



***THE IMPACT OF TOLLS
ON THE CITY OF PORTSMOUTH:
THE EVIDENCE FIFTEEN MONTHS LATER***

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Executive Summary

The impacts of tolls and tunnel closures upon Portsmouth have been substantially (though not totally) negative and, as predicted, this negative impact easily has exceeded that experienced by any other city in Hampton Roads. Vehicle traffic through the tunnels obviously has declined (though there are multiple causes for this).

Tolls have been responsible for a more than 5,700 vehicle decline in MTT traffic on weekdays and a more than 7,900 vehicle decline in MTT traffic on weekends (taking into account other factors such as the size of the regional labor force, the rate of unemployment, and the month of the year). At the same time, tolls also have been responsible for a more than 6,300 vehicle decline in DTT traffic on weekdays and a more than 17,000 vehicle decline in DTT traffic on weekends (again, taking into account other factors).

Tolls have had a demonstrable negative effect upon sales tax collections in the City of Portsmouth. Some businesses in Portsmouth have been driven to the edge and are unlikely to survive long enough to see the completion of the overall Elizabeth River Company project. After taking into account eight factors that likely influence sales tax collections in Portsmouth, I estimate that tolls have reduced the City's taxable sales by \$3.52 million quarterly (about 2.3 percent of the pre-toll amount).

Unfortunately, the tolls have been accompanied by "negative events"---partial or full tunnel closures, occasional bad weather, etc. These are almost important quantitatively as the tolls themselves in terms of discouraging or eliminating tunnel traffic. Seemingly unpredictable and/or inadequately publicized tunnel closings have been particularly destructive. "Negative events" such as tunnel closures reduce that quarter's taxable sales in the City by an average of \$2.49 million (almost 1.7 percent of the pre-toll amount).

Taken together, the negative effect of tolls and the negative effect of the persistent tunnel closure have reduced quarterly taxable sales by \$6.01 million, which is approximately 4.0 percent of total taxable sales in the City of Portsmouth in the final pre-toll year, 2013.

Finally, my rough estimate is that Portsmouth is impacted 31 percent more than Suffolk by the tolls and closures, 459 percent more than Norfolk, and 616 percent more than Virginia Beach. The benefits of the MTT/DTT/MLK Extension project will be felt throughout the region; Portsmouth, however, is bearing a disproportionate share of the costs.

THE IMPACT OF TOLLS ON THE CITY OF PORTSMOUTH: THE EVIDENCE FIFTEEN MONTHS LATER

Fifteen months have passed since tolls were imposed on the Midtown Tunnel (MTT) and the Downtown Tunnel (DTT). What has been the impact of the tolls and construction tunnel closures on the City of Portsmouth? What does the evidence reveal?

Unfortunately, the impact of tolls and closures upon Portsmouth has been substantially (though not totally) negative and, as predicted, that negative impact easily exceeds that felt by any other city in Hampton Roads.¹ Vehicle traffic through the tunnels clearly has declined; some businesses in Portsmouth have been driven to the edge and are unlikely to survive long enough to see the completion of the overall Elizabeth River Company project; and, tolls and tunnel closures have had a demonstrable negative effect upon sales tax collections in the City of Portsmouth.

I hasten to note, however, that in cases such as these, one must be careful to take into account factors other than tolls that might have influenced tunnel traffic and sales tax collections. Among other factors that need to be taken into account are the general sluggishness of economic and population growth in Hampton Roads, occasional disruptions at the Port, adverse weather, and the tremendously negative impact that unpredictable and poorly advertised tunnel closings (inexplicably sometimes involving the closing off of one tunnel entirely in one direction) and construction have had on the driving choices of our region's residents. **As we will see, what I term "negative events" (partial or full tunnel closures, hurricanes, etc.) are almost important quantitatively as the tolls themselves in terms of discouraging or eliminating tunnel traffic and negatively impacting taxable sales in Portsmouth.**

I deal with these "other" factors by using a multivariate statistical analysis. In a nutshell, I use statistical regression techniques to determine the net effect that tolls have had on tunnel traffic, and the net effect that tolls have had on sales tax revenues, while simultaneously considering the impact of other factors such as the overall economic climate, activities at the Port and local universities, weather, tunnel closings, etc.

Here is the bottom line: tolls are not, and have not been, the only cause of declining tunnel traffic. Nor are tolls the only cause of stagnant sales tax revenues in Portsmouth. However, my analysis reveals that:

¹ James V. Koch, "The Differential Impact of Tolls on the City of Portsmouth," January 6, 2014.

- Tolls have been responsible for a more than 5,700 vehicle decline in MTT traffic on weekdays and a more than 7,900 vehicle decline in MTT traffic on weekends (taking into account all of the other factors)
- Tolls also have been responsible for a more than 6,300 vehicle decline in DTT traffic on weekdays and a more than 17,000 vehicle decline in DTT traffic on weekends (again, taking into account the other factors).

As significant as the effect of tolls has been on MTT and DTT vehicle traffic, the impact of inadequately managed tunnel construction/closures has been almost as important in depressing tunnel traffic. This is particularly noticeable on weekends, when more discretionary drivers exist.

Discretionary drivers do not have to travel through the tunnels to hold jobs. Instead, they can opt to travel to restaurants, businesses, recreation, churches, and social gatherings, or to stay home. Such individuals constitute a large proportion of “we’ll stay at home rather than go through the tunnels” crowd according to a January 2014 public opinion survey conducted for the Hampton Roads Transportation Planning Organization (HRTPO). While 16 percent of adults in South Hampton Roads said they commuted daily through the MTT and DTT, another 35 percent said they traveled through the tunnels “once a week” or a “few times a month.”² It is this latter group that contains most of our region’s discretionary drivers, most of whom can opt not to use the tunnels.

My interviews with businesses, governmental agencies and travelers reveal that discretionary drivers have become especially sensitive to tunnel closings that they view as arbitrary or unpredictable, and tunnel closings that quite simply are badly labeled and inadequately advertised. A January 2015 public opinion survey performed for the HRTPO reported that 45 percent of those interviewed said that they had altered their commuting pattern in order to avoid paying tolls.³ Actual tunnel traffic numbers, however, suggest that the 45 percent number was a substantial overestimate. We’ll now look at those data.

AN UNFILTERED VIEW OF MTT AND DTT TUNNEL TRAFFIC: BEFORE AND AFTER

Figure 1 shows the variation in *annual* traffic through the MTT and DTT between 2000 and 2014. Figure 2 illustrates the average variation over these 15 years in traffic throughout

² “South Hampton Roads Midtown and Downtown Tunnels Toll Survey: Part I, Pre-tolling Report and Findings,” Judy Ford Wason Center at Christopher Newport University, 2013.

³ “South Hampton Roads Midtown and Downtown Tunnels Toll Survey: Part II, Post-Tolling Report and Findings,” Judy Ford Wason Center at Christopher Newport University, January, 2015.

the *days* of the week. Figure 3 contrasts *weekday versus weekend* traffic. We can make the following generalizations from the information in these graphs:

- **Annual traffic through the DTT gradually had been trending downward well before the onset of tolls in January 2014. One can see in Figure 1 that total 2013 DTT traffic already was 13.4 percent below that of 2001. In recent years, this decline has reflected two primary factors: (1) a stagnant regional economy; and, (2) the approximate 34,000 decline in the number of full-time active duty military based in our region that has occurred since 2004.⁴ The decline in the number of civilian Department of Defense employees in our region have been less dramatic, but also important.**

We have not felt much negative economic impact from these personnel reductions because the overall compensation of uniformed military and Department of Defense civilian workers has increased significantly. In 2013, the average compensation of an active duty military individual in our region was \$90,364 and the average compensation of a federal employee in our region was \$97,596. These levels of compensation contrast to an average private sector compensation per employee in our region of only \$53,260.⁵ Nevertheless, the lesson is that there are fewer defense-related workers in Hampton Roads and this means that not as many of them are here to drive through our tunnels.

This serves to remind us that not all of the decline in tunnel traffic can be ascribed to the imposition of tolls and related tunnel closures. Some of the decline is part of a long-term trend relating to changes in fundamental economic factors such as the size of our regional labor force. Such factors have been depressing tunnel traffic independent of tolls and closures.

- **Proportionately, the DTT has been affected more by the imposition of tolls and related tunnel closures than the MTT. DTT 2014 traffic was 22.2 percent below that of 2013, while MTT traffic was down only 10.0 percent over the same time period. Tunnel construction and closures have focused on the DTT. When these occur, not only do drivers avoid the DTT, but also substantial numbers switch to the MTT.**

⁴ Hampton Roads Planning District Commission, March 19, 2015.

⁵ Hampton Roads Planning District Commission, March 19, 2015.

- **Weekday traffic through the MTT and DTT is at its lowest on Mondays and then gradually increases until it peaks on Friday. Monday traffic is especially light in the MTT.**
- **The weekend fall-off in traffic is particularly severe for the MTT tunnel (a 49.3 percent decline from the Friday average to the weekend daily traffic average) as compared to the DTT (a 35.1 percent decline). This is despite the fact that tunnel closures have been concentrated on the DTT.**
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Figure 1

Total Annual Vehicle Traffic Traveling Through the MTT and DTT, 2000-2014

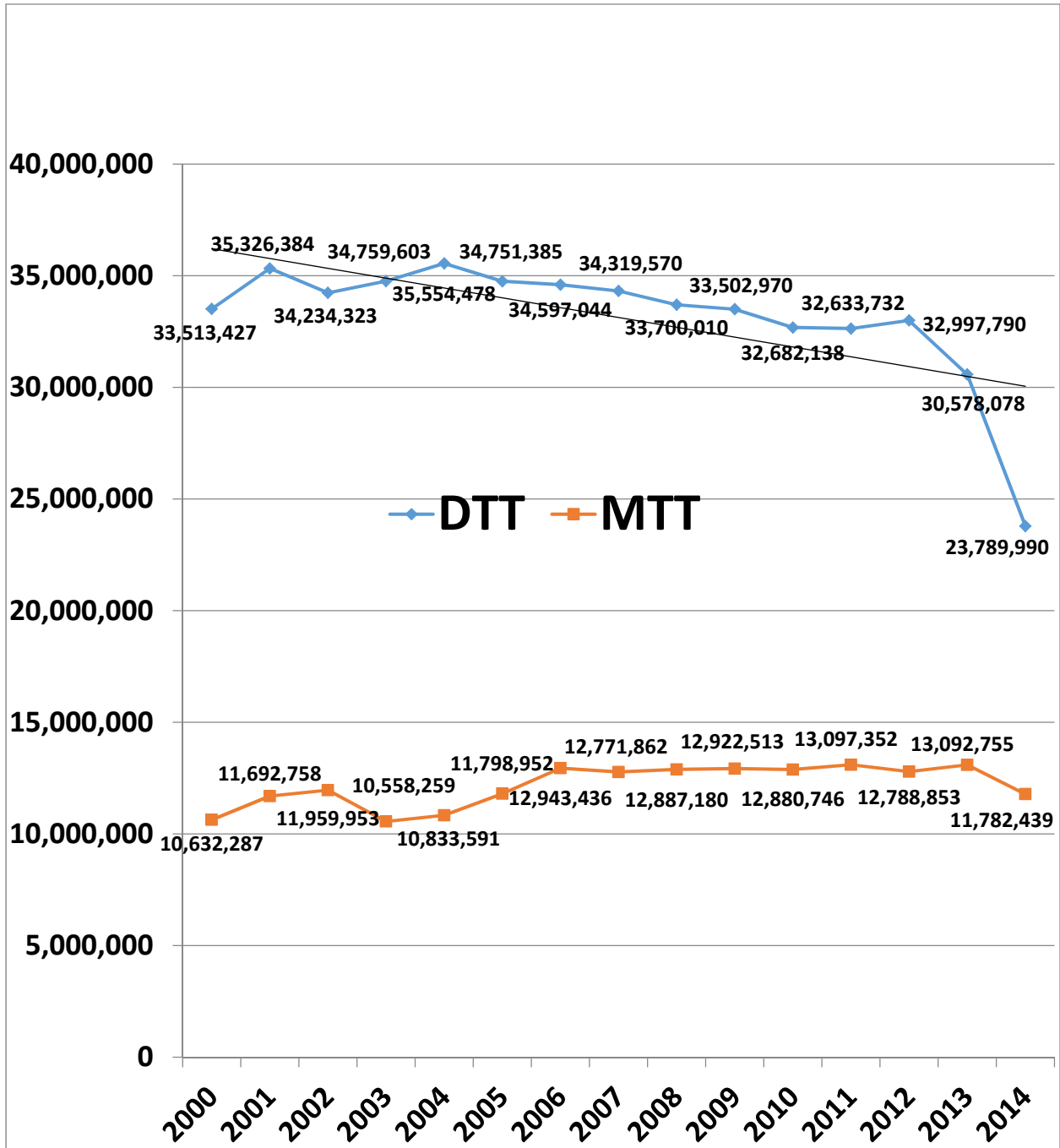


Figure 2

**Average Vehicle Traffic Traveling Through the MTT
by the Day of the Week, 2000-2014**

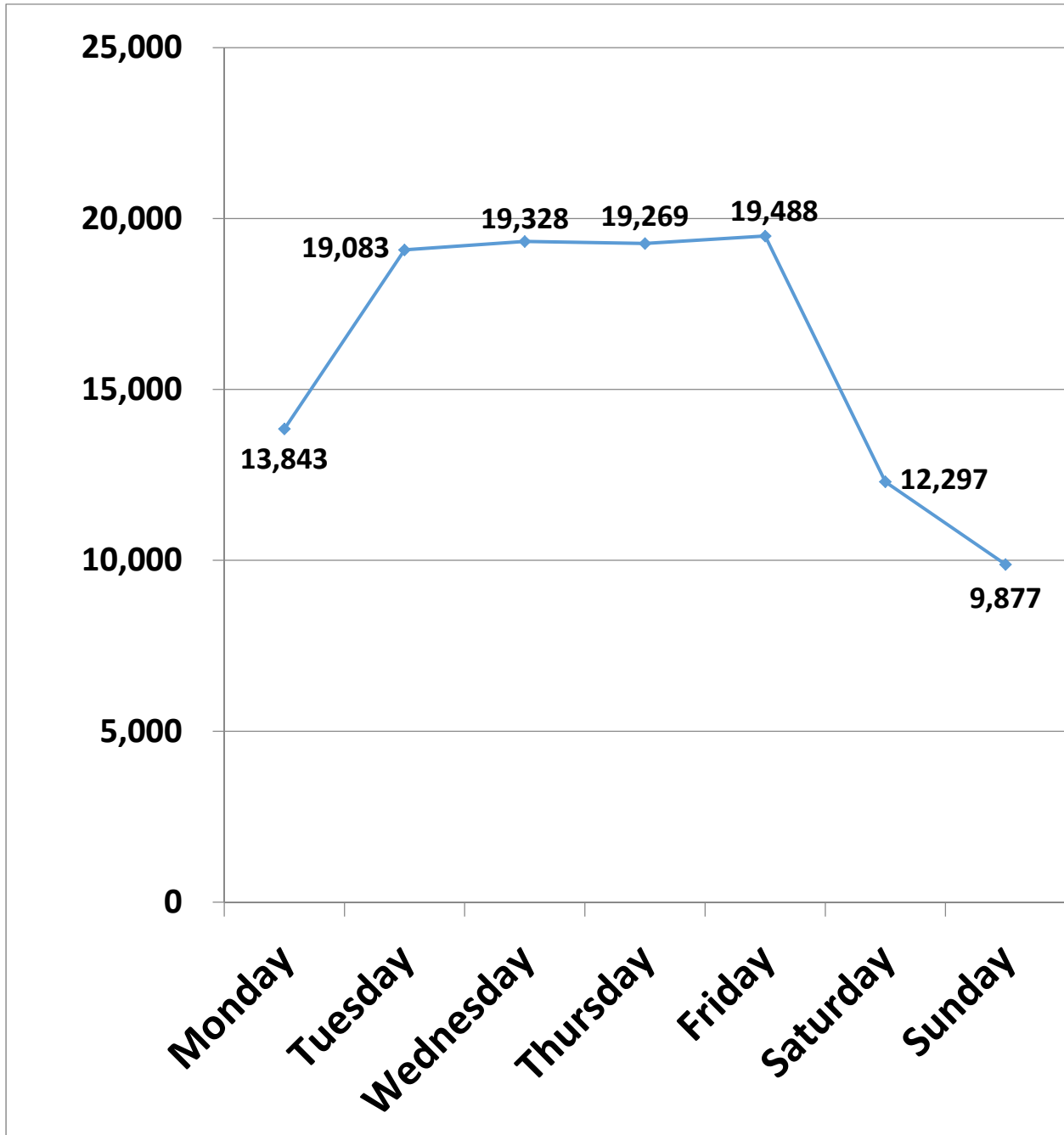
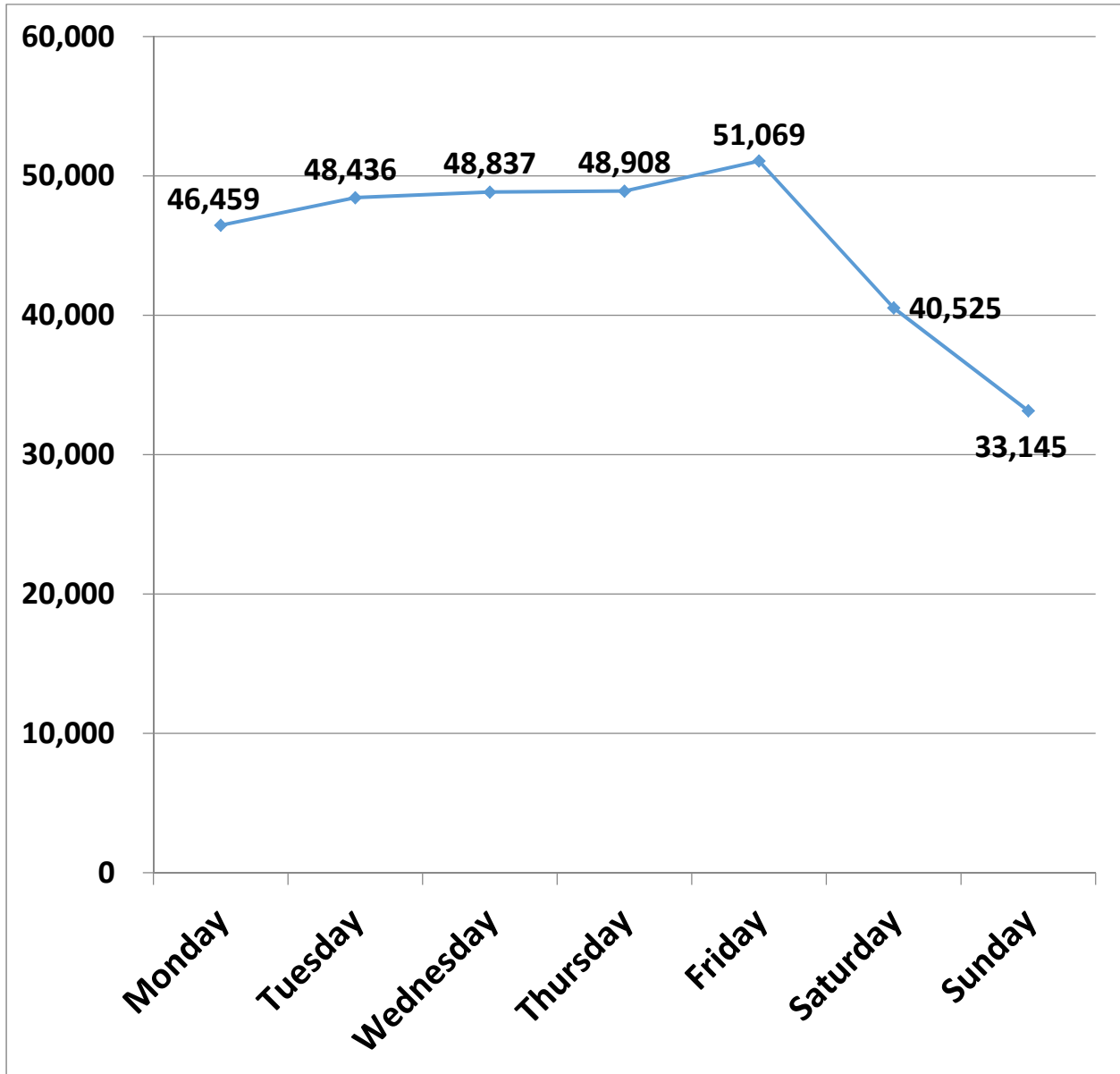


Figure 3

**Average Vehicle Traffic Traveling Through the DTT
by the Day of the Week, 2000-2014**



THE IMPACT OF TOLLS ON MTT AND DTT TUNNEL TRAFFIC

At the beginning of this report, I discussed the need to recognize that there are many different factors that affect tunnel traffic and sales tax collections in addition to tolls and tunnel closures. Recognizing multiple influences requires a multivariate analysis. I do so by assuming that the daily tunnel traffic between 2000 and 2014, averaged over a month, is influenced by the following factors:⁶

- **The size of the regional labor force**: The more workers we have in our region, the more work commuters there will be. Some of them will travel through the MTT and DTT. However, commuting for work purposes diminishes on weekends, so it is necessary to separate weekday traffic from weekend traffic. It's worth noting that the size of our regional labor force typically peaks in the month of July, when high school and college students are working. The size of our regional labor force in July 2014 was 857,596--- only 7,384 (.8 percent) larger than in July 2007. One reason for this is that the number of full-time active duty or civilian employees of the Department of Defense has declined by almost 20,000 individuals since 2000.
- **Port activity**: Plausibly, more port traffic (as measured by TEUs handled) could stimulate tunnel traffic, though there are multiple ways that trucks can travel to their destinations that do not involve the MTT or DTT.
- **The rate of unemployment**: Those without jobs aren't work commuters and therefore we would expect the rate of unemployment to be negatively related to tunnel traffic during the week, but less so on weekends when non-work traffic is larger and tolls are lower.
- **The month of the year**: There are noticeable seasonal variations in tunnel traffic, with peaks typically occurring in April and October and troughs occurring in January and July. Winter weather usually deters vehicle travel and vacations similarly reduce tunnel traffic.
- **"Negative" events**: A negative event is a tunnel closure or occasional bad weather and negative events have a visibly depressing impact upon tunnel traffic. However, a negative event affecting the DTT often actually turns out to be a positive event for the MTT if it involves the partial or full closure of the DTT. DTT drivers switch to the

⁶ Note that since monthly tunnel traffic is the primary focus of my attention, I am restricted to using other variables that also are applicable on a monthly basis. In addition, most of these other variables also must be available for the City of Portsmouth.

MTT. As a matter of record, there have been far more negative events affecting the DTT than the MTT.

- **Colleges in Regular Session?** When Old Dominion University, Tidewater Community College, Norfolk State University and Regent University are in regular academic year session, this could stimulate additional student, faculty and staff traffic in the MTT and DTT. However, even if this effect is quantitatively important, presumably it is diminished in the summer and in months such as December and May when relatively fewer classes are in session.
- **Tolls:** Tolls represent an incremental cost to drivers going through the tunnels and one of the most fundamental and basic economic predictions is that tolls will reduce tunnel traffic.

For those who prefer mathematical notation and are familiar with statistical terminology, I estimate a regression in which either MTT or DTT daily traffic averaged over a month is the dependent variable. Taking the MTT as an example:⁷

$$MTT = f(LFS, PORT, UNEMPL, MONTH, NEGATIVE, COLLEGE, TOLLS)$$

where: MTT = average daily traffic traveling through the Midtown Tunnel in a month

LFS = size of the regional labor force

PORT = volume of TEU activity at the Port

UNEMPL = regional rate of unemployment

MONTH = month of the year

NEGATIVE = negative event such as a closure or bad weather

COLLEGE = ODU, NSU, RU and TCC are open and in regular session

TOLL = tolls exist (or do not)

For those readers with a background in statistics, it should be noted that the MONTH, NEGATIVE, COLLEGE and TOLL variables are specified as “dummy” (categorical) variables. For example, the COLLEGE variable assumes a value of 1 if the colleges are in regular session, but a value of 0 otherwise.

Negative events (primarily tunnel closures, but occasionally because of the weather) have been particularly common for the DTT, which unfortunately has experienced repetitive closures on weekends. On some particularly damaging occasions, DTT traffic has been

⁷ Formally, $MTT_i = a + \sum b_i X_i$, as $i = 1, 2, \dots, 180$ months from 2000 through 2014 and X_i is the value of each independent variable X in month i .

completely closed in one direction, which makes it impossible for a driver to come and go to Portsmouth or Norfolk via the same route. The reactions of some of the drivers whom I interviewed about this occasionally were unprintable.

VDOT's digital boards usually rely upon two separate digital sign "pages" to provide information. The first digital sign page that drivers see might say "Tunnel Closed" in large letters, but vital details such as times and dates do not appear until a second page. Drivers who are keeping their eyes on the road, or a bit impatient, likely will see only the first sign page, which often reads "Tunnel Closed." And, this is their takeaway.

Drivers not intimately familiar with the MTT and DTT (for example, discretionary drivers from Norfolk and Virginia Beach) appear to react negatively to this approach to signage. What they actually see (or hear about) is "Tunnel Closed" and hence in their minds, the message is "*I can't get through*"---these are the actual words of a weekend customer of arts-oriented Portsmouth establishments and frequent diner in downtown restaurants.

To some extent, drivers can deal with closures, if they understand ahead of time what is going to happen. If drivers know what is going to be closed and when this will occur, and can read this information while driving, then they can figure out a way to cope. Alas, the Elizabeth River Company (ERC) and the Virginia Department of Transportation (VDOT) don't receive very high grades in satisfying this standard. Closures have not been well publicized and some electric sign notifications ("Tunnel Closure") haven't supplied enough information to attention-challenged drivers to enable them to understand what is (or is not) going to occur.

Uncertainty nearly always depresses economic activity and this has been the case with respect to MTT and DTT closures. What drivers think could happen with respect to closures may be far worse than what actually happens, but in many drivers' minds, tunnel closures have become sufficiently unpredictable that they are not going to take chances. My conversations with a variety of Portsmouth businesses generated dozens of examples of customers who have disappeared or reduced their patronage because of what these customers perceive to be unpredictable tunnel closures. Similar conversations with tunnel drivers from the cities of Norfolk and Virginia Beach usually elicited puzzled responses concerning the timing of tunnel closures.

Fortunately, there is a relatively inexpensive way to fix this problem. VDOT and ERC should rethink how they present their messages. They need to use smaller letters and more words after the phrase "Tunnel Closed" on what for drivers is the first page of the electronic signs they see outside the tunnels. Second pages can contain additional information, but it is the first page's content that is especially crucial. It appears that this can be accomplished at minimal cost. Given that closures have been costing Portsmouth approximately \$10 million in

taxable sales annually (in addition to the negative impact of the tolls themselves), expeditious VDOT/ERC action is merited.

Let me reiterate that I have not been talking hypothetically. A half dozen Portsmouth businesses provided me with proprietary data showing not only an overall decline in their sales since construction closures have begun, but also specific declines in sales attached to particular construction work episodes. Consider the example of a medium-sized, prosperous Portsmouth business whose sales fell 25 percent in 2014 after 25 years of successful expansion. Construction has virtually closed off access to this business to travelers headed east on I-264. There are numerous other examples. One business woman told me she “*dreaded*” the impact of the construction of the Dr. Martin Luther King Extension because it will “*poke a big hole in my business*”

Consider the plight of a well-regarded downtown Portsmouth business, the vast majority of whose customers come from outside Portsmouth. “*Unpredictable tunnel closures are killing our ‘east of the water’ business,*” commented the owner. (There was an upside to this story, however. Increasingly, this business attracts customers via the Internet and thus has been able to deflect much of the damage. This opportunity, however, is one that only some businesses can utilize because of the nature of their products.)

A Portsmouth art dealer noted that 75 percent of his customers came to his shop from “*east of the Elizabeth River, mainly Virginia Beach*”). This business person noted that his sales historically have been heavily weighted toward the weekends and that is why the weekend closure of the DTT had wreaked havoc on his sales.

A church that historically has drawn members and worshipers from all around Hampton Roads has seen a noticeable decline in attendance from previously faithful worshipers coming from Norfolk and Virginia Beach. However, the church has seen an increase in worshipers coming to it from Western Hampton Roads.

My analysis reveals that:

- **Negative events focused on the MTT reduce MTT vehicle traffic by 2,300 daily vehicles on weekdays and by almost the same amount on weekends.**
- **However, negative weekend events focused on the DTT shift more than 6,600 daily vehicles from the DTT to the MTT on weekends.**
- **Negative events focused on the DTT reduce vehicle traffic by an average of more than 16,400 vehicles daily. This is approximately 20 percent of its pre-toll vehicle volume.**

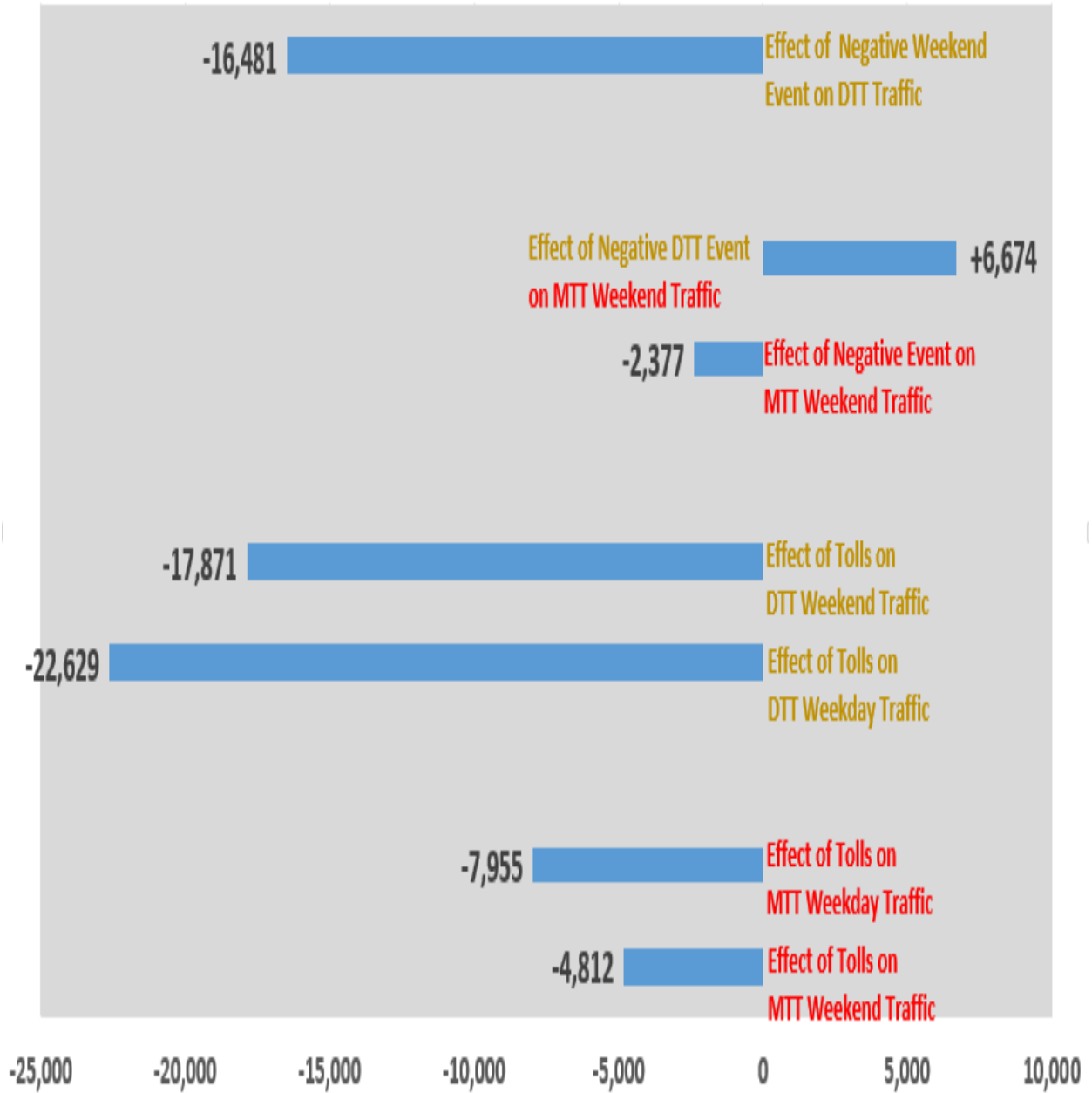
It is important to note that the phenomenon of potential drivers choosing to stay at home rather than traversing through the tunnel isn't all bad for Portsmouth. A significant number of drivers based "east of the water" in Norfolk or Virginia Beach stay on that side of the river because of the tolls and closures and this damages Portsmouth. However, other drivers, mainly those living in Portsmouth and Suffolk, choose to stay at home and this helps Portsmouth. The problem is that the negative effect (which centers on the "stay at homes" in Norfolk and Virginia Beach) is much larger than the positive effect (which focuses on Portsmouth and Suffolk). The populations of the cities reveal why this is so. Together, Portsmouth and Suffolk have a population of about 180,000, while Norfolk and Virginia Beach together claim about 700,000 citizens.

The tolls themselves (as opposed to negative events) predictably depress vehicle traffic through both tunnels. I summarize these effects in Figure 4, but we must remember that these are "net" effects that take into account the influence of the other determinants of vehicle traffic):

- **Tolls have reduced weekday MTT traffic by an average of 7,955 daily**
- **Tolls have reduced weekend MTT traffic by an average of 4,812 daily**
- **Tolls have reduced weekday DTT traffic by an average of 22,629 daily**
- **Tolls have reduced weekend DTT traffic by an average of 17,871 daily**

Figure 4

The Effects of Tolls and Negative Events on Average Daily Traffic at the Midtown (MTT) and Downtown (DTT) Tunnels



Thus far, I have concentrated on the impact of tolls and negative events on tunnel traffic. What about the other factors I have included in my analysis and their impact upon traffic?

- **The size of the regional labor force**: As noted above, the more workers we have in our region, the more work commuters there will be. Some of them will travel through the MTT and DTT. I found that independent of tolls, a 1.0 percent increase in our regional labor force (roughly 7,500 workers) increases average daily tunnel traffic by about 220 vehicles.
- **Port activity**: Plausibly, more port activity (as measured by TEUs handled) could stimulate tunnel traffic, though there are multiple ways that trucks can travel to their destinations that do not involve the MTT or DTT. However, I found only a small positive effect of port activity upon MTT and DTT traffic---in the range of about 100 vehicles daily for both tunnels.
- **The rate of unemployment**: Those without jobs aren't work commuters and therefore we would expect the rate of unemployment to be negatively related to tunnel traffic during the week, but less so on weekends when non-work traffic is larger and tolls are lower. And, this is what I found, though once again the size of this effect was modest. For example, a 1.0 percent increase in the region's rate of unemployment diminishes MTT traffic by 12 vehicles daily and DTT traffic by 35 vehicles daily.
- **The month of the year**: There are noticeable seasonal variations in tunnel traffic, with peaks typically occurring in April and October and troughs occurring in January and July. Winter weather usually deters vehicle travel and vacations similarly reduce tunnel traffic. I found the seasonal effects to be significant only in January and July. Both months have negative impacts on tunnel traffic (taking into account all of the other variables in my analysis). January's negative impact appears to reflect both adverse weather and the several day impact of the New Year's holiday. July's negative impact appears to reflect individuals either leaving town on vacations, or staying home for their vacations. For the MTT, for example, the negative January effect is slightly more than 1,000 vehicles daily, while the negative July effect is slightly more than 600 vehicles daily.
- **Colleges in Regular Session?** When Old Dominion University, Tidewater Community College, Norfolk State University and Regent University are in regular academic year session, this could stimulate additional student, faculty and staff traffic in the MTT and DTT. However, the "colleges in session" variable was quite small, though positive, for weekday traffic, and quite small, though negative, for weekend traffic.

Finally, while tolls and closures clearly have reduced vehicle traffic through the tunnels, that traffic has not cratered as much as some had feared. The aforementioned January 2014 public opinion survey of South Hampton Roads residents conducted for the HRTPO found that 57 percent of adults surveyed said they intended to “change their commute” in order to avoid paying tolls. An overlapping 58 percent said they would “avoid traveling to certain destinations that require paying the tolls,”⁸ though a subsequent January 2015 public opinion survey conducted for the HRTPO reduced that to 41 percent.⁹ Another overlapping 33 percent said they would telecommute or work from home rather than pay tolls.¹⁰

These percentages have not materialized and this underlines the difference between “talk” about tolls and actual driver behavior--- and ultimately it is driver behavior that counts. Nevertheless, it should be noted that both the Gilmerton and High Rise bridges have experienced visibly higher traffic flows since the inauguration of the tolls and their traffic surges when tunnel closures occur.

THE IMPACT OF TOLLS AND NEGATIVE EVENTS ON SALES TAX COLLECTIONS

I must preface my presentation of these results by noting that we have only a partial year’s evidence concerning the impact of tolls upon taxable sales in the City of Portsmouth. **We’ll have much stronger evidence available a year from now. This said, the evidence that is available points to a significant negative impact of tolls on taxable sales in Portsmouth.**

Once again, I assume that many different factors affect taxable sales in the City of Portsmouth. Given the availability of data, I assume that taxable sales depend upon the factors I used in my analysis of the impact of tolls on MTT and DTT traffic:

- **The size of the regional labor force:** I assume more workers translates to higher taxable sales
- **Port activity:** Perhaps higher port activity generates higher taxable sales
- **The rate of unemployment:** I assume that unemployed individuals have less money to spend
- **The month of the year:** If the weather is bad, or individuals are on vacation, they may spend less in Portsmouth.

⁸ “South Hampton Roads Midtown and Downtown Tunnels Toll Survey: Part I, Pre-tolling Report and Findings,” Judy Ford Wason Center at Christopher Newport University, January, 2014. About one-third of those surveyed were from Portsmouth.

⁹ “South Hampton Roads Midtown and Downtown Tunnels Toll Survey: Part II, Post-Tolling Report and Findings,” Judy Ford Wason Center at Christopher Newport University, January, 2015.

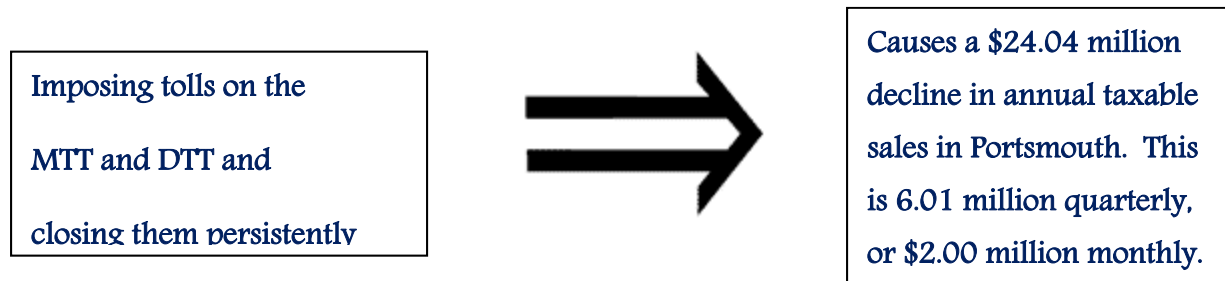
¹⁰ “South Hampton Roads Midtown and Downtown Tunnels Toll Survey: Part I, Pre-tolling Report and Findings,” Judy Ford Wason Center at Christopher Newport University, January, 2014.

- **Colleges in Regular Session?** When there are more college students present in the region, perhaps this stimulates taxable sales in Portsmouth.
- **Negative Events:** Tunnel closures and bad weather should diminish taxable sales, but beware of the “stay at home” effect of such events.
- **Tolls:** Are there tolls or not?

And, I add **Tunnel Traffic** to this list. I assume that tunnel traffic translates to higher taxable sales.

Here’s what I found:

- **Taking all of the previous factors into consideration, the net effect of tolls has been to reduce taxable sales in the City of Portsmouth by \$14.08 million annually, or \$3.52 million quarterly, and about \$1.17 million monthly (see Figure 5).**
- **Negative events (tunnel closures and occasional bad weather) diminish taxable sales in Portsmouth. In months when these things occur, taxable sales are down by \$9.96 million annually, or \$2.49 million quarterly, and about \$.83 million monthly (see Figure 5 once again). Note that negative events cause some Portsmouth residents to stay at home.**



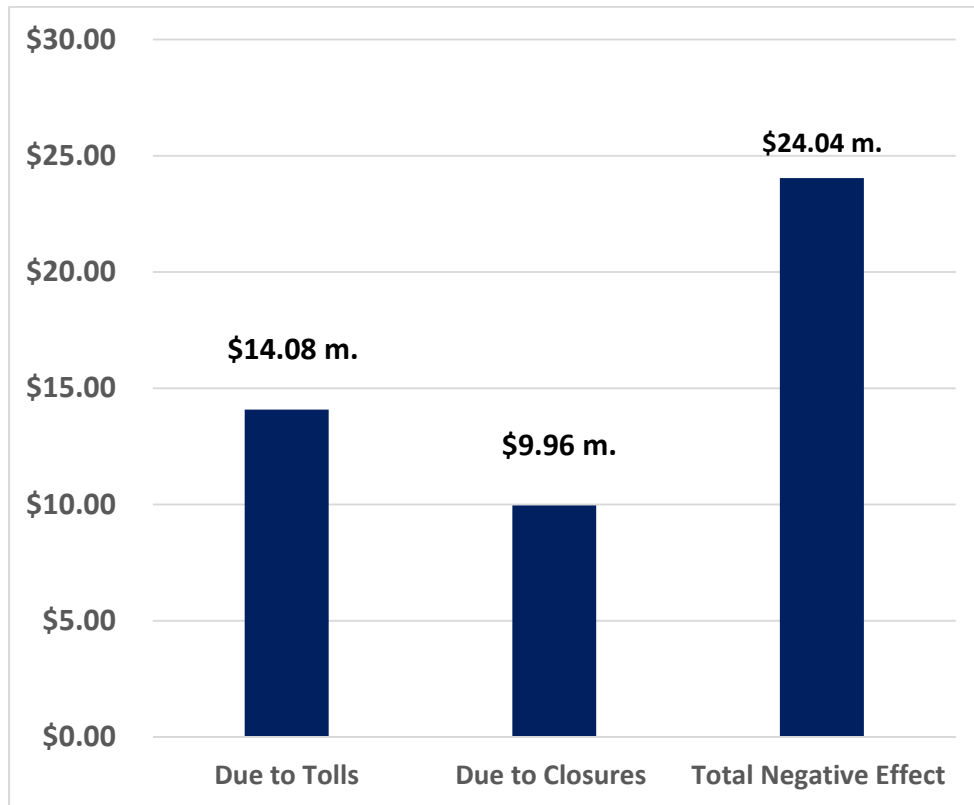
- **If we approximate Portsmouth’s sales tax collections at 1.0 percent of its total taxable sales, then the immediate traceable effect of tolls on Portsmouth’s sales tax revenues is -\$60,000 quarterly and -\$240,000 annually. However, this number will climb if some Portsmouth businesses begin to disappear because of the tolls. Nevertheless, readers should remember that this estimate is based upon the limited taxable sales data that currently are available. We will be able to be much more precise next year at this time.**
- **As expected, tunnel traffic is positively related to taxable sales. If tolls did not exist, then each 1,000 vehicle average daily total increase in MTT and DTT tunnel**

traffic would translate to about \$22,000 monthly in additional taxable sales in the City of Portsmouth.

- The larger the regional labor force, the higher are taxable sales in the City of Portsmouth. A 1,000 worker increase in the size of the regional labor force stimulates taxable sales in Portsmouth by about \$7,000 monthly.
- Port activity has almost no impact upon taxable sales in Portsmouth.
- Not surprisingly, higher rates of unemployment depress taxable sales. A 1.0 percent increase in the rate of unemployment in the region reduces taxable sales in Portsmouth by about \$300,000 monthly.
- “Colleges in Regular Session” has a modest positive impact upon taxable sales in Portsmouth---about \$5,000 monthly in taxable sales.
- Both January and July diminish taxable sales (taking into account all of the other factors just mentioned), but not by large amounts. Once again, there is a stay at home factor at work.

Table 5

**Estimated Total Annual Decline in Taxable Sales in Portsmouth
Due to Tolls and Tunnel Closures (in millions of \$)**



PROPERTY VALUES AND ASSESSED VALUATIONS

In a nutshell, it's too early to tell what impact the imposition of tolls will have upon property values and assessed valuations. It will be several years before we know if there has been an impact and even then, the impact will be felt unevenly inside the City of Portsmouth.

Nevertheless, we can make several reasonable deductions. **A fundamental principle of property economics is that the business value of a firm is closely tied to the volume of its sales and its profitability. Plainly speaking, if the sales and profitability of some Portsmouth merchants decline because of the existence of tolls and tunnel closures, then the value of their businesses will decline, followed by a decline in their assessed valuations and subsequent tax collections.**

Three general examples stand out in this regard.

- 1) Several dozen Portsmouth businesses, mostly (but not always) located downtown, traditionally have attracted many customers from “east of the water” and now easily can demonstrate that they are being damaged by the tolls and closures. I talked with one business owner who told me that well more than one-half of his customers came from just a few Virginia Beach zip codes and *“these tolls are hurting me badly.”* This will translate to a decline in the value of such businesses, reduced assessed valuations, and diminished tax collections by the City and perhaps even the Commonwealth.
- 2) A few Portsmouth businesses, once again located primarily downtown, have found they are able to sell their products effectively via the Internet. Such businesses will deflect some or most of the negative effect of the tolls and closures. In one specific case, a business actually may end up better off because it was forced to discover a new lode of Internet-related customers.
- (3) Some Portsmouth businesses, mostly located outside of downtown, have experienced modest increases in sales coming from individuals “west of the water” who have decided to stay home rather than traveling to Norfolk or Virginia Beach.

Unfortunately, as the taxable sales analysis in a previous section revealed, it appears that there are many more type (1) businesses in the City of Portsmouth currently than types (2) or (3). That is, there are more businesses being hurt (some demonstrably to the point of being driven out of business) in the City of Portsmouth than are being helped. Unless conditions change, this will lower the values of the penalized businesses, diminish their property values and assessed valuations, and reduce both sales and real estate tax collections.

PORTSMOUTH IS AFFECTED MORE THAN THE OTHER SOUTH HAMPTON ROADS CITIES

In my 2014 report, I utilized Census commuting data to demonstrate the City of Portsmouth is affected much more by the tolls and closures than any of the other cities whose citizens often must use the tunnels (Norfolk, Suffolk, Virginia Beach). In that analysis, I relied heavily upon Table 1 below. It remains useful.

I use the data from Table 1 to create Figure 6, which simultaneously reports the number of probable commuters through the MTT and DTT to and from each affected Southside city and the percentage of each city’s population those tunnel commuters comprise. Not only does Portsmouth have more tunnel commuters than any other Southside city, but also these tunnel commuters constitute a much larger percentage of its population than is true for any other city.

Portsmouth has 17,184 workers who likely commute daily through the MTT and DTT; this is 17.9 percent of the City’s population. Only Suffolk, at 13.6 percent, even approaches the

intensity of tunnel use by its citizens. Meanwhile, Norfolk (where tunnel commuters constitute 3.2 percent of its population) and Virginia Beach (tunnel commuters comprise 2.5 percent of its population) are only modestly impacted by the tolls and closures. This is not to say these cities are unaffected. Instead, I simply observe that they are affected far less than Portsmouth by tunnel tolls and closures. **Roughly speaking, Portsmouth is impacted 31 percent more than Suffolk by the tolls and closures, 459 percent more than Norfolk and 616 percent more than Virginia Beach.**

The tunnel projects were advertised as being good for the entire region and ultimately this will be true. This project will be a positive development for Hampton Roads. Even so, the distribution of the costs and benefits has been and will continue to be unequal---so unequal that this project cries out for attention and adjustment by the region and the Commonwealth.

TABLE 1

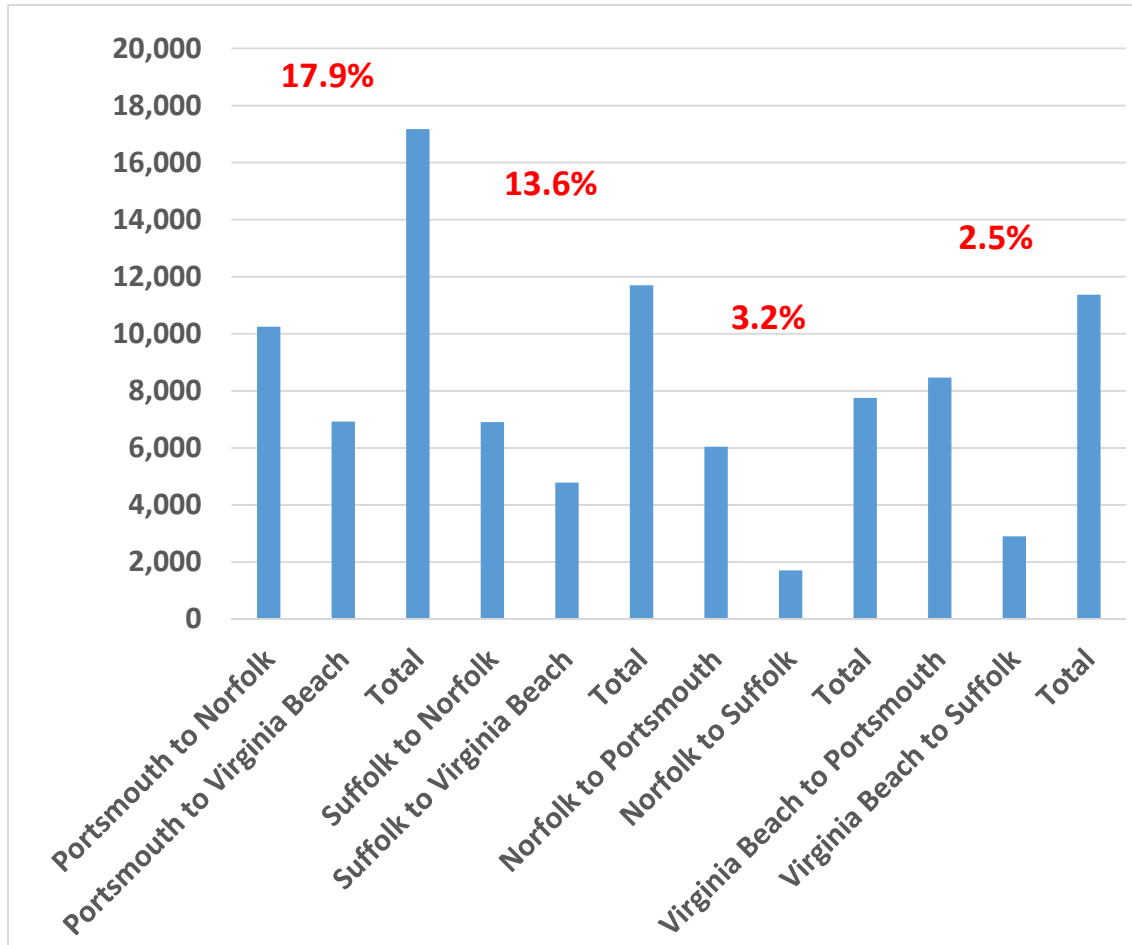
Where Workers Live and Where They Work in Hampton Roads, 2013

Where Workers Live and Where They Work Hampton Roads 2011																	
Location of Job	N of Jobs	Gloucester County	Isle of Wight County	James City County	Mathews County	Surry County	York County	Chesapeake	Hampton	Newport News	Norfolk	Poquoson	Portsmouth	Suffolk	Virginia Beach	Williamsburg	Outside Hampton Roads
Gloucester County	13,206	5,550	61	428	665	2	489	116	317	972	127	75	116	99	280	54	3,855
Isle of Wight County	14,025	20	65	455	706	2	520	123	336	1,033	135	80	123	106	297	57	9,968
James City County	37,618	1,363	310	12,055	286	329	2,869	418	1,269	4,827	347	234	356	401	757	1,130	10,668
Mathews County	2,045	267	4	28	711	2	37	22	37	66	13	9	7	9	17	2	815
Surry County	3,413	48	258	115	11	726	89	117	79	171	35	16	50	83	138	11	1,164
York County	28,992	1,695	417	3,388	208	74	6,067	446	2,380	5,347	428	613	428	391	828	526	5,755
Chesapeake	132,806	478	1,441	701	104	70	41,070	3,162	3,288	13,226	137	9,498	6,504	30,394	129	22,587	
Hampton	76,504	1,130	1,717	1,833	189	30	5,047	3,469	23,816	13,744	3,910	1,634	1,956	2,103	5,088	213	10,625
Newport News	134,154	4,822	4,837	4,463	662	102	10,072	4,819	21,508	40,661	3,973	2,193	3,518	4,659	6,376	463	21,026
Norfolk	192,051	106	1,742	1,334	183	65	1,432	27,297	6,484	5,236	50,825	285	10,249	6,909	52,164	228	27,513
Poquoson	2,410	50	35	40	5	-	291	50	297	344	37	875	32	33	80	3	237
Portsmouth	61,237	131	1,312	255	34	38	304	11,722	1,721	1,881	6,044	44	16,620	5,065	8,466	38	7,561
Suffolk	37,179	222	2,074	333	40	101	368	4,341	885	1,355	1,710	76	3,015	12,107	2,905	29	7,620
Virginia Beach	229,365	612	1,329	1,130	137	-	1,082	25,843	3,631	3,724	23,138	196	6,925	4,790	125,237	215	31,376
Williamsburg	19,123	921	145	5,679	105	174	2,078	205	686	3,162	212	125	196	184	348	1,407	3,496

Sources: Employment data from Bureau of Economic Analysis, www.bea.gov, and include self-employed and military personnel.
 U.S. Census Bureau. 2013. OnTheMap Application. Longitudinal-Employer Household Dynamics Program <http://onthemap.ces.census.gov/>
http://lehd.ces.census.gov/applications/help/onthemap.html#what_is_onthemap

FIGURE 6

Estimated Number of Commuters from Southside Cities Likely to Use the MTT and DTT and the Estimated Percent of Each City's Population Doing So (2013)



RECOMMENDATIONS

In my January 2014 report, I discussed several strategies that might be followed in order to diminish the negative impact of the tolls and tunnel closures:

- Buy down the bonds in order to keep tolls at their 2016 levels (second best: buy down, but permit increases): Realistically, this requires action by the General Assembly and this is not likely. A more promising avenue (which probably also ultimately would require General Assembly action) would be to dedicate a portion of the region's relatively new sales tax revenue stream to servicing the bonds on the

tunnels. The argument is straightforward---this is a regional project that all studies indicate is going to benefit the region, but the City of Portsmouth is paying a disproportionate share of the costs of the project. Hence, some revenue and cost sharing is appropriate.

- More intelligent closure decisions, much better dissemination of closure and construction decisions: This is doable and absolutely should be done. Inadequate publicity, inferior and somewhat deceptive signage, and a failure to provide drivers with a dependable, longer term schedule of closures have combined to deter vehicles from going through the tunnels. Especially difficult to understand have been decisions to close off completely the DTT in one direction. My interviews with drivers, customers, and business owners reveal that they simply do not understand why such closures should occur. At the very least, VDOT and the ERC need to explain why such actions are necessary even as they provide drivers with much more detailed, reliable information about construction and closures. VDOT and ERC should make this a very high priority; they've not been doing a very good job thus far in this arena. Further, they should be much more sympathetic to the signage needs to firms whose business obviously has been diminished by construction and closures. The stiff-necked approach of VDOT and ERC to placing temporary signs that would help businesses in jeopardy is going to drive several firms out of business. It isn't that they are trying; rather, it is that their efforts thus far have been inadequate.
- Advertise and push public transportation alternatives: Who has been riding the alternatives and how often? Do drivers even know the alternatives exist? What incentives could HRT offer to entice drivers to try the alternatives? We have only limited evidence on these questions thus far. When one compares HRT traffic on four key routes (#44, which goes through the MTT; #45, which goes through the DTT; #47, which starts in Chesapeake and goes across Portsmouth to Portsmouth's downtown area; and, the Ferry), a mixed picture emerges. Year-over-year, traffic on #44 (the MTT) is down noticeably, while #45 traffic (the DTT) is up significantly. More riders also are using #47, the crosstown route that connects a variety of individuals and sites, including possible tunnel users, but ferry traffic is down modestly.
- Publicize and give greater prominence to HRT's still not widely known NuRide Program and its *Traffic* web site (www.gohrt.com/services/traffic), where prospective car poolers can make contact with each other. HRT's *NuRide* is advertised as the nation's largest commuter rewards program; it enables travelers to earn rewards for carpooling, vanpooling, biking, walking, telecommuter and using

mass transportation (bus, ferry, light rail). The rewards can be used at stores, restaurants, and a variety of interesting events. *Traffix* is a low-cost way to enable commuters to make contact with each other and thereby reduce the burden of the tolls upon themselves and simultaneously reduce traffic congestion. HRT should actively advertise *NuRide* and *Traffix* in regional publications, newspapers, on television, and on the Internet. Let's see whether such advertising makes a difference in *NuRide* and *Traffix* patronage.

If tolls had begun at the initially advertised levels (\$1.84 peak for cars), then HRT ridership would have increased more.

- Tax Credits: Tunnel drivers could be offered tax credits either by the City, or by the Commonwealth. The latter would require General Assembly action and will not succeed without the formation of alliances with legislators representing other regions (Richmond, Northern Virginia) which also have tolls. The tax credit approach cannot happen immediately and of course will require support from other cities in Hampton Roads, who may be reluctant to provide such. Portsmouth needs to work to bring the region's other cities to understand that they are receiving many of the benefits of the ERC project, but Portsmouth is paying a disproportionate share of the costs. This is an equity argument and such approaches usually have limited success. Nevertheless, the data demonstrating the relative impact of tolls and closures on Portsmouth are overwhelming and the City needs to make its case, perhaps even taking out advertisements in the *Virginian-Pilot* and other media outlets in order to do so.

LOOKING INTO THE FUTURE

My estimates are that tolls have reduced taxable sales in Portsmouth by \$14 million annually, while closures have inflicted another \$10 million of annual damage to taxable sales. There is good news and bad news associated with these estimates.

- A piece of good news is that the \$10 million blow to taxable sales because of construction closures eventually will terminate and this will eliminate this particular negative effect. However, it will be several years before that will occur.
- A piece of bad news is that the damage being done to taxable sales likely will increase in 2015 and 2016 if some Portsmouth businesses are forced to close their doors. Based upon my observations and interviews, some business failures appear to be almost inevitable. Improved signage by VDOT and ERC, however, could reduce this damage.

- It also seems likely that the full dampening effect of MLK extension construction activity was not yet reflected in the 2014 data, but will be in 2015. This is another reason to expect the downward pressure on taxable sales to increase in 2015.
- Even so, the ultimate impact of the MLK extension on Portsmouth is not yet clear. When completed, the MLK Extension will eliminate a major traffic bottleneck and open a new set of more efficient locational possibilities to businesses and workers. This could have a positive effect upon the activities and values of businesses and even residential properties because they now will have a much greater mobility. On the other hand, tolls could drown out this possible benefit. The ultimate impact remains to be seen.
- Over the longer term, and after construction has been completed, if the tolls continue to have their current negative effect, then the value of Portsmouth businesses and properties that serve tunnel travelers will gradually decline. In raw economic terms, these businesses simply won't be worth as much as before.
- Counteracting this, however, is the reality that when all of the construction is completed (and setting tolls aside), the cost of driving in and out of Portsmouth will decline. Vehicles will be able to travel at higher speeds, fewer traffic jams will confer time savings, travel will become much more predictable, vehicle wear and tear will decline, and there will be diminished pollution. To the extent these reductions in costs exceed the size of the tolls being paid, they will make Portsmouth a more attractive place to live and/or to locate a business.
- Nevertheless, even if this project ultimately turns out to be a net positive for Portsmouth, it will still be the case that the costs of the tunnels will fall on Portsmouth much more heavily than any other South Hampton Roads city. What will be a good thing for the entire region will not be quite so good for Portsmouth.