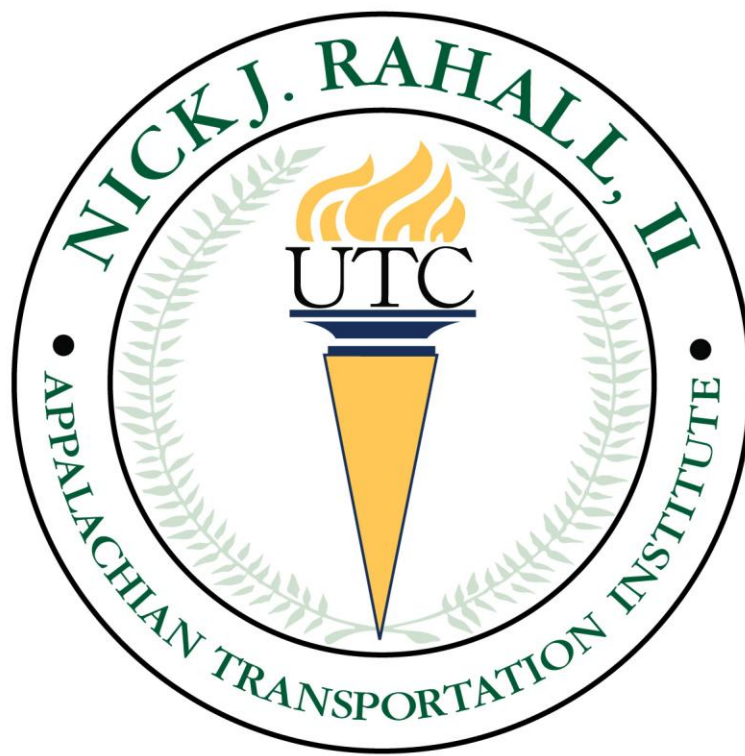


Creation of West Virginia Parkways Authority by
the WVDOT:
2009 Traffic and Toll Revenue Forecasts



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April 2009

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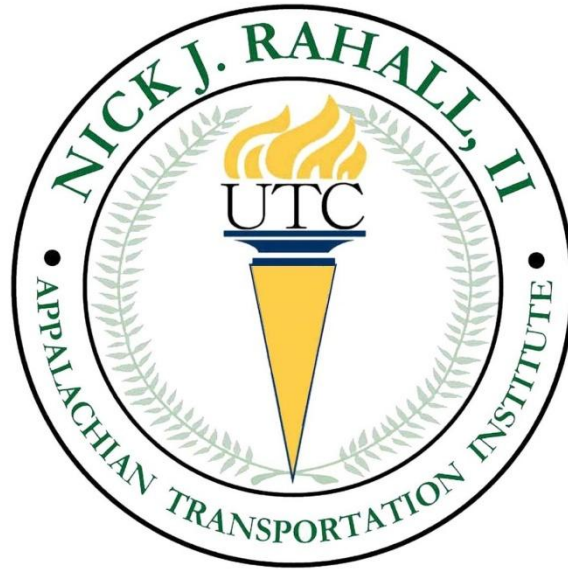
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2009 Traffic and Toll Revenue Forecasts**

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Chapter 1. Introduction

Background

The West Virginia Department of Transportation (DOT) plans to direct the West Virginia Parkways, Economic Development and Tourism Authority to build the West Virginia Parkways Authority using an organizational structure similar to that used in the State of Florida. In 2002, the Florida Legislature transformed Florida's Turnpike into an Authority as a part of the Florida Department of Transportation. The objective of Florida Turnpike Authority is to employ the efficiency of private sector methods in operating the Turnpike as a business for the State. A centerpiece of this strategy is to capitalize on the advantages of electronic toll collection. The West Virginia Parkways Authority would manage the designated toll facilities and collect user fees to be deposited into a fund to maintain and expand the system. The toll facilities, designated as Parkway Routes, could be maintained by the West Virginia Division of Highways.

The West Virginia Parkways Authority would initially include the West Virginia Turnpike, US 35 in Putnam and Mason Counties, and the Mon-Fayette Expressway in Monongalia County. Additionally, the proposed Wellsburg Bridge in Brooke County and the Dick Henderson Bridge in Kanawha County are considered for tolling. The collected revenue could be used to fund the construction of these routes with any excess revenue used to fund other highway construction such as useable sections of the King Coal Highway, Coalfields Expressway, WV 705 connector, WV 2, WV 9, WV 10 and other projects that may be economically viable. These highways could also be tolled to generate additional toll revenue.

Therefore, a feasibility study needs to be conducted to determine the amount of toll revenues these roads and bridges could be anticipated to generate. This information is essential to guide a plan that will be developed to borrow against future toll revenues. The West Virginia DOT would estimate how much money in tolls would be collected from these highways for the next 20-30 years, then borrow that amount all at once and pay back the money annually with interest, much like a home mortgage loan. A toll rate schedule would be developed for the repayment over the 20-30 year life of the loan. Initially, the West Virginia DOT proposed adjustment factors for annual toll increases would be as follows: 1) increase in Consumer Price Index (CPI), 2) 2.00 percent per annum, and 3) increase in nominal Gross Domestic Product (GDP). The West Virginia DOT initially proposed a standard toll rate per-mile for cars and trucks across the West Virginia Parkways Authority, with trucks being tolled at a rate of 3.5 times the rate set for cars. For example, if the standard toll rate for passenger cars is \$0.10 per mile, then the standard toll rate for trucks would be \$0.35 per mile. Residents of West Virginia using EZ Pass would be able to deduct their toll costs in order to save West Virginia State income taxes.

Study overview

The RTI will conduct updated traffic and revenue analyses to provide comprehensive information for creating the West Virginia Parkways Authority, formerly the West Virginia Parkways, Economic Development and Tourism Authority, as a Division within the West Virginia Department of Transportation. The West Virginia Parkways Authority will manage the

designated parkways and collect user fees to be deposited into a fund to expand and maintain the West Virginia roads and bridges.

Purpose and scope of study

The purpose of this report is to provide comprehensive information for policymakers and practitioners on tolling and road pricing. Using alternative toll rate plans, the report estimates the amount of toll revenues each road or bridge would be anticipated to generate. The estimated future revenues will be used to fund the construction and maintenance of the proposed West Virginia roads and bridges. Any excess revenue will be used to fund other highway construction. Specific objectives will include to:

- 1) present a project overview of the West Virginia Parkways Authority and the scope of study;
- 2) discuss the benefits of successful turnpike systems and demonstrate their economic impacts;
- 3) describe the proposed toll roads and bridges (e.g., US 35 in Putnam and Mason Counties, the Mon-Fayette Expressway in Monongalia County, the Wellsburg Bridge in Brooke County, and the Dick Henderson Bridge in Kanawha County);
- 4) provide a summary of current toll rates, traffic, and revenues in West Virginia;
- 5) identify alternative toll rate plans based on the factors determining toll rate increases (e.g., CPI, GDP, or GSP);
- 6) develop a traffic analysis to predict traffic volume of passenger cars and commercial trucks over the 20-30 years;
- 7) forecast toll revenues for the same period; and
- 8) highlight the results of predicted toll revenues for alternative toll rate plans.

The scope of this report is limited to an economic analysis of estimating traffic volume and revenues for the proposed West Virginia roads and bridges. A tolling model in this report identifies alternative toll rate plans and forecasts traffic volume and toll revenues. However, this report does not address collection options (e.g., Electronic Toll Collection), public opinion polls and surveys, and bond issues. These issues should be addressed in future research.

The rest of the report is organized as follows: Chapter 2 describes the benefits of successful turnpike system, with a presentation of a case study of the Florida Turnpike Enterprise. Chapter 3 provides a description of the proposed West Virginia toll roads and bridges. Chapter 4 presents current toll structure in West Virginia that includes toll schedule and historical traffic volume and toll revenues. In Chapter 5, toll rate determinants are discussed to develop alternative toll rate scenarios in West Virginia. Chapter 6 presents traffic analysis to predict traffic volume on the toll roads and bridges and further provides revenue analysis to forecast toll revenues. The final section, Chapter 7, concludes the paper. The contributions and limitations of this study are discussed.

Chapter 2. Benefits of Successful Turnpike System

The direct benefits of a toll road are derived from enhancements in road capacity, accessibility, mobility, efficiency, and safety. The primary economic impact results from an improvement in road capacity or connectedness that decreases the time spent travelling to a destination. New toll roads may create an accessibility premium as formerly distant places are connected and travel time between those places is reduced and made safer.

When developing a new toll road, there are several categories of direct and indirect effects. Major categories of direct impact include: 1) construction; 2) changed access to existing businesses; 3) increased business activity near points of access; 4) change in taxable property values following right-of-way acquisition. Indirect effects are: 1) local multiplier effects of construction, maintenance and changed access to traditional business areas; 2) potential increase in tourist activity resulting from gains in accessibility; 3) potential attraction of new businesses to the area by gains in accessibility and productivity attributable to the transportation improvement; 4) fiscal benefits attributable to project induced growth; and, 5) fiscal costs resulting from the greater need for services attributable to project induced growth (Transportation Research Board, 2002).

Additional socioeconomic effects of a new toll road due include: 1) alteration of traffic patterns and access; 2) relocation of homes and businesses, or relocation or alteration public facilities. These effects include temporary or permanent alterations to neighborhood cohesion, neighborhood stability, travel patterns of commuters and shoppers, recreation patterns at public facilities, pedestrian dependency and mobility, perceived quality of the natural environment, personal safety and privacy, and aesthetic and cultural values. The potential improved safety of four-lane roads over two-lane alternatives is another important socioeconomic impact.

While the economic impact of a toll road is determined similarly to that of a non-toll road, there is a difference between a toll road and a free road. The primary difference is in the tighter cost-revenue relationship created by having users pay for a toll road in proportion to their use. In general, toll roads often allow highway systems in high growth areas to keep up with growth more quickly than tax-funded roads. A toll is superior to a gas tax in terms of fairness (only users pay for it) and large scale. More importantly, an access controlled toll road provides greater safety. According to Samuel (2000), the accident rate on toll roads is one third less than on comparable free roads was only because of better maintenance and traffic management (time-variable tolls). In 2006, 147 accidents occurred on US 35, resulting in a single fatality. According to estimates computed by the National Safety Council (NSC)¹, the total economic cost of these accidents is \$2,232,500. The economic cost was found by adding the estimated cost per death (\$1,130,000) to the cost of 147 crashes (\$1,102,500=147 * \$7,500). This assumes that no one suffered a disabling injury in any of the accidents. Each disabling injury adds \$61,600 of economic cost (NSC 2007).

¹ National Safety Council. 2007. Estimating the Costs of Unintentional Injuries, 2007. www.nsc.org/resources/issues/estcost.aspx (accessed on January 30, 2009).

The general disadvantages of a toll road versus a free road are plazas (slows traffic), double taxation as consumers have already paid road user fees, potential diversion of traffic to non-tolled roads, institutional problems at toll agencies and political contentiousness due to necessary price increases. Therefore, it is important to determine how to manage a toll road.

The differences between a private and a government-managed toll road must also be considered given the trend toward privatization. There are several advantages of a private toll system: it forces a potential road to be evaluated for effectiveness and to align costs with revenues; it is self-financing. It may allow quicker construction or improvements and adoption of innovative pricing options such as variable, congestion-based pricing; it can be more focused on customer service if the contract is long-term. A private toll system may also be the only option to put a road in place in the time desired.

There are also some disadvantages of a private toll system: private toll roads may have to be regulated because of antitrust issues; the road can be under-utilized and the investment may have to be refinanced if revenue projections are not met; it may also require a non-compete clause stating that no alternative roads can be built within a specified distance of either side of the toll road for a defined time span without paying penalties, which would constrain some future development. A full impact analysis must determine the number of people that will benefit from reduced travel time and the amount of time saved.

Case study: the Florida Turnpike Enterprise

In the aftermath of World War II, Florida emerged as one of the fastest growing states in the country. In the 1950's, Florida had a population of less than 3 million, but today more than 18 million people call Florida home (Warren 2006). This rapid growth placed high demand on the availability of reliable transportation. In 1953, The Florida legislature created the Florida State Turnpike Authority and began work on what was originally the "Sunshine State Parkway." The first section, which stretched 110 miles from Golden Gates to Fort Pierce, was opened to traffic on January 25, 1957. A second 61-mile section opened in July 1963, but the two sections were not connected until November 1963. In 1969, two new projects were authorized: the Homestead Extension and the Bee Line Expressway (later renamed Beachline Expressway). The Homestead Extension connects to the southern end of the turnpike and extends from Miami to Florida City, which is just north of the Florida Keys. The Beachline Expressway connects the turnpike at Orlando with the "Space Coast" and the JFK Space Center. Later in 1969, the Florida Turnpike was incorporated into the new Florida Department of Transportation. The Homestead Extension and the Bee Line Expressway were completed in 1973 to form a connection of tollways that included 320 miles of road (Florida's Turnpike Enterprise n.d.).

In 1986 the Florida Turnpike had nearly paid off all its bonds. A study was requested to investigate the possible future role of the turnpike. *The Future of Florida's Turnpike* was presented to the legislature in 1987. The report recommended using the turnpike to finance projects that would alleviate urban congestion, expand and upgrade the turnpike, and to coordinate local governments and turnpike authorities. Florida's state legislature created the Office of Florida's Turnpike in 1988 to operate within the Department of Transportation but with greater flexibility in financing and upgrading facilities. In 1990, Florida's Legislature authorized

the Florida Turnpike to construct non-contiguous toll roads, set environmental and financial feasibility standards, and also authorized higher rate per mile tolls on new projects (Turnpike Annual Report 2007). The Florida Turnpike also purchased the Sawgrass Expressway in 1990 at the suggestion of the Legislature. In 1994, Veterans Expressway and Seminole Expressway (Project 1) opened to traffic. Due to the success of the Office of Florida's Turnpike in financing and upgrading tollways, it was granted more flexibility in its operations with the formation of the Turnpike District in 1994. The Southern Connector Extension opened in 1996 and Polk Parkway in 1998. The latest projects to be finished were the Suncoast Parkway in 2001, Seminole Expressway (project 2) in 2002, and the Daniel Webster Western Beltway in 2006 (Florida's Turnpike Enterprise n.d.).

During the 1990's, the Florida Turnpike had begun looking for new ways to increase efficiency and improve customer service. The first result of this effort was the implementation of Florida's electronic toll collection system known as SunPass. Electronic tolling allows vehicles to maintain speeds of up to 45 miles per hour while traveling through toll plazas. This alleviates congestion and decreases average travel time for customers using the Turnpike. The second result of Florida's search for innovation was the creation of the Florida Turnpike Enterprise (FTE) in 2002. Like its predecessors, the Office of Florida's Turnpike and the Turnpike District, the goal of the Florida Turnpike Enterprise is to bring a more business-like approach to managing Florida's turnpikes and to allow greater flexibility in how it runs its operations (Turnpike Annual Report 2007). According to the Florida Turnpike Enterprise's website, the Enterprise is in charge of operating all Florida Department of Transportation (FDOT) owned or operated toll facilities. This makes the Enterprise responsible for operating 80 percent of the toll facilities in Florida, representing 600 miles of roadway (Innovation Breeds Success n.d.).

Toll rates

The Florida Turnpike Enterprise owns 10 tollways. Many of these tollways have maintained their original toll rates since opening. This includes Veterans Expressway, Suncoast Parkway, Seminole Expressway, Polk Parkway, and Daniel Webster Western Beltway. Table 1 shows current toll rates on FTE's 10 tollways. The displayed rates are for cash transactions. Vehicles using Florida's SunPass electronic toll collection system receive discounts on several of the tollways.²

² Table 1 does not include SunPass discount rates. A page from FTE's 2007 Comprehensive Annual Financial Report detailing cash toll rates and SunPass toll rates has been recreated in Appendix.

Table 1. Current Florida Turnpike Enterprise Toll Rates.

Facility	Length (miles)	Passenger vehicle		Commercial vehicle		Year toll took effect
		Toll	Rate per mile	Toll	Rate per mile	
Mainline	265	\$18.20	\$0.069	\$52.25	\$0.197	2004
Suncoast Parkway ^a	42	\$3.00	\$0.071	\$12.00	\$0.286	2001
Homestead Extension	47	\$4.00	\$0.085	\$16.00	\$0.340	2004
Sawgrass Expressway	23	\$2.00	\$0.087	\$8.00	\$0.348	2004
Daniel Webster Western Beltway ^a	11	\$1.00	\$0.091	\$4.00	\$0.364	2006
Seminole Expressway ^{a,b}	18	\$2.00	\$0.111	\$8.00	\$0.444	1993
Veterans Expressway ^a	15	\$1.75	\$0.117	\$7.00	\$0.467	1994
Polk Parkway ^a	25	\$3.00	\$0.120	\$12.00	\$0.480	1998
Southern Connector Extension ^b	6	\$0.75	\$0.125	\$3.00	\$0.500	1996
Beachline Expressway West ^b	8	\$1.50	\$0.188	\$6.00	\$0.750	2004

^a These tollways still use their original toll rates.

^b Only portions of these tollways are owned by the Florida Turnpike Enterprise.

(Source: Florida Turnpike Enterprise website: Toll Calculator)

The Florida Turnpike Enterprise historically has chosen to raise its toll rates to adjust for inflation and growth. Table 2 shows toll rates on the Mainline tollway over the past 20 years. As of 2007 Florida Department of Transportation tollways are required to adjust toll rates no frequently more than once a year for SunPass rates and no less frequently than once every 5 years for cash rates. Toll rates are to be adjusted using CPI or a similar inflation indicator (Turnpike Annual Report 2007).

Table 2. Historical Mainline Toll Rates.^a

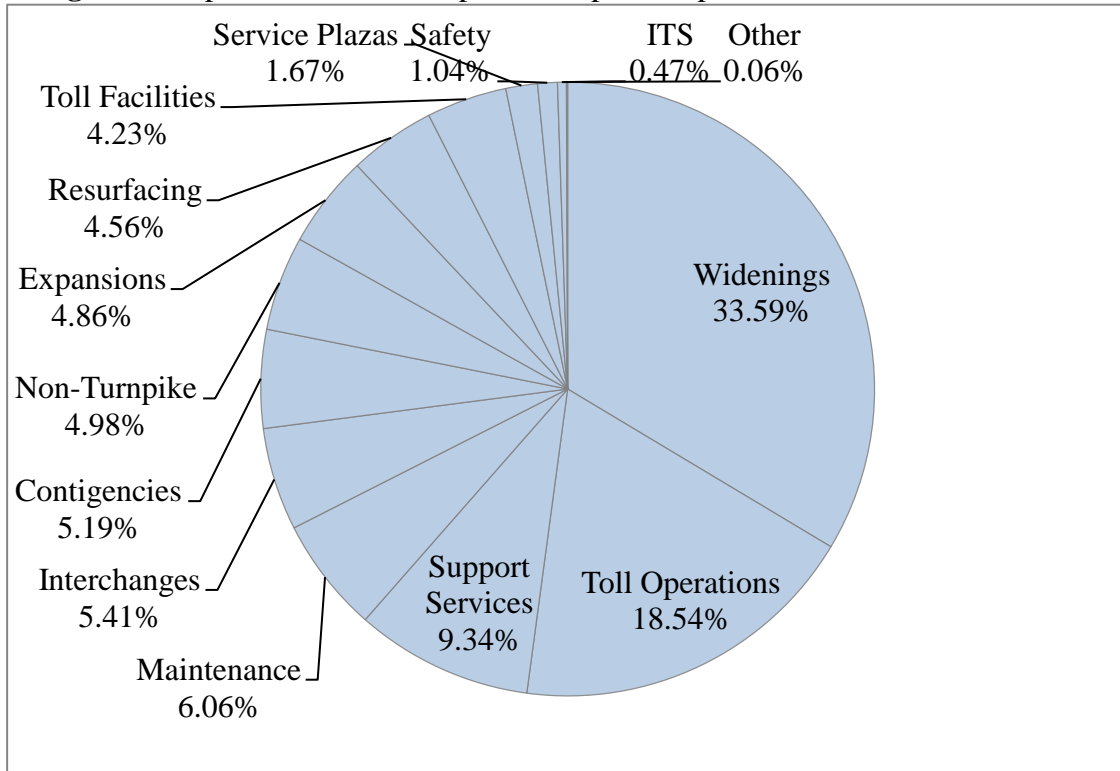
Years toll was enforced	Rate per mile: Passenger vehicle
1989 – 1990	\$0.030
1991 – 1992	\$0.039
1993 – 2003	\$0.060
2004 – Present	\$0.069

^a Data obtained with the assistance of Florida Turnpike Enterprise's Public Information Offices.

New goals of the Florida Turnpike Enterprise

With the completion of the Daniel Webster Western Beltway, all currently approved Florida Turnpike Enterprise tollways have been built. A new focus was adopted within the Florida Turnpike Enterprise on increasing mobility, increasing capacity, and improving safety. Projects were designed with these goals in mind. To achieve these goals, the FTE prepared a financial plan. Figure 1 shows the expected expenditures by the Enterprise from 2009 to 2013 using the financial plan.³ As shown in the figure, widening (34 percent), toll operations (19 percent), and support services (9 percent) have large portions of the expected expenditures.

Figure 1. Expected Florida Turnpike Enterprise Expenditures for 2009-2013.



(Source: Florida Turnpike Enterprise 2007 Turnpike Annual Report)

To increase mobility, the Florida Turnpike Enterprise is constructing SunPass-only interchanges and open road tolling (ORT) plazas along its tollways. Three Mainline SunPass-only interchanges were completed in 2007: the Kissimmee Park Road interchange in Osceola County, the Becker Road interchange in St. Lucie County, and the Jog Road interchange in Palm Beach County. ORT plazas will replace traditional toll plazas (Turnpike Annual Report 2007). Vehicles using the SunPass system will be able to simply drive under a bridge-like structure while maintaining highway speeds while vehicles using other methods of payment will divert to standard tolling booths on the side of the tollway.

³ The chart was created using data from the FTE 2007 Annual Report and should be considered tentative.

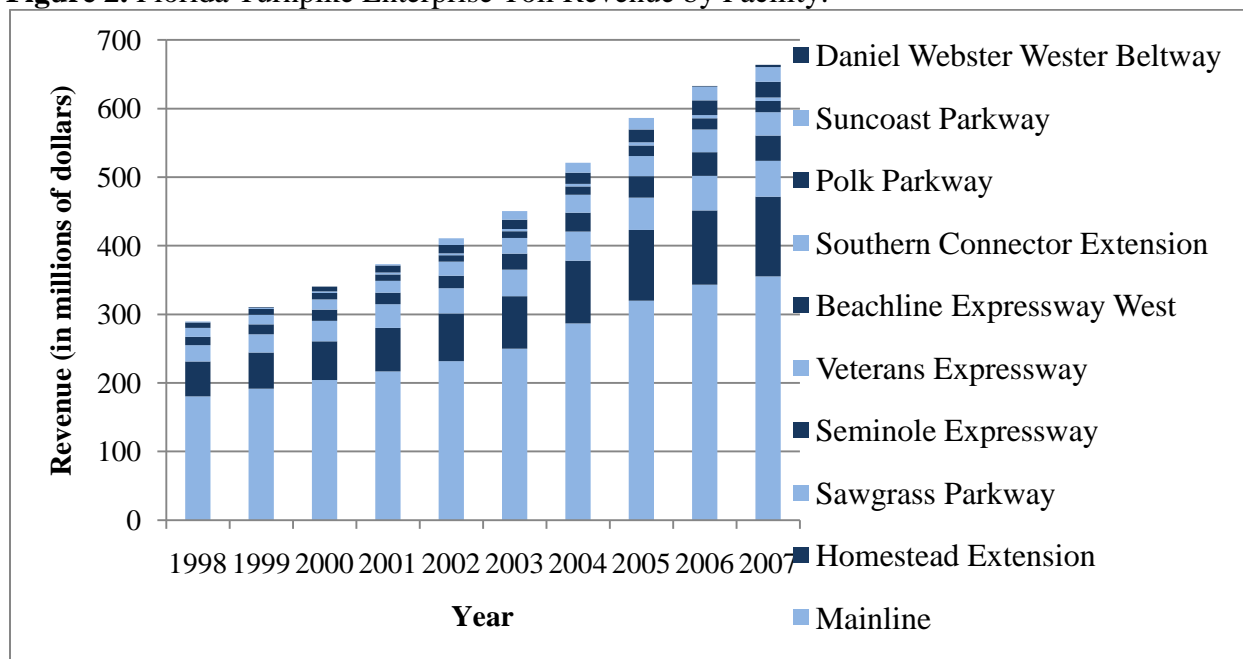
The Enterprise's approach to increasing capacity focuses on widening the existing tollways. Adding lanes in areas of high traffic should alleviate congestion and decrease average travel times. As of 2007, 7 widening projects were under construction with another 11 being discussed. One such widening project involves adding lanes to 16 miles of the Mainline Turnpike to make it an 8 lane road over that distance. This is occurring from the Beachline Expressway interchange to the Beulah Road interchange, mile markers 254 and 270 respectively. Future widening projects include a 9 mile section of the Homestead Extension from the Don Shula Expressway interchange to the Dolphin Expressway interchange and a 16 mile section of the Seminole Expressway (Turnpike Annual Report 2007). Figure 1 clearly indicates importance of these widening projects because one third of the money is allotted to these projects.

The safety of drivers on Enterprise tollways determines several projects. In 2004 the Mainline Turnpike alone experienced 3,860 major accidents and 95 fatalities. Certain key areas are being addressed to mitigate these numbers. One area of interest is 160 miles of Mainline Turnpike that have a narrow median of 40 feet or less. Accidents where a vehicle travels across the median into incoming traffic contribute largely to fatal accidents. Barrier walls or guardrails were constructed along those areas with narrow medians. Cable barriers are also being put up on approximately 280 miles where a body of water exceeding three feet in depth lies within 75 feet of the road. Another aspect of the recent focus on safety has been decreasing the time necessary to clear an accident. The Enterprise is working closely with the Florida Highway Patrol on ways to expedite this process (Warren 2006).

Increasing revenue

The Florida Turnpike has shown a steady annual increase in total revenue since the initial opening of the Mainline tollway in 1957. In its first year of operation, the Mainline produced approximately \$3 million in revenue. Fifty years later in 2007, the Florida Turnpike Enterprise produced \$664 million in revenue. FTE revenue accounts for over 80 percent of the revenue earned on all Florida Department of Transportation tollways. As shown in Figure 2, total revenue has increased at a faster rate since 2002 (Turnpike Annual Report 2007). The toll rate increase on four tollways in 2004 makes it difficult to determine how much of the increases in revenue are attributable to the FTE. The openings of several toll roads in the years just before the creation of the FTE also contribute to this problem. Figure 2 shows the breakdown of toll revenue by facility over the past decade. The order from bottom to top in the legend is maintained throughout the figure.

Figure 2. Florida Turnpike Enterprise Toll Revenue by Facility.



(Source: Florida Turnpike Enterprise 2007 Comprehensive Annual Financial Report)

Increases in revenue are most likely the result of several factors. First, increasing vehicles-miles traveled on Enterprise tollways certainly contributed. In the past 10 years the number of vehicle-miles traveled on Enterprise tollways has approximately doubled from 4.1 billion in 1998 to 8.3 billion in 2007 (Turnpike Annual Report 2007). This is the result of a growing population in Florida as well the opening of several new tollways. Two tollways opened in 1994 and three more tollways were opened between 1998 and 2007. The FTE's 2007 Comprehensive Financial Report shows these new tollways experienced rather drastic growth. Revenue has more than doubled in this time span from just below \$300 million to \$664 million. Second, increases in toll rates on four tollways in 2004 contributed to the revenue increases. Of these four facilities, Mainline, Homestead Extension, Sawgrass Expressway, and Beachline Expressway West, the first three listed make up the top three tollways in terms of revenue under the Enterprise (Comprehensive Annual Financial Report 2007).

Why is it successful?

The Florida Turnpike Enterprise built upon an already productive system. Florida as a state has experienced heavy tourism and rapid population growth. Since its creation in 2002, the Florida Turnpike Enterprise has shown greater increases in revenue than the years before it took over. Surveys conducted to gauge customer satisfaction help to show why the Enterprise has been successful. When the Enterprise was created, surveys were designed to monitor the progress in meeting goals set by the organization. The Enterprise sends hundreds of thousands of copies of the survey to customers using the SunPass toll system each year. A satisfaction goal of 80 percent in all categories was set. According to the 2007 survey data, every category shows an improvement in the percent of people surveyed showing satisfaction. The most compelling result to show that the Enterprise is a success would be the responses on whether the customers

were satisfied with the value received for paying the toll. In 2002, 81 percent agreed or strongly agreed that they were satisfied. By 2006, this number had reached 92 percent with a growing number of strongly agrees. This increase in satisfaction even continued when toll rates were raised on four tollways in 2004. Surprisingly, the 96 percent of customers surveyed would recommend using the Florida turnpike to family and friends (Customer Satisfaction Survey 2007).

When the Florida Turnpike Enterprise was created, customer satisfaction was put in high importance. The surveys have served as one useful source of customer feedback. Another source has been the award-winning call centers. Florida Turnpike Enterprise's call centers have twice received J.D. Power and Associates' award for call center customer service and were the first toll agency to do so. There is still room for improvement here as only 75 percent agreed or strongly agreed that the call center representatives were friendly and responsive. When the original survey was issued in 2002 the two areas that returned the worst numbers were "acceptability of delays caused by construction" (55 percent) and "satisfaction with the amount of time taken to clear an accident" (46 percent). These concerns were applied to operations and as a result, acceptability of construction delays has risen 17 percent to 72 percent, and satisfaction with time taken to clear accidents has risen 10 percent to 56 percent (Customer Satisfaction Survey 2007). The Enterprise is still striving to reduce the amount of time taken to clear an accident and one method of expedition being tested is the use of photogrammetric technology to document accidents (Warren, 2006).

The Florida Turnpike Enterprise has worked to increase efficiency wherever possible. The Turnpike Enterprise Asset Management System (TEAMS) is one example. The TEAMS uses Leica ADE© software, to provide Wi-Fi access to data on every sign, barrier, and even mile marker on the Florida Turnpike. If a storm damages something on the Turnpike, it can be quickly located and fixed (Sims 2007). These innovative programs, along with its customer focus, play a large part in the success of the Florida Turnpike Enterprise. When a problem or deficiency has been identified, projects are designed, goals are set, and work gets done with efficiency. This is all part of the business approach of the Enterprise that has been successful enough that the FDOT has entrusted the Florida Turnpike Enterprise with operating all of the FDOT-owned toll facilities.

Chapter 3. Proposed Toll Roads and Bridges

Mon-Fayette Expressway

The Mon-Fayette Expressway stretches 65 miles from PA Route 51 at Pittsburgh to I-68 near Morgantown, West Virginia. West Virginia began construction in 1999 and is not expected to begin construction on the interchange with I-68 until 2012 (Pennsylvania Turnpike 2008). Pennsylvania opened the portion of the expressway from the Pennsylvania border to Fairchance in March 2000. Over the next year 651,771 trips were made on the road for an average of 1,786 trips per day. The same portion also produced \$561,871 in toll revenues in the first year of operation (Schroyer 2001). The completion of the northern end of Mon-Fayette Expressway has become uncertain due to rising costs. Alternative methods of funding, such as public-private partnerships, are being investigated to finish the northern section (Grata 2008). The expressway

is intended to serve as a modern road to Pittsburgh while providing economic opportunities for the old towns along its path, as well as a safer alternative route for traffic.

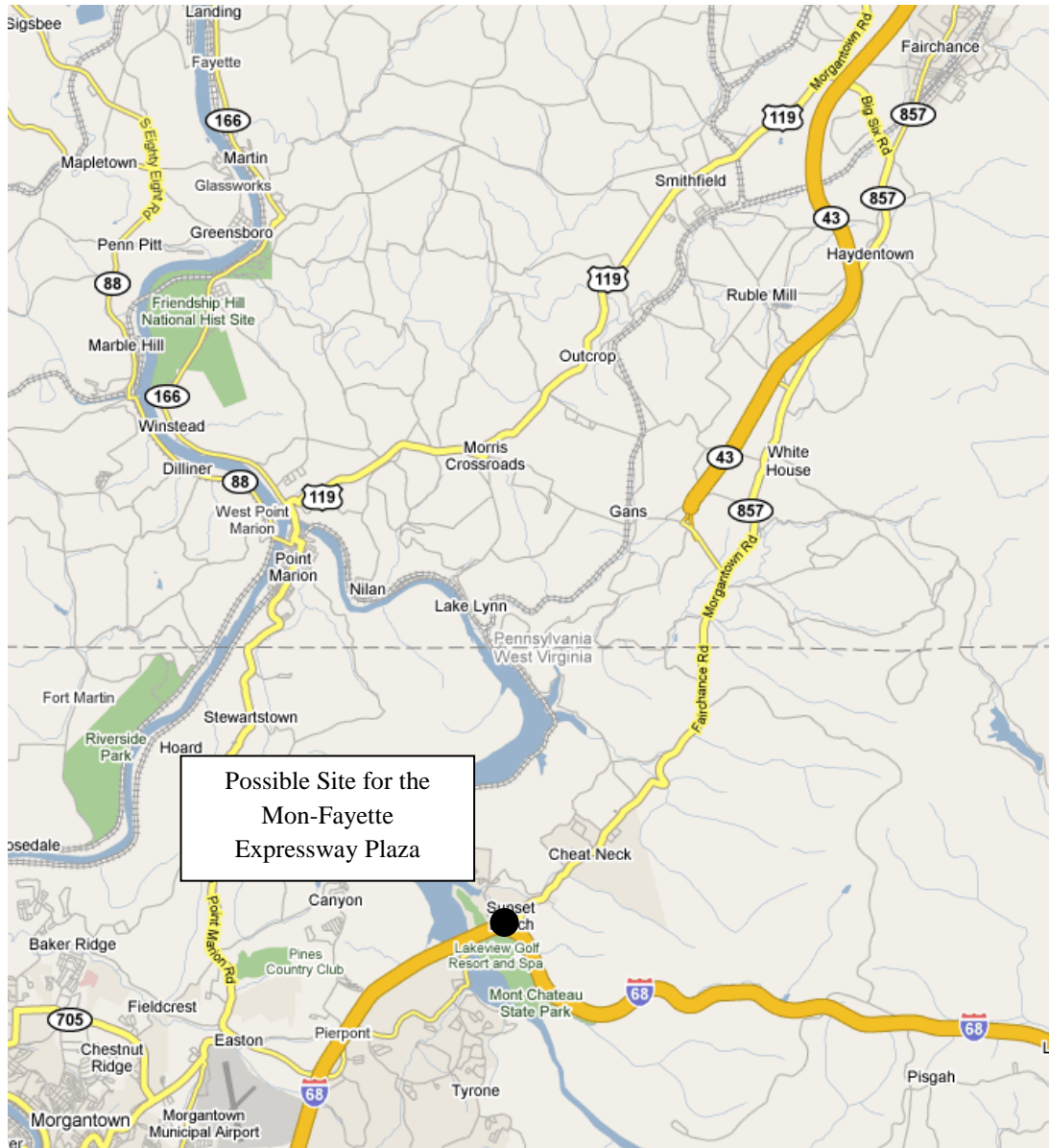


Figure 3. The Mon-Fayette Expressway in Monongalia County (Source: Google Maps).

US 35 in Putnam and Mason Counties

The US 35 corridor is to be a multi-lane, partial access-control facility. US 35 refers to the road being built from Henderson in Mason County to I-64 in Putnam County. The corridor will replace a two-lane road that connected Henderson to US 60 in St. Albans, in Kanawha County, and which carries heavy commercial traffic. In 2006, 147 accidents, including one fatality occurred on the 2 lane US 35. The new US 35 is being built to provide a safer route. Eighteen of these miles will be in Mason County and sixteen in Putnam County. The road has

been up to this point funded primarily by federal appropriations. Currently, 13 miles of the project remain unfunded.



Figure 4. US 35 in Putnam and Mason Counties (Source: Google Maps).

Wellsburg Bridge

Local officials desire that a new bridge be constructed in the area of Wellsburg, West Virginia. One bridge remains open in the area since the closing of the Fort Steuben Bridge on January 15, 2009. Officials decided the deck plates on that the bridge had become deteriorated to a point where it was no longer safe for traffic to cross the bridge. The bridge is slated for demolition later this spring (Gosset 2009). Efforts to repair the remaining Market Street Bridge, have become a high priority in wake of Fort Steuben Bridge's closing. This bridge is currently being studied to see what repairs are necessary to keep it in operation for 10 more years or at least until a new bridge can be built (King 2009). U.S. Senators Byrd and Rockefeller have allocated \$18 million to this project for the purposes of studying, planning, and beginning initial construction. The location of the bridge has yet to be determined though, a study recommending

seven locations was recently completed. Currently the estimated cost for the new bridge is \$100 million (Scott 2008).



Figure 5. The Wellsburg Bridge in Brooke County (Source: Google Maps).

Dick Henderson Bridge

The 74-year old Dick Henderson Memorial Bridge carries WV 25 spur over the Kanawha River between Nitro and St. Albans. The bridge consists of two lanes and spans 1,365 feet. In the wake of the collapse of the I-35W bridge in Minneapolis in August 2007, concern was raised of the condition of this bridge. Eroding concrete and bent guardrails had officials concerned. However, the resulting inspection found the bridge to be in “fair” condition and determined it could safely carry current traffic. The Kanawha Valley Regional Transportation Authority still chose to cease running its buses over the bridge, because when carrying passengers, the buses exceed the posted weight limit of 14 tons for the bridge. Current plans include replacing the bridge in 2014. The estimated cost to replace the bridge is \$75 million (Thompson 2007).



Figure 6. The Dick Henderson Bridge in Kanawha County (Source: Google Maps).

Chapter 4. Current toll structure in West Virginia

The West Virginia Turnpike: a brief history

In 1947, West Virginia began studying the feasibility of creating a four-lane highway connecting northern West Virginia at Wheeling with southern West Virginia at Princeton. The goal was to increase efficiency and open up West Virginia for industry. State roads were very curvy, had high accident rates, and did not connect population centers well. By the time construction began in 1952, the highway design had been reduced a two-lane road from Charleston to Princeton because the cost of the project was so high. The completed project cost \$133 million and included 88 miles of roadway, including a \$5 million state-of-the-art tunnel later named Memorial Tunnel (Monday n.d.). Building the highway required cutting through the mountains, using 16,000,000 pounds of dynamite and removing 33,000,000 cubic yards of earth. The southern 36-mile portion, from Beckley to Princeton, opened to traffic in September 1954. The northern 52-mile portion from Charleston to Beckley opened in November 1954. The time

it took to travel from Charleston to Princeton was reduced by nearly two hours (West Virginia Turnpike History n.d.).

In 1958, the West Virginia Turnpike was incorporated into the Interstate and Defense Highway System, as were the Ohio Turnpike and Pennsylvania Turnpike. At this time, this turnpike was a success in providing accessibility for people and industry. As the interstate system grew though, the West Virginia Turnpike found itself with more traffic than it could safely accommodate. Accident and fatality rates begin to rise, which lead to public outcry to upgrade the turnpike. In 1966, the Federal Highway Act set interstate standards at four lanes of traffic. The Federal Highway Act of 1968 allowed West Virginia to use interstate funds to upgrade the Turnpike. Funding was on a 90 percent Federal/10 percent State basis. The West Virginia Division of Highways (WVDOH) paid the 10 percent for the state. The Authority finished repaying the ten percent to the WVDOH in 1994 (WVPEDTA Comprehensive Annual Financial Report 2008). It was determined that the Memorial Tunnel needed to be bypassed to finish the widening of the Turnpike. This nearly two-mile bypass cost \$35 million and caused the Memorial Tunnel to be closed in 1988 (Monday n.d.). The Memorial Tunnel has been used for several purposes since that. First it served as a fire ventilation test site and then as storage for the Parkway Authority. Recently it has been used as a Center for National Response where various organizations simulate disasters (West Virginia Memorial Tunnel Project 2005).

The West Virginia Turnpike runs 88 miles from Charleston to Princeton. Figure 7 shows the roads in the area. The Turnpike carries I-77 for the entire length of the turnpike and I-64 from Charleston to Beckley. The Turnpike provides an important North-South Corridor through which Virginia and North Carolina are connected to Ohio and Pennsylvania. There exist only a few alternative routes, such as U.S. 19, but none of the alternatives offer the speed or convenience of the Turnpike.

In 1989 the West Virginia Parkways, Economic Development and Tourism Authority took over the turnpike. 1989 also saw the removal of all ramp toll plazas except one located at North Beckley on the Route 19 interchange (West Virginia Turnpike History n.d.). Revenues have increased annually since the Authority took over, but the annual increase in revenue was as low as 0.8 percent from 2000 to 2007. Maintenance costs continued to increase at a faster rate and as a result, over half of the Turnpike is rated in fair or poor condition. The Authority's goal is for this statistic to be lower than 25 percent (Porterfield 2008). In December of 2005 the Parkways Authority voted to raise the toll rates which had not changed since 1981. The 60 percent increase in toll rates took effect January 1, 2006. On February 13, 2006, a judge ruled on behalf of a trucker's association and restored the previous toll rates. Additionally, one formerly required project, the Shady Springs interchange, is no longer required to be built (Samuel 2007). In 2007, Public Resources Advisory Group (PRAG) was asked by the Governor to review the Authority and prepare a financial report. The PRAG report found that under current toll rates, approximately \$300 million of maintenance will be deferred by the year 2016. Citing this and other findings, PRAG recommended raising toll rates (PRAG 2007). Currently the 1981 toll rate schedule is still in use.

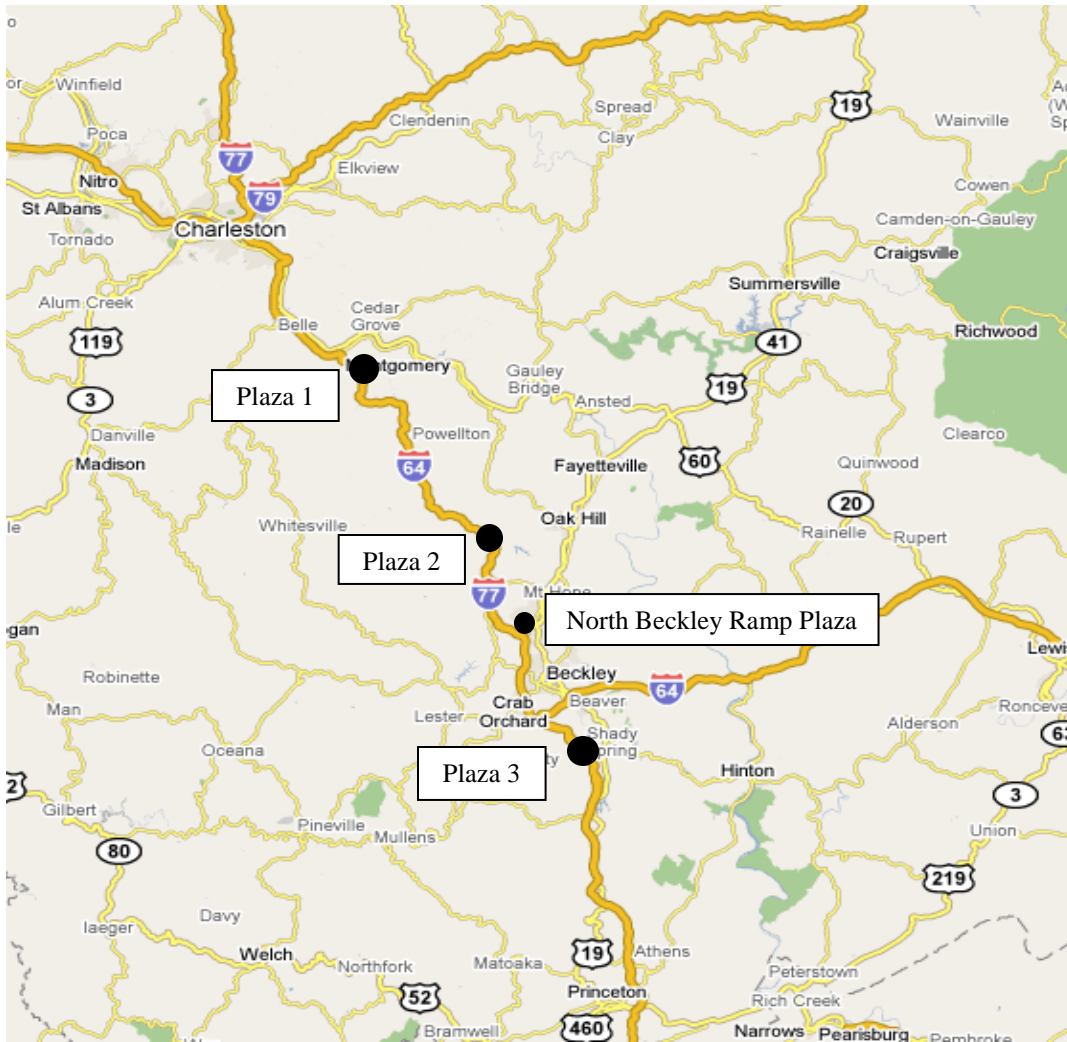


Figure 7. The West Virginia Turnpike (Source: Google Maps).

Current toll schedule

The West Virginia Parkways Authority collects tolls at three main plazas along the turnpike as well as at ramp plazas at the North Beckley exit. The toll schedule in Table 3 was created in 2000 and reclassified vehicles into nine classes from the previous four classes. This re-classification did not constitute a toll rate change, as it designed to maintain the same level of toll revenue as under the previous classifications. The use of electronic toll collection through E-ZPass has increased the speed at which vehicles can pay tolls. The toll is paid through an electronic transponder that allows vehicles to drive through the plaza without stopping and still pay tolls. A number of lanes at each plaza are designated "E-ZPass" only for non-peak hours.

Table 3. Current Toll Rates for the West Virginia Turnpike (effective since January, 2000).

Toll Class	Axles	Height	Vehicle Type	Mainline Tolls per Plaza (Rate Per Mile)	North Beckley Plaza Toll Rates
1	2	Under 7'6"	Passenger car	\$1.25 (\$0.043)	\$0.25
2	3+	Under 7'6"	Passenger car w/trailer	\$1.50 (\$0.051)	\$0.50
3	2/3	Over 7'6"	Motor home	\$1.50 (\$0.051)	\$0.50
4	3+	Over 7'6"	Motor home w/trailer	\$2.00 (\$0.068)	\$0.75
5	2	Over 7'6"	2-axle vehicle	\$2.00 (\$0.068)	\$0.50
6	3	Over 7'6"	3-axle vehicle	\$2.75 (\$0.094)	\$0.75
7	4	Over 7'6"	4-axle vehicle	\$4.00 (\$0.136)	\$1.00
8	5	Over 7'6"	5-axle vehicle	\$4.25 (\$0.145)	\$1.00
9	6+	Over 7'6"	6-axle vehicle	\$6.00 (\$0.205)	\$1.50

(Source: West Virginia Parkways, Economic Development and Tourism Authority, accessed at www.wvturnpike.com/tollrates.html)

Historic traffic and toll revenues

The West Virginia Turnpike last changed its toll rate in 1981. Initially, the West Virginia Turnpike showed steadily increasing revenue and transaction. Table 4 shows the data on revenue and transactions for passenger and commercial vehicles from 1981 to 2008. Passenger and commercial vehicles split the revenue very closely, with commercial vehicles making up 54 percent of revenue in 2008. Commercial vehicles made up 23 percent of total transactions in 2008. Revenue for passenger vehicles has nearly tripled since 1981 while the number of passenger vehicle transactions for 2008 was nearly six times what it was in 1981. Revenue for commercial vehicles in 2008 was three and a half times the amount in 1981. The number of commercial vehicle transactions for 2008 was over six times the 1981 amount. The vehicle reclassification that occurred in 2000 played a large role in the increases in transaction for commercial vehicles since the number nearly doubled that year.

Table 4. Transaction and Revenue History of West Virginia Turnpike (in Thousands).

Year	Transactions: Passenger Vehicles	Transactions: Commercial Vehicles	Transactions: Total	Revenue : Passenger Vehicles	Revenue: Commercial Vehicles	Revenue: Total
1981	4,527	1,281	5,808	\$8,278	\$8,355	\$16,633
1982	5,397	989	6,386	\$10,131	\$8,360	\$18,491
1983	6,066	1,162	7,228	\$10,160	\$9,752	\$19,912
1984	7,413	1,270	8,683	\$11,355	\$11,253	\$22,608
1985	6,811	1,279	9,910 ^a	\$11,652	\$12,112	\$24,830
1986	6,866	1,398	11,750 ^a	\$13,494	\$13,467	\$28,070
1987	7,391	1,589	13,025 ^a	\$14,801	\$15,522	\$31,227
1988	8,917	1,792	15,350 ^a	\$17,773	\$17,046	\$36,270
1989	9,913	2,009	16,015 ^a	\$19,201	\$18,707	\$39,131
1990	14,208	2,038	18,147 ^a	\$19,036	\$19,059	\$38,656
1991	19,260	2,127	21,387	\$19,193	\$18,850	\$38,043
1992	20,571	2,313	22,684	\$20,037	\$19,583	\$39,620
1993	21,084	2,464	23,548	\$20,486	\$20,614	\$41,100
1994	21,907	2,722	24,629	\$20,824	\$22,315	\$43,139
1995	23,244	3,074	26,318	\$21,668	\$24,361	\$46,029
1996	23,724	3,219	26,943	\$22,014	\$25,114	\$47,128
1997	25,587	3,659	29,246	\$22,791	\$26,704	\$49,495
1998	26,543	4,057	30,600	\$23,624	\$29,312	\$52,936
1999	26,792	4,200	30,992	\$23,629	\$29,852	\$53,481
2000	25,883	7,697 ^b	33,580	\$26,473	\$28,683	\$55,156
2001	25,182	7,769	32,951	\$24,984	\$28,647	\$53,631
2002	26,864	7,625	34,489	\$26,670	\$28,269	\$54,939
2003	26,809	7,607	34,416	\$26,616	\$28,141	\$54,757
2004	27,544	7,866	35,410	\$27,388	\$29,466	\$56,854
2005	27,078	8,308	35,386	\$27,165	\$31,044	\$58,209
2006	26,745	8,437	35,182	\$27,856	\$34,002	\$61,858
2007	26,908	8,265	35,225	\$26,908	\$31,257	\$58,165
2008	26,413	8,018	34,431	\$25,463	\$30,182	\$55,645

^a During these years automatic lanes were open and account for the difference between passenger, commercial and total vehicle transactions.

^b Vehicle classifications changed in 2000 in a manner that was meant to show no change in revenue. That is why there a sharp leap in commercial vehicles occurs but no leap in revenue. (Source: West Virginia Parkways, Economic Development and Tourism Authority).

Chapter 5. Alternative Toll Rate Plans

Toll rates on the West Virginia are \$0.043 per mile for two-axle passenger vehicles and \$0.145 per mile for five-axle commercial vehicles. Table 5 shows the lengths, rates, rates per mile, last year toll was changed, and determinants for toll rate changes for comparable toll facilities in the United States. It treats passenger vehicles defined as any two-axle vehicle. Table 6 displays data for the same categories but for commercial vehicles defined as five-axle vehicles.

The tables indicate that West Virginia has waited 14 years longer than any of the other facilities shown to raise its toll rates. West Virginia is also 23 years behind the average of 2004 for tolls last changed. The West Virginia Turnpike has comparatively low rates for both passenger and commercial vehicles. If the West Virginia Turnpike were to double its current rates, the new rates for both passenger and commercial vehicles would approximately equal the average rates. Commercial toll rates are especially low with only six facilities having a lower rate per mile.

The PRAG report indicates that revenue has grown at a rate of 2.1 percent from 2001 to 2005. Operations and maintenance costs have risen at a rate of 2.6 percent from 1996 to 2006. The PRAG report also gives the operating and maintenance costs at \$27.8 million for 2005 which equates to a cost of \$67,022 per mile of roadway for the West Virginia Turnpike. This cost does not include deferred maintenance. As of 2007, 64 percent of the roadway was considered to be in fair or poor condition which is substantially above the Authority's target of 25 percent. Also, 10 percent of the roadway rated unacceptable on the International Roughness Index (IRI). Deferred maintenance is becoming a problem for the West Virginia Turnpike. By 2011, 34 percent of the roadway will be in poor condition if additional revenue is not found to fund necessary projects (PRAG 2007).

In recent years, many toll facilities have begun to choose adjustment factors to plan when and how much tolls should be adjusted. When a tolling authority decides to set these factors, such action is often an attempt to compensate for inflation. Common adjustment factors include Consumer Price Index (CPI), Gross Domestic Product (GDP), and a rate varying between 2 percent and 5 percent annually.

Table 5. Toll Road Facilities Compared by Rate Per Mile for Two-Axle Vehicles.

Facility	Source	Length (miles)	Toll	Rate per mile	Year of Last Toll Change	Determinants of Toll Rate Adjustment
Garden State Parkway-- New Jersey (SB) ^b	http://www.state.nj.us/turnpike/gsp-vcenter-points.htm http://ws.gmnews.com/news/2008/1015/front_page/002.html	173	\$5.00	\$0.029	2008	Need based ^c
Alligator Alley-- Florida ^a	http://www.naplesnews.com/news/2006/Feb/04/alligator_alley_toll_increase_weekend/ http://www.naplesnews.com/news/2008/oct/08/prop-osal-would-increase-alligator-alley-toll-rates/	78	\$2.50 (\$3.75)	\$0.032 (\$0.048)	2006	Greater of CPI or 3percent Annually
Garden State Parkway-- New Jersey (NB) ^b	http://www.state.nj.us/turnpike/gsp-vcenter-points.htm http://ws.gmnews.com/news/2008/1015/front_page/002.html	173	\$6.00	\$0.035	2008	Need based ^c
Delaware SR-1	http://www.aaroads.com/blog/?p=107 http://www.paturndpike.com/straighttalk/docs/tolling-chart.aspx	56	\$2.00	\$0.036	2007	*
Maine Turnpike	http://www.maineturnpike.com/traveler_services/cash_tolls.php http://www.paturndpike.com/straighttalk/docs/tolling-chart.aspx	106	\$4.00	\$0.038	2005	*
Masspike (EB)-- Massachusetts	http://www.masspike.com/user-cgi/tollcalc.cgi http://www.paturndpike.com/straighttalk/docs/tolling-chart.aspx	135.1	\$5.10	\$0.038	2008	*
Kansas Turnpike	http://ksturnpike.com/tolls.shtml http://www.paturndpike.com/straighttalk/docs/tolling-chart.aspx	236	\$9.25	\$0.039	2007	Annual increases to be less than 5percent
Will Rogers Turnpike-- Oklahoma	http://www.pikepass.com/ http://www.paturndpike.com/straighttalk/docs/tolling-chart.aspx	88.5	\$3.50	\$0.040	2001	*
New York State Thruway (New York City Line to Pennsylvania State Line NB/WB)	http://www.paturndpike.com/straighttalk/docs/tolling-chart.aspx http://www.nysthruway.gov/index.shtml	496.7	\$20.50	\$0.041	2008	*
Turner Turnpike-- Oklahoma	http://www.pikepass.com/ http://www.paturndpike.com/straighttalk/docs/tolling-chart.aspx	86	\$3.50	\$0.041	2001	*
Cimarron Turnpike-- Oklahoma	http://www.pikepass.com/ http://www.paturndpike.com/straighttalk/docs/tolling-chart.aspx	59.2	\$2.50	\$0.042	2001	*
Ohio Turnpike	http://www.ohioturnpike.org/ http://www.paturndpike.com/straighttalk/docs/tolling-chart.aspx	236.4	\$10.25	\$0.043	2007	*
West Virginia Turnpike	http://www.wvturnpike.com/ http://www.paturndpike.com/straighttalk/docs/tolling-chart.aspx	88	\$3.75	\$0.043	1981	*

Table 5. Toll Road Facilities Compared by Rate Per Mile for Two-Axle Vehicles (Cont.).

Central Turnpike-- New Hampshire	http://www.nh.gov/dot/bureaus/turnpikes/ http://www.paturndot.com/straighttalk/docs/tolling chart.aspx	44.7	\$2.00	\$0.045	2007	*
Indian Nation Turnpike-- Oklahoma	http://www.pikepass.com/ http://www.paturndot.com/straighttalk/docs/tolling chart.aspx	105.2	\$4.75	\$0.045	2001	*
Spaulding Turnpike-- New Hampshire	http://www.nh.gov/dot/bureaus/turnpikes/ http://www.paturndot.com/straighttalk/docs/tolling chart.aspx	33.2	\$1.50	\$0.045	2007	*
HE Bailey Turnpike-- Oklahoma	http://www.pikepass.com/ http://www.paturndot.com/straighttalk/docs/tolling chart.aspx	86.4	\$4.00	\$0.046	1995	*
Muskogee Turnpike-- Oklahoma	http://www.pikepass.com/ http://www.paturndot.com/straighttalk/docs/tolling chart.aspx	53.1	\$2.50	\$0.047	2001	*
New York State Thruway (Pennsylvania State Line to New York City Line)	http://www.paturndot.com/straighttalk/docs/tolling chart.aspx http://www.nysthruway.gov/index.shtml	496.7	\$25.00	\$0.050	2008	*
Indiana Toll Road	https://www.getizoom.com/tollRates.do http://www.macquarie.com.au/au/mig/asset_portfolio/us/indiana.htm	157	\$8.00	\$0.051	2008	Greater of CPI, GDP, or 2percent annually
Dulles Toll Road-- Virginia	http://www.virginiadot.org/travel/faq-toll.asp http://www.paturndot.com/straighttalk/docs/tolling chart.aspx	14	\$0.75	\$0.054	2006	Need based
Ronald Reagan Tollway-- Illinois	http://www.getipass.com/tollcalc/TollCalcMain.jsp http://www.paturndot.com/straighttalk/docs/tolling chart.aspx	98	\$5.40	\$0.055	2005	*
Atlantic City Expressway--New Jersey	http://www.sjta.com/acexpressway/toll_info.asp http://www.paturndot.com/straighttalk/docs/tolling chart.aspx	44	\$2.50	\$0.057	1998	*
Masspike (WB)-- Massachusetts	http://www.masspike.com/user-cgi/tollcalc.cgi http://www.paturndot.com/straighttalk/docs/tolling chart.aspx	135.1	\$8.60	\$0.064	2008	*
Pennsylvania Turnpike - (I-76 / I-70 / I- 276)-East-West Mainline	http://www.paturndot.com/toll/tollmileage.aspx http://www.paturndot.com/straighttalk/docs/tolling chart.aspx	357.6	\$22.75	\$0.064	2004	*
Cherokee Turnpike-- Oklahoma	http://www.pikepass.com/ http://www.paturndot.com/straighttalk/docs/tolling chart.aspx	32.9	\$2.25	\$0.068	2001	*
Florida Turnpike (Mainline & HEFT)	http://www.floridasturnpike.com/TRI/index.htm http://www.paturndot.com/straighttalk/docs/tolling chart.aspx	312	\$21.20	\$0.068	2004	*
Creek Turnpike-- Oklahoma	http://www.pikepass.com/ http://www.paturndot.com/straighttalk/docs/tolling chart.aspx	33.2	\$2.45	\$0.074	2002	*
New Jersey Turnpike ^b	http://ws.gmnews.com/news/2008/1015/front_page/ 002.html http://www.tollroadsnews.com/node/3768	122.4	\$9.00	\$0.074	2008	Need based ^c

Table 5. Toll Road Facilities Compared by Rate Per Mile for Two-Axle Vehicles (Cont.).

Kilpatrick Turnpike--Oklahoma	http://www.pikepass.com/ http://www.paturnpike.com/straighttalk/docs/tollingchart.aspx	24.5	\$2.00	\$0.082	2001	*
James Addams Tollway--Illinois	http://www.illinoistollway.com/portal/page?_dad=portal&_schema=PORTAL&_pageid=133,1495185 http://www.paturnpike.com/straighttalk/docs/tollingchart.aspx	76	\$6.60	\$0.087	2005	*
Tri-State Tollway--Illinois	http://www.illinoistollway.com/portal/page?_dad=portal&_schema=PORTAL&_pageid=133,1495185 http://www.paturnpike.com/straighttalk/docs/tollingchart.aspx	77	\$7.50	\$0.097	2005	*
Polk Parkway--Florida	http://www.floridasturnpike.com/TRI/index.htm http://www.paturnpike.com/straighttalk/docs/tollingchart.aspx	25	\$3.00	\$0.120	1998	*
Chesapeake Expressway--Virginia	http://www.chesapeakeexpressway.com/faq.shtml Dulles Toll Road Rate Increase in Support of the Dulles Corridor Metrorail Project: VDOT	16	\$2.00	\$0.130	2001	*
E-470—Colorado	http://www.tollroadsnews.com/node/678 (E-470 Public Highway Authority, Colorado: Fitch Ratings)	47	\$8.65	\$0.184	2005	Scheduled adjustments using CPI
Veterans Memorial Tollway --Illinois	http://www.illinoistollway.com/portal/page?_dad=portal&_schema=PORTAL&_pageid=133,1495185 http://www.paturnpike.com/straighttalk/docs/tollingchart.aspx	17.6	\$4.00	\$0.227	2005	*
Dulles Greenway--Virginia	http://dullesgreenway.com/road-information.html http://www.paturnpike.com/straighttalk/docs/tollingchart.aspx	14	\$3.50	\$0.250	2007	*
Pocahontas Parkway--Virginia	http://www.pocahontas895.com/home.html http://www.paturnpike.com/straighttalk/docs/tollingchart.aspx	8.8	\$2.50	\$0.284	2008	Lesser of 2.8percent , CPI, or GDP annually
Delaware Turnpike I-95	http://www.deldot.gov/public.ejs?command=PublicTollRateI95 http://www.paturnpike.com/straighttalk/docs/tollingchart.aspx	11.2	\$4.00	\$0.357	2007	*
Averages	N/A	113	N/A	\$0.08	2004	N/A

Calculated in American Dollars with no discounts

^a Florida is considering leasing Alligator Alley and as part of the deal tolls would increase in July 2009. New rates for commercial vehicles were not given.

^b New Jersey approved a 50 percent toll increase for the Garden State Parkway and New Jersey Turnpike that should become effective December 1st, 2008. Listed Values are based off this toll increase. This toll adjustment has not yet been enacted and is subject to change.

^c New Jersey's governor's plan called for annual adjustments based on inflation but this plan has since been revised and the annual adjustment portion was removed.

*Either no methods of determining when and how much to raise toll rates was cited by these facilities or the determinants could not be located at the time this table was created.

Table 6. Toll Road Facilities Compared by Rate Per Mile for Five-Axle Commercial Vehicles.

Facility	Source	Length (miles)	Toll	Rate per mile	Year of Last Toll Change	Determinants of Toll Rate Adjustment
Garden State Turnpike-- New Jersey ^b	http://www.state.nj.us/turnpike/gsp-vcenter-points.htm http://ws.gmnews.com/news/2008/1015/front_page/002.html	173	\$17.50	\$0.101	2008	Need based ^c
Dulles Toll Road-- Virginia	http://www.virginiadot.org/travel/faq-toll.asp http://www.paturnpike.com/straighttalk/docs/tollingchart.aspx (Resolution of the Commonwealth Transportation Board: Adjustment of Toll Rates on the Dulles Toll Road)	14	\$1.50	\$0.107	2006	Need based
Kansas Turnpike	http://ksturnpike.com/tolls.shtml http://www.paturnpike.com/straighttalk/docs/tollingchart.aspx	236	\$28.25	\$0.120	2007	Annual increases to be less than 5percent
Ohio Turnpike	http://www.ohioturnpike.org/ http://www.paturnpike.com/straighttalk/docs/tollingchart.aspx	236.4	\$28.25	\$0.120	2007	*
Alligator Alley-- Florida ^a	http://www.naplesnews.com/news/2006/Feb/04/alligator_alley_toll_increase_weekend/ http://www.naplesnews.com/news/2008/oct/08/proposal-would-increase-alligator-alley-toll-rates/	78	\$10.00	\$0.128	2006	Greater of CPI or 3percent Annually
HE Bailey Turnpike-- Oklahoma	http://www.pikepass.com/ http://www.paturnpike.com/straighttalk/docs/tollingchart.aspx	86.4	\$12.50	\$0.145	1995	*
West Virginia Turnpike	http://www.wvturnpike.com/ http://www.paturnpike.com/straighttalk/docs/tollingchart.aspx	88	\$12.75	\$0.145	1981	*
Muskogee Turnpike-- Oklahoma	http://www.pikepass.com/ http://www.paturnpike.com/straighttalk/docs/tollingchart.aspx	53.1	\$8.00	\$0.151	2001	*
Maine Turnpike	http://www.mainturnpike.com/traveler_services/cash_tolls.php http://www.paturnpike.com/straighttalk/docs/tollingchart.aspx	106	\$16.00	\$0.151	2008	*
Indian Nation Turnpike-- Oklahoma	http://www.pikepass.com/ http://www.paturnpike.com/straighttalk/docs/tollingchart.aspx	105.2	\$16.00	\$0.152	2001	*
Central Turnpike-- New Hampshire	http://www.nh.gov/dot/bureaus/turnpikes/ http://www.paturnpike.com/straighttalk/docs/tollingchart.aspx	44.7	\$7.00	\$0.157	2007	*
Will Rogers Turnpike-- Oklahoma	http://www.pikepass.com/ http://www.paturnpike.com/straighttalk/docs/tollingchart.aspx	88.5	\$14.25	\$0.161	2001	*
Turner Turnpike-- Oklahoma	http://www.pikepass.com/ http://www.paturnpike.com/straighttalk/docs/tollingchart.aspx	86	\$14.25	\$0.166	2001	*

Table 6. Toll Road Facilities Compared by Rate Per Mile for Five-Axle (Cont.).

Masspike (EB)- - Massachusetts	http://www.masspike.com/user-cgi/tollcalc.cgi http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx	135.1	\$22.50	\$0.167	2008	*
Cimarron Turnpike-- Oklahoma	http://www.pikepass.com/ http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx	59.2	\$10.00	\$0.169	2001	*
Indiana Toll Road	https://www.getizoom.com/tollRates.do http://www.macquarie.com.au/au/mig/asset_portfolio/us/indiana.htm	157	\$27.25	\$0.174	2008	Greater of CPI, GDP, or 2percent annually
Delaware SR-1	http://www.aaroads.com/blog/?p=107 http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx	56	\$10.00	\$0.179	2007	*
Spaulding Turnpike-- New Hampshire	http://www.nh.gov/dot/bureaus/turnpikes/ http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx	33.2	\$6.00	\$0.181	2007	*
Florida Turnpike (Mainline & HEFT)	http://www.floridasturnpike.com/TRI/index.htm http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx	312	\$64.25	\$0.206	2004	*
Atlantic City Expressway-- New Jersey	http://www.sjta.com/acexpressway/toll_info.asp http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx	44	\$10.00	\$0.227	1998	*
Cherokee Turnpike-- Oklahoma	http://www.pikepass.com/ http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx	32.9	\$7.50	\$0.228	2001	*
Masspike (WB)-- Massachusetts	http://www.masspike.com/user-cgi/tollcalc.cgi http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx	135.1	\$31.25	\$0.231	2008	*
New York State Thruway (New York City Line to Pennsylvania State Line NB/WB)	http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx http://www.nysthruway.gov/index.shtml	496.7	\$115.25	\$0.232	2008	*
Creek Turnpike-- Oklahoma	http://www.pikepass.com/ http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx	33.2	\$7.80	\$0.235	2002	*
Pennsylvania Turnpike - (I-76 / I-70 / I- 276)-East-West Mainline	http://www.paturndpike.com/toll/tollmileage.aspx http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx	357.6	\$90	\$0.252	2004	*
New York State Thruway (Pennsylvania State Line to New York City Line EB/SB)	http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx http://www.nysthruway.gov/index.shtml	496.7	\$132.75	\$0.267	2008	*
Ronald Reagan Tollway-- Illinois	http://www.getipass.com/tollcalc/TollCalcMain.jsp http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx	98	\$27.00	\$0.276	2005	*

Table 6. Toll Road Facilities Compared by Rate Per Mile for Five-Axle (Cont.).

Kilpatrick Turnpike--Oklahoma	http://www.pikepass.com/ http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx	24.5	\$6.80	\$0.278	2001	*
New Jersey Turnpike ^b	http://ws.gmnews.com/news/2008/1015/front_page/002.html http://www.tollroadsnews.com/node/3768	122.4	\$37.15	\$0.304	2008	Need Based ^c
Chesapeake Expressway--Virginia	http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx	16	\$5.00	\$0.313	2001	*
James Addams Tollway--Illinois	http://www.illinoistollway.com/portal/page?_dad=portal&_schema=PORTAL&_pageid=133,1495185 http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx	76	\$33.00	\$0.434	2005	*
Polk Parkway--Florida	http://www.floridasturnpike.com/TRI/index.htm http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx	25	\$12.00	\$0.480	1998	*
Tri-State Tollway--Illinois	http://www.illinoistollway.com/portal/page?_dad=portal&_schema=PORTAL&_pageid=133,1495185 http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx	77	\$37.50	\$0.487	2005	*
Pocahontas Parkway--Virginia	http://www.pocahontas895.com/home.html http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx	8.8	\$5.50	\$0.625	2008	Lesser of 2.8percent, CPI, or GDP Annually
Dulles Greenway--Virginia	http://dullesgreenway.com/road-information.html http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx	14	\$10.25	\$0.732	2007	*
E-470 (Colorado)	http://www.tollroadsnews.com/node/678 E-470 Public Highway Authority, Colorado: Fitch Ratings	47	\$35.00	\$0.745	2005	Scheduled adjustments using CPI
Delaware Turnpike I-95	http://www.deldot.gov/public.ejs?command=PublicTollRateI95 http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx	11.2	\$9.00	\$0.804	2007	*
Veterans Memorial Tollway--Illinois	http://www.illinoistollway.com/portal/page?_dad=portal&_schema=PORTAL&_pageid=133,1495185 http://www.paturndpike.com/straighttalk/docs/tollingchart.aspx	17.6	\$16.00	\$0.909	2005	*
Averages	N/A	113	N/A	\$0.29	2004	N/A

Calculated in American dollars with no discounts

^a Florida is considering leasing Alligator Alley and as part of the deal tolls would increase in July 2009. Proposed increases are in parentheses.

^b New Jersey approved a 50 percent toll increase for the Garden State Parkway and New Jersey Turnpike that should become effective December 1st, 2008. Listed values are based off the toll increase. This toll adjustment has not yet been enacted and is subject to change.

^c New Jersey's governor's plan called for annual adjustments based on inflation but this plan has since been revised and the annual adjustment portion was removed.

*Either no methods of determining when and how much to raise toll rates was cited by these facilities or the determinants could not be located at the time this table was created.

Alternative toll rate scenarios in West Virginia

This report examines the traffic volume and toll revenues for alternative toll rate scenarios. The report assumes that toll rates will be used in September 2009 and annually adjusted by Personal Consumption Expenditures Price Index (PCEPI), excluding Scenario 1.

The following scenarios are investigated for US 35, the Wellsburg Bridge, the Mon-Fayette Expressway, and the Dick Henderson Bridge:⁴

- Scenario 1: The West Virginia Turnpike toll rate (mainline) in 2009 and no annual adjustment thereafter.
- Scenario 2: The toll rate is increased by 20 percent in 2009 and adjusted by PCEPI thereafter.
- Scenario 3: The toll rate is increased by 40 percent in 2009 and adjusted by PCEPI thereafter.
- Scenario 4: The toll rate is increased by 60 percent in 2009 and adjusted by PCEPI thereafter.
- Scenario 5: The toll rate is increased by 80 percent in 2009 and adjusted by PCEPI thereafter.
- Scenario 6: The toll rate is increased by 100 percent in 2009 and adjusted by PCEPI thereafter.

Chapter 6. Traffic Volume and Toll Revenues

Traffic analysis

This report reviews the existing literature to estimate the toll price elasticity of demand which measures how much the traffic volume responds to a change in toll prices.⁵ Demand for traffic volume is elastic if the traffic demand responds substantially to changes in the toll prices and it is inelastic if the traffic demand responds only slightly to changes in the prices. In other words, when the demand for traffic volume is elastic (inelastic), the percentage change in traffic demanded is greater (smaller) than that in toll price.

Table 7 shows the toll price elasticity of demand for six toll facilities. As shown in the table, the demand elasticity of the West Virginia Turnpike is -0.16 (Wilbur Smith 2005). In other words, a 1 percent increase in toll price will cause a 0.16 percent decrease in traffic volume. All six of the toll facilities have inelastic demand. This means that traffic volume is relatively unresponsive to a change in price. Further, the toll price elasticity of demand is likely to be small if alternative routes are not available.

Based on the literature review, this report uses the elasticity of demand of -0.16 for a short-run (2009) and the elasticity of demand of -0.33 in 2030 to incorporate a long-run effect.

⁴ The traffic and revenue analyses assume two plazas for the US 35 and one toll plaza for the Wellsburg Bridge, the Mon/Fayette Expressway, and the Dick Henderson Bridge, respectively.

⁵ Toll price elasticity of demand (E) = $\frac{\% \text{ change in traffic volume demanded}}{\% \text{ change in toll rate}}$

Because the proposed West Virginia toll roads and bridges do not have easily accessible alternative routes, highly inelastic demand for traffic volume is assumed for both short and long-runs. In addition, this report assumes that there is a difference between short-run and long-run elasticities of demand. In the short-run, users can switch to a higher occupancy mode, alter their routes, or abandon their trips. In the long-run, users may change their origins and destinations (e.g., their residence or office location) to avoid the routes with the higher toll rates (Burris 2003). Therefore, long-run elasticities are generally greater than short-run (Lee, Klein, and Camus 1999; Oum, Waters, and Yong 1992).

Table 7. Toll Price Elasticity of Demand, Comparison of Previous Study Results.

Facility/Area	Demand Elasticity	Closest Alternative Route	Rural or Urban Highway?	Year Data Was Collected	Source
West Virginia Turnpike	-0.16	More than 1 hour	Largely rural	2005	Wilbur Smith
New Jersey Turnpike	-0.2 to -0.3	Varies by section; in some places parallel	Largely urban	2005	Steer Davies Gleave
Coleman Bridge in VA	-0.16 (short-term) to -0.33 (long-term): -0.25 on average	2 to 7.5 miles (3.5 to 9 minutes)	Largely urban	2002-2004	Charles River Associates
San Francisco Bay Bridge	< -0.05	*	Urban	1996	Gifford & Talkington
Verrazano Narrows Bridge in NYC	-0.05	*	Urban	1995	Wilbur Smith
Richmond, VA Pike	-0.34	*	Urban	1995	Wilbur Smith

*Information could not be obtained.

This report uses the Annual Average Daily Traffic (AADT) projections to forecast the annual traffic volume for the alternative toll rates. The turning movement AADT data are obtained from West Virginia Department of Highways. For example, the AADT projections for 2011 and 2031 are 8,000 and 9,700 for the Wellsburg Bridge. The linear function is used to estimate the traffic volume for the period of 2009-2030.

Revenue analysis

The toll revenue is estimated by multiplying the predicted traffic volume by the actual weighted average rates for passenger and commercial vehicles in 2008. For Scenarios 2-6, this report adopts the Personal Consumption Expenditures Price Index (PCEPI) as an inflation adjustment factor. The PCEPI, like the CPI, indexes consumer prices. The PCEPI takes into account substitution effect of goods and is shown a pattern of rising 0.33 percent less than the CPI.⁶ Therefore, the PCEPI can provide greater stability and predictability than the CPI for

⁶ CPI uses a fixed basket of goods.

long-run forecast. In addition, PCEPI projection data are available through 2050 with Regional Economic Models, Inc. (REMI). This allows longer term projections which can be used to prepare long-term plans more efficiently and accurately.

Predicted traffic volume and revenue

Tables 8-13 show annual transactions and toll revenue forecasts for the Wellsburg Bridge (Scenarios 1-6). Similarly, the results of US 35, the Mon-Fayette Expressway, and the Dick Henderson Bridge are provided in Tables 14-19, 20-25, and 26-31, respectively.

Table 8. Annual Transactions and Toll Revenue Forecasts for Scenario 1 for the Wellsburg Bridge (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	643	71	714	\$642	\$269	\$911
2010	2,600	289	2,889	\$2,595	\$1,089	\$3,684
2011	2,628	292	2,920	\$2,623	\$1,101	\$3,723
2012	2,656	295	2,951	\$2,650	\$1,112	\$3,763
2013	2,684	298	2,982	\$2,678	\$1,124	\$3,802
2014	2,712	301	3,013	\$2,706	\$1,136	\$3,842
2015	2,740	304	3,044	\$2,734	\$1,147	\$3,881
2016	2,768	308	3,075	\$2,762	\$1,159	\$3,921
2017	2,796	311	3,106	\$2,790	\$1,171	\$3,961
2018	2,823	314	3,137	\$2,818	\$1,183	\$4,000
2019	2,851	317	3,168	\$2,845	\$1,194	\$4,040
2020	2,879	320	3,199	\$2,873	\$1,206	\$4,079
2021	2,907	323	3,230	\$2,901	\$1,218	\$4,119
2022	2,935	326	3,261	\$2,929	\$1,229	\$4,158
2023	2,963	329	3,292	\$2,957	\$1,241	\$4,198
2024	2,991	332	3,323	\$2,985	\$1,253	\$4,237
2025	3,019	335	3,354	\$3,013	\$1,264	\$4,277
2026	3,047	339	3,385	\$3,040	\$1,276	\$4,317
2027	3,075	342	3,416	\$3,068	\$1,288	\$4,356
2028	3,103	345	3,447	\$3,096	\$1,299	\$4,396
2029	3,131	348	3,478	\$3,124	\$1,311	\$4,435
2030	3,159	351	3,509	\$3,152	\$1,323	\$4,475

* Current dollars are used.

Table 9. Annual Transactions and Toll Revenue Forecasts for Scenario 2 for the Wellsburg Bridge (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	621	69	690	\$744	\$312	\$1,057
2010	2,509	279	2,787	\$3,078	\$1,292	\$4,369
2011	2,531	281	2,813	\$3,177	\$1,334	\$4,511
2012	2,554	284	2,838	\$3,278	\$1,376	\$4,654
2013	2,577	286	2,863	\$3,372	\$1,415	\$4,788
2014	2,599	289	2,888	\$3,468	\$1,455	\$4,923
2015	2,622	291	2,913	\$3,569	\$1,498	\$5,067
2016	2,644	294	2,938	\$3,674	\$1,542	\$5,216
2017	2,666	296	2,963	\$3,783	\$1,588	\$5,371
2018	2,688	299	2,987	\$3,894	\$1,634	\$5,528
2019	2,711	301	3,012	\$4,005	\$1,681	\$5,686
2020	2,733	304	3,036	\$4,121	\$1,729	\$5,850
2021	2,754	306	3,060	\$4,240	\$1,780	\$6,020
2022	2,776	308	3,085	\$4,361	\$1,830	\$6,191
2023	2,798	311	3,109	\$4,482	\$1,881	\$6,364
2024	2,820	313	3,133	\$4,608	\$1,934	\$6,543
2025	2,841	316	3,157	\$4,738	\$1,989	\$6,727
2026	2,863	318	3,181	\$4,870	\$2,044	\$6,914
2027	2,884	320	3,204	\$5,005	\$2,101	\$7,106
2028	2,905	323	3,228	\$5,142	\$2,158	\$7,300
2029	2,926	325	3,252	\$5,286	\$2,219	\$7,505
2030	2,948	328	3,275	\$5,432	\$2,280	\$7,711

* Current dollars are used.

Table 10. Annual Transactions and Toll Revenue Forecasts for Scenario 3 for the Wellsburg Bridge (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	600	67	666	\$838	\$352	\$1,190
2010	2,417	269	2,686	\$3,460	\$1,452	\$4,912
2011	2,435	271	2,705	\$3,565	\$1,496	\$5,062
2012	2,452	272	2,725	\$3,672	\$1,541	\$5,213
2013	2,470	274	2,744	\$3,771	\$1,583	\$5,353
2014	2,487	276	2,763	\$3,870	\$1,624	\$5,495
2015	2,504	278	2,782	\$3,976	\$1,669	\$5,645
2016	2,520	280	2,800	\$4,086	\$1,715	\$5,801
2017	2,537	282	2,819	\$4,200	\$1,763	\$5,963
2018	2,553	284	2,837	\$4,315	\$1,811	\$6,125
2019	2,570	286	2,855	\$4,430	\$1,859	\$6,289
2020	2,586	287	2,873	\$4,549	\$1,909	\$6,458
2021	2,602	289	2,891	\$4,672	\$1,961	\$6,633
2022	2,617	291	2,908	\$4,796	\$2,013	\$6,809
2023	2,633	293	2,925	\$4,921	\$2,065	\$6,986
2024	2,648	294	2,942	\$5,050	\$2,119	\$7,169
2025	2,663	296	2,959	\$5,182	\$2,175	\$7,357
2026	2,678	298	2,976	\$5,316	\$2,231	\$7,547
2027	2,693	299	2,992	\$5,453	\$2,289	\$7,742
2028	2,708	301	3,009	\$5,591	\$2,347	\$7,938
2029	2,722	302	3,025	\$5,737	\$2,408	\$8,145
2030	2,737	304	3,041	\$5,883	\$2,469	\$8,353

* Current dollars are used.

Table 11. Annual Transactions and Toll Revenue Forecasts for Scenario 4 for the Wellsburg Bridge (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	578	64	643	\$923	\$387	\$1,311
2010	2,326	258	2,584	\$3,804	\$1,597	\$5,401
2011	2,338	260	2,598	\$3,913	\$1,642	\$5,556
2012	2,351	261	2,612	\$4,022	\$1,688	\$5,711
2013	2,363	263	2,625	\$4,123	\$1,730	\$5,853
2014	2,374	264	2,638	\$4,223	\$1,772	\$5,995
2015	2,386	265	2,651	\$4,330	\$1,817	\$6,148
2016	2,397	266	2,663	\$4,441	\$1,864	\$6,305
2017	2,408	268	2,675	\$4,555	\$1,912	\$6,467
2018	2,418	269	2,687	\$4,670	\$1,960	\$6,630
2019	2,429	270	2,699	\$4,785	\$2,008	\$6,794
2020	2,439	271	2,710	\$4,904	\$2,058	\$6,962
2021	2,449	272	2,721	\$5,026	\$2,109	\$7,135
2022	2,458	273	2,732	\$5,149	\$2,161	\$7,309
2023	2,468	274	2,742	\$5,271	\$2,212	\$7,484
2024	2,477	275	2,752	\$5,397	\$2,265	\$7,663
2025	2,486	276	2,762	\$5,527	\$2,320	\$7,847
2026	2,494	277	2,771	\$5,657	\$2,374	\$8,031
2027	2,502	278	2,780	\$5,791	\$2,430	\$8,221
2028	2,510	279	2,789	\$5,924	\$2,486	\$8,411
2029	2,518	280	2,798	\$6,065	\$2,545	\$8,610
2030	2,526	281	2,806	\$6,205	\$2,604	\$8,810

* Current dollars are used.

Table 12. Annual Transactions and Toll Revenue Forecasts for Scenario 5 for the Wellsburg Bridge (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	557	62	619	\$1,000	\$420	\$1,420
2010	2,234	248	2,483	\$4,112	\$1,726	\$5,837
2011	2,242	249	2,491	\$4,221	\$1,771	\$5,992
2012	2,249	250	2,499	\$4,329	\$1,817	\$6,146
2013	2,255	251	2,506	\$4,428	\$1,858	\$6,286
2014	2,262	251	2,513	\$4,526	\$1,899	\$6,425
2015	2,268	252	2,520	\$4,631	\$1,943	\$6,574
2016	2,273	253	2,526	\$4,739	\$1,989	\$6,727
2017	2,279	253	2,532	\$4,850	\$2,035	\$6,885
2018	2,283	254	2,537	\$4,961	\$2,082	\$7,043
2019	2,288	254	2,542	\$5,071	\$2,128	\$7,200
2020	2,292	255	2,547	\$5,185	\$2,176	\$7,361
2021	2,296	255	2,551	\$5,301	\$2,225	\$7,526
2022	2,299	255	2,555	\$5,418	\$2,274	\$7,691
2023	2,303	256	2,558	\$5,533	\$2,322	\$7,856
2024	2,305	256	2,561	\$5,652	\$2,372	\$8,024
2025	2,308	256	2,564	\$5,773	\$2,423	\$8,196
2026	2,310	257	2,566	\$5,894	\$2,474	\$8,368
2027	2,312	257	2,568	\$6,018	\$2,526	\$8,543
2028	2,313	257	2,570	\$6,141	\$2,577	\$8,718
2029	2,314	257	2,571	\$6,270	\$2,631	\$8,901
2030	2,315	257	2,572	\$6,398	\$2,685	\$9,083

* Current dollars are used.

Table 13. Annual Transactions and Toll Revenue Forecasts for Scenario 6 for the Wellsburg Bridge (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	535	59	595	\$1,068	\$448	\$1,516
2010	2,143	238	2,381	\$4,382	\$1,839	\$6,221
2011	2,145	238	2,384	\$4,488	\$1,883	\$6,371
2012	2,147	239	2,386	\$4,593	\$1,927	\$6,520
2013	2,148	239	2,387	\$4,686	\$1,967	\$6,653
2014	2,149	239	2,388	\$4,779	\$2,006	\$6,784
2015	2,150	239	2,389	\$4,877	\$2,047	\$6,924
2016	2,150	239	2,389	\$4,979	\$2,090	\$7,069
2017	2,149	239	2,388	\$5,083	\$2,133	\$7,216
2018	2,148	239	2,387	\$5,186	\$2,177	\$7,363
2019	2,147	239	2,386	\$5,288	\$2,219	\$7,507
2020	2,145	238	2,384	\$5,392	\$2,263	\$7,655
2021	2,143	238	2,381	\$5,498	\$2,308	\$7,806
2022	2,141	238	2,378	\$5,604	\$2,352	\$7,955
2023	2,137	237	2,375	\$5,707	\$2,395	\$8,103
2024	2,134	237	2,371	\$5,813	\$2,440	\$8,253
2025	2,130	237	2,367	\$5,921	\$2,485	\$8,406
2026	2,126	236	2,362	\$6,027	\$2,529	\$8,556
2027	2,121	236	2,356	\$6,134	\$2,575	\$8,709
2028	2,115	235	2,351	\$6,240	\$2,619	\$8,860
2029	2,110	234	2,344	\$6,352	\$2,666	\$9,017
2030	2,104	234	2,337	\$6,461	\$2,712	\$9,172

* Current dollars are used.

Table 14. Annual Transactions and Toll Revenue Forecasts for Scenario 1 for US 35 (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	1,465	658	2,123	\$1,462	\$2,481	\$3,943
2010	6,029	2,709	8,738	\$6,017	\$10,211	\$16,227
2011	6,198	2,785	8,983	\$6,185	\$10,496	\$16,681
2012	6,367	2,860	9,227	\$6,354	\$10,782	\$17,136
2013	6,536	2,936	9,472	\$6,522	\$11,068	\$17,590
2014	6,704	3,012	9,716	\$6,690	\$11,354	\$18,044
2015	6,873	3,088	9,961	\$6,859	\$11,639	\$18,498
2016	7,042	3,164	10,205	\$7,027	\$11,925	\$18,952
2017	7,210	3,239	10,450	\$7,195	\$12,211	\$19,406
2018	7,379	3,315	10,695	\$7,364	\$12,497	\$19,861
2019	7,548	3,391	10,939	\$7,532	\$12,782	\$20,315
2020	7,717	3,467	11,184	\$7,701	\$13,068	\$20,769
2021	7,885	3,543	11,428	\$7,869	\$13,354	\$21,223
2022	8,054	3,619	11,673	\$8,037	\$13,640	\$21,677
2023	8,223	3,694	11,917	\$8,206	\$13,925	\$22,131
2024	8,392	3,770	12,162	\$8,374	\$14,211	\$22,585
2025	8,560	3,846	12,406	\$8,543	\$14,497	\$23,040
2026	8,729	3,922	12,651	\$8,711	\$14,783	\$23,494
2027	8,898	3,998	12,895	\$8,879	\$15,069	\$23,948
2028	9,067	4,073	13,140	\$9,048	\$15,354	\$24,402
2029	9,235	4,149	13,385	\$9,216	\$15,640	\$24,856
2030	9,404	4,225	13,629	\$9,384	\$15,926	\$25,310

* Current dollars are used.

Table 15. Annual Transactions and Toll Revenue Forecasts for Scenario 2 for US 35 (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	1,416	636	2,052	\$ 1,696	\$ 2,877	\$ 4,573
2010	5,817	2,614	8,431	\$ 7,137	\$12,111	\$19,248
2011	5,970	2,682	8,653	\$ 7,494	\$12,717	\$20,210
2012	6,123	2,751	8,874	\$ 7,858	\$13,336	\$21,194
2013	6,275	2,819	9,094	\$ 8,212	\$13,936	\$22,148
2014	6,426	2,887	9,313	\$ 8,573	\$14,548	\$23,121
2015	6,577	2,955	9,532	\$ 8,954	\$15,194	\$24,148
2016	6,727	3,022	9,750	\$ 9,349	\$15,865	\$25,214
2017	6,877	3,090	9,967	\$ 9,759	\$16,561	\$26,319
2018	7,026	3,157	10,183	\$10,176	\$17,270	\$27,446
2019	7,175	3,224	10,399	\$10,602	\$17,992	\$28,595
2020	7,323	3,290	10,613	\$11,044	\$18,741	\$29,785
2021	7,471	3,357	10,827	\$11,500	\$19,517	\$31,017
2022	7,618	3,423	11,041	\$11,966	\$20,306	\$32,272
2023	7,765	3,488	11,253	\$12,439	\$21,110	\$33,550
2024	7,911	3,554	11,465	\$12,929	\$21,942	\$34,871
2025	8,056	3,619	11,676	\$13,436	\$22,802	\$36,238
2026	8,201	3,685	11,886	\$13,952	\$23,677	\$37,628
2027	8,346	3,750	12,095	\$14,485	\$24,581	\$39,065
2028	8,490	3,814	12,304	\$15,026	\$25,500	\$40,526
2029	8,633	3,879	12,512	\$15,594	\$26,464	\$42,059
2030	8,776	3,943	12,719	\$16,172	\$27,444	\$43,616

* Current dollars are used.

Table 16. Annual Transactions and Toll Revenue Forecasts for Scenario 3 for US 35 (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	1,368	615	1,982	\$1,911	\$3,243	\$5,154
2010	5,615	2,523	8,138	\$8,037	\$13,638	\$21,675
2011	5,757	2,587	8,344	\$8,431	\$14,307	\$22,738
2012	5,899	2,650	8,549	\$8,833	\$14,990	\$23,823
2013	6,040	2,714	8,754	\$9,222	\$15,651	\$24,873
2014	6,180	2,777	8,957	\$9,619	\$16,323	\$25,942
2015	6,319	2,839	9,159	\$10,037	\$17,033	\$27,069
2016	6,458	2,901	9,359	\$10,470	\$17,768	\$28,238
2017	6,596	2,963	9,559	\$10,919	\$18,530	\$29,449
2018	6,733	3,025	9,757	\$11,376	\$19,306	\$30,682
2019	6,869	3,086	9,955	\$11,841	\$20,095	\$31,936
2020	7,004	3,147	10,151	\$12,322	\$20,911	\$33,234
2021	7,138	3,207	10,346	\$12,820	\$21,756	\$34,576
2022	7,272	3,267	10,539	\$13,326	\$22,615	\$35,941
2023	7,405	3,327	10,732	\$13,841	\$23,488	\$37,329
2024	7,537	3,386	10,924	\$14,372	\$24,390	\$38,762
2025	7,669	3,445	11,114	\$14,921	\$25,322	\$40,243
2026	7,799	3,504	11,303	\$15,479	\$26,268	\$41,747
2027	7,929	3,562	11,491	\$16,054	\$27,245	\$43,299
2028	8,058	3,620	11,678	\$16,639	\$28,237	\$44,875
2029	8,186	3,678	11,864	\$17,251	\$29,276	\$46,527
2030	8,313	3,735	12,048	\$17,873	\$30,330	\$48,203

* Current dollars are used.

Table 17. Annual Transactions and Toll Revenue Forecasts for Scenario 4 for US 35 (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	1,318	592	1,909	\$2,104	\$3,570	\$5,674
2010	5,393	2,423	7,816	\$8,822	\$14,971	\$23,794
2011	5,515	2,478	7,992	\$9,229	\$15,662	\$24,891
2012	5,635	2,532	8,166	\$9,643	\$16,364	\$26,007
2013	5,753	2,585	8,338	\$10,039	\$17,037	\$27,076
2014	5,870	2,637	8,507	\$10,441	\$17,718	\$28,159
2015	5,985	2,689	8,674	\$10,863	\$18,435	\$29,299
2016	6,098	2,740	8,838	\$11,300	\$19,176	\$30,476
2017	6,210	2,790	9,000	\$11,750	\$19,940	\$31,690
2018	6,321	2,840	9,160	\$12,206	\$20,714	\$32,919
2019	6,429	2,889	9,318	\$12,667	\$21,497	\$34,164
2020	6,536	2,937	9,473	\$13,143	\$22,304	\$35,446
2021	6,642	2,984	9,626	\$13,632	\$23,135	\$36,767
2022	6,746	3,031	9,777	\$14,128	\$23,975	\$38,103
2023	6,848	3,077	9,925	\$14,628	\$24,825	\$39,453
2024	6,949	3,122	10,071	\$15,143	\$25,699	\$40,842
2025	7,048	3,166	10,214	\$15,673	\$26,597	\$42,270
2026	7,145	3,210	10,356	\$16,208	\$27,505	\$43,713
2027	7,241	3,253	10,495	\$16,757	\$28,438	\$45,195
2028	7,336	3,296	10,631	\$17,312	\$29,379	\$46,691
2029	7,428	3,337	10,766	\$17,891	\$30,362	\$48,253
2030	7,520	3,378	10,898	\$18,476	\$31,354	\$49,830

* Current dollars are used.

Table 18. Annual Transactions and Toll Revenue Forecasts for Scenario 5 for US 35 (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	1,268	570	1,838	\$2,278	\$3,866	\$6,144
2010	5,181	2,328	7,509	\$9,535	\$16,181	\$25,716
2011	5,287	2,375	7,662	\$9,954	\$16,892	\$26,846
2012	5,391	2,422	7,813	\$10,378	\$17,612	\$27,990
2013	5,492	2,468	7,960	\$10,782	\$18,297	\$29,079
2014	5,592	2,512	8,104	\$11,189	\$18,988	\$30,177
2015	5,689	2,556	8,245	\$11,617	\$19,714	\$31,331
2016	5,784	2,599	8,383	\$12,057	\$20,461	\$32,517
2017	5,877	2,640	8,517	\$12,509	\$21,228	\$33,737
2018	5,968	2,681	8,649	\$12,965	\$22,002	\$34,967
2019	6,056	2,721	8,777	\$13,424	\$22,781	\$36,205
2020	6,143	2,760	8,903	\$13,896	\$23,581	\$37,477
2021	6,227	2,798	9,025	\$14,379	\$24,402	\$38,782
2022	6,310	2,835	9,145	\$14,866	\$25,228	\$40,095
2023	6,390	2,871	9,261	\$15,356	\$26,059	\$41,415
2024	6,468	2,906	9,374	\$15,857	\$26,910	\$42,767
2025	6,544	2,940	9,484	\$16,371	\$27,782	\$44,153
2026	6,618	2,973	9,591	\$16,887	\$28,657	\$45,544
2027	6,689	3,005	9,695	\$17,414	\$29,553	\$46,967
2028	6,759	3,037	9,795	\$17,944	\$30,452	\$48,396
2029	6,826	3,067	9,893	\$18,496	\$31,388	\$49,883
2030	6,891	3,096	9,987	\$19,049	\$32,326	\$51,375

* Current dollars are used.

Table 19. Annual Transactions and Toll Revenue Forecasts for Scenario 6 for US 35 (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	1,219	548	1,767	\$2,433	\$4,129	\$6,562
2010	4,969	2,233	7,202	\$10,161	\$17,243	\$27,404
2011	5,059	2,273	7,332	\$10,584	\$17,961	\$28,544
2012	5,147	2,312	7,459	\$11,009	\$18,683	\$29,692
2013	5,231	2,350	7,582	\$11,411	\$19,365	\$30,776
2014	5,313	2,387	7,701	\$11,814	\$20,049	\$31,862
2015	5,393	2,423	7,816	\$12,236	\$20,765	\$33,000
2016	5,470	2,457	7,927	\$12,668	\$21,498	\$34,166
2017	5,544	2,491	8,034	\$13,110	\$22,249	\$35,359
2018	5,615	2,523	8,138	\$13,554	\$23,001	\$36,555
2019	5,684	2,554	8,237	\$13,997	\$23,754	\$37,751
2020	5,750	2,583	8,333	\$14,451	\$24,523	\$38,974
2021	5,813	2,612	8,425	\$14,914	\$25,309	\$40,223
2022	5,874	2,639	8,513	\$15,376	\$26,094	\$41,471
2023	5,932	2,665	8,597	\$15,838	\$26,878	\$42,716
2024	5,987	2,690	8,677	\$16,309	\$27,677	\$43,986
2025	6,040	2,714	8,753	\$16,788	\$28,491	\$45,279
2026	6,090	2,736	8,826	\$17,266	\$29,301	\$46,568
2027	6,137	2,757	8,894	\$17,752	\$30,126	\$47,878
2028	6,182	2,777	8,959	\$18,236	\$30,947	\$49,182
2029	6,224	2,796	9,020	\$18,737	\$31,798	\$50,535
2030	6,263	2,814	9,077	\$19,236	\$32,644	\$51,880

* Current dollars are used.

Table 20. Annual Transactions and Toll Revenue Forecasts for Scenario 1 for the Mon-Fayette Expressway (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	593	73	666	\$592	\$276	\$868
2010	2,433	301	2,734	\$2,428	\$1,134	\$3,562
2011	2,495	308	2,803	\$2,490	\$1,162	\$3,652
2012	2,557	316	2,873	\$2,551	\$1,191	\$3,742
2013	2,618	324	2,942	\$2,613	\$1,220	\$3,833
2014	2,680	331	3,011	\$2,674	\$1,249	\$3,923
2015	2,742	339	3,081	\$2,736	\$1,277	\$4,013
2016	2,803	346	3,150	\$2,798	\$1,306	\$4,104
2017	2,865	354	3,219	\$2,859	\$1,335	\$4,194
2018	2,927	362	3,289	\$2,921	\$1,364	\$4,284
2019	2,989	369	3,358	\$2,982	\$1,392	\$4,375
2020	3,050	377	3,427	\$3,044	\$1,421	\$4,465
2021	3,112	385	3,497	\$3,106	\$1,450	\$4,555
2022	3,174	392	3,566	\$3,167	\$1,479	\$4,646
2023	3,236	400	3,635	\$3,229	\$1,507	\$4,736
2024	3,297	408	3,705	\$3,290	\$1,536	\$4,826
2025	3,359	415	3,774	\$3,352	\$1,565	\$4,917
2026	3,421	423	3,843	\$3,414	\$1,594	\$5,007
2027	3,482	430	3,913	\$3,475	\$1,622	\$5,098
2028	3,544	438	3,982	\$3,537	\$1,651	\$5,188
2029	3,606	446	4,052	\$3,598	\$1,680	\$5,278
2030	3,668	453	4,121	\$3,660	\$1,709	\$5,369

* Current dollars are used.

Table 21. Annual Transactions and Toll Revenue Forecasts for Scenario 2 for the Mon-Fayette Expressway (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	573	71	644	\$686	\$320	\$1,006
2010	2,348	290	2,638	\$2,880	\$1,345	\$4,225
2011	2,403	297	2,700	\$3,016	\$1,408	\$4,425
2012	2,459	304	2,762	\$3,156	\$1,473	\$4,629
2013	2,514	311	2,824	\$3,290	\$1,536	\$4,826
2014	2,569	317	2,886	\$3,427	\$1,600	\$5,027
2015	2,624	324	2,948	\$3,572	\$1,667	\$5,239
2016	2,678	331	3,009	\$3,722	\$1,738	\$5,459
2017	2,733	338	3,070	\$3,878	\$1,810	\$5,688
2018	2,787	344	3,131	\$4,036	\$1,884	\$5,921
2019	2,841	351	3,192	\$4,198	\$1,960	\$6,158
2020	2,895	358	3,253	\$4,365	\$2,038	\$6,403
2021	2,948	364	3,313	\$4,539	\$2,119	\$6,658
2022	3,002	371	3,373	\$4,715	\$2,201	\$6,916
2023	3,055	378	3,433	\$4,895	\$2,285	\$7,180
2024	3,108	384	3,492	\$5,080	\$2,372	\$7,452
2025	3,161	391	3,552	\$5,272	\$2,461	\$7,733
2026	3,214	397	3,611	\$5,467	\$2,552	\$8,020
2027	3,266	404	3,670	\$5,669	\$2,647	\$8,315
2028	3,319	410	3,729	\$5,874	\$2,742	\$8,616
2029	3,371	417	3,787	\$6,089	\$2,843	\$8,931
2030	3,423	423	3,846	\$6,307	\$2,944	\$9,251

* Current dollars are used.

Table 22. Annual Transactions and Toll Revenue Forecasts for Scenario 3 for the Mon-Fayette Expressway (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	553	68	621	\$773	\$361	\$1,133
2010	2,262	280	2,542	\$3,238	\$1,511	\$4,749
2011	2,311	286	2,597	\$3,385	\$1,580	\$4,965
2012	2,361	292	2,652	\$3,535	\$1,650	\$5,185
2013	2,409	298	2,707	\$3,679	\$1,717	\$5,396
2014	2,458	304	2,761	\$3,825	\$1,786	\$5,611
2015	2,506	310	2,815	\$3,979	\$1,858	\$5,837
2016	2,553	316	2,869	\$4,139	\$1,932	\$6,072
2017	2,600	321	2,922	\$4,305	\$2,010	\$6,314
2018	2,647	327	2,974	\$4,473	\$2,088	\$6,561
2019	2,693	333	3,026	\$4,643	\$2,168	\$6,811
2020	2,739	339	3,078	\$4,819	\$2,250	\$7,069
2021	2,785	344	3,129	\$5,001	\$2,335	\$7,336
2022	2,830	350	3,180	\$5,186	\$2,421	\$7,607
2023	2,875	355	3,230	\$5,373	\$2,509	\$7,882
2024	2,919	361	3,280	\$5,567	\$2,599	\$8,165
2025	2,963	366	3,330	\$5,766	\$2,692	\$8,458
2026	3,007	372	3,379	\$5,968	\$2,786	\$8,754
2027	3,050	377	3,427	\$6,176	\$2,883	\$9,059
2028	3,093	382	3,475	\$6,387	\$2,982	\$9,369
2029	3,136	388	3,523	\$6,608	\$3,085	\$9,693
2030	3,178	393	3,570	\$6,831	\$3,189	\$10,021

* Current dollars are used.

Table 23. Annual Transactions and Toll Revenue Forecasts for Scenario 4 for the Mon-Fayette Expressway (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	533	66	599	\$851	\$397	\$1,249
2010	2,176	269	2,445	\$3,560	\$1,662	\$5,222
2011	2,220	274	2,494	\$3,715	\$1,734	\$5,449
2012	2,263	280	2,542	\$3,872	\$1,808	\$5,680
2013	2,305	285	2,590	\$4,022	\$1,878	\$5,900
2014	2,346	290	2,636	\$4,174	\$1,948	\$6,122
2015	2,387	295	2,683	\$4,334	\$2,023	\$6,357
2016	2,428	300	2,728	\$4,499	\$2,100	\$6,599
2017	2,468	305	2,773	\$4,669	\$2,180	\$6,849
2018	2,507	310	2,817	\$4,841	\$2,260	\$7,102
2019	2,546	315	2,860	\$5,016	\$2,342	\$7,357
2020	2,584	319	2,903	\$5,195	\$2,425	\$7,621
2021	2,621	324	2,945	\$5,380	\$2,512	\$7,892
2022	2,658	329	2,987	\$5,567	\$2,599	\$8,166
2023	2,695	333	3,028	\$5,756	\$2,687	\$8,443
2024	2,730	337	3,068	\$5,950	\$2,778	\$8,728
2025	2,766	342	3,107	\$6,150	\$2,871	\$9,021
2026	2,800	346	3,146	\$6,351	\$2,965	\$9,316
2027	2,834	350	3,184	\$6,558	\$3,062	\$9,620
2028	2,868	354	3,222	\$6,767	\$3,159	\$9,926
2029	2,900	358	3,259	\$6,985	\$3,261	\$10,247
2030	2,933	362	3,295	\$7,205	\$3,364	\$10,569

* Current dollars are used.

Table 24. Annual Transactions and Toll Revenue Forecasts for Scenario 5 for the Mon-Fayette Expressway (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	513	63	577	\$922	\$430	\$1,352
2010	2,091	258	2,349	\$3,848	\$1,796	\$5,644
2011	2,128	263	2,391	\$4,007	\$1,871	\$5,877
2012	2,165	268	2,432	\$4,167	\$1,946	\$6,113
2013	2,200	272	2,472	\$4,320	\$2,017	\$6,336
2014	2,235	276	2,511	\$4,473	\$2,088	\$6,561
2015	2,269	280	2,550	\$4,634	\$2,163	\$6,798
2016	2,303	285	2,587	\$4,800	\$2,241	\$7,041
2017	2,335	289	2,624	\$4,971	\$2,321	\$7,291
2018	2,367	293	2,660	\$5,142	\$2,401	\$7,543
2019	2,398	296	2,694	\$5,315	\$2,481	\$7,797
2020	2,428	300	2,728	\$5,493	\$2,564	\$8,057
2021	2,458	304	2,762	\$5,675	\$2,649	\$8,324
2022	2,486	307	2,794	\$5,858	\$2,735	\$8,593
2023	2,514	311	2,825	\$6,042	\$2,821	\$8,863
2024	2,541	314	2,855	\$6,231	\$2,909	\$9,139
2025	2,568	317	2,885	\$6,424	\$2,999	\$9,423
2026	2,593	321	2,914	\$6,617	\$3,089	\$9,707
2027	2,618	324	2,942	\$6,816	\$3,182	\$9,997
2028	2,642	327	2,969	\$7,014	\$3,275	\$10,289
2029	2,665	329	2,995	\$7,221	\$3,371	\$10,593
2030	2,688	332	3,020	\$7,429	\$3,468	\$10,897

* Current dollars are used.

Table 25. Annual Transactions and Toll Revenue Forecasts for Scenario 6 for the Mon-Fayette Expressway (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	493	61	554	\$985	\$460	\$1,444
2010	2,005	248	2,253	\$4,100	\$1,914	\$6,015
2011	2,036	252	2,288	\$4,260	\$1,989	\$6,249
2012	2,067	255	2,322	\$4,421	\$2,064	\$6,485
2013	2,096	259	2,355	\$4,572	\$2,134	\$6,706
2014	2,124	263	2,387	\$4,723	\$2,205	\$6,927
2015	2,151	266	2,417	\$4,881	\$2,279	\$7,160
2016	2,178	269	2,447	\$5,043	\$2,355	\$7,398
2017	2,203	272	2,475	\$5,210	\$2,432	\$7,642
2018	2,227	275	2,502	\$5,376	\$2,510	\$7,886
2019	2,250	278	2,529	\$5,542	\$2,587	\$8,130
2020	2,273	281	2,554	\$5,712	\$2,667	\$8,379
2021	2,294	284	2,578	\$5,886	\$2,748	\$8,634
2022	2,315	286	2,601	\$6,059	\$2,829	\$8,888
2023	2,334	288	2,622	\$6,232	\$2,909	\$9,141
2024	2,352	291	2,643	\$6,408	\$2,992	\$9,400
2025	2,370	293	2,663	\$6,588	\$3,075	\$9,663
2026	2,386	295	2,681	\$6,766	\$3,159	\$9,925
2027	2,402	297	2,699	\$6,948	\$3,244	\$10,191
2028	2,416	299	2,715	\$7,128	\$3,328	\$10,456
2029	2,430	300	2,730	\$7,316	\$3,415	\$10,731
2030	2,443	302	2,744	\$7,502	\$3,502	\$11,004

* Current dollars are used.

Table 26. Annual Transactions and Toll Revenue Forecasts for Scenario 1 for the Dick Henderson Bridge (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	1,536	171	1,706	\$1,533	\$643	\$2,176
2010	6,256	695	6,951	\$6,243	\$2,620	\$8,864
2011	6,370	708	7,077	\$6,356	\$2,668	\$9,024
2012	6,483	720	7,203	\$6,469	\$2,715	\$9,185
2013	6,596	733	7,329	\$6,583	\$2,763	\$9,345
2014	6,710	746	7,455	\$6,696	\$2,810	\$9,506
2015	6,823	758	7,581	\$6,809	\$2,858	\$9,666
2016	6,936	771	7,707	\$6,922	\$2,905	\$9,827
2017	7,050	783	7,833	\$7,035	\$2,953	\$9,987
2018	7,163	796	7,959	\$7,148	\$3,000	\$10,148
2019	7,276	808	8,085	\$7,261	\$3,047	\$10,309
2020	7,390	821	8,211	\$7,374	\$3,095	\$10,469
2021	7,503	834	8,337	\$7,487	\$3,142	\$10,630
2022	7,616	846	8,463	\$7,600	\$3,190	\$10,790
2023	7,730	859	8,588	\$7,714	\$3,237	\$10,951
2024	7,843	871	8,714	\$7,827	\$3,285	\$11,111
2025	7,956	884	8,840	\$7,940	\$3,332	\$11,272
2026	8,070	897	8,966	\$8,053	\$3,380	\$11,433
2027	8,183	909	9,092	\$8,166	\$3,427	\$11,593
2028	8,296	922	9,218	\$8,279	\$3,475	\$11,754
2029	8,410	934	9,344	\$8,392	\$3,522	\$11,914
2030	8,523	947	9,470	\$8,505	\$3,570	\$12,075

* Current dollars are used.

Table 27. Annual Transactions and Toll Revenue Forecasts for Scenario 2 for the Dick Henderson Bridge (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	1,484	165	1,649	\$1,777	\$746	\$2,523
2010	6,036	671	6,707	\$7,406	\$3,108	\$10,514
2011	6,136	682	6,817	\$7,701	\$3,232	\$10,933
2012	6,234	693	6,927	\$8,002	\$3,358	\$11,360
2013	6,333	704	7,037	\$8,288	\$3,479	\$11,767
2014	6,431	715	7,146	\$8,580	\$3,601	\$12,180
2015	6,529	725	7,255	\$8,888	\$3,730	\$12,619
2016	6,627	736	7,363	\$9,209	\$3,865	\$13,074
2017	6,724	747	7,471	\$9,541	\$4,004	\$13,545
2018	6,820	758	7,578	\$9,878	\$4,146	\$14,024
2019	6,917	769	7,685	\$10,221	\$4,290	\$14,510
2020	7,013	779	7,792	\$10,575	\$4,438	\$15,014
2021	7,109	790	7,898	\$10,943	\$4,593	\$15,535
2022	7,204	800	8,004	\$11,315	\$4,749	\$16,064
2023	7,299	811	8,110	\$11,693	\$4,908	\$16,601
2024	7,393	821	8,215	\$12,084	\$5,072	\$17,156
2025	7,488	832	8,320	\$12,488	\$5,241	\$17,729
2026	7,582	842	8,424	\$12,898	\$5,413	\$18,311
2027	7,675	853	8,528	\$13,321	\$5,591	\$18,911
2028	7,768	863	8,631	\$13,750	\$5,771	\$19,520
2029	7,861	873	8,735	\$14,200	\$5,960	\$20,160
2030	7,954	884	8,837	\$14,657	\$6,151	\$20,808

* Current dollars are used.

Table 28. Annual Transactions and Toll Revenue Forecasts for Scenario 3 for the Dick Henderson Bridge (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	1,433	159	1,592	\$2,001	\$840	\$2,841
2010	5,816	646	6,463	\$8,325	\$3,494	\$11,819
2011	5,902	656	6,557	\$8,642	\$3,627	\$12,269
2012	5,986	665	6,651	\$8,963	\$3,762	\$12,725
2013	6,070	674	6,744	\$9,268	\$3,890	\$13,157
2014	6,153	684	6,836	\$9,576	\$4,019	\$13,595
2015	6,235	693	6,928	\$9,903	\$4,156	\$14,059
2016	6,317	702	7,019	\$10,241	\$4,298	\$14,540
2017	6,398	711	7,109	\$10,591	\$4,445	\$15,037
2018	6,478	720	7,198	\$10,946	\$4,594	\$15,540
2019	6,557	729	7,286	\$11,304	\$4,744	\$16,049
2020	6,636	737	7,373	\$11,675	\$4,900	\$16,575
2021	6,714	746	7,460	\$12,058	\$5,061	\$17,119
2022	6,791	755	7,546	\$12,445	\$5,223	\$17,669
2023	6,868	763	7,631	\$12,837	\$5,388	\$18,225
2024	6,944	772	7,716	\$13,241	\$5,557	\$18,798
2025	7,019	780	7,799	\$13,658	\$5,732	\$19,390
2026	7,094	788	7,882	\$14,079	\$5,909	\$19,988
2027	7,167	796	7,964	\$14,513	\$6,091	\$20,604
2028	7,240	804	8,045	\$14,951	\$6,275	\$21,226
2029	7,313	813	8,125	\$15,411	\$6,468	\$21,879
2030	7,384	820	8,205	\$15,875	\$6,663	\$22,538

* Current dollars are used.

Table 29. Annual Transactions and Toll Revenue Forecasts for Scenario 4 for the Dick Henderson Bridge (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	1,381	153	1,534	\$2,205	\$925	\$3,130
2010	5,596	622	6,218	\$9,154	\$3,842	\$12,996
2011	5,667	630	6,297	\$9,485	\$3,981	\$13,465
2012	5,738	638	6,375	\$9,819	\$4,121	\$13,939
2013	5,807	645	6,452	\$10,132	\$4,253	\$14,385
2014	5,874	653	6,527	\$10,449	\$4,385	\$14,834
2015	5,941	660	6,601	\$10,784	\$4,526	\$15,310
2016	6,007	667	6,675	\$11,130	\$4,671	\$15,802
2017	6,072	675	6,746	\$11,488	\$4,821	\$16,309
2018	6,135	682	6,817	\$11,848	\$4,973	\$16,821
2019	6,198	689	6,887	\$12,211	\$5,125	\$17,336
2020	6,259	695	6,955	\$12,586	\$5,282	\$17,868
2021	6,320	702	7,022	\$12,971	\$5,444	\$18,415
2022	6,379	709	7,088	\$13,360	\$5,607	\$18,967
2023	6,437	715	7,153	\$13,751	\$5,771	\$19,522
2024	6,495	722	7,216	\$14,153	\$5,940	\$20,093
2025	6,551	728	7,278	\$14,567	\$6,114	\$20,680
2026	6,606	734	7,340	\$14,983	\$6,288	\$21,272
2027	6,660	740	7,400	\$15,411	\$6,468	\$21,879
2028	6,712	746	7,458	\$15,841	\$6,648	\$22,489
2029	6,764	752	7,516	\$16,292	\$6,838	\$23,129
2030	6,815	757	7,572	\$16,745	\$7,028	\$23,772

* Current dollars are used.

Table 30. Annual Transactions and Toll Revenue Forecasts for Scenario 5 for the Dick Henderson Bridge (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	1,329	148	1,477	\$2,388	\$1,002	\$3,390
2010	5,376	597	5,974	\$9,894	\$4,152	\$14,046
2011	5,433	604	6,037	\$10,230	\$4,293	\$14,523
2012	5,489	610	6,099	\$10,568	\$4,435	\$15,003
2013	5,543	616	6,159	\$10,882	\$4,567	\$15,449
2014	5,596	622	6,218	\$11,198	\$4,700	\$15,898
2015	5,647	627	6,275	\$11,532	\$4,840	\$16,372
2016	5,697	633	6,330	\$11,876	\$4,984	\$16,860
2017	5,746	638	6,384	\$12,230	\$5,133	\$17,363
2018	5,793	644	6,437	\$12,585	\$5,282	\$17,867
2019	5,838	649	6,487	\$12,941	\$5,431	\$18,372
2020	5,883	654	6,536	\$13,307	\$5,585	\$18,891
2021	5,925	658	6,584	\$13,682	\$5,742	\$19,424
2022	5,967	663	6,630	\$14,058	\$5,900	\$19,958
2023	6,007	667	6,674	\$14,434	\$6,058	\$20,493
2024	6,045	672	6,717	\$14,820	\$6,220	\$21,040
2025	6,082	676	6,758	\$15,216	\$6,386	\$21,601
2026	6,118	680	6,797	\$15,611	\$6,552	\$22,163
2027	6,152	684	6,835	\$16,015	\$6,722	\$22,737
2028	6,184	687	6,872	\$16,419	\$6,891	\$23,311
2029	6,216	691	6,906	\$16,842	\$7,068	\$23,910
2030	6,246	694	6,940	\$17,264	\$7,246	\$24,509

* Current dollars are used.

Table 31. Annual Transactions and Toll Revenue Forecasts for Scenario 6 for the Dick Henderson Bridge (in Thousands).

Year	Annual transactions			Annual toll revenue*		
	Passenger vehicles	Commercial vehicles	Total transactions	Passenger vehicles	Commercial vehicles	Total transactions
2009	1,278	142	1,420	\$2,550	\$1,070	\$3,621
2010	5,156	573	5,729	\$10,543	\$4,425	\$14,968
2011	5,199	578	5,777	\$10,877	\$4,565	\$15,441
2012	5,241	582	5,823	\$11,210	\$4,705	\$15,915
2013	5,280	587	5,867	\$11,517	\$4,834	\$16,351
2014	5,318	591	5,909	\$11,823	\$4,962	\$16,786
2015	5,354	595	5,948	\$12,147	\$5,098	\$17,245
2016	5,388	599	5,986	\$12,478	\$5,237	\$17,715
2017	5,420	602	6,022	\$12,818	\$5,380	\$18,198
2018	5,450	606	6,056	\$13,156	\$5,522	\$18,678
2019	5,479	609	6,088	\$13,494	\$5,663	\$19,157
2020	5,506	612	6,118	\$13,838	\$5,808	\$19,646
2021	5,531	615	6,146	\$14,190	\$5,956	\$20,146
2022	5,554	617	6,171	\$14,540	\$6,103	\$20,643
2023	5,576	620	6,195	\$14,888	\$6,248	\$21,137
2024	5,596	622	6,217	\$15,243	\$6,397	\$21,640
2025	5,614	624	6,237	\$15,604	\$6,549	\$22,153
2026	5,630	626	6,255	\$15,962	\$6,699	\$22,661
2027	5,644	627	6,271	\$16,326	\$6,852	\$23,178
2028	5,657	629	6,285	\$16,686	\$7,003	\$23,690
2029	5,667	630	6,297	\$17,062	\$7,161	\$24,223
2030	5,676	631	6,307	\$17,433	\$7,317	\$24,750

* Current dollars are used.

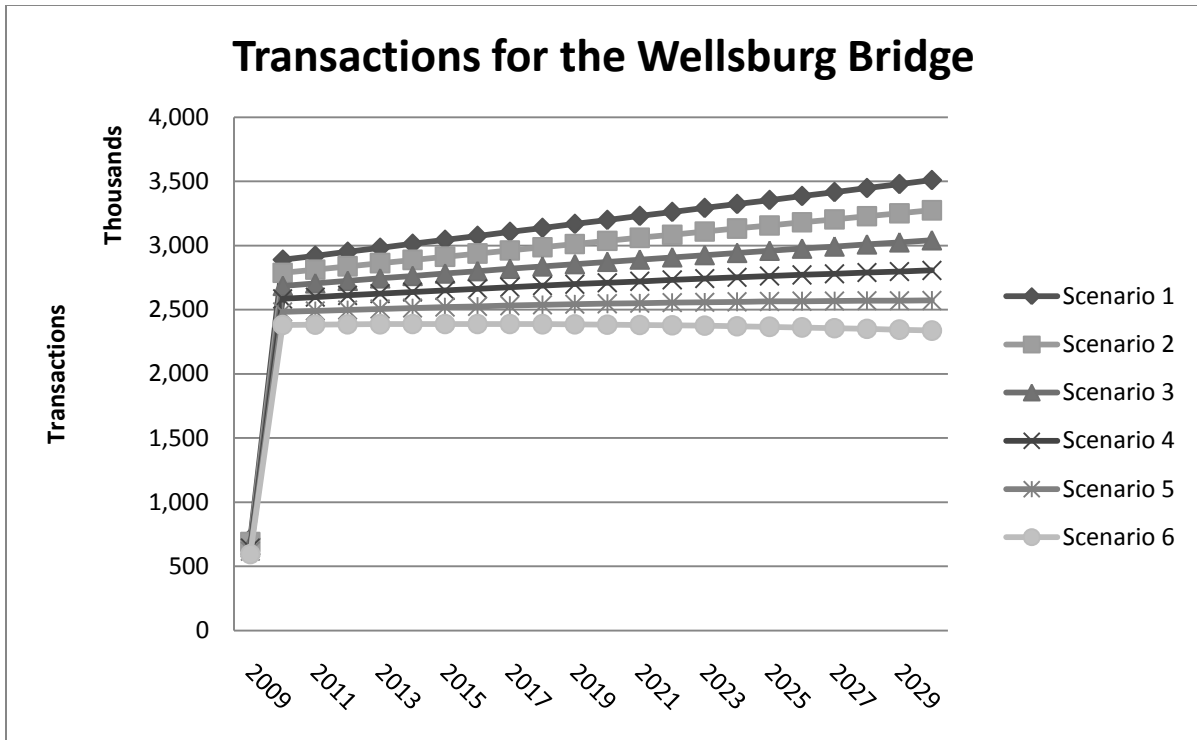


Figure 8. Predicted Transactions of All Vehicles for the Wellsburg Bridge.

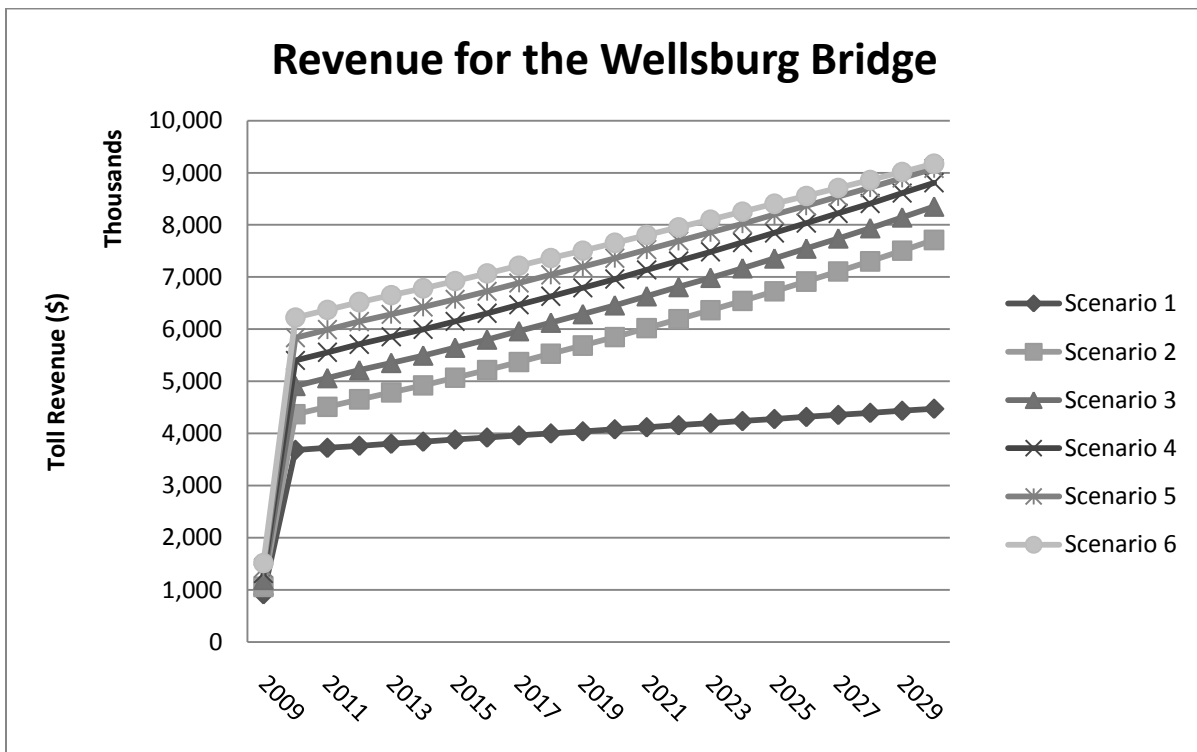


Figure 9. Predicted Revenue of All Vehicles for the Wellsburg Bridge.

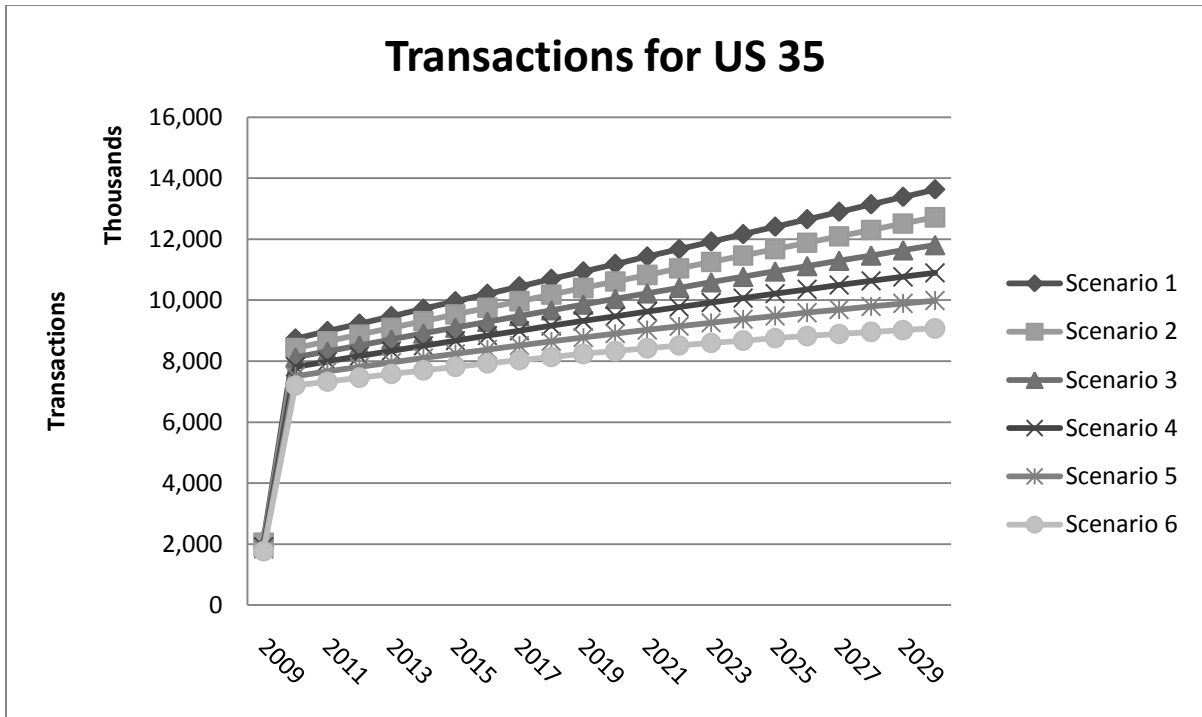


Figure 10. Predicted Transactions of All Vehicles for US 35.

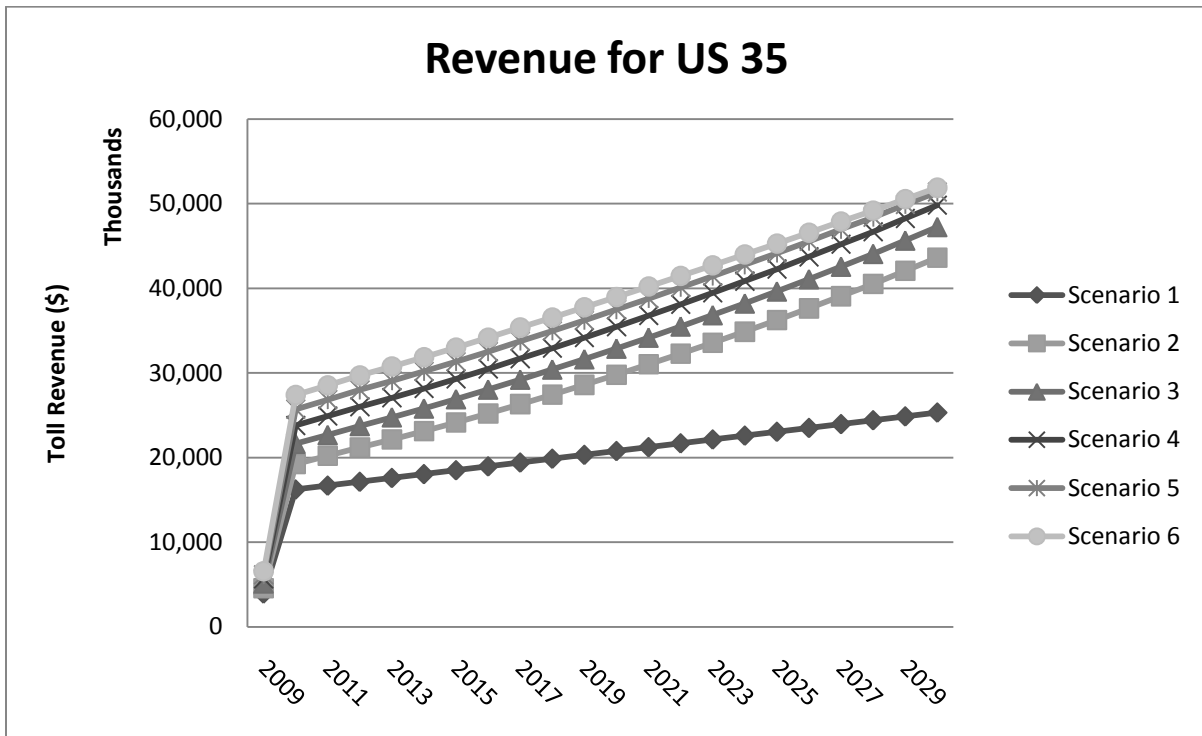


Figure 11. Predicted Revenue of All Vehicles for US 35.

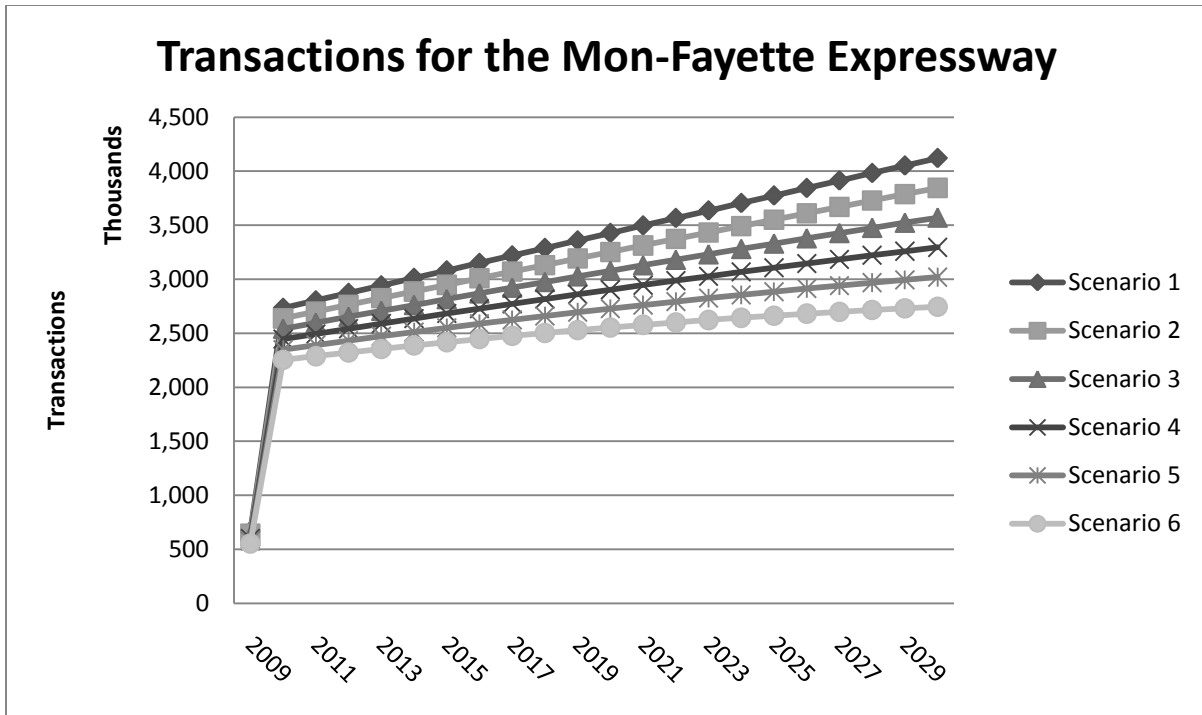


Figure 12. Predicted Transactions of All Vehicles for the Mon-Fayette Expressway.

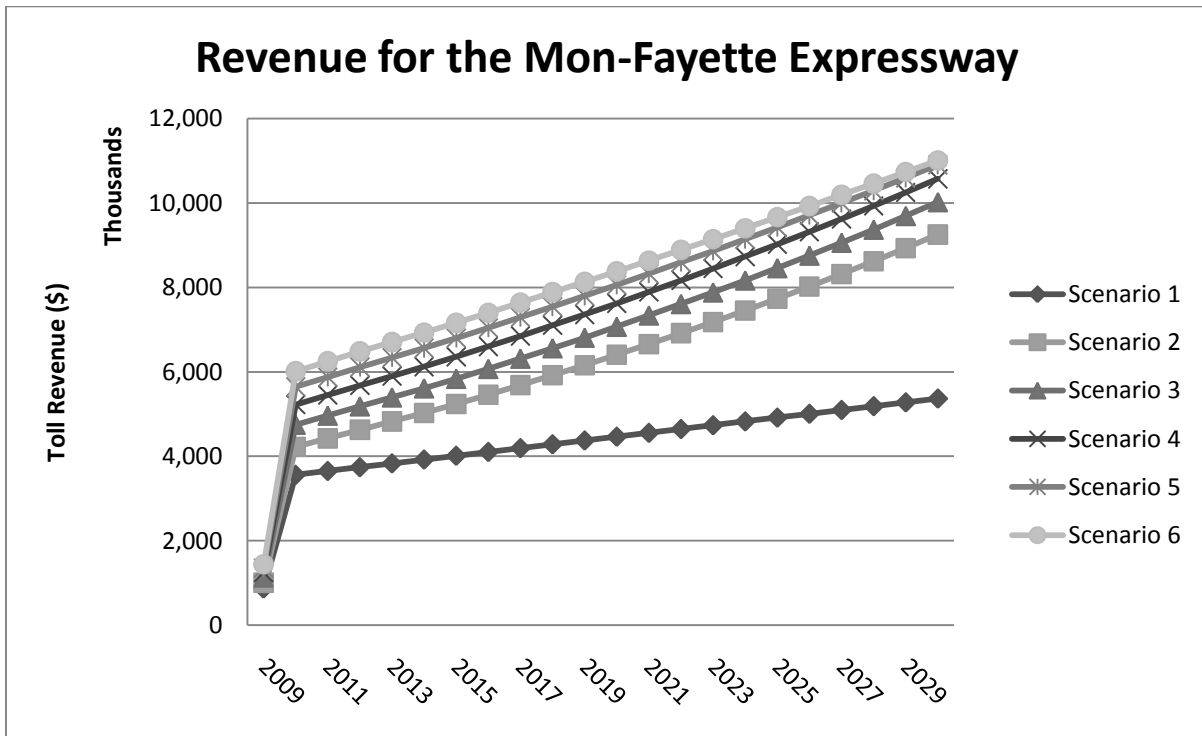


Figure 13. Predicted Revenue of All Vehicles for the Mon-Fayette Expressway.

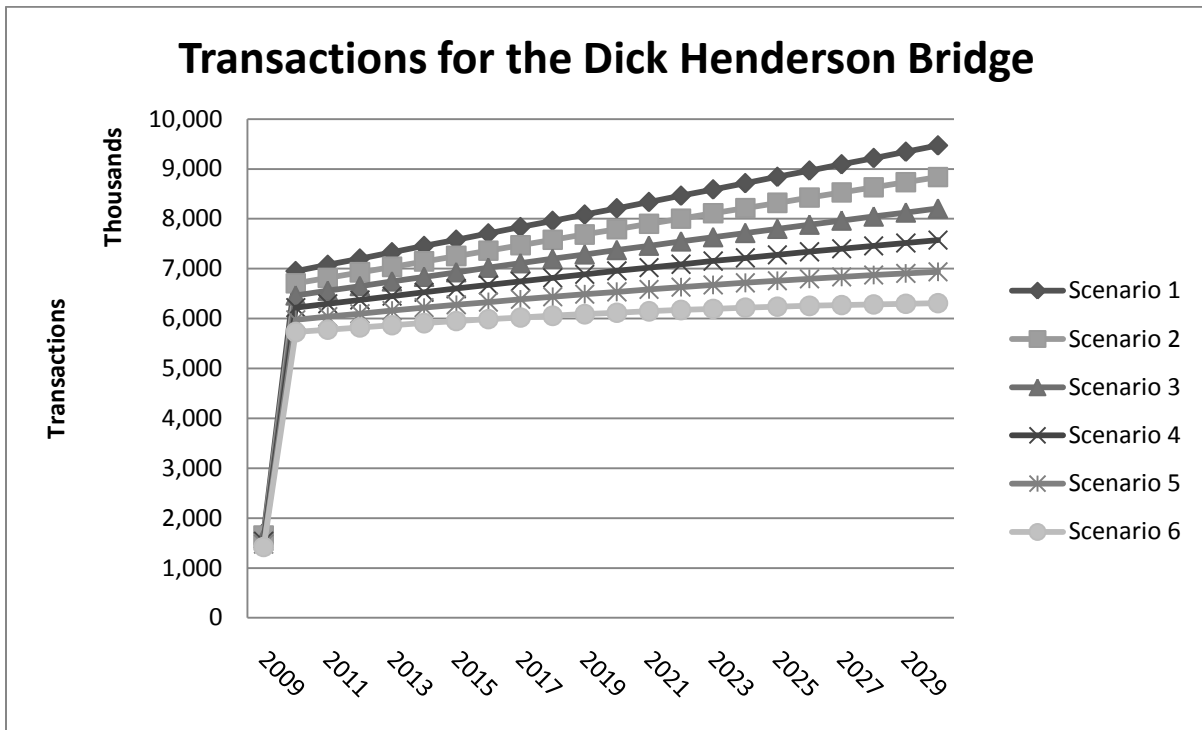


Figure 14. Predicted Transactions of All Vehicles for the Dick Henderson Bridge.

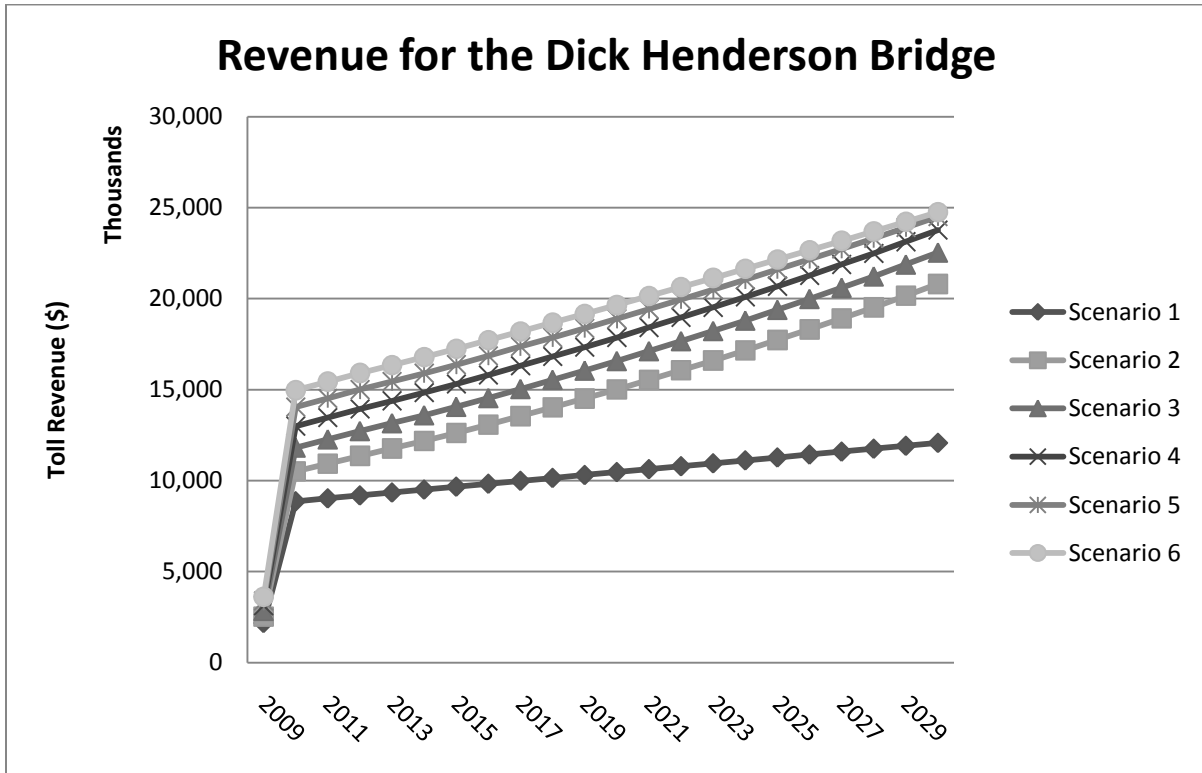


Figure 15. Predicted Revenue of All Vehicles for the Dick Henderson Bridge.

Chapter 7. Conclusions

Key findings of this study

This report provides the predicted traffic volume and revenue for the Wellsburg Bridge, US 35, the Mon-Fayette Expressway, and the Dick Henderson Bridge. For the predicted traffic volume, the results show that the toll rate increases are likely to reduce traffic volume of the proposed roads and bridges. For example, for the Wellsburg Bridge, the forecasted transactions of Scenario 1 (no toll increase) substantially increase from 2.9 million in 2010 to 3.5 million vehicles in 2030. However, Scenario 6 (100 percent toll increase in 2009 and PCEPI adjustment thereafter) shows a slight decrease in transactions from 2010 (2.38 million) to 2030 (2.34 million).

Using the predicted transactions, the toll revenue is estimated for the period of 2009-2030. The results show that marginal toll revenue of additional 20 percent increment tends to be larger for lower toll rates because of smaller offset effect of toll increase (reduced traffic volume). Marginal benefits of 20 percent toll increase are measured as the difference of revenues between Scenarios. For the 2030 predicted revenue from US 35, the marginal benefits are \$3.6 million from 20 percent to 40 percent toll increase (Scenario 2 to 3). However, they are \$2.6 million from 40 percent to 60 percent increase (Scenario 3 to 4), \$1.5 million from 60 percent to 80 percent increase (Scenario 4 to 5), and \$0.5 million from 80 percent to 100 percent increase (Scenario 5 to 6), respectively. This provides evidence that the initial 20 percent increase is likely to have the largest marginal revenue for a long term.

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Appendix

SunPass Toll versus Cash Toll

As indicated in Table 20, toll rates are differentiated between conventional cash customers and customers paying through the SunPass electronic toll collection (ETC) method on most Turnpike System facilities. The toll rates for cash and SunPass customers on the Polk Parkway, Suncoast Parkway and Western Beltway, Part C are the same because these are recent expansion projects. The March 2004 system-wide toll rate increase for cash customers was not implemented on the Polk Parkway and the Suncoast Parkway. Pricing preferences are provided to SunPass customers because the ETC method provides for increased throughput at the toll plazas, enhanced safety, and lower transaction processing costs.

Table 32. Florida's Turnpike System Current Toll Rates Per Mile for Two-Axle Vehicles.

Project	Length of Project (Miles)	SunPass Toll	SunPass Rate Per Mile	Cash Toll	Cash Rate Per Mile
Homestead Extension (HEFT)	47	\$2.75	\$0.059	\$4.00	\$0.085
Southern Coin System	43	\$2.00	\$0.047	\$2.75	\$0.064
Ticket System	155	\$9.40	\$0.061	\$11.70	\$0.075
Northern Coin System	67	\$3.00	\$0.045	\$3.75	\$0.056
Beachline West Expressway	8	\$0.50	\$0.063	\$0.75	\$0.094
Sawgrass Expressway	23	\$1.50	\$0.065	\$2.00	\$0.087
Seminole Expressway	18	\$1.50	\$0.083	\$2.00	\$0.111
Veterans Expressway	15	\$1.25	\$0.083	\$1.75	\$0.117
Southern Connector Extension	6	\$0.50	\$0.083	\$0.75	\$0.125
Polk Parkway	25	\$3.00	\$0.120	\$3.00	\$0.120
Suncoast Parkway	42	\$3.00	\$0.071	\$3.00	\$0.071
Western Beltway, Part C ^a	11	\$1.00	\$0.091	\$1.00	\$0.091

^aThe Western Beltway, Part C facility consists of eleven miles of roadway extending from I-4 in Osceola County to Seidel Road in Orange County. In December 2005, approximately five miles of the Turnpike section between Seidel Road and US 192 was opened to traffic. The remaining six miles of the Turnpike section opened in December of 2006.

Three-Plus Axle Vehicle (Truck) Toll

Only the toll for two-axle vehicles is provided in the above table. Two toll rate formulas are utilized on the Turnpike System to calculate truck tolls: the “n minus one” formula, and the “per-axle” formula. The n minus one formula is used for all Turnpike projects except for the Ticket System which utilizes the per-axle formula.

- N minus One = Number of vehicle axles, minus one, multiplied by the two-axle toll.
- Per-Axle = Number of vehicle axles, multiplied by the two-axle toll divided by two.

Toll Rate Setting

Section 338.231, Florida Statutes, authorizes the Department to fix and adjust toll rates on the Turnpike System and requires all toll rate changes to be implemented through the provisions of the Administrative Procedure Act (Chapter 120, Florida Statutes). This requires a published notice and the opportunity for a public hearing to solicit public comment before adoption of the proposed toll rate change.

Forecast of toll revenues