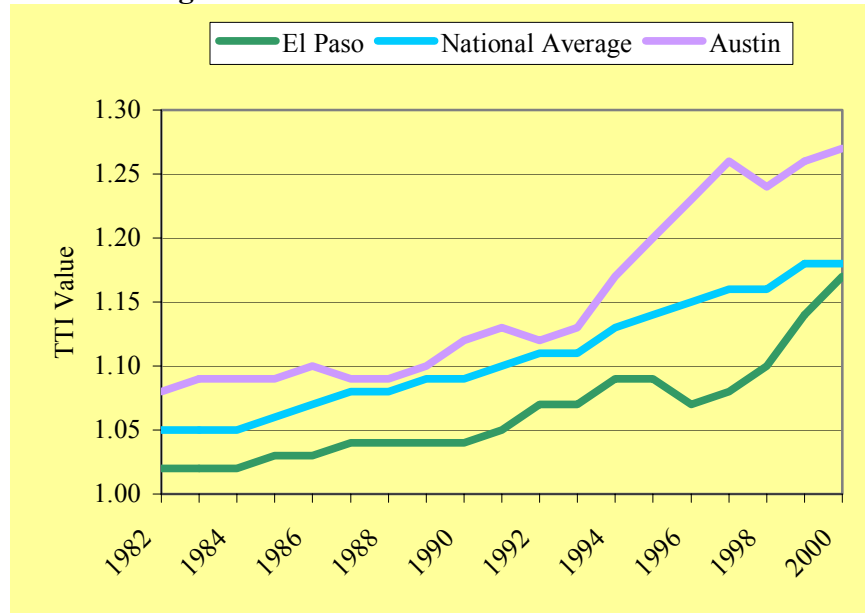


Exhibit S4: Congestion Levels for Medium-Sized Urban Areas in Texas



A 25-year analysis was performed comparing the costs of achieving particular congestion relief goals in five Texas areas – the Dallas-Fort Worth, Houston, San Antonio and Austin urban areas and the Border. The four scenarios included maintenance of the present Travel Time Index in each area and the rest of the State, and three improvement scenarios that consisted of reducing congestion to a particular Travel Time Index value (1.25, 1.20 and 1.15). In those areas where the existing Travel Time Index was already less than the target, the goal was to maintain the existing TTI.

Just to maintain present levels of congestion over the next 25 years would require \$38.5 billion more than the \$140.1 billion (Exhibits S5 and S6) that will be spent if present spending trends continue (the baseline). It will cost \$218.3 billion to achieve a 1.15 Travel Time Index or an estimated \$78.2 billion more than current trends indicate will be available. *(All costs in this report are in 2000 dollars unless otherwise noted.)*

These costs are a function of the lane-miles that would be added to the system in order to achieve and maintain the alternative congestion scenarios. The cost estimates were generated from general cost per lane-mile values for various types of roadway. The analysis did not consider specific project costs. For example, to maintain existing congestion levels would require the annual addition of almost 900 street and freeway lane-miles to the State system in the metropolitan areas included in this report at a cost of \$38.5 billion more than is expected to be spent over the next 25 years. To meet the 1.15 TTI scenario would require 1,500 lane-miles to be added to the system annually in the metropolitan areas included in this report at a cost of \$78.2 billion over 25 years.

While these numbers are daunting, they are relatively small when considered two different ways.

- On an annual cost per capita basis (see Exhibit S5), maintaining the current TTI will cost \$60 more per capita in 2025 than the current trends (baseline).
- When compared to the baseline conditions, the benefits of doing something outweigh the costs of doing nothing. Maintaining the existing Travel Time Index in 2025, while costing \$60 more per capita, will return \$232 in benefits that year. Achieving the 1.15 Travel Time Index Goal will mean spending \$121 more, but gaining a benefit of \$764 in 2025.

Put in terms of cost to the average household (see Exhibit S6), to improve traffic flow to the 1.15 Travel Time Index standard would require \$335 more per household in 2025 than what baseline expenditures are expected to be. It will cost \$166 per household more to maintain the present level of traffic congestion than current spending trends indicate will be spent in 2025. These costs are more than offset by travel time delay reductions and lower fuel consumption benefits of \$2,118 at the 1.15 Travel Time Index standard. By comparison, the average household spent \$372 on alcoholic beverages in 2000, according to the U.S. Department of Labor Consumer Expenditure Survey.

When road construction, operations and maintenance costs are combined with the cost of additional travel time and fuel consumed in congested traffic, Exhibit S7 clearly shows that addressing the mobility challenge is a better value than suffering the problems of congestion. Peak period travelers across the entire State will spend \$118 more annually to save \$604 by meeting the 1.15 Travel Time Index Goal, an annual net savings of \$486.

The plan is almost justified if one assumes that travelers place no value on their time (and anyone who observes driver behavior during the peak knows this is not true). Approximately \$118 in additional cost to support the 1.15 TTI Goal would be offset by \$73 of lower fuel costs due to more efficient operations. The travel time, air quality, health and other benefits are not included in this value.

Exhibit S5: Per Capita Costs and Savings from Achieving Alternative Travel Time Index Goals

| Year | Estimated Baseline (Current Trend) Expenditures (\$Billion) | Additional Funds Required | | Additional per Capita Cost | | Estimated Savings per Capita | | Estimated Net Benefit per Capita from Reduced Delay and Fuel Costs | |
|---------------------------------|---|--|--------------------------------------|--|--------------------------|--|--------------------------|--|--------------------------|
| | | to Maintain Existing Congestion Levels (\$Billion) | to Achieve 1.15 TTI Goal (\$Billion) | to Maintain Existing Congestion Levels | to Achieve 1.15 TTI Goal | to Maintain Existing Congestion Levels | to Achieve 1.15 TTI Goal | to Maintain Existing Congestion Levels | to Achieve 1.15 TTI Goal |
| 2000 | \$4.4 | \$1.2 | \$2.5 | \$58 | \$118 | \$0 | \$217 | (\$58) | \$99 |
| 2005 | \$4.8 | \$1.3 | \$2.7 | \$59 | \$119 | \$94 | \$311 | \$35 | \$192 |
| 2010 | \$5.2 | \$1.4 | \$2.9 | \$59 | \$119 | \$126 | \$415 | \$67 | \$296 |
| 2015 | \$5.6 | \$1.5 | \$3.1 | \$59 | \$120 | \$160 | \$528 | \$101 | \$408 |
| 2020 | \$6.0 | \$1.7 | \$3.4 | \$60 | \$121 | \$194 | \$642 | \$134 | \$521 |
| 2025 | \$6.4 | \$1.8 | \$3.6 | \$60 | \$121 | \$232 | \$764 | \$172 | \$643 |
| Net Increase from Current Trend | | | | | | | | | |
| Over 25 Years | \$0 | \$38.5 | \$78.2 | | | | | | |
| 25-Year Total | \$140.1 | \$178.6 | \$218.3 | | | | | | |

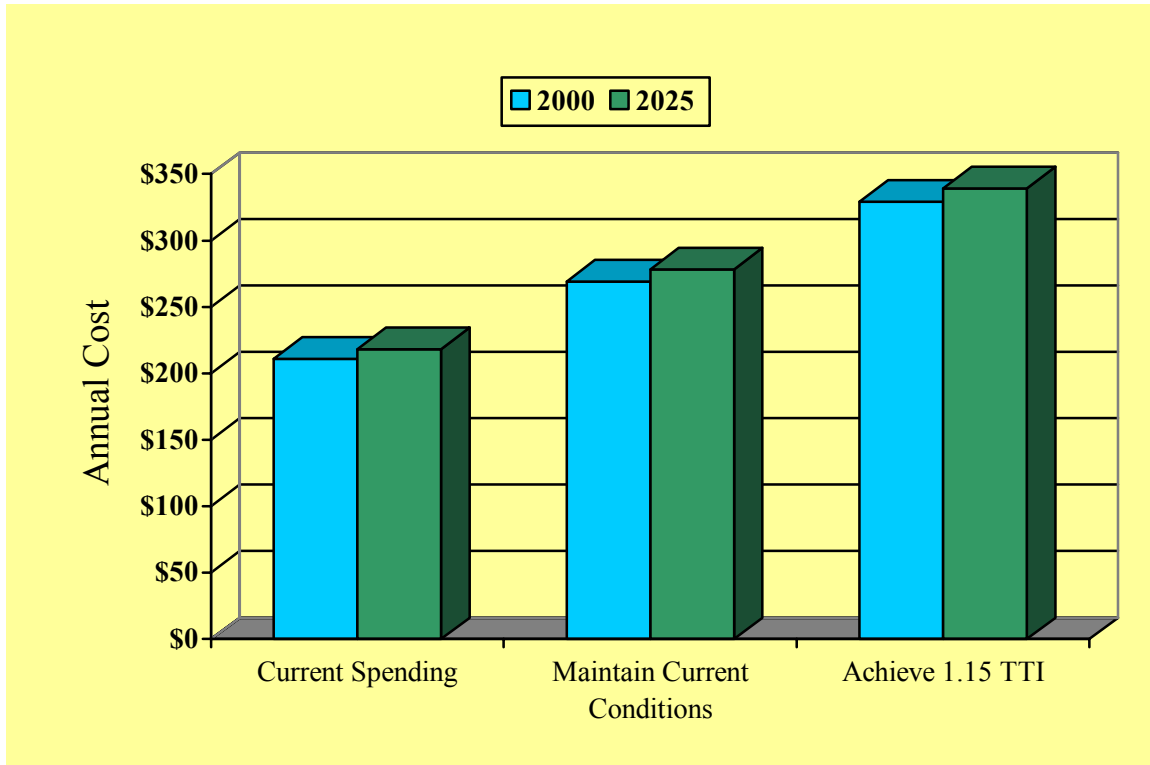
Note: The numbers presented in the table above are selected years only. The "Net Increase from Current Trend Expenditure" and "25-Year Total" lines in the table represent the net increase and total expenditures over the entire 25-year period.

Exhibit S6: Average per Household Costs and Savings from Achieving Alternative Travel Time Index Goals

| Year | Estimated Baseline (Current Trend) Expenditures (\$Billion) | Additional Funds Required | | Additional Average per Household Cost | | Estimated Savings per Household | | Estimated Net Benefit per Household from Reduced Delay and Fuel Costs | |
|---|---|--|--------------------------------------|--|--------------------------|--|--------------------------|---|--------------------------|
| | | to Maintain Existing Congestion Levels (\$Billion) | to Achieve 1.15 TTI Goal (\$Billion) | to Maintain Existing Congestion Levels | to Achieve 1.15 TTI Goal | to Maintain Existing Congestion Levels | to Achieve 1.15 TTI Goal | to Maintain Existing Congestion Levels | to Achieve 1.15 TTI Goal |
| 2000 | \$4.4 | \$1.2 | \$2.5 | \$159 | \$324 | \$0 | \$596 | (\$159) | \$272 |
| 2005 | \$4.8 | \$1.3 | \$2.7 | \$162 | \$327 | \$259 | \$885 | \$97 | \$558 |
| 2010 | \$5.2 | \$1.4 | \$2.9 | \$163 | \$328 | \$347 | \$1,144 | \$184 | \$816 |
| 2015 | \$5.6 | \$1.5 | \$3.1 | \$163 | \$331 | \$442 | \$1,458 | \$279 | \$1,127 |
| 2020 | \$6.0 | \$1.7 | \$3.4 | \$166 | \$335 | \$537 | \$1,776 | \$371 | \$1,441 |
| 2025 | \$6.4 | \$1.8 | \$3.6 | \$166 | \$335 | \$643 | \$2,118 | \$477 | \$1,783 |
| Net Increase from Current Trend Over 25 Years | \$0 | \$38.5 | \$78.2 | | | | | | |
| 25-Year Total | \$140.1 | \$178.6 | \$218.3 | | | | | | |

Note: The numbers presented in the table above are selected years only. The “Net Increase from Current Trend Expenditure” and “25-Year Total” lines in the table represent the net increase and total expenditures over the entire 25-year period.

Exhibit S7: Average Annual Cost per Texan to Achieve Mobility Goals



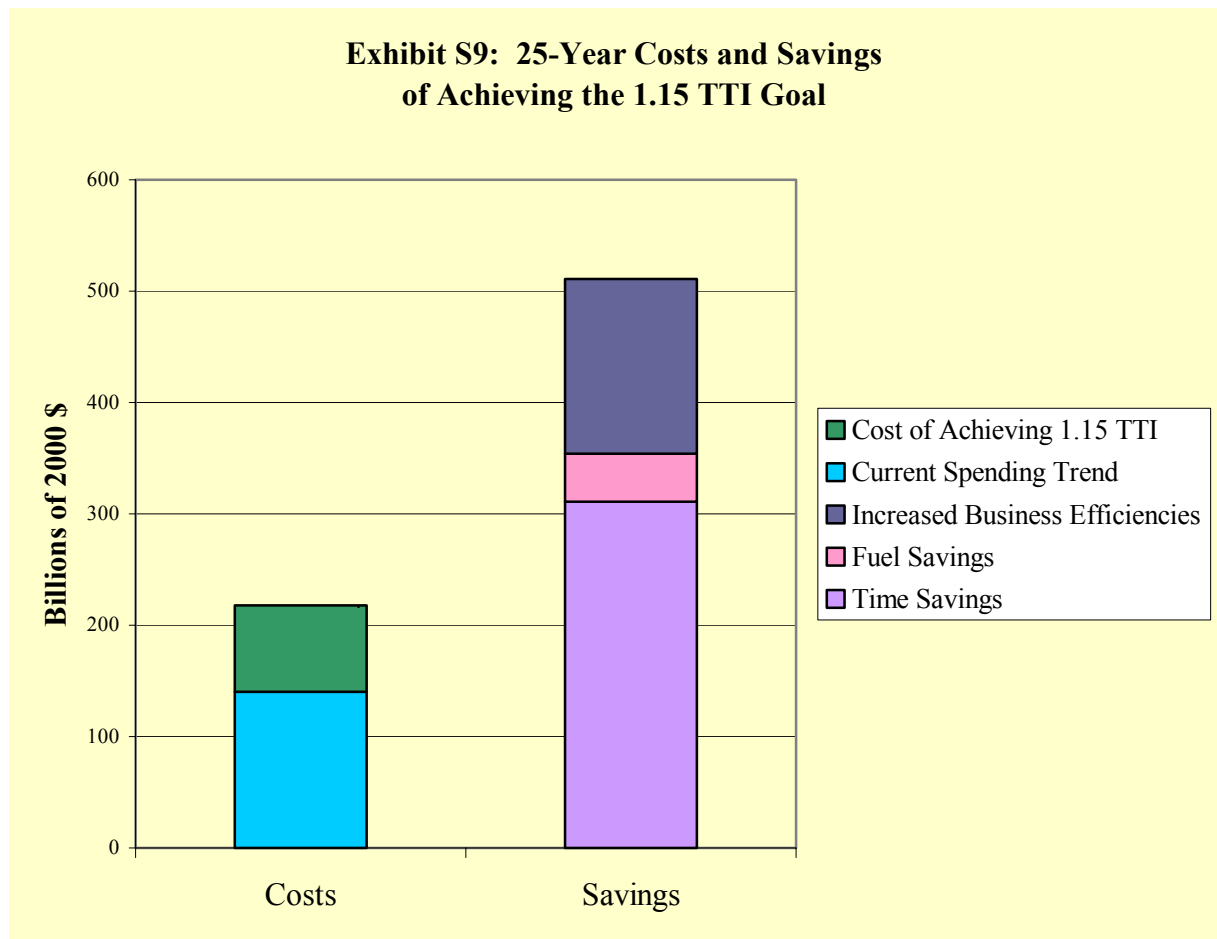
The benefits of providing this response to the State’s needs are tremendous, and not all of the benefits can be quantified (e.g., air quality, reduced stress). However, as an example the following exhibit shows baseline expenditures, per capita and household costs, and per capita and household savings associated with both maintaining the current congestion level and achieving a 1.15 Travel Time Index goal.

| Exhibit S8: The Annual Cost of “Doing Something” Compared to Current Trends | | | | | | |
|--|---------------|----------------|---|--------------|---------|--------------|
| Average Annual Peak Period Traveler ¹ Cost Component | Current Trend | | Cost to Achieve 1.15 Travel Time Index Goal | | Savings | |
| Road Costs ² | | \$211 | | \$329 | | (\$118) |
| Congestion Costs: | | | | | | |
| Delay | \$737 | | \$206 | | \$531 | |
| Fuel | \$110 | | \$37 | | \$73 | |
| Sub Total | | \$847 | | \$243 | | \$604 |
| TOTAL | | \$1,058 | | \$572 | | \$486 |

¹ In this example, Peak Period Travelers include all those in the State, not just in urban areas.
² Road costs are the average annual per capita costs of constructing and maintaining the state highway system.

Exhibit S9 illustrates the aggregate 25-year cost of the current spending trend, the additional cost associated with achieving the 1.15 Travel Time Index goal, and the time, fuel and business efficiency savings. As can be seen in the chart, the net effect of

spending \$78 billion over 25 years to achieve a 1.15 TTI yields over \$500 million in quantifiable benefits.



Other benefits from adequate funding that are not explored fully in this report total \$157 billion over 25 years, a portion of which include:

- Greater safety from timely investment in road surfaces, bridges and appurtenances.
- Improved air quality due to reduced fuel consumption by stop-and-go traffic, including reducing emissions by 775,000 tons of hydrocarbon pollutants.
- Rapid response to maintenance problems would reduce overall construction and maintenance costs.
- Improved ride on the system from smoother pavements, fewer ruts and potholes.
- Greater ability to predict travel time and a reduced delay effect from collisions and vehicle breakdowns.
- Substantial job creation, on the order of 38,000 jobs per billion dollars of capital road spending. This amounts to an additional 120,000 permanent jobs associated with achieving the 1.15 TTI goal.

Thus, while travel demand is expected to increase rapidly, **the cost of the required roadway expansions is less than the cost to continue on the current trend.** Further, many of these issues can be addressed on a local option basis as opposed to a statewide tax increase. Of course, it is important to remember that cost is only one dimension to this issue – environmental considerations, public acceptance, as well as other issues, must be addressed.

IV. Consideration of Policy Options

The level of increase anticipated in metropolitan transportation demand dictate that roadways are the most viable comprehensive solution in addressing traffic congestion. Strategies other than roadway expansion can have a positive effect in some travel markets, but cannot produce universal improvements in traffic congestion throughout urban areas.

Transit can play an important role in providing an alternative to the automobile in some parts of large urban areas. However, attempting to expand automobile competitive transit service to all segments of an urban area in order to attract a significant number of automobile drivers to a much broader range of destinations would be prohibitively expensive and likely provide only limited response. For the purposes of this analysis, the proposals include the assumption of maintaining the current share of travel by transit at current levels (approximately 2 percent of commute trips).

While metropolitan planning organizations in Texas currently estimate that virtually all new transportation demand will be personal vehicle travel, each urban area and agency will identify approaches to meeting the congestion challenge. The mix of projects, programs, and strategies will likely be different for each. All improvement options should be evaluated with an analysis comparing the share of the resources consumed to the share of the problem solved. (This is a subject area recommended for further research.) The performance measures used should connect the projects and programs being evaluated with the goals expressed in the area-wide and sub-regional land use and transportation plan.

Clearly, preserving and improving urban mobility and access in Texas requires strategies that improve the flow of roadway traffic. This will include new roadways and roadway expansions, but it will also mean improved traffic management, computer-based technological advances and other strategies. Among them are:

- Improved Operations - Texas must lead the Nation in the effective operation of its road system. New capacity construction should be coupled with achieving the greatest throughput on existing facilities. New information-technology-based operations capabilities should be implemented wherever they can contribute cost-effective enhancements including greater user information, more rapid response to accident scenes, more effective operation of work-zones, etc. Attention should be given to improving the interactions between pedestrians and automobiles, especially to improve safety.

- Texas has a higher share than the national average of commuters who carpool. While the *share* of commuters who carpool dropped slightly from 1990 to 2000, the *number* of Texans who carpooled to work increased by almost 200,000. This is one of the State's key strengths in work travel. Every opportunity to encourage the natural market tendencies in the population to use carpooling should be employed.
- Toll roads or toll lanes may be very effective improvements and funding strategies in some corridors. This type of improvement focuses costs on those who use the specific facilities when they choose to use it rather than sharing costs among all residents. Toll roads also can be built rapidly by leveraging innovative finance mechanisms.
- Working at home opportunities are significant in Texas. It is the only other work "travel mode" to show significant growth in the last decade (in addition to auto-based work travel). More people work at home or walk to work than use transit. Both the private sector and government should consider opportunities to support the expansion of working at home. This may be as simple as reducing existing impediments to working at home options.