

# Traffic Congestion



# TUNNEL VISION: TRAFFIC CONGESTION IN HAMPTON ROADS

Traffic congestion is the bane of the existence of an increasing number of people within Hampton Roads. How to address this growing problem also is a contentious political issue in the Commonwealth, and a deadlock over transportation programs designed to address this congestion caused the 2006 legislative session to last until June.

One of the focal points of the debate has been traffic across the James River estuary between the Peninsula and Southside. Do we need to construct a third crossing? Or, can we more efficiently add tubes to the two existing crossings? Or, should we forget these water crossings and instead dramatically reconstruct and expand Route 460 from Suffolk to Petersburg?

The answers to these questions depend upon a host of factors. The most obvious are anticipated growth in traffic levels, land acquisition and construction costs, environmental impacts and the negative impact of traffic congestion on business activity. In this chapter, we address traffic congestion throughout the region, but concentrate on providing valuable information about anticipated traffic and congestion on the Hampton Roads Bridge-Tunnel (HRBT), which is at the heart of our traffic dilemma.

Accurate knowledge about anticipated traffic volume and the resulting congestion will not magically tell us which is the best solution to our problems, or whether we should finance transportation projects by user fees as opposed to general tax revenues. But, it will help us understand the size of the problem and how rapidly it is growing. This, in turn, may inspire more people to action and help break the legislative gridlock on transportation that currently exists.

## TRAFFIC DELAYS AND COSTS IN HAMPTON ROADS

According to the Texas Transportation Institute at Texas A&M University, in 2003, traffic congestion resulted in 21,746,000 hours of traveler delays in Hampton Roads, or about 26 hours per traveler (a 117 percent increase over 1982). In addition to this lost time, congestion forced drivers to consume an additional 13,839,000 gallons of gasoline. If we value each hour of delay based upon the region's per capita income in 2003 (\$30,090), then each hour lost was worth about \$15 and the total cost of the delays was \$326.2 million. If the price of each gallon of gasoline averaged \$1.50 per gallon, then the fuel cost of this congestion in 2003 was \$20.8 million. **Taken together, this means the approximate cost of traffic congestion within the region in 2003 was \$347 million, without taking into account any environmental costs or the negative impact upon business activity. This translates to \$231 per person.**

What are these costs in 2006? Between 1982 and 2003, total traffic delay hours typically increased about 4 percent per year, but almost twice as fast since 2000. The recent rapid increase in traffic congestion reflects an upsurge in licensed automobiles and trucks within our region. Let's be conservative and assume that hours lost to traffic congestion and gallons of gasoline wasted during traffic congestion both increased by an average of only 5 percent per year between 2003 and 2006. **Taking into account the increase in regional per capita income and the cost of gasoline, we find the total cost of traffic congestion within Hampton Roads in 2006 to be \$473 million, or \$296 per person.** Table 1 summarizes these data and estimates.

Why are the costs of congestion leaping ahead? First, the region's population has been growing, but the number of automobiles and trucks licensed within the region has been growing even more rapidly. One reason for this has been the reduction in the car tax. Second, the value of our time has been increasing. (The increasing value of people's time is a good development, but it also means that every hour lost to traffic congestion has become more costly to those of us who are caught in traffic jams.) Third, the price of gasoline has risen significantly. **Taken together, these factors may not have produced the equivalent of a perfect traffic congestion storm, but those who commute long distances to work might be forgiven for thinking otherwise.**

TABLE 1

**ESTIMATED COSTS OF TRAFFIC CONGESTION IN HAMPTON ROADS, 2003 AND 2006 \***  
 (\* not including environmental costs and negative impact on business activity)

|                          | 2003            | 2006            |
|--------------------------|-----------------|-----------------|
| Value of Lost Time       | \$326.2 million | \$424.8 million |
| Increased Gasoline Costs | \$ 20.8 million | \$ 48.1 million |
| Total                    | \$347.0 million | \$472.9 million |
|                          | (\$231 per cap) | (\$296 per cap) |

## THE HAMPTON ROADS BRIDGE-TUNNEL

The Hampton Roads Bridge-Tunnel constitutes one of the major choke points in traffic flow within our region. Given very reasonable assumptions about traffic growth, the Virginia Modeling, Analysis and Simulation Center at Old Dominion University, represented by researchers John Sokolowski and Marshall Hutto, generated estimates of future traffic congestion in the HRBT for the State of the Region report.

Graph 1 plots actual hourly traffic counts of automobiles and trucks traveling through the HRBT in 2005 (blue), projected growth through 2010 (red) and projected growth through 2015 (white). Not surprisingly, the peak traffic times during the day occurred between 7 a.m. - 9 a.m. and 4 p.m. - 7 p.m.

Let's see what these traffic flows mean to a hypothetical HRBT commuter who sets out from the I-564/I-64 junction, near the Norfolk Naval Base, and travels west on I-64 to the Hampton University exit. If traffic is flowing freely and the driver maintains a 55 mph speed, then her commute will last only 11 minutes. However, during a typical afternoon rush hour in 2005, this commute actually took almost four times as long – 41 minutes. Our simulations predict that the time for this trip will grow to 58 minutes in 2010 and to a stratospheric 82 minutes in 2015. This means that traffic will be moving nearly eight times slower than when no congestion is present.

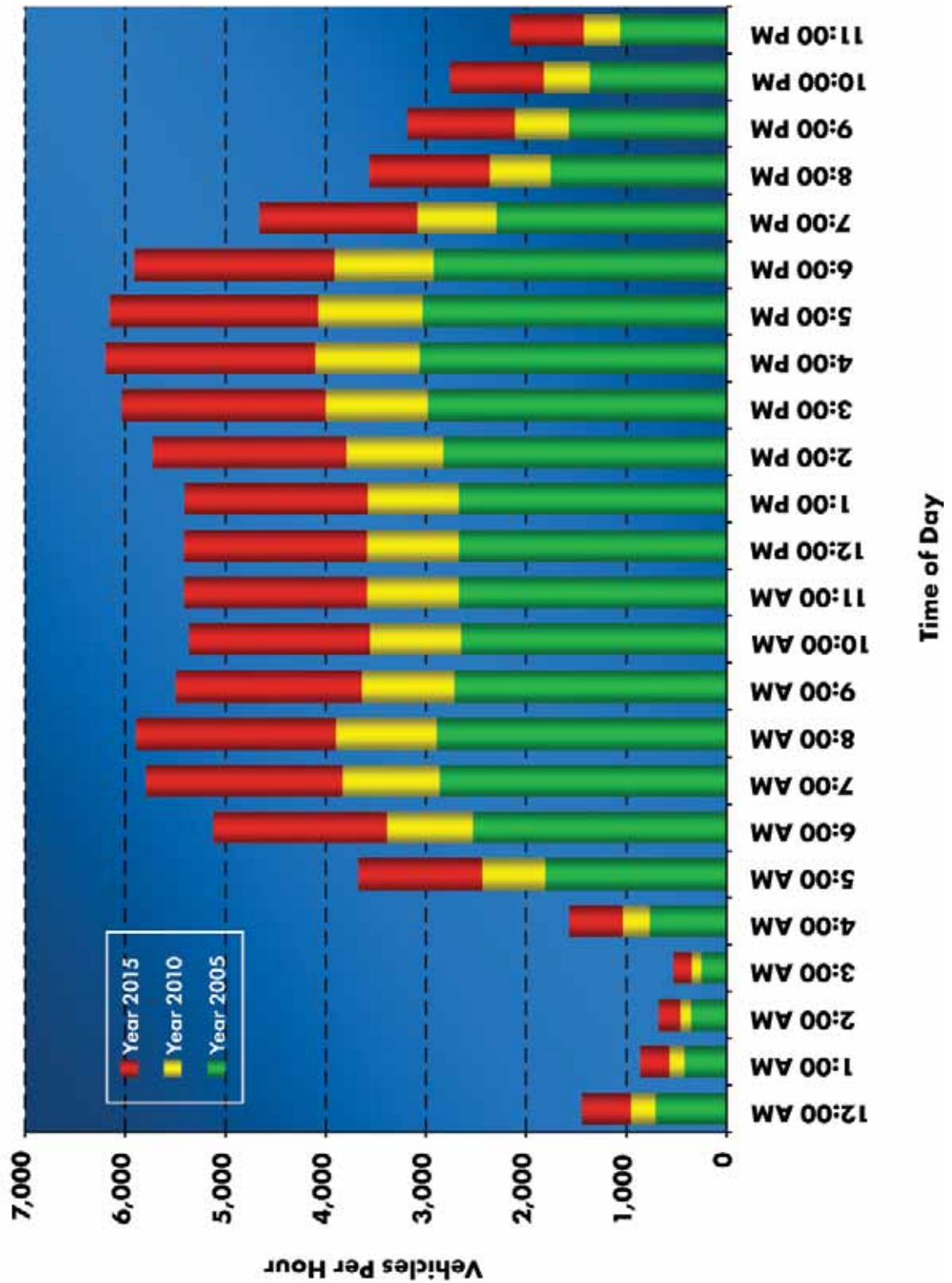
Graph 2 illustrates the projected growth in commuting time for 2005, 2010 and 2015. The average speed of our typical driver's automobile during her commute will fall from 14.5 mph in 2005 to 7.2 mph in 2015. Our driver had better have soothing music playing on her car stereo and be prepared for a late dinner, because she will arrive almost 45 minutes later in 2015 than she did in 2005. If she has the same experience in her morning commute, then she is going to spend nearly 1 1/2 additional hours per day on the road.

Of course, if our driver is traveling a farther distance (for example, starting in Virginia Beach and going to Newport News), then these congestion times rise significantly. Further, note that we have assumed an accident-free trip. Imagine the havoc that an accident would cause if one or both lanes were closed. A one-lane obstruction that begins at 4 p.m. and lasts one hour will approximately double commuting times for all drivers during rush hour.

Let's now return to our analysis of the costs of traffic congestion and extend it to 2015. Once again, let's make conservative assumptions about how fast traffic delays will grow. Even though the length of traffic delays in the HRBT will increase an estimated 8 percent annually through 2015, let's assume that delays within the region overall will grow only at 5 percent per year, since drivers change their commuting habits and continuously select the most efficient travel routes. Let's also assume that drivers progressively begin to purchase more fuel-efficient automobiles, but that gasoline prices rise at 6 percent annually (about twice the recent rate of overall price inflation).

Table 2 summarizes our estimates. By 2015, the costs of traffic congestion within the region will amount to \$1 billion per year, which translates to more than \$600 per capita annually. Further, it is unfortunately true that these costs will accelerate as the region's roads become critically overloaded. The addition of 5,000 new vehicles to uncrowded roads makes little difference;

**GRAPH 1**  
**HAMPTON ROADS BRIDGE-TUNNEL**  
**AVERAGE TRAFFIC VOLUME MAY - SEPTEMBER**



**GRAPH 2**  
**AVERAGE MAXIMUM TRAVEL TIME ON I-64 WEST**  
**MAY - SEPTEMBER DURING AFTERNOON RUSH HOUR FROM**  
**I-564 TO HAMPTON UNIVERSITY EXIT**

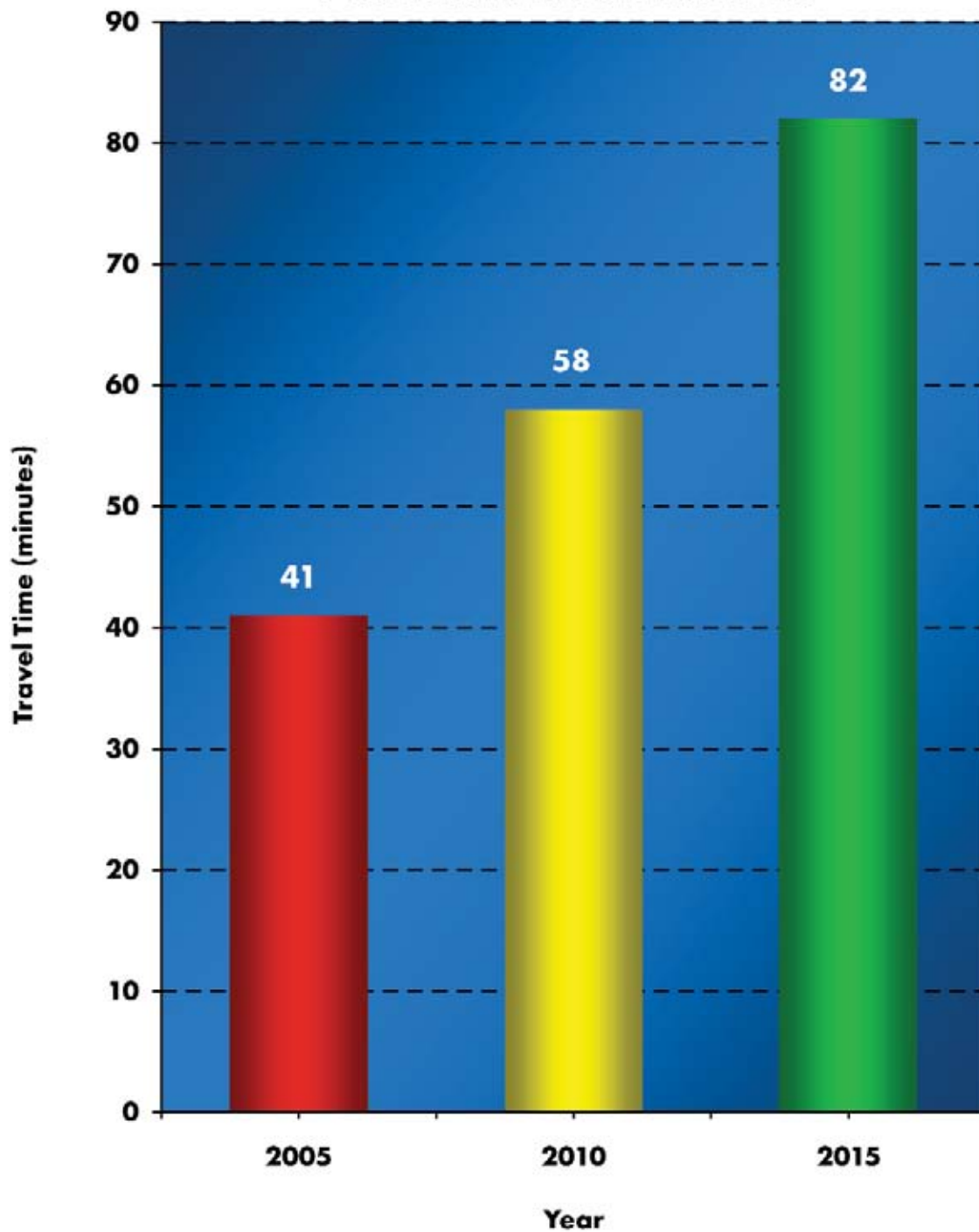


TABLE 2

**ESTIMATED COSTS OF TRAFFIC CONGESTION IN HAMPTON ROADS, 2006, 2010 AND 2015 \***  
 (\*not including environmental costs and negative effects on business activity)

|                          | 2006            | 2010            | 2015              |
|--------------------------|-----------------|-----------------|-------------------|
| Value of Lost Time       | \$424.8 million | \$604.0 million | \$939.9 million   |
| Increased Gasoline Costs | \$ 48.1 million | \$ 73.8 million | \$126.0 million   |
| Total                    | \$472.9 million | \$677.8 million | \$1,065.9 million |
|                          | (\$296 per cap) | (\$408 per cap) | (\$608 per cap)   |

however, the addition of the same 5,000 vehicles to roads that already are bumper-to-bumper with vehicles will produce virtual gridlock. Thus, congestion grows geometrically.

**Ah, but what if we take action immediately? The blunt truth is that even if the citizenry takes steps promptly to build a third crossing, or to add traffic tubes to the existing crossings, or to expand and improve Route 460, the beneficial effects of these actions will not be felt for many years. Where a third crossing or additional tubes are concerned, the gestation time between initiation and implementation may be 15 to 25 years. By contrast, the Route 460 project might provide more immediate relief, though it would not address the specific problems of commuters who travel between the Peninsula and Southside. While it is perilous to project traffic and other variables more than a decade into the future, if current trends were to continue, traffic congestion costs would approach \$2 billion in 2020, and only then might we experience relief — if we take action today.**

## ENVIRONMENTAL COSTS AND NEGATIVE BUSINESS EFFECTS

The estimates we have just provided focus on the direct and easily computable effects of traffic congestion — the value of time that travelers lose while sitting in traffic jams and the cost of additional fuel burned as their vehicles are idling. However, there are two other classes of costs that are real, which we did not include. The first is environmental costs. Vehicles that are stalled in a traffic jam emit significant levels of pollutants that reduce air quality, accelerate corrosion and reduce the life spans of both human beings and animals.

The second type of cost is business activity that is discouraged, or simply does not occur, because firms cannot receive the supplies they need — or deliver their own products — in a timely and cost-effective manner. The natural tendency of firms that find themselves in this situation is to seek another location, presumably outside of Hampton Roads. It's not easy to estimate the precise impact of this scenario, but the comments of area business leaders make it abundantly clear that these calculations are on their minds. **Suppose the gross regional product of Hampton Roads is reduced by only .5 percent because of traffic congestion. This would cost us \$330 million. A 1 percent reduction in our gross regional product would cost our region a whopping \$660 million. This amounts to more than \$410 per person annually.**



## SUMMING IT UP

One need not be a mathematics whiz to perceive that the costs of traffic congestion to Hampton Roads are large and are growing rapidly. **Already in 2006, each citizen plausibly lost at least \$700 per year because of traffic congestion, assuming the 1 percent negative impact of congestion on business activity reflects reality. By 2010, this cost will approach \$1,000 per citizen per year.**

Yes, the citizens of Hampton Roads will have to sacrifice other valuable things if they choose to address the traffic congestion problem. If taxes are increased to address transportation problems, then this “tax bite” will immediately be apparent in higher gasoline taxes, license fees, etc. If taxes are not increased, but transportation dollars are taken from the Commonwealth’s general fund, then we will experience lower expenditures on education, health services, the environment and law enforcement. We can’t spend the same dollar in two places.

**What should also be apparent from our analysis, however, is that one way or another, Hampton Roads residents are going to pay the costs of traffic congestion. Either we choose to spend additional funds on transportation, or we will incur the costs of traffic congestion detailed above. Plausibly, these will approach \$1,000 per citizen in 2010.** It appears that spending the necessary resources to address our traffic congestion problems actually is the less expensive way to go. Nearly all of the recently proposed transportation programs would cost far less than the \$1,000 per citizen per year and usually have fallen into the range of \$100 to \$500 per citizen, depending upon the nature and size of the solution.

Although most economists lean in favor of “user fees” to the funding of transportation networks, there are other ways to skin this financial cat. These include an increase in the income or sales taxes; privatization of road and tunnel building (which would result in significant tolls); tolls (as opposed to gasoline taxes); and congestion taxes similar to what we see now in London where one is taxed for entering the center city. The reader will note that while we do not advocate a specific approach to funding our regional transportation needs, we do, however, implore citizens and elected officials to take our transportation needs seriously. As the data above demonstrate, we are approaching a crisis situation. It is high time for action.