

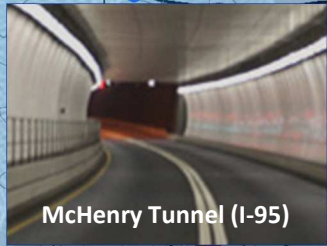
# Maryland Transportation Authority 2014 Traffic and Toll Revenue Forecast (Legacy Facilities)



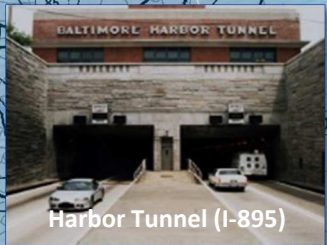
Kennedy Highway (I-95)



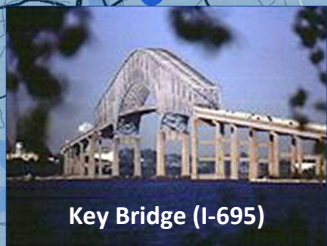
Hatem Bridge (US 40)



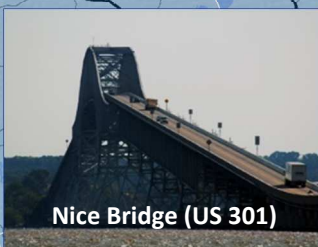
McHenry Tunnel (I-95)



Harbor Tunnel (I-895)



Key Bridge (I-695)



Nice Bridge (US 301)



Bay Bridge (US 50/301)

FINAL  
March 2015



**CDM  
Smith**

This traffic and revenue study was prepared for the seven legacy toll facilities owned and operated by the MDTA including the Thomas J. Hatem Memorial Bridge (Hatem Bridge), the John F. Kennedy Memorial Highway (Kennedy Highway); the Baltimore Harbor Tunnel (Harbor Tunnel); the Fort McHenry Tunnel (McHenry Tunnel), the Francis Scott Key Bridge (Key Bridge), the William Preston Lane Jr. Memorial Bridge (Bay Bridge) and the Harry W. Nice Memorial Bridge (Nice Bridge).

Two other toll facilities, the Intercounty Connector (ICC/MD 200) and the I-95 Express Toll Lanes<sup>SM</sup> are not addressed in this report.

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# Executive Summary

As the traffic and revenue consultant for the Maryland Transportation Authority (MDTA), CDM Smith conducted a traffic and revenue study for the seven legacy toll facilities operated by the MDTA. These seven facilities provide critical transportation infrastructure links for both local and regional movement of people and goods, and fulfill varied roles within the local and regional transportation system. Accordingly, they therefore serve a varied mix of passenger car and commercial vehicle traffic that make toll payments by E-ZPass®, video and cash methods. Collectively, these facilities generated \$574.1 million of In-Lane Toll Revenue in Fiscal Year (FY) 2014.

The seven facilities shown in Figure ES-1 have been grouped into three geographic regions of the state. These are the Northern, Central and Southern Regions. The Northern Region consists of the John F. Kennedy Memorial Highway and the Thomas J. Hatem Bridge; the Central Region the Fort McHenry Tunnel, the Baltimore Harbor Tunnel, and the Francis Scott Key Bridge; and the Southern Region the Harry W. Nice Memorial Bridge and the William Preston Lane Jr. Memorial (Bay) Bridge. All the facilities are on either Interstates or major US routes that cross bodies of water with very limited competing alternative routes.

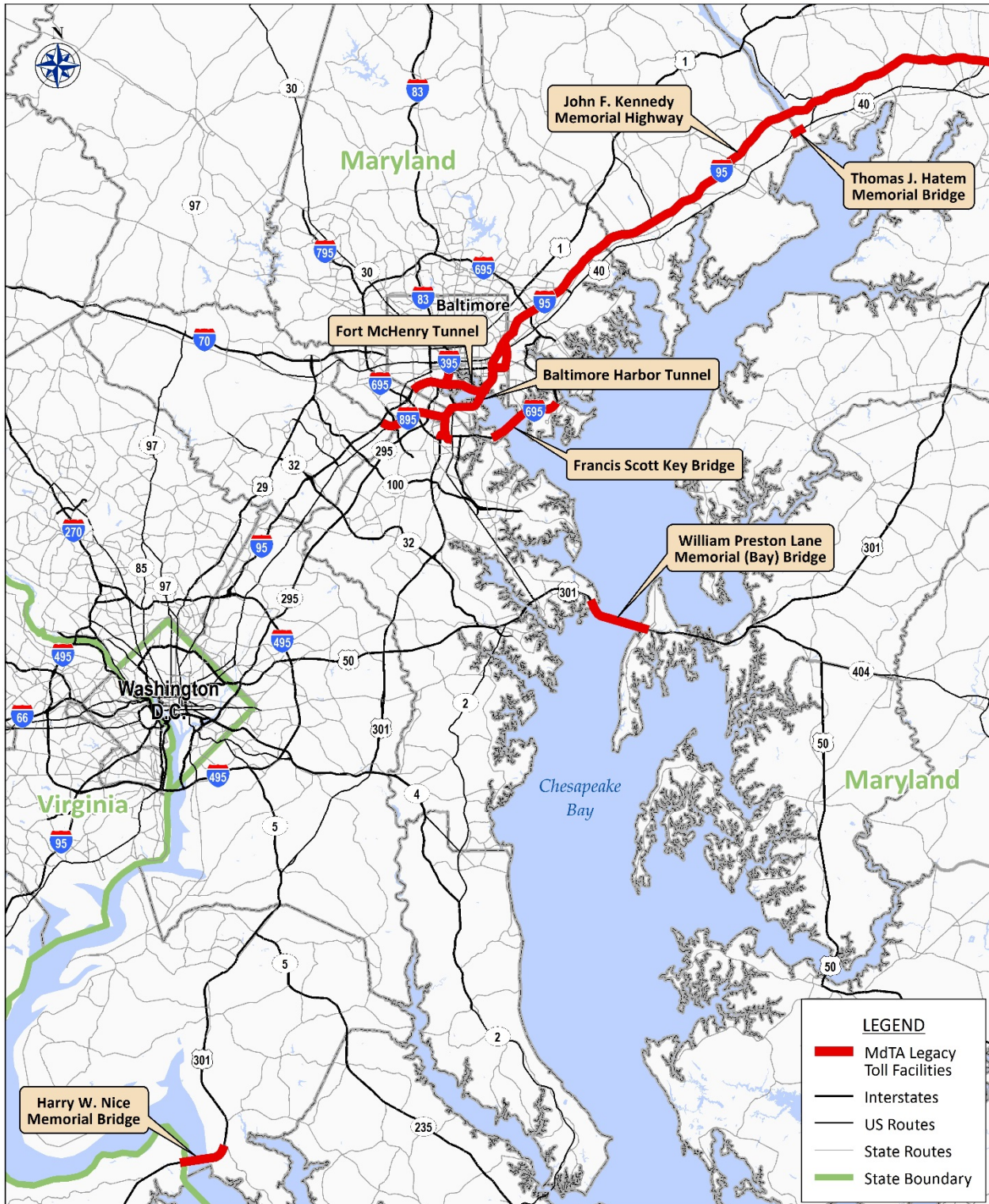
In the Northern Region, the Thomas J. Hatem Bridge and the John F. Kennedy Memorial Highway form two parallel crossings of the Susquehanna River. The Hatem Bridge carries US 40 across the river and is the oldest of the MDTA's facilities, having been open to traffic since August 1940. The existing structure replaced an older bridge that first opened in 1910. The John F. Kennedy Memorial Highway is a 50-mile segment of I-95 that was opened in November 1963. The mainline toll plaza is located just east of the Susquehanna River.

The Central Region contains three alternative routes to crossing Baltimore Harbor: the Baltimore Harbor Tunnel (I-895), the Francis Scott Key Bridge (I-695), and the Fort McHenry Tunnel (I-95). The oldest of the three Baltimore Harbor crossings is the Harbor Tunnel which opened in November 1957. The Key Bridge was built to alleviate congestion and delays at the Harbor Tunnel and was opened in March 1977. The newest MDTA facility, the McHenry Tunnel, an eight-lane, 1.5 mile crossing that opened in November 1985, completed the triplet of existing harbor crossings.

The Southern Region contains two facilities which carry US 301 to diverse destinations. The William Preston Lane Jr. Memorial (Bay) Bridge was first opened to traffic in July 1952 and crosses the Chesapeake Bay. Twenty-one years later in June 1973, a parallel span carrying westbound traffic was opened, with the original span carrying eastbound traffic. The Harry W. Nice Bridge was opened in December 1940, connecting Maryland with Virginia, thereby allowing travelers making regional through-trips to bypass the Washington DC area.

The objective of the study was to develop updated 10-year forecasts for each of the seven legacy facilities. The forecast period extended from FY 2015, beginning July 1, 2014, through FY 2024, ending June 30, 2024. The study made maximum use of all available data, including historical trend information by vehicle classification and methods of toll payment for each facility. The analysis also included a general overview of socioeconomic trends, both nationally and around the service areas of the tolled facility. Regression models were developed to aid in the understanding of the factors that explain travel demand in order to forecast transactions and revenue for each toll facility.

Figure ES-1  
Legacy Facility Location Map  
Maryland Toll Facilities





Transaction and toll revenue forecasts for the Intercounty Connector (ICC/MD 200), the State's first all-electronic, congestion-managed toll road, connecting the I-370 and I-95 corridors and the all-electronic, congestion-managed I-95 Express Toll Lanes<sup>SM</sup> project were not included in this report. Separate traffic and revenue studies have been performed for these facilities.

In addition to estimates of transactions and "In-Lane Toll Revenue" for the seven legacy toll facilities, estimates of "other toll revenue" and concession revenue available to the MDTA were prepared to provide a full picture of revenue potential through FY 2024. While historical and forecasted revenue are provided in Table ES-1, "Other Toll Revenue" by category are provided in Table ES-2, including items such as unused toll revenue, transponder sales, fees and discounts.

It should be noted that the forecasts are based on the current toll schedules implemented on July 1, 2013 and presented in Tables 1-1 through 1-3 of Chapter 1 and in Appendix A of this report. Furthermore, these forecasts assume no toll rate or schedule adjustments throughout the ten year forecast period.

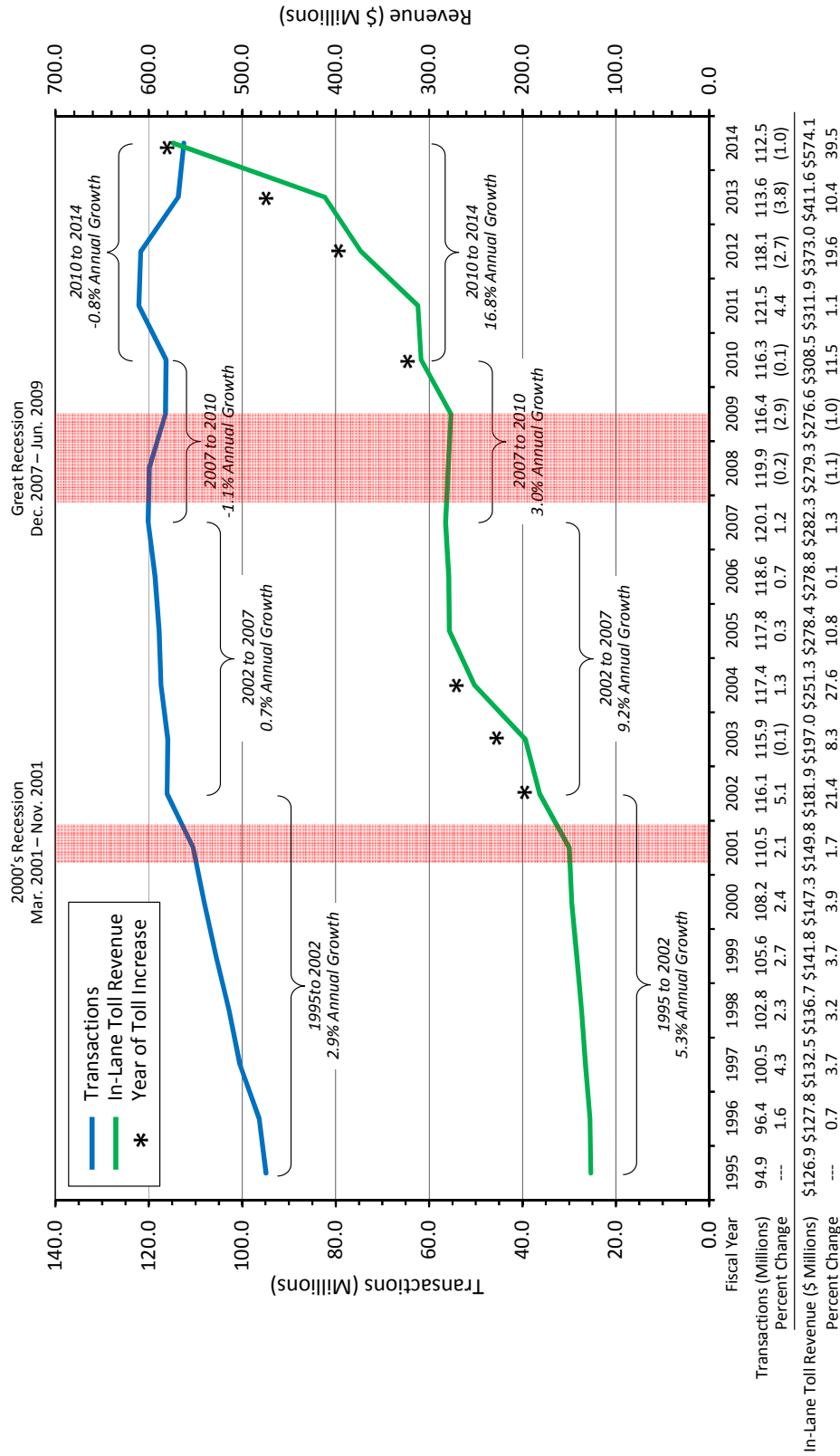
What follows in this executive summary is an overview of the full study effort including a review of historical transaction and revenue trends, relevant socioeconomic conditions, forecasting and the 10-year transaction and revenue forecasts.

## Historical Transaction and Revenue Trends

In the course of our work, a complete set of available historical traffic and economic data sets were compiled. Historical transaction and revenue trend data provided by the MDTA for each of the seven legacy toll facilities were reviewed, including regional traffic trends on adjacent competing highways. Regional trends were reviewed to better understand the context within which the MDTA facilities operate, including vehicle miles traveled (VMT) for Maryland and traffic counts on other major highways. Historical transactions and revenue trends for each of the legacy facilities were reviewed, as these trends served as inputs to the regression model used for developing the 10-year transaction and revenue forecasts. Additionally, E-ZPass<sup>®</sup> market penetration rates and vehicle classification distributions were also reviewed.

While transaction and revenue trends were reviewed for each facility, historical transaction and revenue data on a system-wide basis between FY 1995 and FY 2014 are described below and presented in Figure ES-2. Also shown in Figure ES-2 is the duration of recent recessions, as well as the year in which toll increases occurred. Even considering the recession which began in late FY 2001 and extended almost half way into FY 2002, transactions on a system-wide basis increased each year between FY 1995 and FY 2002 at a healthy average annual rate of 2.9 percent. However, during the five years from FY 2002 through FY 2007 which followed, transaction growth slowed to an average of 0.7 percent per annum. While this period predated the Great Recession, growth was likely influenced by the three toll increases which occurred in each year from FY 2002 through FY 2004. Following this period of continued annual growth (except for FY 2003), transactions declined between FY 2007 and FY 2010 by an average of 1.1 percent per year, most likely due to the impacts of the Great Recession and the FY 2010 toll increase. Transactions recovered in FY 2011, reaching a system high of 121.5 million, before decreasing annually through FY 2014 as a result of the toll increases which occurred each year from FY 2012 through FY 2014. Transactions in FY 2014 were 112.5 million, which were slightly greater than those processed during FY 2001. Average annual transaction growth for the MDTA legacy facilities on a systemwide basis was 0.9 percent per year during the 20-year period from

**Figure ES-2**  
**Systemwide Historical Transaction and Revenue Trends**



FY 1995 to FY 2014. However, during the last five years between FY 2009 and FY 2014, transactions decreased an average annual rate of 0.8 percent.

In-lane, systemwide toll revenue increased each year between FY 1995 and FY 2014, except in FY 2008 and FY 2009. As shown in Figure ES-2, between FY 1995 and FY 2002, toll revenue grew at an average annual rate of 5.3 percent, the result of the 2.9 percent per annum increase in transactions, combined with a 2.3 percent per annum growth in the average toll; the latter influenced almost exclusively by the FY 2010 toll increase. Over the next five years, a series of toll increases resulted in an average annual revenue increase of 9.2 percent per year. As a result of the decreases in transaction growth related to the Great Recession, revenues declined in FY 2008 by 1.1 percent and in FY 2009 by 1.0 percent. However, due to the FY 2010 toll increase, toll revenue between FY 2007 and FY 2010 grew at an average annual rate of 3.0 percent. Revenues have recovered in recent years, aided by a series of toll increases. Revenues were \$574.1 million in FY 2014, representing an average annual growth rate since FY 2010 of 16.8 percent. Overall, the average annual In-Lane Toll Revenue growth was 8.3 percent per year between FY 1995 and FY 2014.

## Socioeconomic Review

Vehicle travel on Maryland's tolled facilities occur for various reasons, including, but not limited to commuting, recreation, and commerce. Forecasting traffic on the MDTA system for the aforementioned reasons or otherwise is, to an extent, a function of determining projections of socioeconomic variables, such as population, employment and income, as these types of variables generally explain the levels of and growth in commuting, commerce, etc. Economic forecasts are often seen as one of the key sources of uncertainty in the forecasting process. Consequently, for any toll transaction and toll revenue projection, including those of the MDTA system, the economic growth forecast is one of the critical input data elements. Chapter 3 describes the historical and forecasted trends in the study area socioeconomics to provide the context for the transaction forecasts developed in this study. The socioeconomic trends review and analysis entailed a comprehensive data collection effort that included a host of different pertinent variables such as total population, employment, income, gasoline prices, and real gross regional product from a variety of public and private sources such as the BEA, Census, BLS, EIA, Woods & Poole Economics, and Moody's Analytics.

In general, the economic and demographic review revealed that having endured the great recession and the relatively sluggish recovery in the recent past, the general macroeconomic environment in the U.S., Maryland, the South and Mid-Atlantic Regions has lately been strengthening, which is likely to bode well for the area in the near future. Within Maryland, the Southern sub-state planning region is projected to experience particularly strong growth with respect to most of the analyzed measures relative to the other Maryland regional groupings.

Furthermore, a majority of credible forecasting agencies (both public and private) are now publishing expectations for continued economic output, employment and income expansion, accompanied by only moderate inflation within the short to medium-term future. However, while labor markets along with the larger economic activity measures, continued to improve into 2014, the uneven nature of this strengthening has persisted. A number of risks, such as the fragility of the nascent European recovery including sanctions between Russia and the West, a slowdown in some of the major Asian and Latin American trading partners, exacerbated threats of extremism in the Middle East, and the public sector fiscal difficulties and constraints still remain a headwind on growth in the short-term, as the larger U.S. and global economies are trying to gain a stronger expansionary momentum.

Therefore, it is our belief as reflected in the growth forecasts, that while the growth momentum is generally strengthening and broadening, one should be cautiously optimistic about the ongoing economic expansion that is likely to be experienced in the MDTA geographic influence areas. It is believed that this may translate into continued modest increases in traffic demand on the MDTA tolled facilities over the coming decade. There are, however, other factors such as toll rates and/or transportation network changes beyond the overall socioeconomic growth that can also influence the pace of traffic growth on the MDTA legacy system.

## Forecasts of Traffic and Revenue

Regression models were used as the initial basis for the transaction and In-Lane Toll Revenue forecasts. The regression models attempted to determine the degree to which various independent variables such as tolls, population, employment, gross domestic product (GDP), and others were correlated with the dependent variable (transactions). Each independent variable was tested based on quarterly transaction data by toll facility, vehicle classification, and method of toll payment using historical transaction, socioeconomic, and other data.

The correlated independent variables combined with their applicable forecasts were then used in the transactions forecasting. Transactions were forecasted by facility, vehicle class, and method of toll payment based on the forecasts of the independent variables and the observed historical relationships between the independent variables and transactions. Subsequently, in some cases, adjustments were made to account for historical growth patterns, and potential short-term construction impacts associated with major planned highway improvements.

A summary of both historical and forecasted transactions and In-Lane Toll Revenue from FY 2004 through FY 2024 by facility and aggregated to the total MDTA system is presented in Table ES-1 and shown graphically in Figure ES-3. The forecasts are also provided by facility and vehicle class in Appendix B. Total actual systemwide transactions for FY 2014 was 112.5 million and is forecasted to grow to 119.3 million by FY 2024, or a total of 6.1 percent during the 10-year forecast period. This equates to an average annual growth rate of 0.6 percent per annum. Total transactions are forecasted to reach 115.1 million by FY 2019, a growth of 2.3 percent over FY 2014. From FY 2019 to FY 2024 transactions are forecasted to increase from 115.1 million to 119.3 million, or a total of 3.7 percent. The revenue follows similar growth trends, increasing by a total of 6.5 percent from \$574.1 million in FY 2014 to \$611.5 million in FY 2024, also equating to an average annual change of 0.6 percent.

In addition to the forecasted transactions and In-Lane Gross Toll Revenue, forecasts of various other revenue sources for the MDTA were developed. These include unused toll revenue through the commuter program, transponder sales, monthly E-ZPass® account fees, notice of toll due fees, violation fees, commercial discounts, over-size permits, concession revenues and revenue associated with the Hatem E-Z Pass program. The “Other Revenue” forecasts, along with In-Lane and total legacy system revenue are provided in Table ES-2.

**Table ES-1**  
**Historical and Forecasted Transactions and In-Lane Toll Revenue**

Fiscal Year	Transactions (millions)								Percent Change
	JFK	Hatem	BHT	FMT	FSK	Bay	Nice	Total	
2004 <sup>(1)</sup>	15.20	5.50	25.90	42.70	12.00	12.90	3.20	117.40	-
2005 <sup>(1)</sup>	15.00	5.60	25.50	43.50	12.10	13.00	3.20	117.80	0.3
2006	14.74	5.56	26.26	43.57	11.89	13.27	3.36	118.65	0.7
2007	14.84	5.56	25.74	44.85	12.20	13.49	3.42	120.11	1.2
2008	14.65	5.56	25.77	44.83	12.34	13.37	3.39	119.91	(0.2)
2009	14.64	5.04	25.53	43.45	11.69	12.75	3.35	116.45	(2.9)
2010 <sup>(1)</sup>	14.75	4.99	25.23	44.06	10.96	12.99	3.35	116.33	(0.1)
2011	15.38	5.07	26.12	46.29	11.65	13.56	3.40	121.46	4.4
2012 <sup>(1)</sup>	14.82	5.03	25.75	44.52	11.05	13.67	3.29	118.13	(2.7)
2013 <sup>(1)</sup>	14.58	4.56	23.97	43.58	10.92	12.74	3.26	113.61	(3.8)
2014 <sup>(1)</sup>	14.38	4.95	24.90	41.88	10.42	12.76	3.24	112.52	(1.0)
2015	14.26	4.96	26.03	39.98	10.94	12.86	3.33	112.36	(0.1)
2016	14.37	5.00	25.04	41.11	11.20	13.04	3.38	113.14	0.7
2017	14.54	5.03	24.55	41.72	11.34	13.19	3.39	113.75	0.5
2018	14.66	5.06	24.55	42.07	11.41	13.29	3.39	114.44	0.6
2019	14.77	5.09	24.58	42.38	11.48	13.38	3.40	115.08	0.6
2020	14.88	5.13	24.62	42.67	11.54	13.47	3.40	115.70	0.5
2021	14.99	5.16	25.75	42.49	11.59	13.56	3.40	116.94	1.1
2022	15.12	5.19	25.94	42.85	11.65	13.67	3.41	117.82	0.7
2023	15.26	5.22	26.00	43.22	11.71	13.78	3.41	118.60	0.7
2024	15.39	5.25	26.05	43.57	11.77	13.88	3.42	119.33	0.6

## Average Annual Percent Change:

2004-2014	(0.6)	(1.1)	(0.4)	(0.2)	(1.4)	(0.1)	0.1	(0.4)
2014-2024	0.7	0.6	0.5	0.4	1.2	0.8	0.5	0.6

Fiscal Year	Toll Revenue (\$ millions)								Percent Change
	JFK	Hatem	BHT	FMT	FSK	Bay	Nice	Total	
2004 <sup>(1)</sup>	\$ 88.70	\$ 3.70	\$ 30.70	\$ 68.00	\$ 16.70	\$ 33.60	\$ 9.90	\$ 251.30	-
2005 <sup>(1)</sup>	94.60	3.70	34.70	82.70	19.20	33.50	10.00	278.40	10.8
2006	93.50	3.95	35.64	82.39	18.82	34.02	10.48	278.80	0.1
2007	94.62	3.82	35.11	84.68	19.24	34.39	10.43	282.30	1.3
2008	92.71	3.89	35.33	84.03	19.41	33.88	10.08	279.33	(1.1)
2009	95.14	2.07	35.61	82.97	18.56	32.51	9.77	276.63	(1.0)
2010 <sup>(1)</sup>	107.35	2.61	37.01	94.02	20.54	36.79	10.15	308.47	11.5
2011	107.39	2.82	37.85	95.32	20.78	37.62	10.15	311.92	1.1
2012 <sup>(1)</sup>	116.01	5.25	48.74	118.82	25.82	46.74	11.60	372.98	19.6
2013 <sup>(1)</sup>	121.86	7.80	52.05	135.61	28.94	52.40	12.97	411.62	10.4
2014 <sup>(1)</sup>	162.80	10.17	77.56	183.13	40.26	79.76	20.40	574.08	39.5
2015	161.37	10.44	81.23	177.46	42.48	80.93	21.19	575.10	0.2
2016	162.86	10.62	78.09	179.70	43.38	81.93	21.74	578.32	0.6
2017	164.89	10.75	76.53	181.88	43.84	82.79	21.99	582.66	0.8
2018	166.28	10.87	76.53	183.13	44.10	83.36	22.14	586.40	0.6
2019	167.32	10.97	76.65	184.21	44.35	83.82	22.21	589.52	0.5
2020	168.40	11.06	76.77	185.26	44.58	84.32	22.28	592.67	0.5
2021	169.54	11.15	80.40	186.34	44.80	84.86	22.37	599.45	1.1
2022	170.96	11.24	80.96	187.61	45.02	85.45	22.48	603.72	0.7
2023	172.45	11.33	81.16	188.92	45.25	86.07	22.58	607.77	0.7
2024	173.79	11.42	81.33	190.15	45.47	86.68	22.67	611.50	0.6

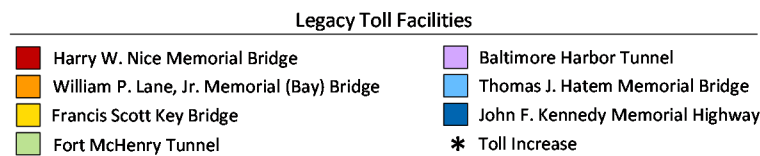
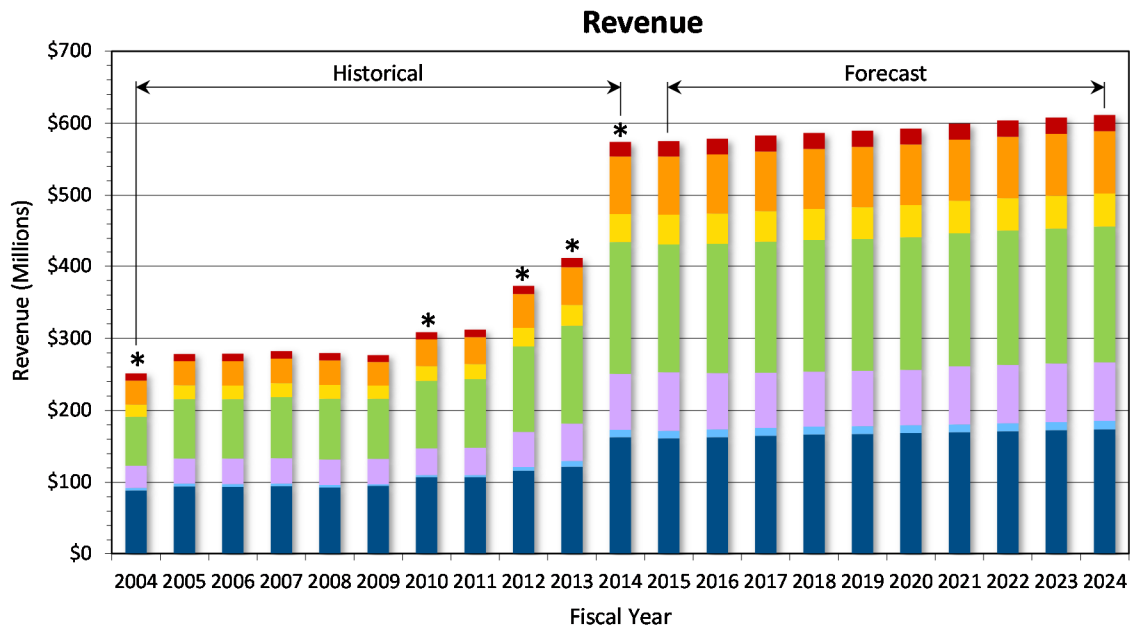
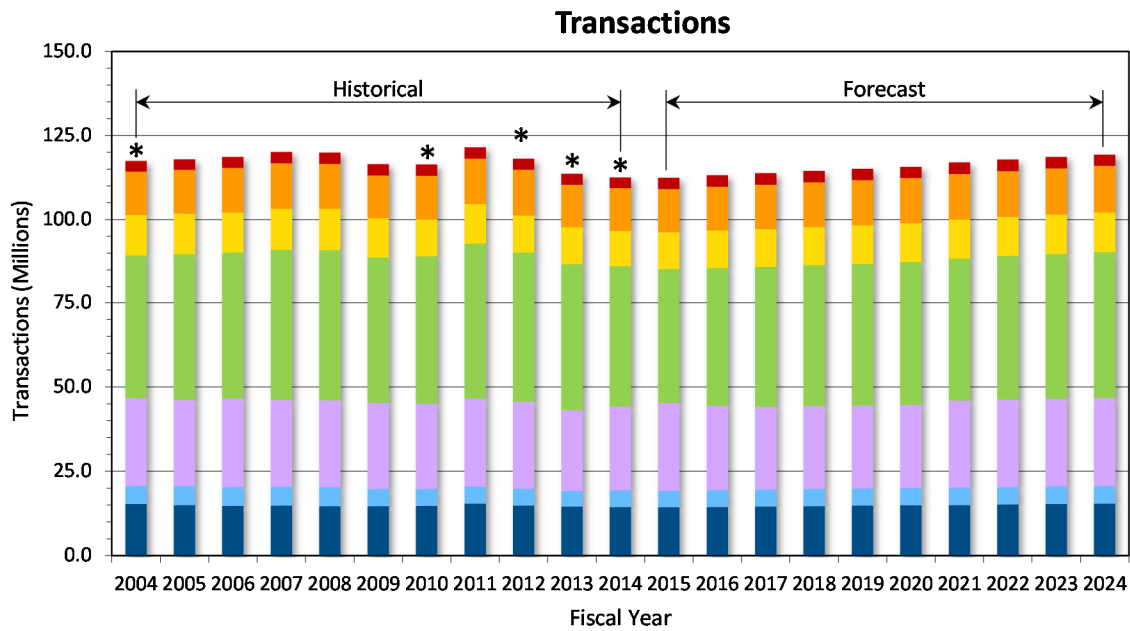
## Average Annual Percent Change:

2004-2014	6.3	10.6	9.7	10.4	9.2	9.0	7.5	8.6
2014-2024	0.7	1.2	0.5	0.4	1.2	0.8	1.1	0.6

<sup>(1)</sup> Year of toll increase.

- Represents actual data.

**Figure ES-3**  
**Historical and Forecasted Transactions and In-Lane Toll Revenue**



**Table ES-2  
Historical and Forecasted In-Lane and Other Revenue**

**Legacy Facilities**

Fiscal Year	Service Fees and Sales										Violation Recovery										Commercial Vehicles										Total Revenue	Percent Change
	In-Lane Toll Revenue	Unused Pre-Trip Paid Revenue	Transponder Sales	Monthly Account Fees	Notice of Toll Due Fees	Civil Penalties	Violation Fees	Commercial Vehicle Post-Usage Discount	Commercial Vehicle High Frequency Discount	Over-size Permit Fee	Concession Revenue <sup>(2)</sup>	Hatem E-Z Pass Program	Total 'Other' Revenue	Total Revenue	Percent Change																	
2004	(1) 251.30	2.00	-	-	-	-	0.80	(2.30)	-	-	-	8.10	8.60	259.90	-																	
2005	(1) 278.50	2.80	-	-	-	-	1.50	(3.90)	-	-	-	8.00	8.40	286.90	10.4																	
2006	278.80	3.50	-	-	-	-	2.80	(4.50)	-	-	-	7.80	9.60	288.40	0.5																	
2007	282.30	4.00	-	-	-	-	3.00	(4.80)	-	-	-	8.10	10.30	292.60	1.5																	
2008	279.30	4.30	-	-	-	-	3.00	(5.00)	-	-	-	8.00	10.30	289.60	(1.0)																	
2009	276.60	4.50	-	-	-	-	1.90	(4.80)	-	-	-	8.00	9.60	286.20	(1.2)																	
2010	308.50	6.60	1.40	9.60	1.10	-	2.30	(6.60)	1.00	1.00	8.20	23.40	331.90	16.0																		
2011	312.00	6.50	1.90	9.90	1.30	-	1.30	(6.70)	1.20	1.20	7.90	23.00	335.00	0.9																		
2012	373.00	9.10	1.70	4.70	0.80	-	2.80	(5.90)	1.30	1.30	7.60	22.20	395.20	18.0																		
2013	(1) 411.60	11.50	1.30	5.30	0.10	-	4.00	(4.60)	1.30	1.30	4.10	23.10	434.70	10.0																		
2014	(1) 574.08	18.69	1.22	5.75	0.00	4.55	0.04	(5.89)	1.04	1.04	3.23	29.48	603.56	38.8																		
2015	575.10	18.79	1.23	5.81	-	4.59	-	(5.92)	1.05	1.05	5.48	31.89	606.99	0.6																		
2016	578.32	18.88	1.23	5.87	-	4.68	-	(5.95)	1.06	1.06	5.91	32.54	610.86	0.6																		
2017	582.66	18.98	1.24	5.93	-	4.78	-	(5.98)	1.07	1.07	5.99	32.87	615.54	0.8																		
2018	586.40	19.07	1.25	5.99	-	4.87	-	(6.01)	1.08	1.08	6.08	33.20	619.59	0.7																		
2019	589.52	19.17	1.25	6.05	-	4.97	-	(6.04)	1.09	1.09	6.16	33.53	623.04	0.6																		
2020	592.67	19.26	1.26	6.11	-	5.07	-	(6.07)	1.10	1.10	6.24	33.84	626.51	0.6																		
2021	599.45	19.36	1.27	6.17	-	5.17	-	(6.10)	1.11	1.11	6.32	34.18	633.63	1.1																		
2022	603.72	19.46	1.27	6.23	-	5.17	-	(6.13)	1.12	1.12	6.48	34.49	638.21	0.7																		
2023	607.77	19.55	1.28	6.29	-	5.17	-	(6.16)	1.14	1.14	7.38	35.54	643.31	0.8																		
2024	611.50	19.65	1.29	6.35	-	5.17	-	(6.20)	1.15	1.15	7.48	35.79	647.29	0.6																		

Source: Historical data from MDTA.

<sup>(1)</sup> Year of toll increase.

<sup>(2)</sup> Concession Revenue Forecast is 90% of the estimated concession revenue as prepared by Aeras Inc., other projections by CDM Smith.

- Represents actual data.

## Forecast Comparison

In order to set the context for the current forecast, this section provides a comparison of prior revenue forecasts to the actual revenue collected by MDTA, as well as a comparison of the most recent prior forecast to the current forecast.

Table ES-3 provides prior forecasts of In-Lane Toll Revenue and Total Revenue from FY 2009 through FY 2013, as well as the actual In-Lane Toll Revenue and Total Revenue collected by MDTA. In general, this table provides an indication of the reasonableness of recent forecasts. The table identifies the year the forecast was prepared, the fiscal year being forecasted and the accuracy of those forecasts for both In-Lane Toll Revenue and Total Revenue. Actual revenue has always been higher than the forecasts, with the most recent fiscal year, FY 2014, being 5.8 percent above the forecast.

Year Forecast Prepared	Fiscal Year Forecasted	Forecast <sup>(1)</sup>		Actual		Percent Difference	
		In-Lane Toll Revenue	Total Revenue	In-Lane Toll Revenue	Total Revenue	In-Lane Toll Revenue	Total Revenue
2009	2010	\$ 294.4	\$ 315.3	\$ 308.5	\$ 331.8	4.8	5.2
2009	2011	295.6	315.9	312.0	335.0	5.5	6.0
2010	2011	307.6	331.0	312.0	335.0	1.4	1.2
2011	2012	367.1	387.2	373.0	397.3	1.6	2.6
2011	2013	409.0	425.9	411.6	440.6	0.6	3.5
2012	2013	411.4	434.4	411.6	440.6	0.0	1.4
2013	2014	540.3	570.3	574.1	603.6	6.3	5.8

<sup>(1)</sup> Forecasts not prepared by CDM Smith

Table ES-4 provides a comparison of the last 10-year forecast prepared in 2013 to the current, 2014 forecast, including the totals from FY 2014 through FY 2023. Highlighted in blue is the 2014 actual Total Revenue collected, which was 5.8 percent higher than the forecast. Considering the initial higher FY 2014 base, the difference in Total Revenue from FY 2014 to FY 2023 is 4.3 percent.

Fiscal Year	Total Revenue		
	2013 Forecast <sup>(1)</sup>	2014 Forecast <sup>(2)</sup>	Difference
2014	\$ 570.3	\$ 603.6	5.8
2015	578.9	607.0	4.9
2016	583.2	610.9	4.7
2017	583.5	615.5	5.5
2018	589.1	619.0	5.1
2019	598.5	623.0	4.1
2020	607.9	626.5	3.1
2021	612.5	633.6	3.4
2022	618.0	638.2	3.3
2023	623.5	643.3	3.2
<b>Total</b>	<b>\$ 5,965.4</b>	<b>\$ 6,220.6</b>	<b>4.3</b>

<sup>(1)</sup> Forecast not prepared by CDM Smith.  
<sup>(2)</sup> Forecast prepared by CDM Smith.



# Chapter 1

## Introduction

Under contract to the Maryland Transportation Authority (MDTA), CDM Smith conducted a Traffic and Revenue Study for the legacy bridges, tunnels, and highways currently operated by the MDTA. The study culminated in the development of 10-year transaction and revenue estimates for each facility through FY2024. This report summarizes the study effort including existing traffic levels for the legacy facilities, relevant socioeconomic conditions, forecast methodology and the 10-year transaction and revenue forecasts.

### 1.1 System Description and History

The seven legacy toll facilities currently owned and operated by the MDTA across the State of Maryland include:

- Thomas J. Hatem Memorial Bridge (Hatem Bridge)
- John F. Kennedy Memorial Highway, excluding the Express Toll Lanes (Kennedy Highway)
- Baltimore Harbor Tunnel (Harbor Tunnel)
- Fort McHenry Tunnel (McHenry Tunnel)
- Francis Scott Key Bridge (Key Bridge)
- William Preston Lane Jr. Memorial Bridge (Bay Bridge)
- Harry W. Nice Memorial Bridge (Nice Bridge)

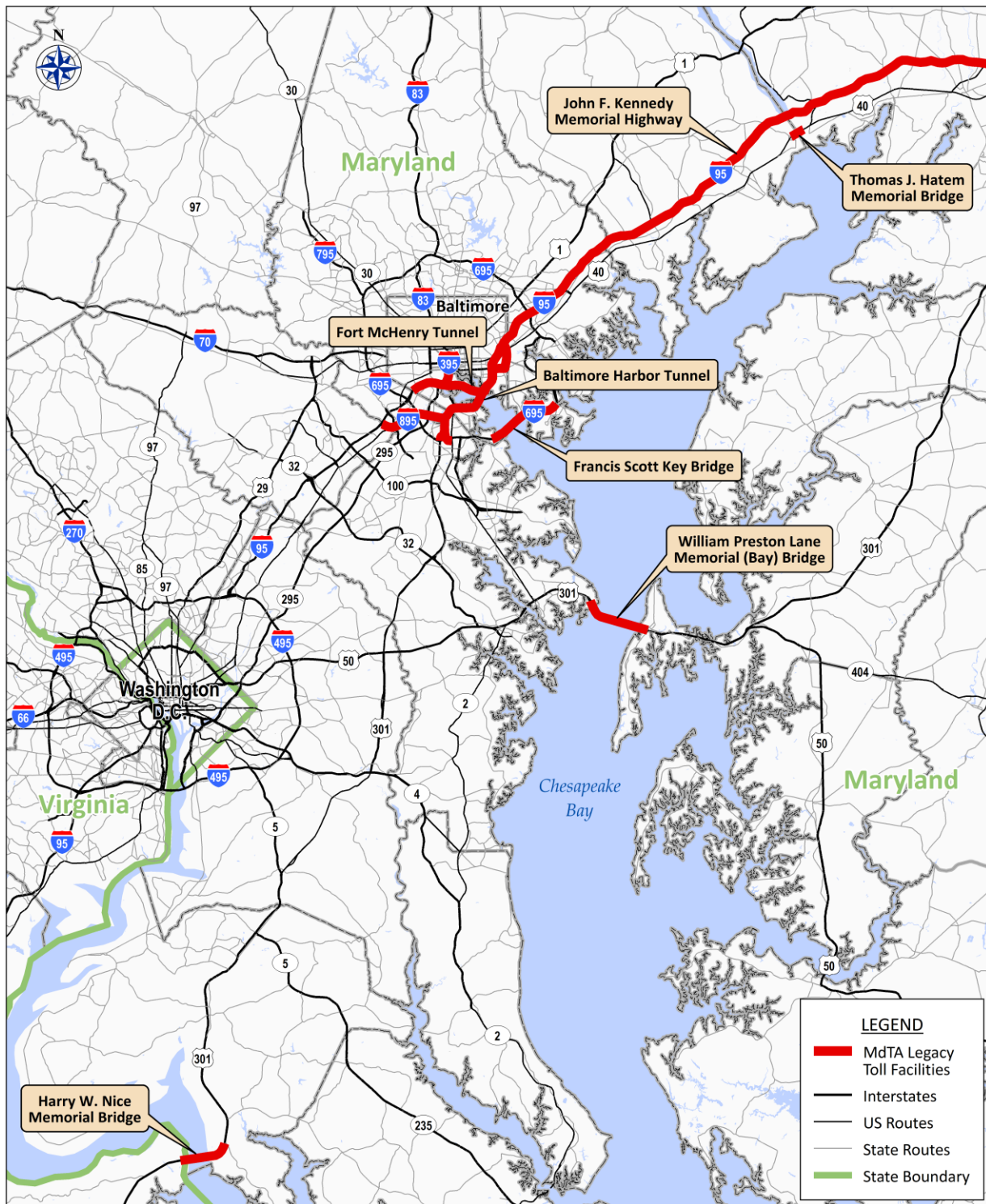
The Intercounty Connector (ICC/MD 200), the State's first all-electronic, congestion-managed toll road connecting the I-370 and I-95 corridors and the all-electronic congestion-managed I-95 Express Toll Lanes<sup>SM</sup> project are not addressed in this report. Separate traffic and revenue studies have been performed for these facilities.

The objective of this analysis was to develop updated 10-year forecasts for each of the seven legacy facilities. The forecast period extends from FY 2015, beginning July 1, 2014, through FY2024, ending June 30, 2024. The study made maximum use of all available data, including historical trend information by vehicle category and toll payment category for each facility. The analysis also includes a general overview of economic trends, both nationally and within the service areas of each facility. Regression models were developed to aid in the understanding of factors that help explain travel demand in order to forecast transactions and revenue for each toll facility.

#### 1.1.1 System Description

Figure 1-1 shows the locations of the seven MDTA legacy facilities in a regional context. The legacy facilities fulfill varied roles within the local and regional transportation system and consequently have a mix of traffic, including both E-ZPass<sup>®</sup>, video and cash customers. Collectively, these facilities generated \$574.1 million of in-lane toll revenue in FY 2014.

**Figure 1-1**  
**Legacy Facility Location Map – Maryland Toll Facilities**



The MDTA has separated the seven toll facilities into three regions. The Northern Region consists of the John F. Kennedy Memorial Highway and the Thomas J. Hatem Bridge. The Central Region consists of the Fort McHenry Tunnel, the Baltimore Harbor Tunnel, and the Francis Scott Key Bridge. The Southern Region consists of the Harry W. Nice Memorial Bridge and the William Preston Lane Jr. Memorial (Bay) Bridge.

In the Northern Region, the Thomas J. Hatem Bridge and the John F. Kennedy Memorial Highway form two parallel crossings of the Susquehanna River. The Hatem Bridge carries US 40 across the river and is the oldest of the MDTA's facilities, having been open to traffic since August 1940. The existing structure replaced an older bridge that first opened in 1910. The John F. Kennedy Memorial Highway is a 50-mile segment of I-95 that was opened in November 1963. The mainline toll plaza is located just northeast of the Susquehanna River.

The Central Region contains three alternative routes that cross Baltimore Harbor: the Baltimore Harbor Tunnel (I-895), the Francis Scott Key Bridge (I-695), and the Fort McHenry Tunnel (I-95). The oldest of the three Baltimore Harbor crossings is the Harbor Tunnel which opened in November 1957. The Key Bridge was built to alleviate congestion and delays at the Harbor Tunnel and was opened in March 1977. The newest of these facilities, the McHenry Tunnel, an eight-lane crossing that opened in November 1985, completed the triplet of existing harbor crossings.

The Southern Region contains two facilities which carry US 301 to diverse destinations. The William Preston Lane Jr. Memorial (Bay) Bridge was first opened to traffic in July 1952 and crosses the Chesapeake Bay. Twenty-one years later in June 1973, a parallel span carrying westbound traffic was opened, with the original span carrying eastbound traffic. The Harry W. Nice Bridge was opened in December 1940, connecting Maryland with Virginia, thereby allowing travelers making regional through-trips to bypass the Washington DC area.

### 1.1.2 Toll Rate Structure and History

An understanding of the structure of payment options for MDTA customers was necessary in developing the traffic and revenue forecasts. Since different method of payment categories tend to have different travel patterns, values of time, trip frequencies and trip preferences, the traffic and revenue forecasts were also developed by method of payment category. This necessitated an understanding of the various payment options offered by MDTA, a summary of which is provided here.

MDTA customers have the option of paying their toll through a variety of toll payment options. The MDTA legacy facility customers can pay via E-ZPass®, video tolling or cash methods. In general, Maryland registered E-ZPass® customers receive a discount over cash customers, while E-ZPass® customers with transponders from out-of-state pay the same base toll rate as the cash customers. Video tolling customers pay a 50 percent surcharge over the base toll rate. MDTA also offers several discount programs for commuters, shoppers using the Bay Bridge, motorists using the Hatem Bridge, and high volume and frequent-user commercial vehicle accounts. Some of these discounts are substantial, such as the Hatem Discount Plans, which provide customers with unlimited trips on the Hatem Bridge for a flat annual fee of \$20. The current toll rate schedules, along with the most recent toll rate changes are provided by Region in Tables 1-1 through 1-3.

The two Northern Region facilities employ a one-way toll collection system; that is round-trip tolls are collected in the eastbound and northbound directions only. Hence, the round-trip tolls are generally the same as those of the Central Region toll facilities. The base toll is \$8.00 for passenger cars, with

the video toll at \$12.00 including a 50 percent surcharge. Maryland two-axle, E-ZPass® customers receive a 10 percent discount, or a toll of \$7.20. For the Northern Region facilities, commuter tolls are offered for two-axle vehicles with a Maryland E-ZPass® Commuter Plan, which includes 50 trips and costs \$70.00 or \$1.40 per trip. Since the Northern Region facilities utilize one-way tolling, two "trips" are required per transaction, making the effective toll rate \$2.80 per transaction or a 65 percent discount over the base toll rate. Vehicles with three-or-more axles are charged progressively higher rates, as shown in Table 1-1.

Special discounts are available at the Hatem Bridge. Currently, two plans are offered: Hatem Plan A and Hatem Plan B. Both plans provide unlimited trips to two-axle E-ZPass® account holders for a flat annual fee of \$20. Plan A does not include account fees, prepaid toll deposits or account statements. However, an E-ZPass® account under Plan A cannot be used at other toll facilities or combined with other Maryland E-ZPass® discounts. Plan B is an add-on to a standard Maryland E-ZPass® account and is subject to the standard fees and pre-paid toll deposits. In addition, E-ZPass® accounts under Plan B can be used at other toll facilities and combined with other Maryland E-ZPass® discounts, with the exception of the Intercounty Connector.

Tolls are collected in both directions at the three Baltimore Harbor crossings that comprise the Central Region. Passenger cars pay a base toll of \$4.00. Video customers pay \$6.00, which includes a 50 percent surcharge, while Maryland two-axle, E-ZPass® customers receive a 10 percent discount with a toll of \$3.60. Commuter discounts are offered to two-axle vehicles with a Maryland E-ZPass® Commuter Plan, which includes 50 trips at a cost of \$70.00, making the effective toll rate \$1.40 per transaction or a 65 percent discount over the base toll rate. As shown in Table 1-2, vehicles with three-or-more axles are charged progressively higher rates.

The two Southern Region facilities utilize one-way toll collection. The base toll is \$6.00 for passenger cars, with a video toll of \$9.00, including a 50 percent surcharge. Maryland two-axle, E-ZPass® customers receive a 10 percent discount, or a toll of \$5.40. For the Southern Region facilities, commuter discounts are offered to two-axle vehicles with a Maryland E-ZPass® Commuter Plan, which includes 25 trips at a cost of \$52.50, making the effective toll \$2.10 per transaction or a 65 percent discount over the base toll. Vehicles with three-or-more-axles are charged progressively higher tolls, as shown in Table 1-3.

Another discount option is offered specifically to motorists using the Bay Bridge. The E-ZPass® Maryland Shoppers' Plan is for MDTA E-ZPass® holders. The plan costs \$30.00 for 10 trips, an average cost of \$3.00 per trip. The plan is valid for 90 days and can be used on Sundays through Thursdays only.

Business accounts that operate vehicles with five-or-more-axles may qualify for a post-usage discount based on total tolls paid in 30-day cycles. The first 30-day cycle begins with the first use of the transponder. Discounts vary from 10 to 20 percent based on the total toll usage during the cycle and are credited back to the account 30 days after the completion of a cycle. In addition, the supplemental rebate program provides rebates to individual vehicles with five-or-more-axles and Maryland E-ZPass® transponders that make 60 or more trips per month.

**Table 1-1  
Northern Region Toll Rates**

		John F. Kennedy Memorial Highway (I-95) and Thomas J. Hatem Memorial Bridge (US 40) <sup>(1)</sup>			
Method of Payment	Vehicle Class	Before	After	After	After
		Nov. 1, 2011	Nov. 1, 2011	Jan. 1, 2012	July 1, 2013
Maryland E-ZPass®	Commuter, 2-axles <sup>(2)</sup>	\$0.80	\$1.50	**	\$2.80
	Class 2 2-axles	\$5.00	\$5.40	**	\$7.20
Cash / Base	Class 2 2-axles	\$5.00	\$6.00	**	\$8.00
	Class 3 3-axles	\$15.00	**	\$12.00	\$16.00
	Class 4 4-axles	\$23.00	**	\$18.00	\$24.00
	Class 5 5-axles <sup>(3)(4)</sup>	\$30.00	**	\$36.00	\$48.00
	Class 6 6+-axles <sup>(3)(4)</sup>	\$38.00	**	\$45.00	\$60.00
	Video	Class 2 2-axles	\$8.00	\$9.00	**
	Class 3 3-axles	\$18.00	\$22.50	\$18.00	\$24.00
	Class 4 4-axles	\$26.00	\$34.50	\$27.00	\$36.00
	Class 5 5-axles	\$33.00	\$45.00	\$51.00	\$63.00
	Class 6 6+-axles	\$41.00	\$53.00	\$60.00	\$75.00

\*\* Indicates no change from previous toll rate.

Notes:

- <sup>(1)</sup> Two E-Zpass® Hatem Bridge plans were made available as of Sept. 30, 2012:
- The first replaced the Hatem Bridge AVI Decal Program and was offered for two-axle vehicles only with an existing valid transponder beginning Feb. 1, 2012, providing unlimited trips on the Hatem Bridge only. The plan cost \$10 beginning on Feb. 1, 2012 and increased to \$20 on July 1, 2013.
  - The second plan opened The Hatem Bridge-Only Plan to existing or new E-Zpass Maryland customers. The primary difference is that accounts under the second plan are subject to account and transponder fees and pre-paid toll deposits, while those under the first plan are not. E-Zpass® accounts under the second plan can also be used on all MDTA legacy facilities.
- <sup>(2)</sup> Commuter rates are for two-axle vehicles with a Maryland E-Zpass® Commuter Plan, which includes 50 trips and costs \$70.00 (\$1.40 per ticket). Two "trips" are required per transaction for the Northern Region facilities per trip. All commuter plans (E-Zpass® and tickets) are valid for 45 days.
- <sup>(3)</sup> Business accounts operating five-or-more-axle vehicles may qualify for an E-Zpass® post-usage discount based on the tolls paid in every 30-day period, with a 10 percent discount offered for total monthly tolls of \$150.00 to \$1,999.99, 15 percent for total monthly tolls of \$2,000.00 to \$7,500.00 and 20 percent for total monthly tolls of over \$7,500.00.
- <sup>(4)</sup> A supplemental rebate program is offered to five-or-more-axle vehicles with individual transponders making 60 or more trips per month. A 5 percent discount is offered for five- or more-axle vehicle transponders making 60-79 trips per month, 10 percent for 80-99 trips per month, and 15 percent for 100 or more per month.

**Table 1-2  
Central Region Toll Rates**

Method of Payment	Vehicle Class	Baltimore Harbor Tunnel (I-895), Fort McHenry Tunnel (I-95/I-395) and Francis Scott Key Bridge (I-695)			
		Before Nov. 1, 2011	After Nov. 1, 2011	After Jan. 1, 2012	After July 1, 2013
Maryland E-ZPass®	Commuter, 2-axles <sup>(1)</sup>	\$0.40	\$0.75	**	\$1.40
	Class 2 2-axles	\$2.00	\$2.70	**	\$3.60
Cash / Base	Class 2 2-axles	\$2.00	\$3.00	**	\$4.00
	Class 3 3-axles	\$6.00	**	**	\$8.00
	Class 4 4-axles	\$9.00	**	**	\$12.00
	Class 5 5-axles <sup>(2)(3)</sup>	\$12.00	**	\$18.00	\$24.00
	Class 6 6+ -axles <sup>(2)(3)</sup>	\$15.00	**	\$23.00	\$30.00
Video	Class 2 2-axles	\$5.00	\$4.50	**	\$6.00
	Class 3 3-axles	\$9.00	**	**	\$12.00
	Class 4 4-axles	\$12.00	\$13.50	**	\$18.00
	Class 5 5-axles	\$15.00	\$18.00	\$27.00	\$36.00
	Class 6 6+ -axles	\$18.00	\$22.50	\$34.50	\$45.00

\*\* Indicates no change from previous toll rate.

**Notes:**

- <sup>(1)</sup> Commuter rates are for two-axle vehicles with a Maryland E-ZPass® Commuter Plan, which includes 50 trips and costs \$70.00 (\$1.40 per ticket). All commuter plans (E-Zpass® and tickets) are valid for 45 days.
- <sup>(2)</sup> Business accounts operating five-or-more-axle vehicles may qualify for an E-Zpass® post-usage discount based on the tolls paid in every 30-day period, with a 10 percent discount offered for total monthly tolls of \$150.00 to \$1,999.99, 15 percent for total monthly tolls of \$2,000.00 to \$7,500.00 and 20 percent for total monthly tolls of over \$7,500.00.
- <sup>(3)</sup> A supplemental rebate program is offered to five-or-more-axle vehicles with individual transponders making 60 or more trips per month. A 5 percent discount is offered for five- or more-axle vehicle transponders making 60-79 trips per month, 10 percent for 80-99 trips per month, and 15 percent for 100 or more per month.

**Table 1-3**  
**Southern Region Toll Rates**

		<b>William Preston Lane, Jr., Memorial (Bay) Bridge (US 50/301)</b>			
<b>Method of Payment</b>	<b>Vehicle Class</b>	<b>Before</b>	<b>After</b>	<b>After</b>	<b>After</b>
		<b>Nov. 1, 2011</b>	<b>Nov. 1, 2011</b>	<b>Jan. 1, 2012</b>	<b>July 1, 2013</b>
Maryland E-ZPass®	Commuter, 2-axes <sup>(1)</sup>	\$1.00	**	**	\$2.10
	Shoppers, 2-axes <sup>(2)</sup>	\$1.00	**	**	\$3.00
	Class 2 2-axes	\$2.50	**	\$3.60	\$5.40
Cash / Base	Class 2 2-axes	\$2.50	\$4.00	**	\$6.00
	Class 3 3-axes	\$9.00	**	\$8.00	\$12.00
	Class 4 4-axes	\$12.00	**	**	\$18.00
	Class 5 5-axes <sup>(3)(4)</sup>	\$15.00	**	\$24.00	\$36.00
	Class 6 6+-axes <sup>(3)(4)</sup>	\$18.00	**	\$30.00	\$45.00
Video	Class 2 2-axes	\$5.50	\$6.00	**	\$9.00
	Class 3 3-axes	\$12.00	\$13.50	\$12.00	\$18.00
	Class 4 4-axes	\$15.00	\$18.00	**	\$27.00
	Class 5 5-axes	\$18.00	\$22.50	\$36.00	\$51.00
	Class 6 6+-axes	\$21.00	\$27.00	\$45.00	\$60.00

		<b>Gov. Harry W. Nice Memorial Bridge (US 301)</b>			
<b>Method of Payment</b>	<b>Vehicle Class</b>	<b>Before</b>	<b>After</b>	<b>After</b>	<b>After</b>
		<b>Nov. 1, 2011</b>	<b>Nov. 1, 2011</b>	<b>Jan. 1, 2012</b>	<b>July 1, 2013</b>
Maryland E-ZPass®	Commuter, 2-axes <sup>(1)</sup>	\$0.60	\$1.00	**	\$2.10
	Shoppers, 2-axes <sup>(2)</sup>	Not Applicable at this Facility			
	Class 2 2-axes	\$3.00	**	\$3.60	\$5.40
Cash / Base	Class 2 2-axes	\$3.00	\$4.00	**	\$6.00
	Class 3 3-axes	\$9.00	**	\$8.00	\$12.00
	Class 4 4-axes	\$12.00	**	**	\$18.00
	Class 5 5-axes <sup>(3)(4)</sup>	\$15.00	**	\$24.00	\$36.00
	Class 6 6+-axes <sup>(3)(4)</sup>	\$18.00	**	\$30.00	\$45.00
Video	Class 2 2-axes	\$6.00	**	**	\$9.00
	Class 3 3-axes	\$12.00	\$13.50	\$12.00	\$18.00
	Class 4 4-axes	\$15.00	\$18.00	**	\$27.00
	Class 5 5-axes	\$18.00	\$22.50	\$36.00	\$51.00
	Class 6 6+-axes	\$21.00	\$27.00	\$45.00	\$60.00

<sup>(1)</sup> Commuter rates are for two-axle vehicles with a Maryland E-Zpass® Commuter Plan, which includes 25 trips and costs \$52.50 (\$2.10 per ticket). All commuter plans (E-Zpass® and tickets) are valid for 45 days.

<sup>(2)</sup> Shopper rates are for two-axle vehicles with a Maryland E-Zpass® Commuter Plan, which includes 10 trips and costs \$30.00 (\$3.00 per ticket). All shopper plans are valid for 90 days.

<sup>(3)</sup> Business accounts operating five-or-more-axle vehicles may qualify for an E-Zpass® post-usage discount based on the tolls paid in every 30-day period, with a 10 percent discount offered for total monthly tolls of \$150.00 to \$1,999.99, 15 percent for total monthly tolls of \$2,000.00 to \$7,500.00 and 20 percent for total monthly tolls of over \$7,500.00.

<sup>(4)</sup> A supplemental rebate program is offered to five-or-more-axle vehicles with individual transponders making 60 or more trips per month. A 5 percent discount is offered for five- or more-axle vehicle transponders making 60-79 trips per month, 10 percent for 80-99 trips per month, and 15 percent for 100 or more per month.

## 1.2 Report Structure

Chapter 2, **Historical Traffic and Revenue Trends**, provides a summary of historical trends and variations of traffic and revenue on the legacy bridges, tunnels, and highways currently operated by the MDTA.

Chapter 3, **Economic and Demographic Review**, provides a summary of historical trends and forecasts of socioeconomic variables to provide the context for developing the traffic and revenue growth projections. The socioeconomic trends review and analysis entailed data collection efforts that included compiling a host of different pertinent variables such as total population, employment, income, gasoline prices, and real gross regional product from a variety of public and private sources such as the Bureau of Economic Analysis (BEA), US Census, Bureau of Labor Statistics (BLS), U.S. Energy Information Administration (EIA), Woods & Poole Economics, and Moody's Analytics.

Chapter 4, **Traffic and Revenue Forecast**, provides a summary of the regression model inputs and the basic underlying assumptions used in the traffic and revenue forecasting process. This chapter also presents the 10-year traffic and revenue forecasts by facility and vehicle class for the legacy system as a whole.



## Chapter 2

# Historical Traffic and Revenue Trends

As part of this analysis, CDM Smith reviewed regional traffic trends as well as historical transactions and revenue provided by MDTA for each of the seven legacy toll facilities. Regional trends were reviewed to understand the context within which the MDTA facilities operate, including vehicle miles traveled (VMT) for Maryland and traffic counts on other major highways. Historical transactions and revenue trends for each of the legacy facilities were reviewed, as these trends served as inputs to the regression model used to develop the 10-year transaction and revenue forecasts. Current E-ZPass® market penetration rates and vehicle classification distributions were also reviewed.

## 2.1 Regional Traffic Review

Regional traffic patterns and trends were analyzed in order to better understand the factors influencing traffic demand on the MDTA Legacy Facilities. Included in this analysis were a review of regional VMT trends and historical traffic counts on nearby competing routes. This data was used to ensure that the results of the regression model were reasonable within the context of these historical regional traffic patterns and trends.

### 2.1.1 Vehicle Miles Travelled

Vehicle miles travelled (VMT) represents the total number of miles travelled by all vehicles annually. VMT trends are important to better understand general trends in historical traffic growth nationally and, more specifically, within a state or region. The Federal Highway Administration develops annual estimates of national and state-wide VMT by roadway type, which have been summarized in Table 2-1 for the years FY 1994 through FY 2013 for the United States and Maryland

Maryland VMT trends during the last 20 years have generally followed those of the United States. Prior to 2001, VMT increased at an average annual rate of 2.5 and 2.4 percent in the United States and Maryland, respectively. Between 2001 and 2006, growth in VMT slowed to an average annual rate of 1.5 percent nationally and 1.6 percent in Maryland. Concurrent with the onset of the Great Recession in 2007 and 2008, VMT declined for the first time since 1980. The average annual percent change in VMT was -0.4 percent nationally and 0.0 percent in Maryland between 2006 and 2011. The proportion of VMT represented by Interstate travel has remained fairly constant throughout the same time period, with roughly 24 percent of national travel and 30 percent of Maryland travel occurring on Interstates, which account for only 2.5 percent and 3.9 percent of all roads at the national level and in Maryland, respectively.

These recent trends in VMT represent a significant change from prior long-term historical trends, with VMT levels remaining at or below the peak levels of 2007. Several factors may be responsible for the change. First, the reduction in employment caused by the Great Recession have led to general reductions in travel by commuters. Additionally the changes may be indicative of longer-term trends such as adjustments to gasoline prices, shifts in development patterns to revitalize traditional urban centers, and increases in telecommuting, carpooling and transit use.

**Table 2-1  
National and State-wide Trends in Vehicle Miles Travelled**

Year	United States <sup>(1)</sup>					Maryland				
	Interstate			Total		Interstate			Total	
	VMT (Millions)	Percent Change	Percent of Total	VMT (Millions)	Percent Change	VMT (Millions)	Percent Change	Percent of Total	VMT (Millions)	Percent Change
1994	550,096	---	23.2	2,372,026	---	12,674	---	28.7	44,165	---
1995	569,024	3.4	23.3	2,438,244	2.8	13,263	4.6	29.6	44,882	1.6
1996 <sup>(2)</sup>	581,579	2.2	23.4	2,482,201	1.8	13,721	3.5	29.8	46,033	2.6
1997	606,067	4.2	23.5	2,576,543	3.8	14,013	2.1	30.1	46,609	1.3
1998	630,157	4.0	23.9	2,641,891	2.5	14,407	2.8	29.8	48,343	3.7
1999	648,124	2.9	23.9	2,708,328	2.5	14,499	0.6	29.5	49,126	1.6
2000	667,603	3.0	24.1	2,767,363	2.2	15,208	4.9	30.3	50,174	2.1
2001	678,723	1.7	24.1	2,815,135	1.7	15,633	2.8	30.1	51,996	3.6
2002	693,942	2.2	24.1	2,873,866	2.1	16,214	3.7	30.2	53,702	3.3
2003	708,173	2.1	24.3	2,909,567	1.2	16,536	2.0	30.2	54,701	1.9
2004	727,163	2.7	24.4	2,982,017	2.5	16,668	0.8	30.1	55,284	1.1
2005	733,655	0.9	24.4	3,009,217	0.9	16,807	0.8	29.8	56,319	1.9
2006	741,000	1.0	24.4	3,033,752	0.8	16,850	0.3	29.9	56,302	(0.0)
2007	745,457	0.6	24.4	3,049,027	0.5	17,015	1.0	30.1	56,503	0.4
2008	725,078	(2.7)	24.2	2,992,705	(1.8)	16,710	(1.8)	30.4	55,023	(2.6)
2009	722,655	(0.3)	24.3	2,975,804	(0.6)	16,965	1.5	30.7	55,293	0.5
2010	729,015	0.9	24.4	2,985,854	0.3	17,040	0.4	30.4	56,126	1.5
2011	725,787	(0.4)	24.4	2,968,990	(0.6)	16,964	(0.4)	30.2	56,221	0.2
2012	N/A	---	---	2,954,189	(0.5)	N/A	---	---	N/A	---
2013	N/A	---	---	2,972,287	0.6	N/A	---	---	N/A	---
<b>Average Annual Percent Change</b>										
<b>1994-2011</b>		<b>1.6</b>			<b>1.3</b>		<b>1.7</b>			<b>1.4</b>
1994-2001		3.0			2.5		3.0			2.4
2001-2011		0.7			0.5		0.8			0.8
2001-2006		1.8			1.5		1.5			1.6
2006-2011		(0.4)			(0.4)		0.1			(0.0)
<b>2011-2013</b>		---			<b>0.1</b>		---			---

1994-2011 VMT Data source: Table VM-2, Highway Statistics 1994-2011, USDOT FHWA Office of Policy Information.  
2012-2013 VMT Data source: USDOT FHWA Office of Policy Information.

<sup>(1)</sup> Includes Puerto Rico.  
<sup>(2)</sup> Interstate-level VMT data unavailable for 1996, and was estimated based on the average 1995 and 1997 interstate miles as a percent of total VMT.

Since historical transactions were used as an inputs to the regression model, the continuation of the historical influence of national and state trends in VMT on the traffic volumes of the MDTA legacy facilities served as an underlying assumption for transaction and revenue forecasting process. Moreover, the final transaction and revenue forecasts were reviewed to ensure that they were reasonable in light of these trends in VMT.

### 2.1.2 Historical Traffic on Other Major Highways

In order to better understand regional traffic patterns, historical traffic counts on select competing major routes were reviewed dating back to FY 1995. These roads include interstates and major highways that compete with or compliment the MDTA legacy facilities. The data presented in this section are based on historical average annual daily traffic volumes and associated growth rates at each location. At MDTA locations where there is a one-way toll, the one-way average annual daily traffic volume was doubled to be more comparable to other locations. For comparative purposes, the

roadways have been are grouped into three regions: Northern, Central, and Southern, corresponding to the MDTA regions.

Historical average traffic volumes and annual growth rates for the Northern Region, which are primarily located in proximity to the Susquehanna River, are presented in Table 2-2. Due to a lack of FY 2014 data at the non-MDTA locations, volumes are only provided through FY 2013 for comparative purposes. Traffic volumes on the two Northern Region MDTA facilities have generally followed the regional trends over the last 20 years. Between FY 1995 and FY 2005, average annual traffic growth was 2.2 percent per year for the MDTA facilities and a comparable 2.4 percent per year for the region. Between FY 2005 and FY 2013, average annual traffic growth was -0.8 percent per year for the MDTA facilities and -0.7 percent per year for the region, with the most significant decreases occurring in FY 2008 and FY 2009, and in FY 2013. This overall trend may be related to reductions in travel associated with the immediate and long-term impacts of the Great Recession of 2008/ 2009.

Table 2-3 presents the historical average traffic volumes and annual growth rates for the Central Region, located in the Baltimore area. Again, due to a lack of FY 2014 data at the non-MDTA locations, historical average traffic volumes are only provided through FY 2013 for comparative purposes. Traffic volumes at the three Central Region MDTA facilities have also generally followed the regional trends over the last 20 years. Between FY 1995 and FY 2005, average annual traffic growth was 2.1 percent per year for the MDTA facilities as compared with a slightly higher 2.6 percent per year for the region. Although traffic volumes on the Maryland State Highway Administration (MSHA) facilities decreased by about 2 percent in FY 2008, most likely due to the impacts of the Great Recession of 2008/2009, traffic volumes on the Central Region MDTA facilities increased by an average of 0.2 percent. On the MDTA facilities, traffic volumes did decrease in FY 2009 and FY 2010. These impacts resulted, at least in part, from the Great Recession and the FY 2010 toll increase. Another significant traffic volume decrease occurred in FY 2013. A toll increase implemented that year is likely the primary catalyst for the decline. Overall, average annual traffic growth between FY 2005 and FY 2013 was -0.4 percent per year for the MDTA facilities and -0.1 percent per year for select other regional highways.

Historical average traffic volumes and annual growth rates for the Southern Region are presented in Table 2-4. Due to the proximity to Virginia, two count locations in northern Virginia have also been included. Since FY 2014 data were not available for all locations, historical average traffic volumes are only provided through FY 2013. Traffic volumes on the two Southern Region MDTA facilities have generally followed the regional trends over the last 20 years. Between FY 1995 and FY 2005, average annual traffic growth was 2.5 percent per year for the MDTA facilities and a slightly higher 2.8 percent per year for the region. During the FY 2005 to FY 2013 period, MSHA and Virginia roadways experienced decreases in volumes during FY 2008. MDTA facilities experienced decreases in volume in FY 2009. This pattern may be the result of some immediate and some lagging impacts of the Great Recession. A traffic volume decrease also occurred in FY 2013, likely due to the toll increase implemented that year. Overall, average annual traffic growth between FY 2005 and FY 2013 was -0.2 percent per year for the MDTA facilities as compared with -0.3 percent per year for the region.

**Table 2-2  
Average Annual Daily Traffic for Selected Northern Region Facilities**

Fiscal Year	MDTA Facilities				MSHA Facilities <sup>(1)</sup>				US 301 S of River Rd.	Percent Change	MTTA Facilities Average	Percent Change	Northern Region Average	Percent Change
	John F. Kennedy Mem. Highway	Percent Change	Thomas J. Hatem Mem. Bridge	Percent Change	I-83 S of Belfast Rd.	Percent Change	US 1 E of Cedar Church Rd.	Percent Change						
1995	67,890	---	22,521	---	46,539	---	8,675	---	9,450	---	45,206	---	31,015	---
2000	78,466	2.9	25,205	2.3	50,219	1.5	9,650	2.2	10,475	2.1	51,836	2.8	34,803	2.3
2005	81,957	0.9	30,520	3.9	61,975	4.3	9,950	0.6	11,425	1.8	56,239	1.6	39,165	2.4
2006	80,744	(1.5)	30,450	(0.2)	66,760	7.7	9,852	(1.0)	11,650	2.0	55,597	(1.1)	39,891	1.9
2007	81,317	0.7	30,474	0.1	62,068	(7.0)	11,640	18.1	11,531	(1.0)	55,896	0.5	39,406	(1.2)
2008	80,283	(1.3)	30,445	(0.1)	59,830	(3.6)	11,061	(5.0)	10,952	(5.0)	55,364	(1.0)	38,514	(2.3)
2009	80,229	(0.1)	27,617	(9.3)	61,620	3.0	11,282	2.0	10,370	(5.3)	53,923	(2.6)	38,224	(0.8)
2010	80,815	0.7	27,325	(1.1)	61,971	0.6	10,050	(10.9)	10,451	0.8	54,070	0.3	38,122	(0.3)
2011	84,739	4.9	27,797	1.7	60,988	(1.6)	9,861	(1.9)	10,252	(1.9)	56,268	4.1	38,727	1.6
2012	84,402	(0.4)	27,810	0.0	60,165	(1.3)	9,882	0.2	10,620	3.6	56,106	(0.3)	38,576	(0.4)
2013	80,448	(4.7)	25,002	(10.1)	60,401	0.4	9,310	(5.8)	10,571	(0.5)	52,725	(6.0)	37,146	(3.7)
<b>Average Annual Percent Change</b>														
1995-2005	1.9		3.1	3.1	2.9		1.4	1.4	1.9	1.9	2.2	2.2	2.4	2.4
2005-2013	(0.2)		(2.5)	(2.5)	(0.3)		(0.8)	(0.8)	(1.0)	(1.0)	(0.8)	(0.8)	(0.7)	(0.7)
1995-2013	0.9		0.6	0.6	1.5		0.4	0.4	0.6	0.6	0.9	0.9	1.0	1.0

Source: MDTA and MSHA AADT Reports.  
<sup>(1)</sup> Maryland State Highway Administration.

**Table 2-3**  
**Average Annual Daily Traffic for Selected Central Region Facilities**

Fiscal Year	MSHA Facilities <sup>(1)</sup>										
	I-83 N of N Charles St	I-95 N of MD 43	I-95 Percent Change	I-95 N of MD 100	I-95 Percent Change	I-97 N of MD 176	I-695 S of I-70	I-695 E of MD 146	I-695 Percent Change	MD 295 N of MD 100	Percent Change
1995	46,900	134,475	---	153,275	---	70,500	156,175	142,475	---	59,075	---
2000	50,850	139,575	0.7	192,575	4.7	95,575	175,125	147,725	0.7	58,025	(0.4)
2005	113,475	173,825	4.5	189,825	(0.3)	99,325	188,325	152,650	0.7	86,250	8.3
2006	113,481	161,780	(6.9)	191,880	1.1	102,610	188,333	152,652	0.0	85,392	(1.0)
2007	113,482	161,781	0.0	191,881	0.0	102,611	193,050	155,270	1.7	91,630	7.3
2008	111,230	157,742	(2.5)	188,042	(2.0)	100,562	189,191	152,171	(2.0)	88,881	(3.0)
2009	112,341	160,880	2.0	192,100	2.2	105,110	188,860	153,692	1.0	88,882	0.0
2010	112,792	161,521	0.4	192,871	0.4	105,531	189,621	150,850	(1.8)	89,423	0.6
2011	102,860	161,682	(8.8)	193,062	0.1	105,642	188,812	151,001	0.1	93,390	4.4
2012	103,371	162,493	0.5	191,280	(0.9)	106,210	190,763	151,762	0.5	92,641	(0.8)
2013	104,302	165,972	2.1	193,001	0.9	107,171	192,484	149,460	(1.5)	92,832	0.2
<b>Average Annual Percent Change</b>											
1995-2005	9.2	2.6	2.6	2.2	2.2	3.5	1.9	0.7	3.9	0.9	2.5
2005-2013	(1.0)	(0.6)	1.2	1.3	1.3	2.4	0.3	(0.3)	0.3	0.9	2.5
1995-2013	4.5	1.2	1.2	1.3	1.3	2.4	0.3	0.3	0.3	0.9	2.5

**MDTA Facilities**

Fiscal Year	Baltimore Harbor Tunnel			Francis Scott Key Bridge			Fort McHenry Tunnel			MdTA Facilities Average			Central Region Average		
	Tunnel	Percent Change	Percent	Bridge	Percent Change	Percent	Tunnel	Percent Change	Percent	Average	Percent Change	Average	Percent Change	Average	Percent Change
1995	109,096	---	52,603	---	198,356	---	112,293	---	120,018	---	112,293	---	120,018	---	112,293
2000	126,192	3.0	59,945	2.6	223,342	2.4	136,493	2.6	136,493	2.6	136,493	2.6	136,493	2.6	136,493
2005	139,720	2.1	66,324	2.0	238,453	1.3	148,166	1.7	148,166	1.7	148,166	1.7	148,166	1.7	148,166
2006	143,902	3.0	65,171	(1.7)	238,754	0.1	149,276	0.7	149,276	0.7	149,276	0.7	149,276	0.7	149,276
2007	141,042	(2.0)	66,867	2.6	245,776	2.9	151,228	1.3	151,228	1.3	151,228	1.3	151,228	1.3	151,228
2008	141,209	0.1	67,632	1.1	245,639	(0.1)	147,339	(2.7)	147,339	(2.7)	147,339	(2.7)	147,339	(2.7)	147,339
2009	139,914	(0.9)	64,045	(5.3)	238,059	(3.1)	144,388	(2.1)	144,388	(2.1)	144,388	(2.1)	144,388	(2.1)	144,388
2010	138,222	(1.2)	60,060	(6.2)	241,443	1.4	146,572	(0.5)	146,572	(0.5)	146,572	(0.5)	146,572	(0.5)	146,572
2011	143,746	4.0	64,410	7.3	255,169	5.7	154,442	5.4	154,442	5.4	154,442	5.4	154,442	5.4	154,442
2012	144,402	0.5	63,992	(0.6)	253,771	(0.5)	154,055	(0.3)	154,055	(0.3)	154,055	(0.3)	154,055	(0.3)	154,055
2013	131,354	(9.0)	59,847	(6.5)	238,775	(5.9)	143,325	(7.0)	143,325	(7.0)	143,325	(7.0)	143,325	(7.0)	143,325
<b>Average Annual Percent Change</b>															
1995-2005	2.5	2.3	2.3	2.3	1.9	2.6	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
2005-2013	(0.8)	(1.3)	0.7	0.7	0.0	(0.1)	(0.4)	1.0	(0.4)	1.0	(0.4)	1.0	(0.4)	1.0	(0.1)
1995-2013	1.0	0.7	0.7	0.7	1.0	1.4	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.4

Source: MDTA and MSHA AADT Reports.  
<sup>(1)</sup> Maryland State Highway Administration.

**Table 2-4  
Average Annual Daily Traffic for Selected Southern Region Facilities**

Fiscal Year	MDTA Facilities						MSHA Facilities <sup>(1)</sup>						Virginia DOT Facilities					
	William P. Lane, Jr. Mem. (Bay) Bridge		Harry W. Nice Mem. Bridge		US 301		I-95 (Virginia) N of Courthouse Rd		US 301 (Virginia) N of Kings Hwy		MdtA Facilities Average		Southern Region Average		Percent Change		Percent Change	
	Change	Percent	Change	Percent	Change	Percent	Change	Percent	Change	Percent	Change	Percent	Change	Percent	Change	Percent	Change	Percent
1995	55,233	---	14,137	---	17,350	---	99,000	---	N/A	---	34,685	---	46,430	---	---	---	---	---
2000	64,877	3.3	14,849	1.0	25,400	7.9	120,000	3.9	N/A	---	39,863	2.8	56,282	3.9	---	---	---	---
2005	71,123	1.9	17,592	3.4	22,975	(2.0)	134,000	2.2	13,000	2.2	44,358	2.2	51,738	1.8 <sup>(2)</sup>	---	---	---	---
2006	72,716	2.2	18,385	4.5	22,751	(1.0)	138,000	3.0	14,000	7.7	45,551	2.7	53,170	2.8	---	---	---	---
2007	73,941	1.7	18,731	1.9	22,522	(1.0)	137,000	(0.7)	14,000	-	46,336	1.7	53,239	0.1	---	---	---	---
2008	73,260	(0.9)	18,580	(0.8)	21,403	(5.0)	133,000	(2.9)	13,000	(7.1)	45,920	(0.9)	51,849	(2.6)	---	---	---	---
2009	69,874	(4.6)	18,341	(1.3)	21,834	2.0	136,000	2.3	13,000	-	44,108	(3.9)	51,810	(0.1)	---	---	---	---
2010	71,200	1.9	18,378	0.2	22,520	3.1	136,000	-	12,000	(7.7)	44,789	1.5	52,020	0.4	---	---	---	---
2011	74,651	4.8	18,693	1.7	22,091	(1.9)	135,000	(0.7)	12,000	-	46,672	4.2	52,487	0.9	---	---	---	---
2012	74,248	(0.5)	18,308	(2.1)	22,142	0.2	135,000	-	12,000	-	46,278	(0.8)	52,340	(0.3)	---	---	---	---
2013	69,783	(6.0)	17,868	(2.4)	20,840	(5.9)	132,000	(2.2)	13,000	8.3	43,826	(5.3)	50,698	(3.1)	---	---	---	---
<b>Average Annual Percent Change</b>																		
1995-2005	2.6	2.2	2.2	2.2	3.1	2.8	3.1	3.1	---	---	---	---	---	---	---	---	---	---
2005-2013	(0.2)	0.2	0.2	(1.2)	(0.2)	(1.2)	(0.2)	(0.2)	-	-	(0.2)	(0.2)	(0.3)	(0.3)	-	-	-	-
1995-2013	1.3	1.3	1.3	1.0	1.6	1.0	1.6	1.6	---	---	1.3	1.3	0.5	0.5	---	---	---	---

Source: MdTA, MSHA and Virginia DOT AADT Reports.

<sup>(1)</sup> Maryland State Highway Administration.

<sup>(2)</sup> For comparative purposes, percent change calculated based on averages that excludes US 301 (Virginia) traffic volumes.

Based on the data available for the selected facilities, the MDTA legacy facilities have generally exhibited traffic growth in line with that of the region. Moreover, traffic volumes have grown at similar rates among the three regions, averaging between 2.0 to 2.5 percent between FY 1995 and FY 2005, with slight declines of less than 1.0 percent between FY 2005 and FY 2014. These trends were used as a guide in estimating future year traffic growth for the traffic and revenue forecasts presented in Chapter 4.

## 2.2 MDTA Toll Transaction and In-Lane Revenue Trends

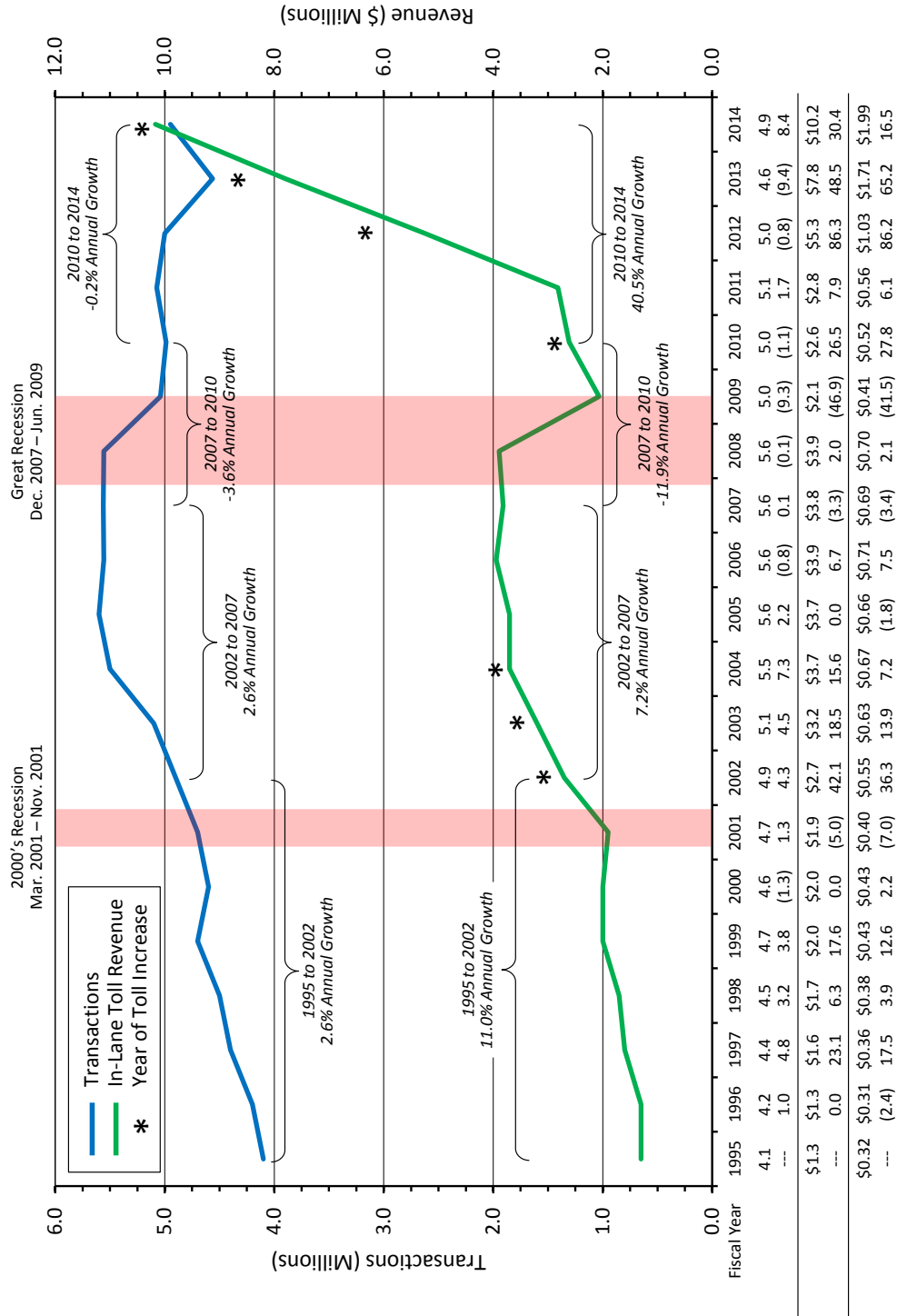
This section details the historical toll transaction and In-Lane Toll Revenue trends for each of the seven legacy facilities of the MDTA system. In-Lane Toll Revenue is the revenue that is collected at the point of transaction and excludes any fees. Other Toll Revenue, which will be discussed further in Chapter 4, is the revenue produced by service fees and sales, violation recovery, concession revenue, and additional commercial vehicle revenue. Data are presented on a fiscal year (July 1 to June 30) basis. Current E-ZPass® market penetration rates and vehicle classification percentages were also reviewed. This data served as important inputs to the regression model used in developing the 10-year transaction and revenue forecasts.

### 2.2.1 Thomas J. Hatem Memorial Bridge

Historical transactions and revenue for the Thomas J. Hatem Memorial Bridge between FY 1995 and FY 2014 are provided in Figure 2-1. Transactions grew steadily between FY 1995 and FY 2002 at an average annual rate of 2.6 percent. Transactions decreased in FY 2000 prior to the 2001 recession, but then recovered the following year. Transactions then continued to grow between FY 2002 and FY 2007, despite three toll increases, at an average annual rate of 2.6 percent. Transactions peaked in FY 2005 at 5.6 million prior to the 2008/2009 Great Recession. The recession may have begun influencing transactions on the Thomas J. Hatem Memorial Bridge as early as FY 2006, as transactions dipped 0.8 percent in that year. Transactions remained at 5.6 million until FY 2009 when they decreased by 9.3 percent, the largest decrease occurring in a year without a toll increase. Following this decrease, continued economic uncertainty and several toll increases decreased transactions further, to 4.6 million in FY 2013. Transactions recovered slightly to 4.9 million in FY 2014, despite the toll increase that year, resulting in an average annual post-recession growth rate of -0.2 percent between FY 2010 and FY 2014. Overall, average annual transaction growth was 0.9 percent per year between FY 1995 and FY 2014.

Revenue increased steadily between FY 1995 and FY 2002 at an average annual rate of 11.0 percent. Over the next three years, a series of toll increases resulted in an average annual increase of about 25 percent per year. Revenues then remained relatively stable between FY2004 and FY 2008, at about \$3.8 million. After experiencing a large dip between FY 2008 and FY 2009 as a result of the decrease in transactions associated with the Great Recession, revenue has steadily grown reaching \$10.2 million in FY 2014. This growth in revenue has been aided by a series of toll increases indicated by the increases in average toll rate, leading to an average annual growth rate of 40.5 percent between FY 2010 and FY 2014. Overall average annual In-Lane Toll Revenue growth was 11.3 percent per year between FY 1995 and FY 2014, with the primary growth in revenues occurring during the last five years.

**Figure 2-1**  
**Historical Transactions and In-Lane Toll Revenue, FY 1995 through FY 2014**  
**Thomas J. Hatem Memorial Bridge**





### 2.2.2 John F. Kennedy Memorial Highway

Historical transactions and revenue for the John F. Kennedy Memorial Highway between FY 1995 and FY 2014 are provided in Figure 2-2. Between FY 1995 and FY 2002, transactions grew at an average annual rate of 3.0 percent, despite the 2001 recession. Between FY 2002 and FY 2007, transactions remained at about 15.0 million. Transactions then declined in FY 2008 by 1.3 percent and in FY 2009 by 0.1 percent, as a result of the impacts of the Great Recession. Transaction then recovered and reached a peak of 15.4 million in FY 2011 despite the FY 2010 toll increase. The toll increases in FY 2012 through FY 2014 are likely the impetus for the annual decreases in transactions to 14.4 million by FY 2014. Thus, despite individual years of robust growth during the last 20 years, average annual transaction growth on the John F. Kennedy Memorial Highway was 0.8 percent per year between FY 1995 and FY 2014, and -0.6 percent per year between FY 2010 and FY 2014.

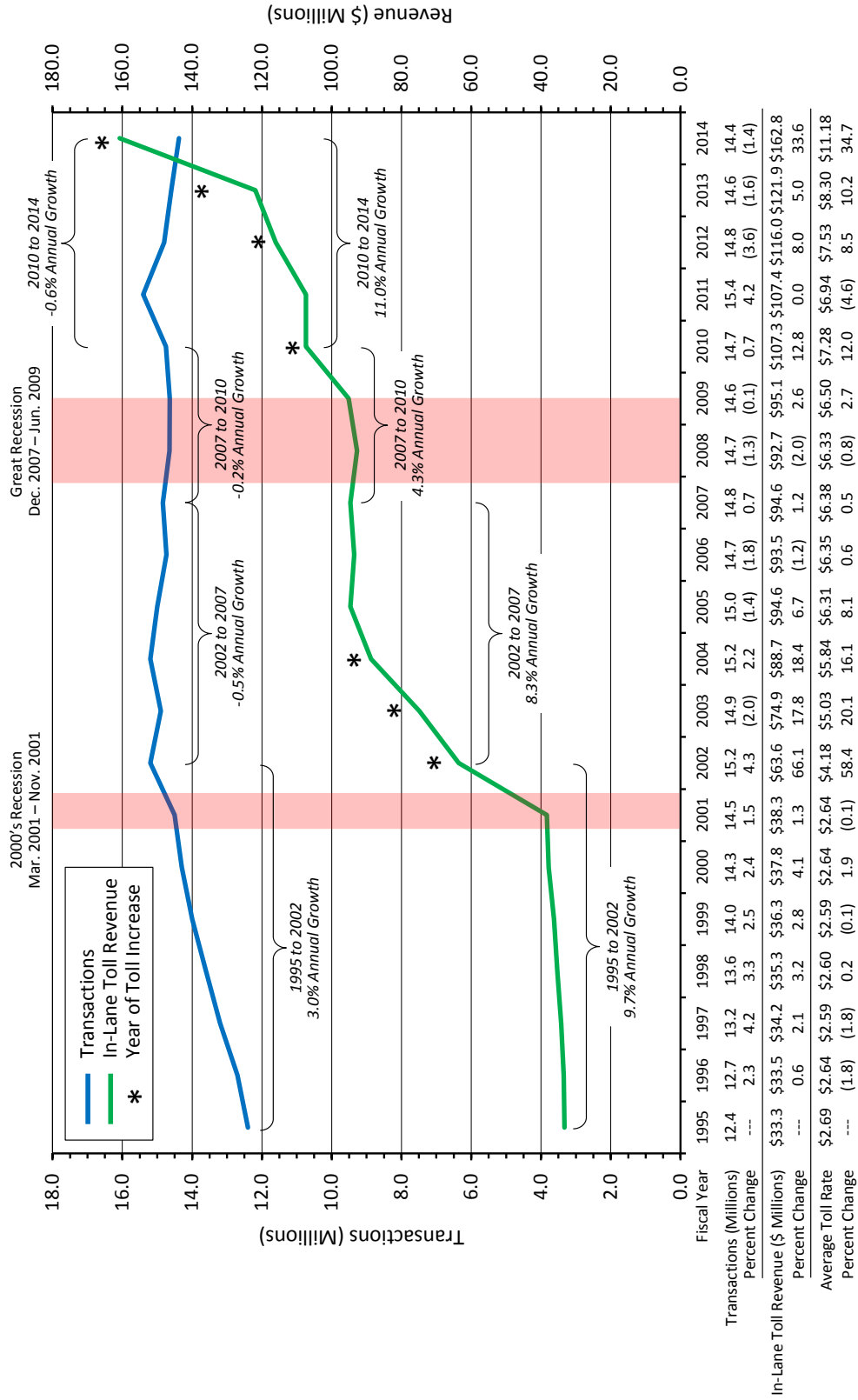
Revenue increased steadily between FY 1995 and FY 2002 at an average annual rate of 9.7 percent. Over the next three years, a series of toll increases resulted in an average annual revenue increase of 32.3 percent per year. Revenues then increased to \$94.6 million in FY 2005 and remained at about that level until FY 2009. This included a 2.0 percent decrease in FY 2008, most likely associated with the impacts of the Great Recession, and a 2.6 percent recovery in FY 2009. Since FY 2009, revenues have grown steadily, reaching \$162.8 million in FY 2014. This growth in revenue has been aided by a series of toll increases indicated by the increases in average toll rate provided in the legend of Figure 2-2. The increases have led to an average annual growth rate of 11.0 percent between FY 2010 and FY 2014. Overall average annual In-Lane Toll Revenue growth was 8.6 percent per year between FY 1995 and FY 2014, with the primary growth in revenues occurring between FY 2001 and FY 2004 and during the last five years.

### 2.2.3 Baltimore Harbor Tunnel

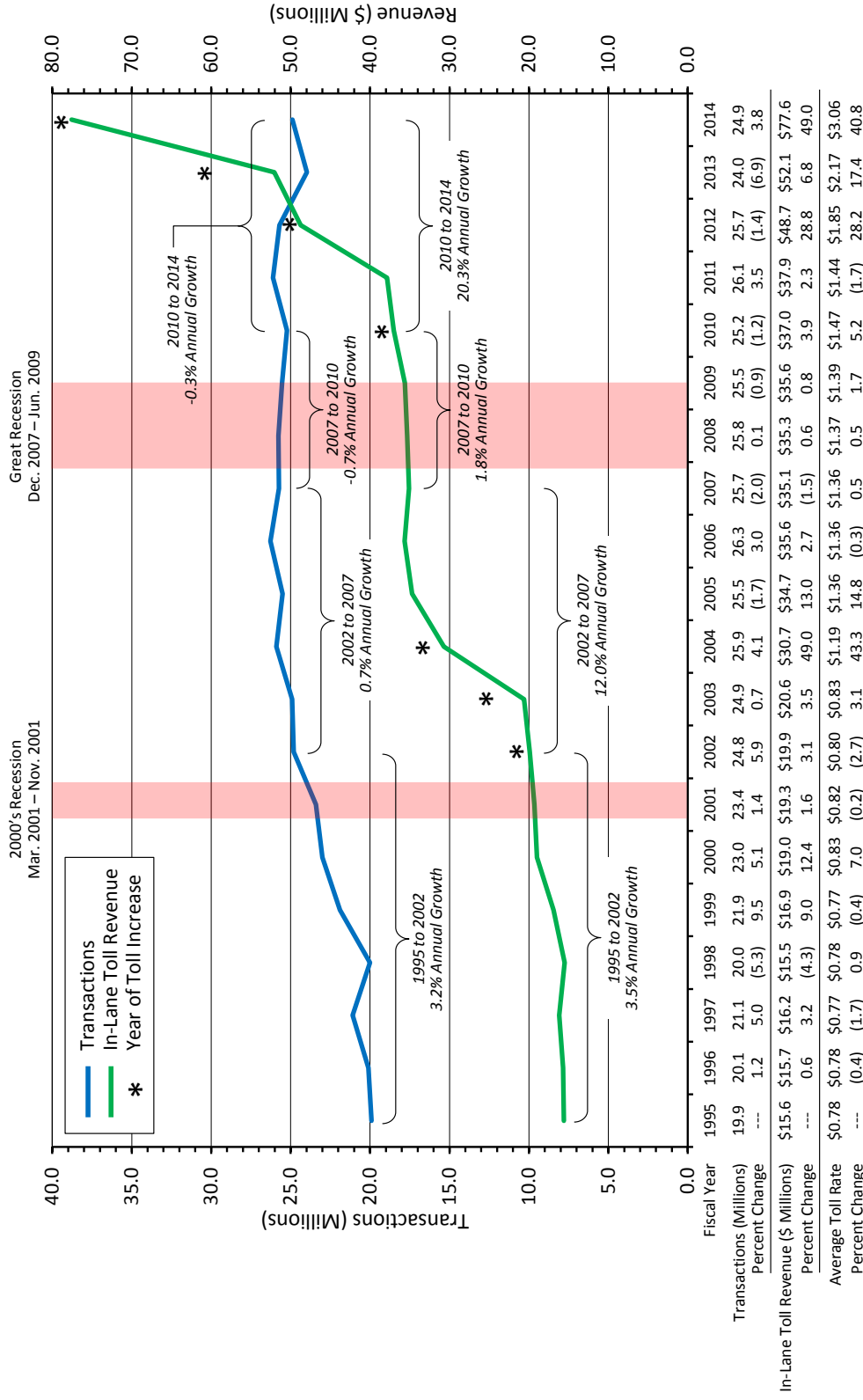
Historical transactions and revenue for Baltimore Harbor Tunnel between FY 1995 and FY 2014 are shown in Figure 2-3. Transactions increased every year between FY 1995 and FY 2002, except for a slight one-year decrease in FY 1998. This was despite the impacts of the 2001 recession and three toll increases. The average annual growth rate for this period was 3.2 percent. Transactions declined in FY 2005 by 1.7 percent and in FY 2007 by 2.0, possibly as a result of the considerable increases in the average price of gasoline that occurred in those years. Even with these setbacks, transactions reached a pre-recession peak of 25.8 million in FY 2008, before declining by 0.9 percent in FY 2009 in the wake of the Great Recession. Despite a 1.2 percent decrease in FY 2010, transaction growth recovered in FY 2011 and reached a peak of 26.1 million in FY 2012. Transactions for FY 2014 were 24.9 million, a decline over the FY 2011 peak, with the most likely contributing factor being the revert toll increases. On average, transactions on the Baltimore Harbor Tunnel have shown long-term growth of 1.2 percent per year between FY 1995 and FY 2014, but have declined in the short-term by an average of 0.3 percent per year between FY 2010 and FY 2014.

Annual revenue increased each year between FY 1995 and FY 2002, aside from a one-year decline from FY 1997 to FY 1998. The average annual increase during this period was 3.5 percent. Over the next five years, a series of toll increases resulted in an average annual revenue increase of 12.0 percent per year. Between FY 2007 and FY 2010, toll revenues increased from \$35.1 million to \$37.0 million, despite declines related to the impacts of the Great Recession. Since FY 2010, revenues have grown steadily to \$77.6 million in FY 2014, aided by a series of toll increases. The average annual

**Figure 2-2**  
**Historical Transactions and In-Lane Toll Revenue, FY 1995 through FY 2014**  
**John F. Kennedy Memorial Highway**



**Figure 2-3**  
**Historical Transactions and In-Lane Toll Revenue, FY 1995 through FY 2014**  
**Baltimore Harbor Tunnel**



growth rate in revenue between FY 2010 and FY 2014 was 20.3 percent. Overall average annual In-Lane Toll Revenue growth was 8.7 percent per year between FY 1995 and FY 2014, with the primary growth in revenues, resulting from toll increases occurring between FY 2001 and FY 2004 and during the last five years.

### 2.2.4 Fort McHenry Tunnel

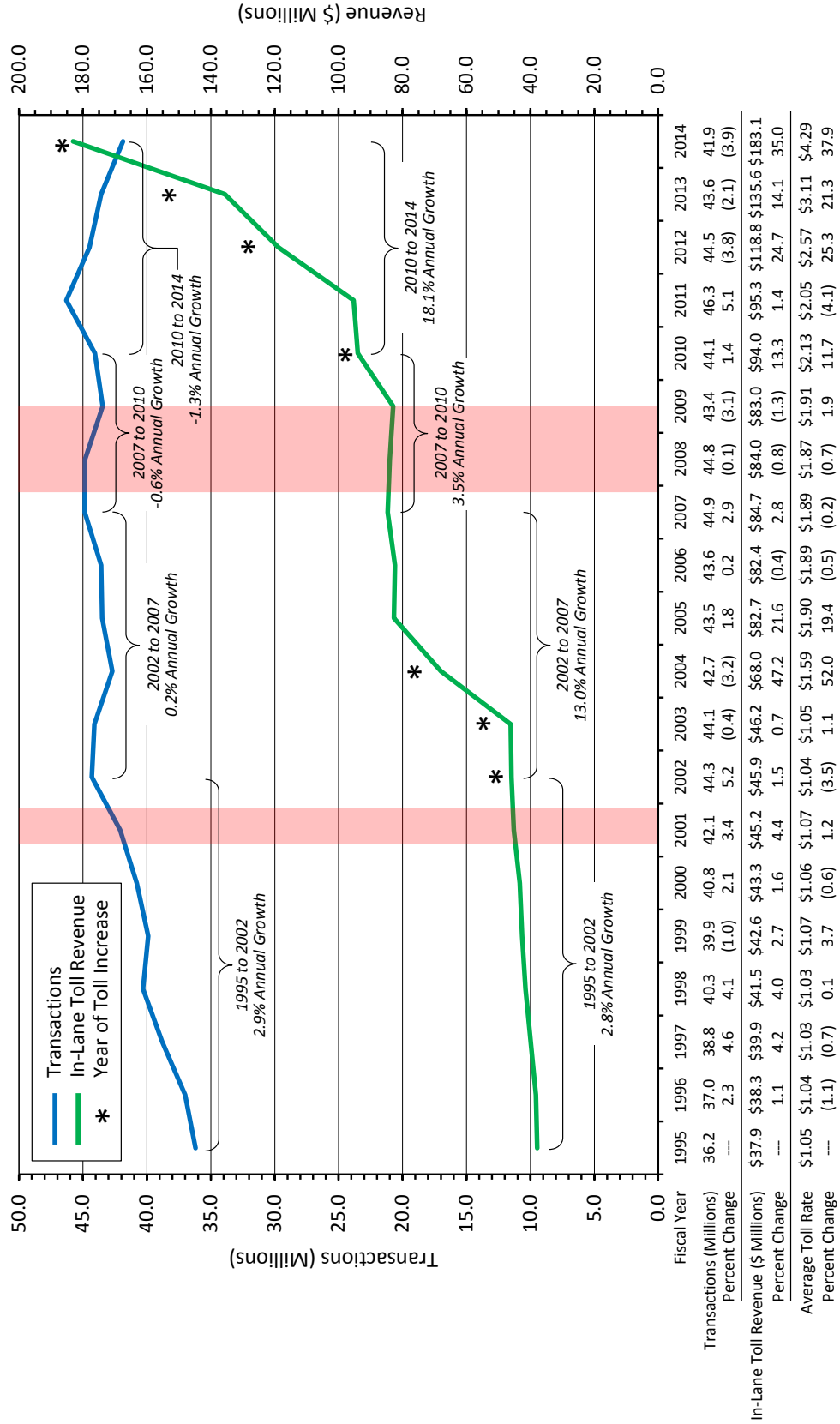
Historical transactions and revenue for the Fort McHenry Tunnel between FY 1995 and FY 2014 are provided in Figure 2-4. Transactions increased each year between FY 1995 and FY 2002 at an average annual rate of 2.9 percent per year despite the 2001 recession, aside from a 1.0 percent decrease in FY 1999. In FY 2003 and FY 2004, transactions decreased to 42.7 million, possibly due to the impacts of the FY 2002 to FY 2004 toll increases. By FY 2007, transactions had recovered to FY 2002 levels. However, transactions then declined in FY 2008 by 0.1 percent and in FY 2009 by 3.1 percent, as a result of the impacts of the Great Recession. Transactions then recovered and reached a peak in FY 2011 at 46.3 million notwithstanding the FY 2010 toll increase. The toll increases in FY 2012 through FY 2014 were likely the primary impetus resulting in the decreases in transactions to 41.9 million by FY 2014. Thus, despite individual years of robust growth during the last 20 years, transactions grew by an average of 0.7 percent per year between FY 1995 and FY 2014. However, in the last four years (FY 2010 and FY 2014), transactions declined by 1.3 percent per year.

Revenue has shown positive growth in 16 of the last 19 years, with minor declines in FY 2006 and in FY 2008 and FY 2009. Between FY 1995 and FY 2002, revenues grew at an average annual rate of 2.8 percent. Over the next three years, a series of toll increases resulted in an average annual revenue increase of 14.6 percent per year. Revenues then increased to \$82.7 million in FY 2005 and remained at about that level until FY 2009. Since FY 2010, aided by a series of toll increases, revenues have grown steadily and have reached \$183.1 million in FY 2014. During this period, the average annual revenue growth rate was 18.1 percent. Overall average annual In-Lane Toll Revenue growth was 8.5 percent per year between 1995 and 2014.

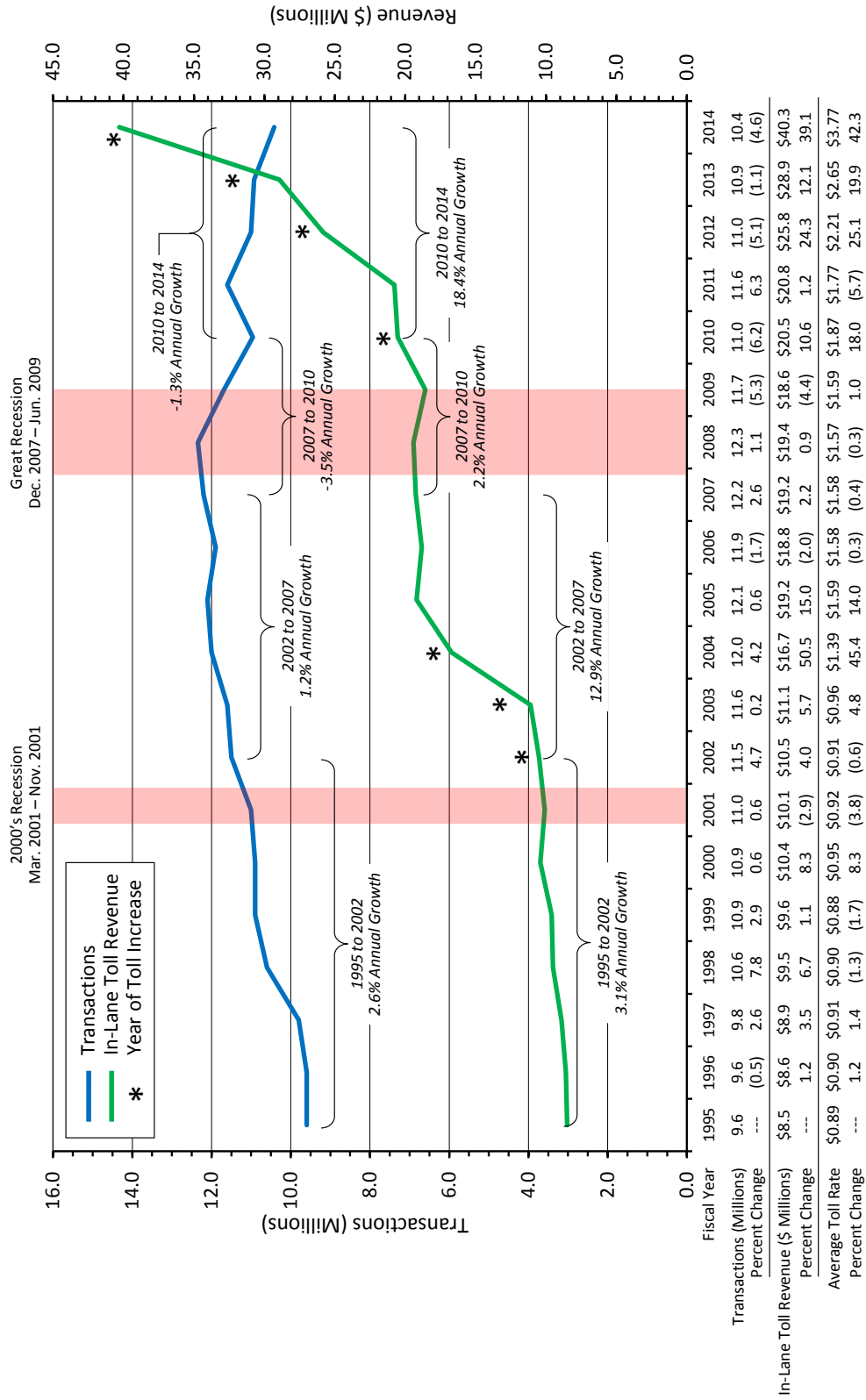
### 2.2.5 Francis Scott Key Bridge

Historical transaction and revenue for the Francis Scott Key Bridge between FY 1995 and FY 2014 are provided in Figure 2-5. Transactions declined between FY 1995 and FY 1996 before increasing through FY 2005 at an average annual rate of 2.3 percent. In the years prior to the 2001 recession, transaction growth slowed to 0.6 percent in both FY 2000 and FY 2001. Following a decrease of 1.7 percent in FY 2006, transactions peaked in FY 2008 at 12.3 million. Transactions then declined in FY 2009 by 5.3 percent as a result of the impacts of the Great Recession. Following this, transactions decreased again in FY 2010 by 6.2 percent, most likely due to a combination of the lingering impacts of the Great Recession and the impacts of the FY 2010 toll increase. Transactions recovered slightly in FY 2011 before decreasing each year from FY 2012 through FY 2014. The toll increases in FY 2012 through FY 2014 were likely the primary impetus for the declines. Overall, transactions grew at an average annual rate of 0.4 percent per year between FY 1995 and FY 2014. However, in the last five years, between FY 2010 and FY 2014, transaction have declined by an average of 1.3 percent per year.

**Figure 2-4**  
**Historical Transactions and In-Lane Toll Revenue, FY 1995 through FY 2014**  
**Fort McHenry Tunnel**



**Figure 2-5**  
**Historical Transactions and In-Lane Toll Revenue, FY 1995 through FY 2014**  
**Francis Scott Key Bridge**



In-Lane Toll Revenue on the Francis Scott Key Bridge has increased each year between FY 1995 and FY 2005 except for a one-year drop between FY 2001 and FY 2002. Between FY 1995 and FY 2002, revenues grew at an average annual rate of 3.1 percent. Over the next three years, a series of toll increases resulted in an average annual increase of 18.2 percent per year. Revenues then increased to \$19.2 million in FY 2005 and remained at about that level until FY 2008. After experiencing a 4.4 percent decrease in FY 2009 as a result of the impact of the Great Recession, revenues have grown steadily reaching \$40.3 million in FY 2014. The recent growth in In-Lane Toll Revenues is primarily due to a series of toll increases. Due to these increases, revenue has grown at an average annual rate of 18.4 percent between FY 2010 and FY 2014. Overall average annual In-Lane Toll Revenue growth was 8.4 percent per year between FY 1995 and FY 2014.

### 2.2.6 William Preston Lane Jr. Memorial (Bay) Bridge

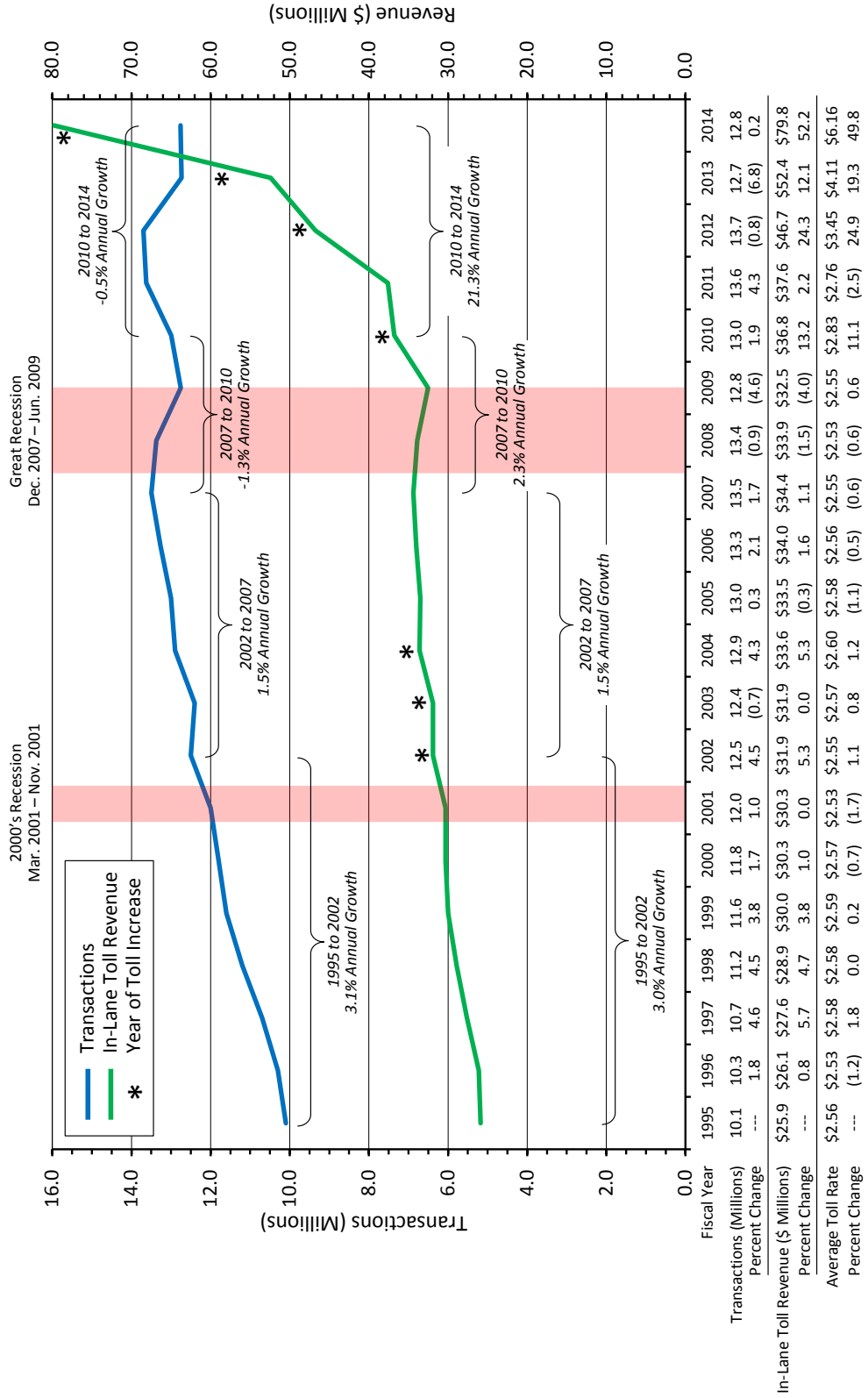
Historical transaction and revenue data for the William Preston Lane Jr. Memorial (Bay) Bridge between FY 1995 and FY 2014 are provided in Figure 2-6. Transactions increased each year from FY 1995 to FY 2007, at an average of 2.4 percent per year, except for a one-year decrease between FY 2002 and FY 2003, likely related to the toll increase that year. Transactions declined in FY 2008 by 0.9 percent and in FY 2009 by 4.6 percent as a result of the Great Recession. Transactions then recovered and reached a peak in FY 2011 at 13.6 million despite the FY 2010 toll increase. The toll increases in FY 2012 through FY 2014 were likely the primary impetus for the decline in transactions to 12.8 million by FY 2014. Transactions grew by an average of 1.3 percent per year between FY 1995 and FY 2014.

In-Lane Toll Revenues on the William Preston Lane Jr. Memorial (Bay) Bridge have increased each year between FY 1995 and FY 2003 except between FY 2000 and FY 2001 and between FY 2002 and FY 2003, where no growth occurred. Between FY 1995 and FY 2002, revenues grew at an average annual rate of 3.0 percent prior to the 2001 recession. Over the next three years, a series of toll increases had limited impacts on toll revenue, with an average annual increase of 3.5 percent per year occurring in those years. After a small decrease of 0.3 percent in FY 2005, most likely due to the changes in gasoline prices that year, transactions continued to grow at about 1.3 percent through FY 2007. Annual decreases in FY 2008 and FY 2009 are most likely related to the impacts of the Great Recession. Since FY 2009, revenues have grown steadily due, in part, to a series of toll increases, reaching \$79.8 million in FY 2014. Between FY 2010 and FY 2014, revenue has grown at an average annual rate of 21.3 percent. Overall average annual In-Lane Toll Revenue growth was 6.0 percent per year between 1995 and 2014.

### 2.2.7 Harry W. Nice Memorial Bridge

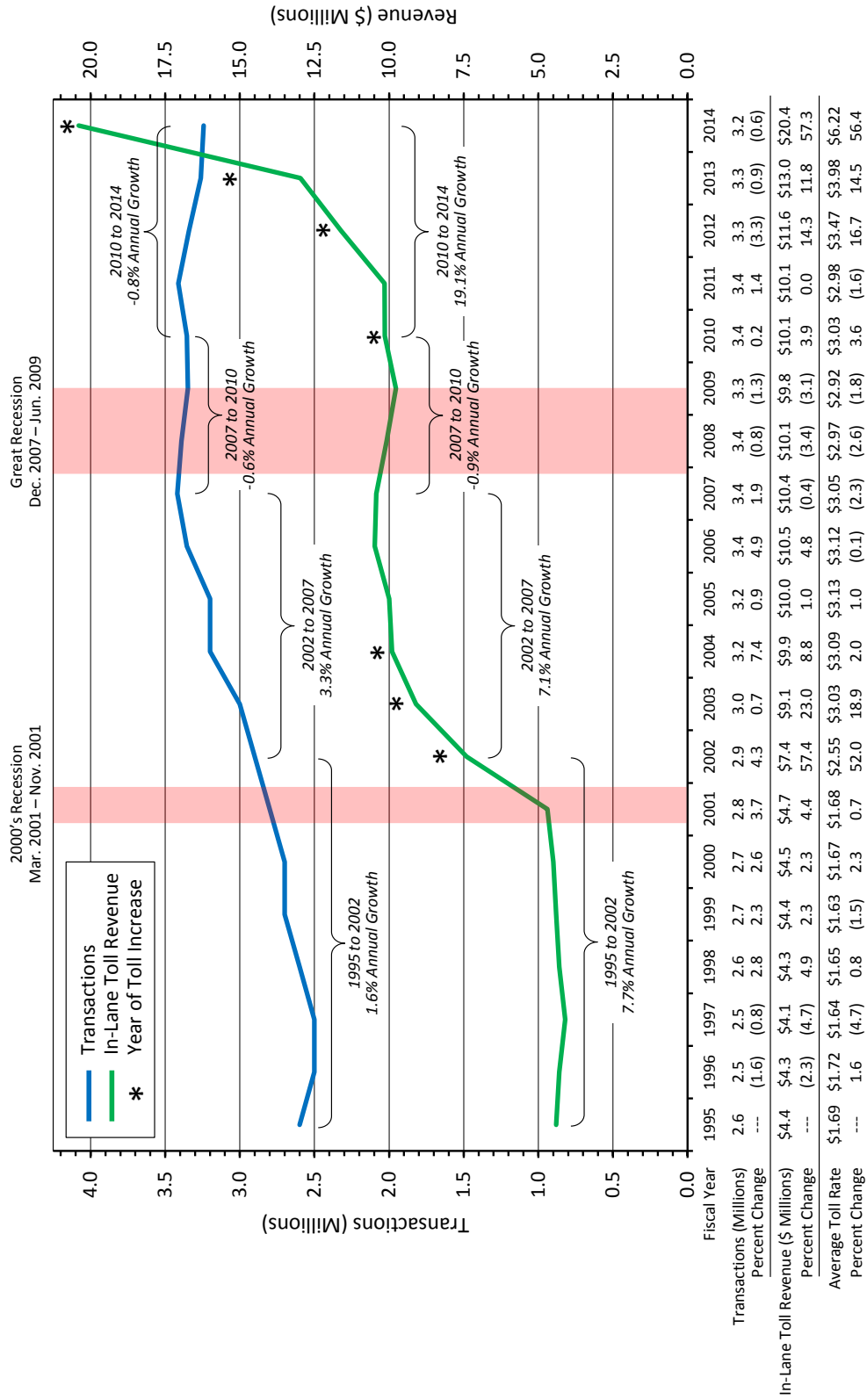
Historical transaction and revenue data for the Harry W. Nice Memorial Bridge between FY 1995 and FY 2014 are provided in Figure 2-7. Transactions declined during the first three years shown in the figure, between FY 1995 and FY 1997, before recovering and steadily growing through FY 2007. Between FY 1997 and FY 2007, transactions grew at an average annual rate of 3.1 percent, despite the 2001 recession and three toll increases. FY 2007 represented the peak transaction level of 3.4 million transactions. Transactions declined in FY 2008 by 0.8 percent and in FY 2009 by 1.3 percent, as a result of the impacts of the Great Recession. The toll increases in FY 2012 through FY 2014 were likely the primary impetus for the decline in transactions to 3.2 million by FY 2014. Average annual transaction growth was 1.1 percent per year between FY 1995 and FY 2014, but in the last five years between FY 2010 and FY 2014, transactions decreased by an average of 0.8 percent per year.

**Figure 2-6**  
**Historical Transactions and In-Lane Toll Revenue, FY 1995 through FY 2014**  
**William Preston Lane Jr. Memorial (Bay) Bridge**





**Figure 2-7**  
**Historical Transactions and In-Lane Toll Revenue, FY 1995 through FY 2014**  
**Harry W. Nice Memorial Bridge**



In-Lane Toll Revenue totals for the Harry W. Nice Memorial Bridge display a similar pattern of growth to those of transactions between FY 1995 and FY 2001, decreasing from FY 1995 to FY 1997 before growing steadily through FY 2006. Between FY 1995 and FY 2002, revenues grew at an average annual rate of 7.7 percent. Over the next three years, a series of toll increases resulted in an average annual increase of 28.2 percent per year. As a result of the decreases in transactions related to the Great Recession, revenues declined between FY 2007 and FY 2010 by an average of 0.9 percent per year. Revenues have recovered in recent years, aided by series of toll increases. Revenues were \$20.4 million in FY 2014, representing an average annual growth rate since FY 2010 of 19.1 percent. Overall average annual In-Lane Toll Revenue growth was 8.4 percent per year between 1995 and 2014, with the primary growth in revenues occurring between FY 2002 and FY 2004 and during the last five years.

### 2.2.8 MDTA Legacy Facilities Total

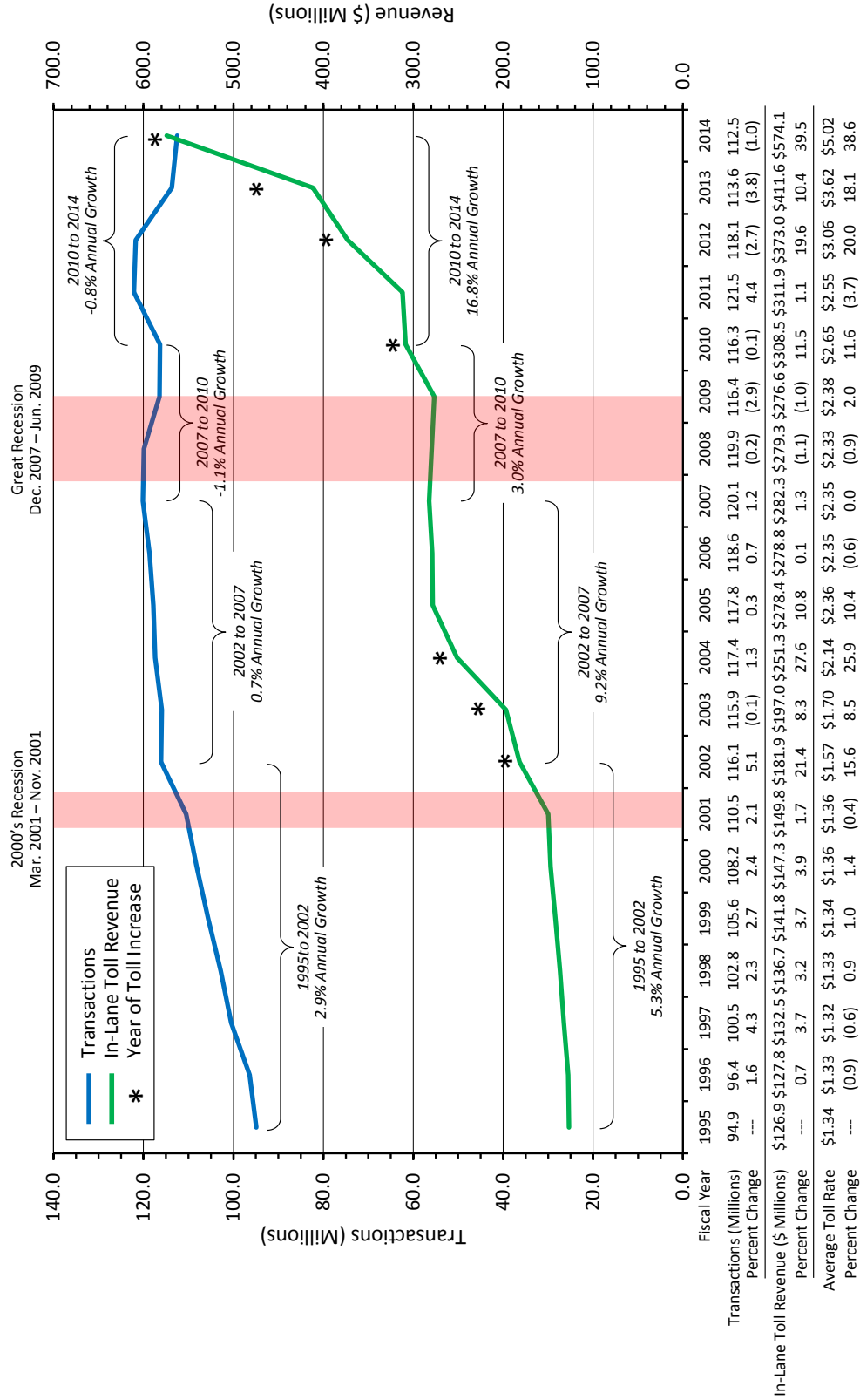
Historical transaction and revenue data for the MDTA legacy facilities on a system-wide basis between FY 1995 and FY 2014 are provided in Figure 2-8. Transactions on a system-wide basis have increased each year between FY 1995 and FY 2007 at an average annual rate of 2.0 percent, except for a very minor decline between FY 2002 and FY 2003, possibly related to the toll increase that year. However, following this steady growth, transactions declined between FY 2007 and FY 2010 by an average of 1.1 percent per year, most likely due to the impacts of the Great Recession and the FY 2010 toll increase. Transactions recovered in FY 2011, reaching a system high of 121.5 million transactions, before decreasing annually through FY 2014. The decline in transactions by FY 2014 to 112.5 million were likely the result of toll increases implemented each year from FY 2012 through FY 2014. Average annual transaction growth for the MDTA legacy facilities on a system-wide basis was 0.9 percent per year between FY 1995 and FY 2014, although in the last four years between FY 2010 and FY 2014, transactions decreased by an average of 0.8 percent per year.

In-Lane Toll Revenue for the MDTA legacy facilities on a system-wide basis has increased each year between FY 1995 and FY 2014, except in FY 2008 and FY 2009. Between FY 1995 and FY 2002, revenues grew at an average annual rate of 5.3 percent. Over the next three years, during which a series of toll increases were implemented, revenue increased at an average of 18.8 percent per year. As a result of the decreases in transaction growth related to the Great Recession, revenues declined in FY 2008 by 1.1 percent and in FY 2009 by 1.0 percent. Revenues have recovered in recent years, aided by a series of toll increases. Revenues were \$574.1 million in FY 2014, representing an average annual growth rate since FY 2010 of 16.8 percent. Overall average annual In-Lane Toll Revenue growth was 8.3 percent per year between 1995 and 2014.

### 2.2.9 Vehicle Class Distribution

Table 2-5 presents a summary of the distribution of annual transactions by vehicle class for FY 2014 for each of the MDTA legacy facilities and on a total system basis. As presented, two-axle vehicles, which include passenger cars, motorcycles, vans and SUVs, comprised 93.2 percent of all transactions. Vehicles with three-or-more-axles, which include trucks, buses and other commercial vehicles, comprised 6.8 percent of total transactions. The John F. Kennedy Memorial Highway (I-95) had the greatest percentage of commercial vehicles, with 11.4 percent of total transactions, while the Baltimore Harbor Tunnel had the lowest percentage, with 2.2 percent of total transactions.

**Figure 2-8**  
**Historical Transactions and In-Lane Toll Revenue, FY 1995 through FY 2014**  
**MDTA Legacy Facilities Total**



**Table 2-5  
Vehicle Class Distribution for the MDTA Legacy Facilities**

		FY 2014 Transactions (000s) <sup>(1)</sup>									
Method of Payment		John F. Kennedy Mem. Highway	Thomas J. Hattem Mem. Bridge	Baltimore Harbor Tunnel	Francis Scott Key Bridge	Fort McHenry Tunnel	William P. Lane, Jr. Mem. (Bay) Bridge	Harry W. Nice Mem. Bridge	Total		
<b>E-Z Pass</b>	2-Axle	12,740	4,794	24,352	9,493	38,474	11,919	3,046	<b>104,819</b>		
	Percent of Total	88.6	96.9	97.8	91.1	91.9	93.4	93.9	<b>93.2</b>		
	3+-Axle	1,637	155	541	926	3,401	840	197	<b>7,697</b>		
	Percent of Total	11.4	3.1	2.2	8.9	8.1	6.6	6.1	<b>6.8</b>		
<b>Total</b>		<b>14,377</b>	<b>4,948</b>	<b>24,893</b>	<b>10,419</b>	<b>41,875</b>	<b>12,759</b>	<b>3,243</b>	<b>112,515</b>		
<b>Percent of Total</b>		<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>		

Source: MdTA  
<sup>(1)</sup> Includes Violation Transactions

### 2.2.10 E-ZPass® Market Penetration

In recent years, electronic toll collection has played an increasingly important role in transaction processing for toll agencies across the nation. MDTA currently collects electronic tolls via E-ZPass®. Toll collection through E-ZPass® provides faster toll processing and decreased collection costs and leakage rates over the alternative video and cash options. As such, increases in E-ZPass® market penetration represent potential increases in total paid revenues.

Table 2-6 provides a concise summary of transactions by method of payment in FY 2014. They are shown individually for each of the seven MDTA legacy facilities, as well as on a total system basis. As shown in Table 2-6, E-ZPass® transactions accounted for 70.7 percent of all transactions in FY 2014. Of these, 47.7 percent were Maryland E-ZPass® customers, including in-state E-ZPass® customers, commuter plans, shopper plans and Hatem Bridge plans. In terms of individual facilities, the Thomas J. Hatem Memorial Bridge had the greatest percentage of E-ZPass® customers, at 92.3 percent of total transactions, primarily due to the Hatem Bridge Toll Plan. The Hatem Bridge Toll Plan provides local residents and commuters with greater access to local businesses and employment centers, while also providing the convenience of E-ZPass® and significant travel cost savings. The Harry W. Nice Memorial Bridge had the smallest percentage of E-ZPass® customers at 52.0 percent of total transactions. On a total system basis, cash and video transactions accounted for a combined 26.9 percent of all transactions. Non-revenue vehicles represented 1.3 percent of FY 2014 transactions, while violations represented 1.1 percent.

**Table 2-6  
Method of Payment Distribution for the MDTA Legacy Facilities**

Method of Payment	FY 2014 Transactions (000s)										Total				
	John F. Kennedy Mem. Highway		Thomas J. Hatem Mem. Bridge		Baltimore Harbor Tunnel		Francis Scott Key Bridge		Fort McHenry Tunnel			William P. Lane, Jr. Mem. (Bay) Bridge		Harry W. Nice Mem. Bridge	
	980	6.8	4,140	83.7	9,631	38.7	5,227	50.2	13,561	32.4		3,819	29.9	845	26.1
<b>E-Z Pass</b>															
Commuter / Shopper / Hatem Plans	980	6.8	4,140	83.7	9,631	38.7	5,227	50.2	13,561	32.4	3,819	29.9	845	26.1	<b>38,203</b>
Percent of Total															<b>34.0</b>
MdTA (2-axle only)	1,526	10.6	144	2.9	3,721	14.9	1,423	13.7	5,699	13.6	2,574	20.2	323	10.0	<b>15,410</b>
Percent of Total															<b>13.7</b>
Non-MdTA (2-axle and 3+-axle)	7,135	49.6	284	5.7	4,006	16.1	1,165	11.2	10,823	25.8	2,011	15.8	517	15.9	<b>25,940</b>
Percent of Total															<b>23.1</b>
<b>Total E-ZPass</b>	<b>9,641</b>	<b>67.1</b>	<b>4,568</b>	<b>92.3</b>	<b>17,358</b>	<b>69.7</b>	<b>7,814</b>	<b>75.0</b>	<b>30,082</b>	<b>71.8</b>	<b>8,404</b>	<b>65.9</b>	<b>1,685</b>	<b>52.0</b>	<b>79,553</b>
Percent of Total															<b>70.7</b>
<b>Cash/Video</b>															
2-axle and 3+-axle	4,521	31.4	306	6.2	6,849	27.5	2,178	20.9	10,854	25.9	4,100	32.1	1,502	46.3	<b>30,309</b>
Percent of Total															<b>26.9</b>
<b>Non-Revenue</b>															
Official Duty	95	0.7	46	0.9	429	1.7	273	2.6	444	1.1	124	1.0	32	1.0	<b>1,444</b>
Percent of Total															<b>1.3</b>
<b>Violations</b>															
Violations	120	0.8	29	0.6	257	1.0	154	1.5	495	1.2	131	1.0	23	0.7	<b>1,209</b>
Percent of Total															<b>1.1</b>
<b>Total</b>	<b>14,377</b>	<b>100.0</b>	<b>4,948</b>	<b>100.0</b>	<b>24,893</b>	<b>100.0</b>	<b>10,419</b>	<b>100.0</b>	<b>41,875</b>	<b>100.0</b>	<b>12,759</b>	<b>100.0</b>	<b>3,243</b>	<b>100.0</b>	<b>112,515</b>
Percent of Total															<b>100.0</b>

Source: MdTA

# Chapter 3

## Socioeconomic Review

### 3.1 Introduction

Vehicle trips on the Maryland tolled facilities occur for various reasons, including, but not limited to: commuting, recreation, and commerce. Forecasting the expected use of the Maryland Transportation Authority (MDTA) System for the aforementioned reasons or otherwise is, to an extent, a function of determining projections of socioeconomic variables, such as population, employment and income, as these types of variables generally explain the levels of and growth in commuting, commerce, etc. Economic forecasts are often seen as one of the key sources of uncertainty in the forecasting process. Consequently, for any toll transaction and toll revenue projection, including those for the MDTA System, the economic growth forecast is one of the critical input data elements. The purpose of this chapter is to describe the historical and forecasted trends in the study area socioeconomics to provide the context for developing travel demand growth projections. The socioeconomic trends review and analysis entailed a comprehensive data collection effort that included gathering a host of different pertinent variables from a variety of public and private sources.

#### 3.1.1 Review of Socioeconomic Historical Trends and Forecasts

An evaluation of socioeconomic trends and forecasts for the geographies along and surrounding the MDTA legacy toll facilities was conducted as part of the traffic forecasting process. Such trends serve as inputs to the traffic growth analysis. Subsections below provide a summary of various demographic and economic measures reviewed for this study, including total population, employment, income, real gross regional product (GRP), inflation, and gasoline prices.

The various governmental agencies and private sector forecasting companies from which data were obtained included: the United States Census Bureau, the United States Bureau of Labor Statistics (BLS), the United States Bureau of Economic Analysis (BEA), the Energy Information Administration (EIA), the MD State Data Center (MD SDC), Woods & Poole Complete Economic and Demographic Data Source (CEDDS) by Woods & Poole Economics, Inc., 2014 (Woods & Poole), and Moody's Analytics.

In the subsequent tables, the socioeconomic growth rates are presented as compound average annual growth (CAAGR) percentages, reported in three- to five-year increments from 2000 through 2024, as applicable. In regards to the geographic coverage, this review started with the "big picture" at the U.S. national and regional levels<sup>1</sup>, and then focuses on the State of Maryland with sub-state groupings. County compositions of the respective geographic areas are included within footnotes.

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<sup>1</sup> South Atlantic and Middle Atlantic, with the former for the most part consisting of the states of Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and D.C.; while the latter includes New Jersey, New York and Pennsylvania.

## 3.2 National and Larger Regional Level

### Historical Trends

#### 3.2.1 Population

The historical population data were obtained from the United States Census Bureau (census years and intercensal estimates). As presented in Table 3-1 below, population in the United States grew from about 281 million in the year 2000 to over 316 million by 2013, averaging about 0.9 percent per year over that timeframe. Comparatively, the South Region, which includes Maryland, grew at a faster pace of 1.4 percent, while the Mid-Atlantic Region lagged behind at a fractional growth of 0.3 percent per year.

Area	2000	2005	2010	2013	Compound Average Annual Growth Rate (Percent)			
					2000 - 2005	2005 - 2010	2010 - 2013	2000 - 2013
United States	281,421,906	295,516,599	308,745,538	316,128,839	1.0%	0.9%	0.8%	0.9%
Mid Atlantic	39,671,861	40,234,574	40,872,375	41,324,267	0.3%	0.3%	0.4%	0.3%
South Atlantic	51,769,160	56,145,779	59,777,037	61,783,647	1.6%	1.3%	1.1%	1.4%

Source: U.S. Census.

#### 3.2.2 Employment and Unemployment

The historical employment data were collected from the Bureau of Economic Analysis (BEA). Employment trends presented in Table 3-2 are typically more volatile than population and more closely resemble overall economic cycles, with relatively higher growth during pre-recession years (2000-2005), followed by notable declines in the period encompassing a recession (2005-2010), and then a subsequent recovery (2010-2013). Overall, both the Nation as a whole and the South Region experienced employment average growth of about 0.3 percent annually since 2000, while the Mid-Atlantic region showed a marginal overall growth of 0.1 percent per year.

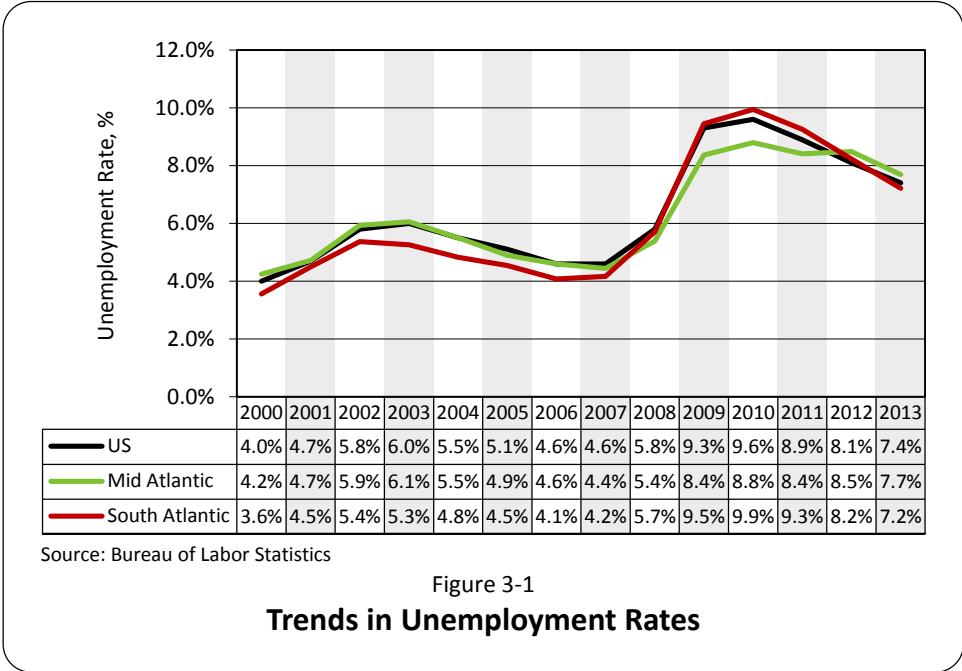
Area	2000	2005	2010	2013	Compound Average Annual Growth Rate (Percent)			
					2000 - 2005	2005 - 2010	2010 - 2013	2000 - 2013
United States	137,610,000	139,560,000	135,526,000	142,173,000	0.3%	-0.6%	1.6%	0.3%
Mid Atlantic	18,774,163	18,730,677	18,430,980	19,001,555	0.0%	-0.3%	1.0%	0.1%
South Atlantic	25,857,475	27,004,726	25,958,746	27,058,104	0.9%	-0.8%	1.4%	0.3%

Source: Bureau of Economic Analysis data for wage and salary employment.

Figure 3-1 depicts annual unemployment rates over the 2000 through 2013 period, based on Bureau of Labor Statistics (BLS) data. Unemployment rates for the South and Mid-Atlantic Regions have generally tracked fairly closely with those for the Nation, with the South showing wider moves in both directions. Unemployment rates were all around 4 percent to 6 percent during the pre-recession years in the past decade. The unemployment rates then spiked closer to 10 percent in 2009, and gradually



decreased to near 7 percent by the end of 2013. The unemployment rate continued to improve in 2014 with the national rate at 5.8 percent as of November 2014.



### 3.2.3 Per Capita Real Income

Historical per capita real income is presented in Table 3-3. Nationwide, per capita annual income now stands at over \$41,000 (in 2009 dollars), which represents real growth of about 1.0 percent per annum during the 2000-2013 time period. The corresponding income level in the South Region is about \$2,000 less than the national average, and has in the recent past grown at rates at or below 1.0 percent per annum, which is also below the national average. Per capita income levels are substantially higher in the Mid-Atlantic Region, averaging about \$5,000-\$7,000 per year more than the national average, and have also increased faster than in the South Atlantic Region and the U.S. average during the 2000-2013 time period.

**Table 3-3**  
Income Per Capita Growth Trends (2009 Dollars)

Area	2000	2005	2010	2013	Compound Average Annual Growth Rate (Percent)			
					2000 - 2005	2005 - 2010	2010 - 2013	2000 - 2013
United States	\$ 36,801	\$ 38,909	\$ 39,527	\$ 41,751	1.1%	0.3%	1.8%	1.0%
Mid Atlantic	41,656	43,876	46,640	48,416	1.0%	1.2%	1.3%	1.2%
South Atlantic	35,759	38,750	38,368	39,574	1.6%	-0.2%	1.0%	0.8%

Source: Moody's Analytics based on Bureau of Economic Analysis data.

### 3.2.4 Real Gross Domestic Product (GDP)

Another fundamental economic indicator that has bearing on traffic demand is gross domestic product (or gross state product/gross regional product, depending on the geographic focus). Historical real

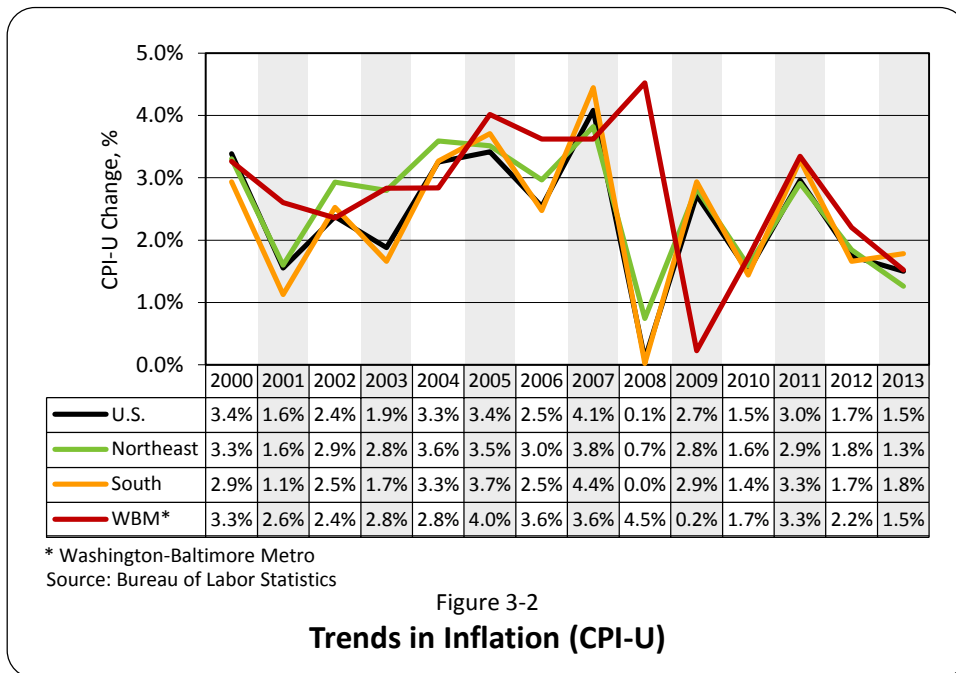
GDP is shown in Table 3-4. Based on the BEA data, national real gross domestic product has averaged 1.7 percent annually between 2000-2013 which is similar to the 1.6 percent per year growth rate in the South Atlantic Region. The real GDP in the Mid-Atlantic Region has expanded relatively more slowly since 2000, averaging 1.4 percent per year.

Area	2000	2005	2010	2013	Compound Average Annual Growth Rate (Percent)			
					2000 - 2005	2005 - 2010	2010 - 2013	2000 - 2013
United States	\$12,559,700	\$14,234,200	\$14,783,800	\$15,710,300	2.5%	0.8%	2.0%	1.7%
Mid Atlantic	1,964,541	2,175,215	2,260,482	2,339,558	2.1%	0.8%	1.2%	1.4%
South Atlantic	2,253,760	2,639,871	2,665,726	2,767,656	3.2%	0.2%	1.3%	1.6%

Source: Bureau of Economic Analysis data.

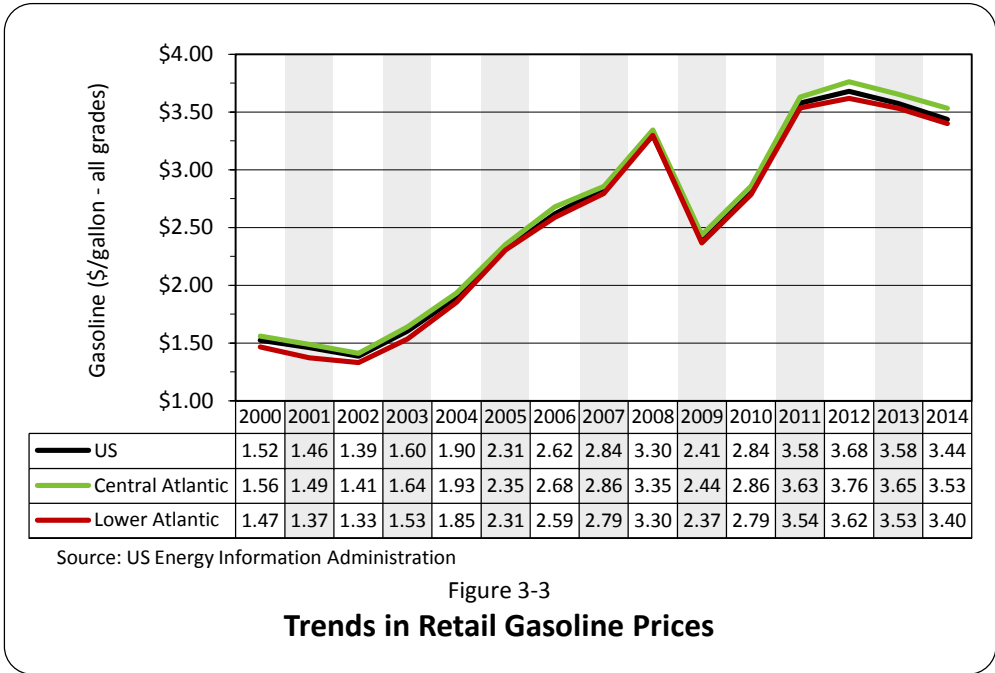
### 3.2.5 Inflation

Inflation, as measured by the popular Consumer Price Index, averaged about 2.4 percent per year in the U.S. over the 2000 to 2013 timeframe, and reached a high of 4.1 percent in 2007, in the pre-recession period. It then dropped sharply in 2008, and more recently settled closer to 1.5 percent annually, as shown in Figure 3-2. Inflation in the Northeast Region (proxy for Mid-Atlantic States) at 2.6 percent annually averaged slightly higher than the national rate, while general prices in the South, including Maryland, trended at 2.4 percent annually, or slightly below the national average since 2000. Washington-Baltimore Metro, however, experienced a relatively higher inflation rate compared to the rest of the South and the Nation, averaging about 2.8 percent during the same period.



### 3.2.6 Gasoline Prices

Another factor that can influence travel demand is the price of gasoline. Figure 3-3 presents the annual average nominal retail price per gallon (in current dollars) of unleaded gasoline (all grades, all formulations) from years 2000 to 2014<sup>2</sup>. The historical data from the U.S. Energy Information Administration (EIA) are shown for the United States, the Central Atlantic Region (including Maryland, and the rest of the Mid- Atlantic states)<sup>3</sup> and Lower Atlantic Region (largely equivalent to the South Regional definition by the U.S. Census).<sup>4</sup> Between these regions, price variation is relatively narrow, with the Lower Atlantic Region closely tracking the national average, and the Central Atlantic Region at somewhat higher levels (typically \$0.05 to \$0.08 cents more per gallon). Overall, between 2000 and 2014 average national gasoline prices increased from about \$1.52 per gallon to \$3.44 per gallon. However, national gasoline prices have recently experienced a sharp decline to a low of \$2.13 per gallon (as of late January 2015).



### Forecasts

#### 3.2.7 Population

As presented in Table 3-5, U.S. population is forecasted to increase over the next decade at an annual rate of 0.8 percent, according to both the U.S. Census Bureau and Moody’s Analytics, while Woods &

<sup>2</sup> Only the gasoline prices-related historical data were updated through all of 2014 for the purposes of this report chapter, while the data for the other variables were left as the latest available as of the earlier compilation time in the fall of 2014.  
<sup>3</sup> Central Atlantic region includes: Delaware, District of Columbia, Maryland, New Jersey, New York and Pennsylvania.  
<sup>4</sup> Lower Atlantic region includes: Florida, Georgia, North Carolina, South Carolina, Virginia and West Virginia.

Poole Economics (W&P)<sup>5</sup> projects the national population growth to be at 1.0 percent per year, which is marginally slower than the pace experienced in the past decade as previously shown in Table 3-1. Population in the South Atlantic Region is projected to increase faster, at 1.5 percent per year according to Moody's Analytics, and 1.3 percent annually according to W&P. The Mid-Atlantic Region is forecasted to experience a relatively modest growth of around 0.2 percent per annum by Moody's and 0.5 percent per annum by W&P.

<b>Area</b>	<b>Census Bureau</b>		<b>Moody's Analytics</b>		<b>Woods &amp; Poole (W&amp;P)</b>	
	<b>2013 - 2018</b>	<b>2018 - 2024</b>	<b>2013 - 2018</b>	<b>2018 - 2024</b>	<b>2013 - 2018</b>	<b>2018 - 2024</b>
United States	0.8%	0.8%	0.8%	0.8%	1.0%	1.0%
Mid Atlantic	N/A	N/A	0.2%	0.1%	0.5%	0.4%
South Atlantic	N/A	N/A	1.5%	1.5%	1.3%	1.3%

Sources: U.S. Census Bureau, December 2014; Moody's Analytics, October 2014; and Woods & Poole, 2014 CEDDS

<sup>(1)</sup> Percentages are presented as compound average annual gerowth.

### 3.2.8 Employment and Unemployment

Employment in the Nation is projected to grow by an average of 1.3 percent per year through 2024 according to W&P, while Moody's Analytics expects a sharp deceleration from 1.7 percent annually through 2018 to 0.6 per annum during the subsequent 2018-2024 interval, as shown in Table 3-6. Regionally, with future growth averaging around 1.6 percent annually, the South Atlantic Region is expected to outperform both the Nation and the Mid-Atlantic Region. The Mid-Atlantic Region is forecasted to have employment increases about 0.3 percent per annum below the U.S. as a whole. All these larger geographies are projected to experience average employment growth at a significantly stronger pace than in the recent past (as previously presented in Table 3-2).

As employment grows in the coming years, the national unemployment rate is also forecasted to continue improving over the next decade. According to a handful key sources that forecast medium to long-term U.S. unemployment, the average rates through the 2014 to 2018 period are projected to decrease from the 2013 rate of 7.4 percent to about 5.6 percent, with further declines to about 5.3 percent during the 2019 to 2024 period, as shown in Table 3-7.

<sup>5</sup> Source: Woods & Poole Economics, Inc. Washington, D.C. Copyright 2014. Complete Economic and Demographic Data Source (CEDDS). Woods & Poole does not guarantee the accuracy of this data. The use of this data and the conclusion drawn from it are solely the responsibility of the Consultant.

<b>Area</b>	<b>Moody's Analytics</b>		<b>Woods &amp; Poole (W&amp;P)</b>	
	<b>2013 - 2018</b>	<b>2018 - 2024</b>	<b>2013 - 2018</b>	<b>2018 - 2024</b>
United States	1.7%	0.6%	1.3%	1.3%
Mid Atlantic	1.2%	0.3%	1.0%	1.0%
South Atlantic	2.0%	1.1%	1.6%	1.5%

Sources: Moody's Analytics, September 2014; and Woods & Poole, 2014 CEDDS.  
<sup>(1)</sup> Percentages are presented as compound average annual growth.

<b>Source</b>	<b>Release Date</b>	<b>2014 - 2018</b>	<b>2019 - 2024</b>
Congressional Budget Office	August 2014	5.8%	5.6%
Federal Reserve Bank, FOMC*	November 2014	5.4%	5.4%
Office of Management and Budget	July 2014	5.7%	5.4%
Moody's Analytics	September 2014	5.6%	5.0%
<b>Average</b>		<b>5.6%</b>	<b>5.3%</b>

\* Federal Open Market Committee, average of the upper and lower bound.  
<sup>(1)</sup> Percentages shown are average annual rates.

### 3.2.9 Per Capita Real Income

As shown in Table 3-8, per capita real income for the U.S. is forecasted to increase at an average annual rate of around 1.5 percent. As in the past, the Mid-Atlantic Region is forecasted to experience stronger income growth relative to the national average, while the South Atlantic Region is projected to grow more slowly going forward.

<b>Area</b>	<b>Moody's Analytics</b>		<b>Woods &amp; Poole (W&amp;P)</b>	
	<b>2013 - 2018</b>	<b>2018 - 2024</b>	<b>2013 - 2018</b>	<b>2018 - 2024</b>
United States	2.5%	1.1%	1.2%	1.5%
Mid Atlantic	2.4%	1.6%	1.3%	1.6%
South Atlantic	1.8%	1.0%	1.2%	1.5%

Source: Moody's Analytics, September 2014; and Woods & Poole, 2014 CEDDS.  
<sup>(1)</sup> Percentages are presented as compound average annual growth.

### 3.2.10 Real Gross Domestic Product

Following a strong performance in the second half of 2014, the U.S. real GDP is projected by major macroeconomic forecasters to increase by around 2.6 percent per year through 2018, followed by a deceleration to around 2.2 percent annually in subsequent years, as summarized in Table 3-9.

<b>Source</b>	<b>Release Date</b>	<b>2014 - 2018</b>	<b>2019 - 2024</b>
Congressional Budget Office	August 2014	2.7%	2.2%
Federal Reserve Bank, FOMC*	November 2014	2.4%	2.2%
Office of Management and Budget	July 2014	2.9%	2.3%
Economist Intelligence Unit	May 2014	2.5%	2.4%
Woods & Poole Economics	March 2014	2.2%	2.3%
Moody's Analytics	August 2014	2.7%	1.9%
<b>Average</b>		<b>2.6%</b>	<b>2.2%</b>

\* Federal Open Market Committee, average of the upper and lower bound.  
<sup>(1)</sup> Percentages are presented as average growth rates.

### 3.2.11 Inflation

As the post-recessionary capacity slack still lingers, inflation is expected to remain relatively moderate and inch upward in the near term, but needs to be watched for potential increases in the medium- to longer-term. Further removal of spare capacity in the labor markets may lead to increased pressures on wages as markets tighten and approach full employment later in the business cycle. A sample of major macroeconomic forecasters expect U.S. annual inflation to generally increase to about 2.1 percent through 2018, and then accelerate slightly to 2.3 percent per year over the subsequent years through 2024, as shown in Table 3-10.

<b>Source</b>	<b>Release Date</b>	<b>2014 - 2018</b>	<b>2019 - 2024</b>
Congressional Budget Office	August 2014	2.1%	2.4%
Federal Reserve Bank, FOMC*	November 2014	1.8%	2.0%
Office of Management and Budget	July 2014	2.1%	2.3%
Moody's Analytics	September 2014	2.5%	2.4%
<b>Average</b>		<b>2.1%</b>	<b>2.3%</b>

\* Federal Open Market Committee, average of the upper and lower bound, using the PCE measure  
<sup>(1)</sup> Percentages are presented as average growth rates.

### 3.2.12 Gasoline Prices

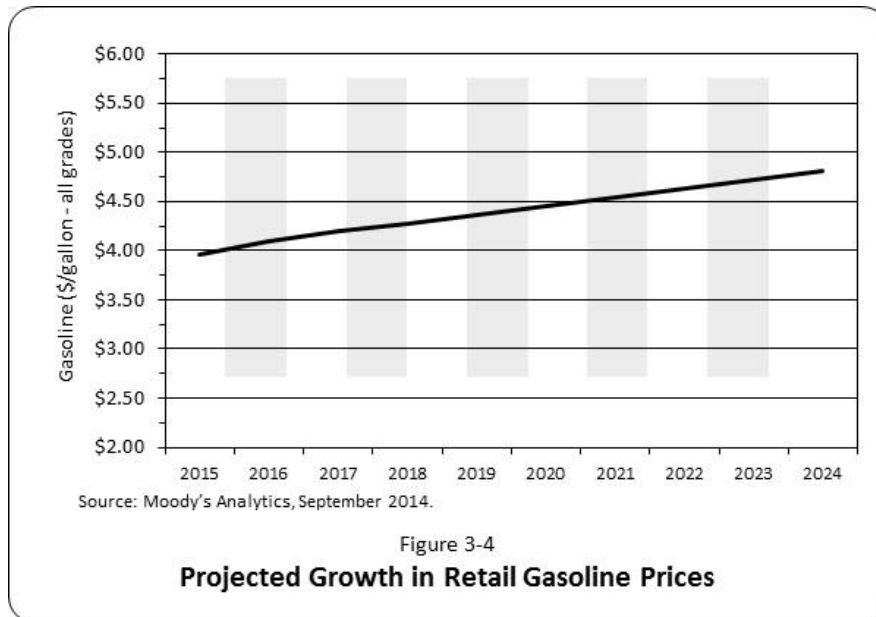
Retail gasoline prices are strongly influenced by larger trends in crude oil prices. The latter can be quite volatile, and are challenging to accurately predict going forward. While in early 2014, major forecasters such as the EIA and OPEC expected crude oil prices to remain in the vicinity of \$100 per barrel through 2025, recent crude oil prices in global markets have dropped significantly to around \$50 per barrel. Such relatively low oil prices of late are attributable to an imbalance between global oil supply and demand, with additional oil exploration in North America and slower overseas economic growth as main factors. Additionally, fuel efficiency gains and environmental concerns have continued to lessen demand for crude oil as the major energy source.

Consequently, there are winners (energy consumers/importers) and losers (producers/exporters) stemming from the recent crude oil price declines, and the U.S. and global economy as a whole tends to benefit as prices remain relatively low. U.S. retail prices which hovered around \$2.20 per gallon in January 2015 are expected to remain below the \$3.00 per gallon levels through 2015, according to the EIA's recent Short-Term Energy Outlook report. It is, however, important to recognize that short-term fluctuations in energy prices can be quite volatile, both to the downside as well as the upside. Although its forecasts badly missed current price levels, Moody's Analytics (September 2014-generated<sup>6</sup>) projection of U.S. retail gasoline prices called for average annual 2015 prices of almost \$4.00 per gallon, rising to about \$4.80 per gallon by the year 2024, as presented in Table 3-11 and Figure 3-4.

<sup>6</sup> Current as of the time of the forecasts development in the fall of 2014.

Area	Year									
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
<b>United States</b>	3.96	4.09	4.20	4.28	4.37	4.45	4.54	4.63	4.72	4.81

Source: Moody's Analytics, September 2014



### 3.3 Maryland and Sub-State Regional Level

This section provides the historical socioeconomic growth context as well as forecasts for the State of Maryland and its major planning regions<sup>7</sup>.

#### Historical Trends

##### 3.3.1 Population

The historical statewide population of Maryland grew by about 630 thousand from 5.3 million in 2000 to over 5.9 million in 2013, which is equivalent of 0.9 percent annually, as presented in Table 3-12. The largest region in the State – Baltimore – expanded its population base at the relatively slowest pace of 0.6 percent annually during the 2000-2013 period, while Southern Maryland grew three times

<sup>7</sup> The Maryland Department of Planning along with its State Data Center (SDC) groups all the counties/equivalents in the state into the following 6 planning regions:

Baltimore consisting of Anne Arundel, Baltimore, Carroll, Harford, Howard Counties and Baltimore City; Washington Suburban consisting of: Frederick, Montgomery and Prince George's Counties; Southern Maryland consisting of: Calvert, Charles, and St Mary's Counties; Upper Eastern Shore consisting of: Caroline, Cecil, Kent and Queen Anne's Counties; Lower Eastern Shore consisting of: Dorchester, Somerset, Wicomico and Worcester Counties; and Western Maryland consisting of: Alleghany, Garret and Washington Counties. Please note that due to its relative remoteness from the MDTA facilities, the Western Maryland Region in the Maryland Panhandle was not included in this review.



faster at 1.8 percent per year. The population in the remaining three major regions increased at around 1.0 to 1.1 percent per annum.

**Table 3-12**  
**Regional Population Growth Trends**

Area	2000	2005	2010	2013	Compound Average Annual Growth Rate (Percent)			
					2000 - 2005	2005 - 2010	2010 - 2013	2000 - 2013
Maryland Statewide	5,296,647	5,592,379	5,773,552	5,928,814	1.1%	0.6%	0.9%	0.9%
Baltimore Region	2,512,557	2,599,352	2,662,691	2,722,221	0.7%	0.5%	0.7%	0.6%
Washington Suburban	1,870,242	1,996,003	2,068,582	2,148,167	1.3%	0.7%	1.3%	1.1%
Southern MD	281,276	321,725	340,439	352,981	2.7%	1.1%	1.2%	1.8%
Upper Eastern Shore	209,286	229,249	239,951	240,998	1.8%	0.9%	0.1%	1.1%
Lower Eastern Shore	186,614	199,904	209,275	211,449	1.4%	0.9%	0.3%	1.0%

Source: U.S. Census.

### 3.3.2 Employment

Employment in Maryland grew considerably slower than population in the 2000 to 2013 period. Statewide employment change averaged 0.4 percent per year, which included a dip of around -0.4 percent annually in the period close to the latest economic recession, as presented in Table 3-13. While the Baltimore Region's employment grew at about the average statewide pace, employment in the Washington Suburban parts of Maryland increased at about half that rate. The Lower Eastern Shore performed the weakest, increasing at 0.1 percent per year. Southern Maryland saw the fastest rate of employment growth at 1.4 per annum.

**Table 3-13**  
**Regional Employment Growth Trends**

Area	2000	2005	2010	2013	Compound Average Annual Growth Rate (Percent)			
					2000 - 2005	2005 - 2010	2010 - 2013	2000 - 2013
Maryland Statewide	2,581,832	2,677,583	2,625,019	2,709,290	0.7%	-0.4%	1.1%	0.4%
Baltimore Region	1,303,524	1,336,483	1,314,076	1,376,571	0.5%	-0.3%	1.6%	0.4%
Washington Suburban	906,899	938,396	914,128	926,836	0.7%	-0.5%	0.5%	0.2%
Southern MD	96,233	109,750	113,404	114,945	2.7%	0.7%	0.5%	1.4%
Upper Eastern Shore	74,373	83,557	81,874	84,788	2.4%	-0.4%	1.2%	1.0%
Lower Eastern Shore	89,594	94,327	89,570	90,943	1.0%	-1.0%	0.5%	0.1%

Source: Bureau of Economic Analysis data for wage and salary employment.

### 3.3.3 Per Capita Real Income

Historical per capita real income in Maryland as a whole and its two largest regions – Baltimore and Washington Suburban – have recently been at levels and growth rates above national averages as presented in Table 3-14. The Baltimore Region's per capita income growth between 2000 and 2013 was the fastest in the state, which may be partly attributable to its relatively slow population growth. Southern Maryland and the Lower Eastern Shore experienced average rates of per capita income growth of 1.4 percent annually, which was above the State's growth rate.

**Table 3-14**  
**Regional Growth Trends in Income Per Capita (in Millions of 2009 Dollars)**

Area	2000	2005	2010	2013	Compound Average Annual Growth Rate (Percent)			
					2000 - 2005	2005 - 2010	2010 - 2013	2000 - 2013
Maryland Statewide	\$ 41,716	\$ 45,963	\$ 47,830	\$ 49,637	2.0%	0.8%	1.2%	1.3%
Baltimore Region	40,462	45,700	47,967	50,128	2.5%	1.0%	1.5%	1.7%
Washington Suburban	47,488	51,013	52,312	53,817	1.4%	0.5%	0.9%	1.0%
Southern MD	37,151	39,785	43,027	44,450	1.4%	1.6%	1.1%	1.4%
Upper Eastern Shore	36,881	40,510	40,942	42,743	1.9%	0.2%	1.4%	1.1%
Lower Eastern Shore	29,754	32,989	34,373	35,547	2.1%	0.8%	1.1%	1.4%

Sources: Woods & Poole based on Bureau of Economic Analysis data.

### 3.3.4 Real Gross Regional Product

Total economic output in Maryland, as measured in terms of Gross State Product, exceeded \$307 billion (in 2009\$), having grown at the average pace of 2.6 percent per year from 2000 to 2013, as shown in Table 3-15. This rate of growth which exceeded the national average was also experienced by all of Maryland's five major planning regions, with the Lower Eastern Shore growing the slowest at 2.0 percent per annum, and Southern Maryland expanding at a more robust real rate of 4.0 percent annually.

**Table 3-15**  
**Regional Growth Trend in Gross Regional Product (in Millions of 2009 Dollars)**

Area	Levels (in millions of 2009\$)				Compound Average Annual Growth Rate (Percent)			
	2000	2005	2010	2013	2000 - 2005	2005 - 2010	2010 - 2013	2000 - 2013
Maryland Statewide	\$ 220,050	\$ 267,983	\$ 291,165	\$ 307,307	4.0%	1.7%	1.8%	2.6%
Baltimore Region	109,172	133,549	143,869	152,488	4.1%	1.5%	2.0%	2.6%
Washington Suburban	85,927	102,984	113,515	119,411	3.7%	2.0%	1.7%	2.6%
Southern MD	7,538	10,089	11,748	12,522	6.0%	3.1%	2.2%	4.0%
Upper Eastern Shore	5,030	6,605	6,795	7,061	5.6%	0.6%	1.3%	2.6%
Lower Eastern Shore	5,384	6,508	6,776	6,964	3.9%	0.8%	0.9%	2.0%

Sources: Woods & Poole based on Bureau of Economic Analysis data.

## Forecasts

### 3.3.5 Population

Maryland's population is forecast to grow at an average rate of 0.7 percent per annum, according to the Maryland State Data Center, and at a faster pace of 1.0 percent annually according to W&P, as shown in Table 3-16<sup>8</sup>. While the Washington Suburban Region is projected to approximately match the statewide population growth rate, according to both sources, the Baltimore Region is forecasted to

<sup>8</sup> While county-level forecast from Moody' Analytics were also procured, not all the counties were included to fully match each of the Maryland major planning regions. Consequently, for population and the other variables covered in this section the two main sources used are MD SDC and W&P.

Also, MD SDC provides projections in five-year intervals, hence the future years anchored around years 2015, 2020 and 2025.

slightly lag the State in population growth. Southern Maryland is expected to continue to outperform the rest of the State, with future population growth at about twice the statewide rate through 2025.

<b>Area</b>	<b>Maryland State Data Center</b>		<b>Woods &amp; Poole (W&amp;P)</b>	
	<b>2015 - 2020</b>	<b>2020 - 2025</b>	<b>2015 - 2020</b>	<b>2020 - 2025</b>
Maryland Statewide	0.7%	0.7%	1.0%	1.0%
Baltimore Region	0.6%	0.4%	1.0%	0.9%
Washington Suburban	0.6%	0.7%	1.0%	1.0%
Southern MD	1.7%	1.5%	2.0%	1.9%
Upper Eastern Shore	1.0%	1.2%	1.3%	1.3%
Lower Eastern Shore	1.1%	0.9%	0.5%	0.4%

Sources: Maryland State Data Center, July 2014; and Woods & Poole, 2014 CEDDS.  
<sup>(1)</sup> Percentages are presented as compound average annual growth.

### 3.3.6 Employment

Similar to the national trends, employment in Maryland is expected to rebound relative to both its recent historical trend and also population growth. Statewide employment is forecasted to increase on average in the 1.0 percent to 1.5 percent per annum range through 2025 as shown in Table 3-17. While most of the other regions are projected to experience employment growth rates relatively similar to the statewide average, Southern Maryland is forecasted to experience a significantly higher pace of growth.

<b>Area</b>	<b>Maryland State Data Center</b>		<b>Woods &amp; Poole (W&amp;P)</b>	
	<b>2015 - 2020</b>	<b>2020 - 2025</b>	<b>2015 - 2020</b>	<b>2020 - 2025</b>
Maryland Statewide	1.2%	0.6%	1.5%	1.4%
Baltimore Region	1.1%	0.5%	1.5%	1.4%
Washington Suburban	1.2%	0.6%	1.5%	1.4%
Southern MD	1.5%	1.1%	1.9%	1.9%
Upper Eastern Shore	1.6%	1.0%	1.5%	1.5%
Lower Eastern Shore	1.2%	0.6%	1.0%	1.0%

Sources: Maryland State Data Center, July 2014; and Woods & Poole, 2014 CEDDS.  
<sup>(1)</sup> Percentages are presented as compound average annual growth.

### 3.3.7 Per Capita Real Income

In line with national trends, per capita real income in Maryland is projected to grow through 2025 at a rate faster than in the recent past. Statewide per capita real income is forecasted to increase by about 1.5 percent annually on average. It is the temporal distribution of that growth that differs between the two sources. The State Data Center (SDC) predicts a substantial deceleration of growth past 2020, while the W&P forecast calls for a relatively steady pace through 2025, as shown in Table 3-18.

Area	Maryland State Data Center		Woods & Poole (W&P)	
	2015 - 2020	2020 - 2025	2015 - 2020	2020 - 2025
Maryland Statewide	2.0%	1.0%	1.4%	1.5%
Baltimore Region	2.2%	1.1%	1.5%	1.6%
Washington Suburban	1.8%	0.9%	1.4%	1.5%
Southern MD	2.2%	1.2%	0.9%	1.1%
Upper Eastern Shore	2.2%	1.1%	1.1%	1.3%
Lower Eastern Shore	1.9%	1.0%	1.5%	1.7%

Sources: Maryland State Data Center, July 2014; and Woods & Poole, 2014 CEDDS.  
<sup>(1)</sup> Percentages are presented as compound average annual growth.

### 3.3.8 Real Gross Domestic Product

According to W&P, Gross State Product (GSP) is forecasted to show real growth of 2.4 percent per annum, as presented in Table 3-19. This is slightly below the historical pace and similar to the forecasted average GDP rate for the Nation as a whole for the next decade. Three of the five planning regions are projected to match the statewide GSP real growth, while the Lower Eastern Shore is expected to lag behind at 2.0 percent per year, and Southern Maryland is again in the growth leadership position with a real GSP forecasted to expand at 2.9 percent annually through 2025.

Area	Woods & Poole (W&P)	
	2015 - 2020	2020 - 2025
Maryland Statewide	2.4%	2.4%
Baltimore Region	2.4%	2.4%
Washington Suburban	2.4%	2.4%
Southern MD	2.9%	2.9%
Upper Eastern Shore	2.4%	2.4%
Lower Eastern Shore	2.0%	2.0%

Source: Woods & Poole, 2014 CEDDS.  
<sup>(1)</sup> Percentages are presented as compound average annual growth.

## 3.4 Summary and Conclusion

In summary, having endured the great recession and the relatively sluggish recovery in the recent past, the general macroeconomic environment in the U.S., Maryland, the South and Mid-Atlantic Regions has lately been strengthening, which is likely to bode well for the area in the near future. Within Maryland, the Southern sub-state planning region is projected to experience particularly strong growth with respect to most of the analyzed measures relative to the other Maryland regional groupings.

A majority of credible forecasting agencies (both public and private) are now publishing expectations for continued economic output, employment and income expansion, accompanied by moderate inflation within the short to medium-term future. While labor markets along with the larger economic activity measures, have continued to improve into 2014, the uneven nature of this strengthening has persisted. A number of risks, such as the fragility of the nascent European recovery including sanctions between Russia and the West, a slowdown in some of the major Asian and Latin American trading partners, exacerbated threats of extremism in the Middle East, and the public sector fiscal difficulties and constraints still remain a headwind on growth in the short-term, as the larger U.S. and global economies are trying to gain a stronger expansionary momentum.

In conclusion, while the growth momentum is generally strengthening and broadening, one can be cautiously optimistic about the ongoing economic expansion that is likely to be experienced in the MDTA geographic influence area. It is believed that this may translate into continued modest increases in traffic demand on the MDTA tolled facilities over the coming decade. There are, however, other factors, such as toll rates and/or transportation network changes, etc., beyond the overall socioeconomic growth that can also influence the pace of traffic growth on the MDTA legacy system – as will be summarized in the following chapter.



## Chapter 4

# Traffic and Revenue Forecast

This chapter summarizes the development of the forecasts of future year transactions and toll revenue for the seven legacy toll facilities of the MDTA. These 10-year annual forecasts have been prepared by facility and vehicle category through 2024, and include monthly forecasts for FY 2015 and 2016.

### 4.1 Model Inputs

Chapter 3 provided a description of growth trends in a series of key exogenous variables such as population, employment, real gross domestic product, and gasoline prices, which could affect toll traffic behavior. A series of regression models were developed using a combination of these data as explanatory variables to aid in the forecast of traffic and revenue. This section provides a brief overview of the model inputs.

#### 4.1.1 Tolls

Historical tolls by class were one key input into the regression model. Cost is typically correlated closely with traffic volumes, as motorists chose how many trips to make and by which route based on trip costs, including tolls. For the purposes of this analysis, it was assumed that MDTA toll rates are not adjusted during the forecast period. Changes in toll rates, if implemented, would alter the traffic and revenue forecast presented in this report.

#### 4.1.2 Economic Indicators

Economic growth has been an important driving force for the study area, and is also linked with traffic growth. The growth in the area's population and employment opportunities will tend to lead to an increase in traffic movement for commuting purposes, as well as other purposes or activities such as freight movement, shopping and recreation. Data for gross product, both state (Gross State Product) and regional (Gross Regional Product) for the Baltimore city region were also procured as a measure to reflect the relationship with the increasing trend of toll transactions at these MDTA facilities. CDM Smith also obtained historic and forecast data from the United States Census Bureau, the United States Bureau of Labor Statistics (BLS), the United States Bureau of Economic Analysis (BEA), Woods & Poole Economics<sup>1</sup> and Moody's Analytics for population, employment and GDP, which were used as inputs for deriving a model as a function of these measures.

#### 4.1.3 Gasoline Prices

Fuel prices are likely to affect the travel pattern and trip frequency of motorists. Historical gasoline prices for both the United States and the Central Atlantic Region through Q3 of 2014 (averaging about \$3.10/gallon over the last 10 years) were obtained from the U.S. Energy and Information Administration (EIA), and adjusted for inflation to constant dollar terms using Consumer Price Index

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<sup>1</sup> Source: Woods & Poole Economics, Inc., Washington, D.C., Copyright 2014. Woods & Poole does not guarantee the accuracy of this data. The use of this data and the conclusion drawn from it are solely the responsibility of the consultant.

values. The forecast of national gasoline prices (averaging about \$4.40/gallon in unadjusted dollar terms over the future 10 years) was obtained from Moody's Analytics (September 2014 release).

## 4.2 Model Specifications

Least-squared, multivariate regression models were used as the initial basis for the transaction and In-Lane Toll Revenue forecasts. The regression models attempted to determine the degree to which various independent variables (such as tolls, population, employment, GDP, etc...) were correlated with the dependent variable (transactions). Each independent variable was tested based on quarterly transaction data by facility, by vehicle classification, and by method of toll payment, using the historical data summarized in Chapters 2 and 3.

In some cases the correlative relationships were very strong, while in others they were not. The correlated independent variables combined with their applicable forecasts were then used in the transactions forecasting process. Transactions were forecasted by facility, by vehicle class, and by method of toll payment based on the forecasts of the independent variables and the observed historical relationships between the independent variables and transactions. Subsequently, in some cases, adjustments were made to primarily account for historical transaction growth patterns, and potential short-term construction impacts associated with planned major highway improvements.

## 4.3 Highway and Transit Improvements

A review of the major highway and transit improvements of the MDTA, the Maryland State Highway Administration, and the Maryland State Transit Administration was undertaken, with the assumption that major changes to the roadway or transit networks could potentially impact traffic using the MDTA legacy facilities. Improvements to or construction of competing routes could potentially reduce traffic volumes on the MDTA facilities, while additional interchanges with or enhancements of existing connecting roadways could potentially increase traffic volumes. Moreover, major construction activity may temporarily divert traffic off the MDTA facilities.

The improvement expected to impact the MDTA legacy facilities is the Canton Viaduct replacement. The bridge deck on this elevated portion of I-895 from the north portal entrance of the Baltimore Harbor Tunnel to Holabird Avenue, a distance of approximately 0.7 miles, will be renovated. The bridge deck and substructure are nearing the end of their life cycle, and therefore need to be replaced. Construction is expected to start in FY 2016 and be completed in FY 2020. During construction, traffic on the Baltimore Harbor Tunnel will likely divert to alternate routes, including the Fort McHenry Tunnel. These estimated diversions were considered in the forecast.

Additionally, two of the legacy facilities are identified for conversion to All Electronic Toll (AET) as shown in Table 4-1. While engineering is currently underway for the conversion to AET on the Francis Scott Key Bridge, and AET construction on the Thomas J. Hatem Memorial Bridge is currently programmed to begin in FY 2015, the dates shown in Table 4-1 are based on preliminary timelines provided by MDTA. The actual schedules for AET implementation at these and the other MDTA legacy facilities will likely change.

These projects as well as other planned highway and transit improvements identified as part of this review are summarized in Table 4-1. Projects such as the I-95 Express Toll Lanes<sup>SM</sup> and Harry W. Nice Memorial Bridge Replacement were not considered to have any impacts on the traffic and revenue forecasts.



**Table 4-1  
Highway and Transit Improvement**

Maryland Transportation Authority Projects		
County	Project	Project Status
Baltimore City, Baltimore	Canton Viaduct Replacement	Construction to begin FY 2016
Baltimore City, Baltimore	I-895 Bridge Deck Replacement	Construction underway
Baltimore City, Baltimore	Fort McHenry Tunnel Deck Overlays	Construction underway
Baltimore City, Baltimore	I-695, Francis Scott Key Bridge AET Conversion	Engineering underway
Baltimore City, Baltimore	I-95 Express Toll Lanes	Construction underway
Charles	US 301, Harry W. Nice Memorial Bridge Replacement	Preliminary engineering underway
Cecil, Harford	US 40, Thomas J. Hatem Memorial Bridge AET Conversion	Construction to begin FY 2015
Maryland State Highway Administration Projects		
County	Project	Project Status
Charles	MD 234, Budds Creek Road	Construction underway
Charles	US 301, South Corridor Transportation Study	Project Planning on hold
Charles	US 301, Waldorf Area Project	Project Planning underway
Cecil	MD 272, Mauldin Avenue	Construction began FY 2014
Queen Anne's	MD 404, Shore Highway	Construction began FY 2014
Queen Anne's	US 301, Blue Star Memorial Highway	Construction began FY 2014
Queen Anne's	US 50, Ocean Gateway	Project on hold
Harford	MD 7, Philadelphia Road	Construction began FY 2014
Harford	MD 22, Aberdeen Thruway	Construction began FY 2014
Harford	MD 24, Rocks Road	Construction began FY 2014
Harford	US 40, Pulaski Highway	Construction underway
Harford	MD 159, Philadelphia Road	Project on hold
Harford	US 1, Belair Road	Project Planning complete
Baltimore County and City	I-83, Harrisburg Expressway	Construction began FY 2014
Baltimore County and City	I-695, Baltimore Beltway	Construction underway
Baltimore County and City	I-795, Northwest Expressway	Project Planning underway
Baltimore County and City	MD 140, Reisterstown Road	Right-of-way began FY 2014
Anne Arundel	MD 175, Annapolis Road	Construction began FY 2014
Anne Arundel	MD 648, Baltimore Annapolis Boulevard	Construction began FY 2014
Anne Arundel	MD 3, Robert Crain Highway	Project Planning underway
Anne Arundel	MD 295, Baltimore Washington Parkway	Project Planning complete
Anne Arundel	US 50, John Hanson Highway	Project Planning began FY 2014
Anne Arundel	MD 198, Laurel Fort Meade Road	Project Planning underway
Howard	MD 32, Patuxent Freeway	Construction underway
Howard	US 29, Columbia Pike	Construction began FY 2014
Howard	MD 108, Clarksville Pike	Engineering underway
Howard	I-70	Project on hold
Howard	US 1, Washington Boulevard	Feasibility study complete
Maryland Transit Administration Projects		
County	Project	Project Status
Baltimore City, Baltimore	Red Line Corridor Transit Study	Preliminary engineering underway
Montgomery, Prince George	Purple Line Corridor Transit Study	Preliminary engineering underway
Montgomery	Corridor Cities Transitway	Preliminary engineering for Phase 1 begins FY 2015
Multiple	MARC Growth and Investment Plan	Ongoing, FY 2014 through FY 2019

## 4.4 Basic Assumptions

Transaction and revenue estimates for the legacy MDTA toll facilities were predicated upon the following assumptions, which are considered reasonable by CDM Smith for purposes of the forecast:

1. This study is limited to the seven MDTA legacy facilities and does not include forecasts for the Intercounty Connector or the I-95 Express Toll Lanes<sup>SM</sup> ;
2. The seven legacy toll facilities and approach roads will continue to be well-maintained and effectively signed;
3. No competing highway projects other than those identified in Table 4-1 will be constructed or significantly improved during the forecast period;
4. MDTA will continue to operate within its business rules and practices;
5. The existing toll collection concept and toll schedules will be in effect throughout the forecast period;
6. For the purposes of this report, it is assumed that no toll adjustments will be made during the forecasting period and that any conversion of facilities to all-electronic tolling will be revenue neutral;
7. Annual revenue estimates are expressed in future year dollars (nominal);
8. No major recession, natural disasters or other significant exogenous events will occur that would significantly reduce travel in the region;
9. Population and employment growth will occur as presented in this study;
10. Motor fuel will remain in adequate supply, and future price increases will not significantly exceed the long term rate of inflation;

Any significant departure from these basic assumptions could materially affect forecasted transactions and toll revenue for the seven facilities.

## 4.5 Transaction and In-Lane Toll Revenue Forecasts

### 4.5.1 Annual Transactions and In-Lane Toll Revenue by Facility

A summary of estimated transactions and In-Lane Toll Revenue forecasts from FY 2014 through FY 2024 for each of the seven MDTA legacy facilities is presented in this section by passenger car and commercial vehicle classes. The forecasts were developed based on the regression modeling process discussed previously in this chapter. Tables 4-2 through 4-8 are additionally provided in Appendix A.

#### 4.5.1.1 John F. Kennedy Memorial Highway (I-95)

Estimates of transaction and In-Lane Toll Revenue for the John F. Kennedy Memorial Highway (I-95) are provided in Table 4-2. The John F. Kennedy Memorial Highway processed 14.4 million transactions in FY 2014, and is expected to grow to an estimated 15.4 million by 2024, an average annual percent growth of 0.7 percent. With the commercial vehicles accounting for 12 percent of these transactions, revenue of \$162.8 million was generated in FY 2014. This is forecasted to increase to \$173.8 in 2024.

**Table 4-2**  
**John F. Kennedy Memorial Highway (I-95)**  
**Transactions and In-Lane Toll Revenue Estimates by Vehicle Class**

Fiscal Year	Transactions (millions)					
	PC		CV		Total	
	Transactions	Percent Change	Transactions	Percent Change	Transactions	Percent Change
2014	12.7		1.7		<b>14.4</b>	
2015	12.6	(0.8)	1.7	(1.0)	<b>14.3</b>	<b>(0.8)</b>
2016	12.7	0.7	1.7	1.3	<b>14.4</b>	<b>0.8</b>
2017	12.8	1.2	1.7	1.3	<b>14.5</b>	<b>1.2</b>
2018	12.9	0.8	1.7	0.8	<b>14.7</b>	<b>0.8</b>
2019	13.0	0.8	1.7	0.3	<b>14.8</b>	<b>0.8</b>
2020	13.1	0.8	1.7	0.5	<b>14.9</b>	<b>0.7</b>
2021	13.2	0.8	1.8	0.5	<b>15.0</b>	<b>0.7</b>
2022	13.4	0.9	1.8	0.7	<b>15.1</b>	<b>0.9</b>
2023	13.5	0.9	1.8	0.7	<b>15.3</b>	<b>0.9</b>
2024	13.6	0.9	1.8	0.6	<b>15.4</b>	<b>0.9</b>
Fiscal Year	In-Lane Toll Revenues (\$ millions)					
	PC		CV		Total	
	Revenue	Percent Change	Revenue	Percent Change	Revenue	Percent Change
2014	\$ 94.9		\$ 67.9		<b>\$ 162.8</b>	
2015	94.2	(0.8)	67.2	(1.0)	<b>161.4</b>	<b>(0.9)</b>
2016	94.8	0.7	68.1	1.3	<b>162.9</b>	<b>0.9</b>
2017	96.0	1.2	68.9	1.3	<b>164.9</b>	<b>1.2</b>
2018	96.8	0.9	69.5	0.8	<b>166.3</b>	<b>0.8</b>
2019	97.6	0.8	69.7	0.3	<b>167.3</b>	<b>0.6</b>
2020	98.3	0.8	70.1	0.5	<b>168.4</b>	<b>0.7</b>
2021	99.1	0.8	70.4	0.5	<b>169.5</b>	<b>0.7</b>
2022	100.0	0.9	70.9	0.7	<b>171.0</b>	<b>0.8</b>
2023	101.0	1.0	71.5	0.7	<b>172.4</b>	<b>0.9</b>
2024	101.9	0.9	71.9	0.6	<b>173.8</b>	<b>0.8</b>

Note: PC= Passenger Cars, CV= Commercial Vehicles

#### 4.5.1.2 Thomas J. Hatem Memorial Bridge

The Thomas J. Hatem Memorial Bridge is forecasted to have an average annual growth in transactions of 0.6 percent over the 10-year forecast period as presented in Table 4-3. In FY 2014 total transactions were 4.9 million. In FY 2019, the mid-point in the forecast period, transactions are estimated at 5.1 million, resulting in revenue of \$ 11.0 million. By FY 2024, that number is estimated to increase to 5.3 million, resulting in revenue growth from \$10.2 million to \$ 11.4 million. The percent of commercial vehicles on the Bridge is estimated at 3 to 4 percent during the 10-year forecast period. The conversion to AET on the Bridge, currently assumed to be completed by FY 2019 was based on preliminary timelines provided by MDTA. The actual schedule for implementation will likely change.

**Table 4-3**  
**Thomas J. Hatem Memorial Bridge (US 40)**  
**Transactions and In-Lane Toll Revenue Estimates by Vehicle Class**

Fiscal Year	Transactions (millions)					
	PC		CV		Total	
	Transactions	Percent Change	Transactions	Percent Change	Transactions	Percent Change
2014	4.8		0.2		4.9	
2015	4.8	0.1	0.2	5.0	5.0	0.3
2016	4.8	0.6	0.2	1.7	5.0	0.7
2017	4.8	0.7	0.2	0.8	5.0	0.7
2018	4.9	0.7	0.2	0.4	5.1	0.6
2019	4.9	0.7	0.2	0.2	5.1	0.6
2020	4.9	0.6	0.2	0.1	5.1	0.6
2021	5.0	0.6	0.2	0.1	5.2	0.6
2022	5.0	0.6	0.2	0.1	5.2	0.6
2023	5.0	0.6	0.2	0.1	5.2	0.6
2024	5.1	0.6	0.2	0.1	5.3	0.6
Fiscal Year	In-Lane Toll Revenues (\$ millions)					
	PC		CV		Total	
	Revenue	Percent Change	Revenue	Percent Change	Revenue	Percent Change
2014	\$ 5.0		\$ 5.2		\$ 10.2	
2015	5.0	0.1	5.4	5.0	10.4	2.6
2016	5.1	1.7	5.5	1.7	10.6	1.7
2017	5.2	1.7	5.6	0.8	10.8	1.3
2018	5.3	1.8	5.6	0.4	10.9	1.0
2019	5.4	1.7	5.6	0.2	11.0	0.9
2020	5.5	1.7	5.6	0.1	11.1	0.9
2021	5.5	1.6	5.6	0.1	11.2	0.8
2022	5.6	1.6	5.6	0.1	11.2	0.8
2023	5.7	1.5	5.6	0.1	11.3	0.8
2024	5.8	1.5	5.6	0.1	11.4	0.8

Note: PC= Passenger Cars, CV= Commercial Vehicles

### 4.5.1.3 Baltimore Harbor Tunnel

The Baltimore Harbor Tunnel transactions and In-Lane Toll Revenue are presented in Table 4-4. Decreases in transactions and revenue have been forecasted to occur between FY 2016 and FY 2020, the result of planned construction on the approaches to the Tunnel. Transactions in FY 2014 were 24.9 million, generating \$77.6 million in toll revenue. In FY 2019, transactions are estimated to reach 24.6 million, generating \$76.7 million in toll revenue. By FY 2024, transactions are forecasted to increase to 26.1 million generating an estimated \$81.3 million in toll revenue. The average annual percent change in transactions from FY 2014 to FY 2019 is -0.3 percent, while the average annual percent change from FY 2019 to FY 2024 is 1.2 percent. The percentage of commercial vehicles remains relatively constant during the forecast period at 2 percent. The conversion to AET at the Baltimore Harbor Tunnel was assumed to be completed in FY 2023. This was based on preliminary timelines provided by MDTA. The actual schedule for implementation will likely change.

**Table 4-4**  
**Baltimore Harbor Tunnel (I-895)**  
**Transactions and In-Lane Toll Revenue Estimates by Vehicle Class**

Fiscal Year	Transactions (millions)					
	PC		CV		Total	
	Transactions	Percent Change	Transactions	Percent Change	Transactions	Percent Change
2014	24.3		0.6		<b>24.9</b>	
2015	25.4	4.6	0.6	4.0	<b>26.0</b>	<b>4.6</b>
2016	24.5	(3.8)	0.6	(3.5)	<b>25.0</b>	<b>(3.8)</b>
2017	24.0	(2.0)	0.6	(2.0)	<b>24.5</b>	<b>(2.0)</b>
2018	24.0	0.0	0.6	0.0	<b>24.5</b>	<b>0.0</b>
2019	24.0	0.2	0.6	0.2	<b>24.6</b>	<b>0.2</b>
2020	24.1	0.2	0.6	0.2	<b>24.6</b>	<b>0.2</b>
2021	25.2	4.6	0.6	4.0	<b>25.7</b>	<b>4.6</b>
2022	25.4	0.7	0.6	0.2	<b>25.9</b>	<b>0.7</b>
2023	25.4	0.2	0.6	0.3	<b>26.0</b>	<b>0.2</b>
2024	25.5	0.2	0.6	0.2	<b>26.1</b>	<b>0.2</b>
Fiscal Year	In-Lane Toll Revenues (\$ millions)					
	PC		CV		Total	
	Revenue	Percent Change	Revenue	Percent Change	Revenue	Percent Change
2014	\$ 69.5		\$ 8.1		<b>\$ 77.6</b>	
2015	72.8	4.8	8.4	4.1	<b>81.2</b>	<b>4.7</b>
2016	70.0	(3.9)	8.1	(3.5)	<b>78.1</b>	<b>(3.9)</b>
2017	68.6	(2.0)	8.0	(2.0)	<b>76.5</b>	<b>(2.0)</b>
2018	68.6	(0.0)	8.0	0.0	<b>76.5</b>	<b>(0.0)</b>
2019	68.7	0.2	8.0	0.2	<b>76.7</b>	<b>0.2</b>
2020	68.8	0.2	8.0	0.2	<b>76.8</b>	<b>0.2</b>
2021	72.1	4.8	8.3	4.0	<b>80.4</b>	<b>4.7</b>
2022	72.6	0.8	8.3	0.2	<b>81.0</b>	<b>0.7</b>
2023	72.8	0.3	8.4	0.2	<b>81.2</b>	<b>0.3</b>
2024	73.0	0.2	8.4	0.3	<b>81.3</b>	<b>0.2</b>

Note: PC= Passenger Cars, CV= Commercial Vehicles

Assumes impacts of construction phases 2016-2020

#### 4.5.1.4 Fort McHenry Tunnel

The Fort McHenry Tunnel transactions and In-Lane Toll Revenue forecasts are presented in Table 4-5. This facility recorded the highest total transactions of all the legacy toll facilities at 41.9 million in FY 2014, and is forecasted to grow to an estimated 42.4 million by FY 2019, and to 43.6 million by FY 2024, an average annual percent change of 0.4 percent. These transactions resulted in the highest toll revenue among the legacy facilities at \$183.1 million in FY 2014, and is forecasted to increase to \$184.2 million by FY 2019, and \$190.2 by FY 2024. The percentage of commercial vehicles remains relatively unchanged at 8 percent throughout the 10-year forecast period. The conversion to AET at the Fort McHenry Tunnel was assumed to be completed in FY 2023. This was based on preliminary timelines provided by MDTA. The actual schedule for implementation will likely change.

**Table 4-5**  
**Fort McHenry Tunnel (I-95)**  
**Transactions and In-Lane Toll Revenue Estimates by Vehicle Class**

Fiscal Year	Transactions (millions)					
	PC		CV		Total	
	Transactions	Percent Change	Transactions	Percent Change	Transactions	Percent Change
2014	38.3		3.6		41.9	
2015	36.4	(4.9)	3.6	0.1	40.0	(4.5)
2016	37.5	3.1	3.6	(0.0)	41.1	2.8
2017	38.1	1.6	3.6	(0.3)	41.7	1.5
2018	38.5	0.9	3.6	(0.2)	42.1	0.8
2019	38.8	0.8	3.6	(0.2)	42.4	0.7
2020	39.1	0.8	3.6	(0.2)	42.7	0.7
2021	38.9	(0.4)	3.5	(0.5)	42.5	(0.4)
2022	39.3	0.9	3.5	(0.2)	42.8	0.8
2023	39.7	1.0	3.5	(0.2)	43.2	0.9
2024	40.0	0.9	3.5	(0.2)	43.6	0.8

Fiscal Year	In-Lane Toll Revenues (\$ millions)					
	PC		CV		Total	
	Revenue	Percent Change	Revenue	Percent Change	Revenue	Percent Change
2014	\$ 115.0		\$ 68.1		\$ 183.1	
2015	109.2	(5.0)	68.2	0.1	177.5	(3.1)
2016	111.7	2.3	68.0	(0.3)	179.7	1.3
2017	114.1	2.1	67.8	(0.3)	181.9	1.2
2018	115.4	1.2	67.7	(0.2)	183.1	0.7
2019	116.6	1.0	67.6	(0.2)	184.2	0.6
2020	117.8	1.0	67.4	(0.2)	185.3	0.6
2021	119.0	1.0	67.3	(0.2)	186.3	0.6
2022	120.4	1.2	67.2	(0.2)	187.6	0.7
2023	121.9	1.2	67.0	(0.2)	188.9	0.7
2024	123.3	1.1	66.9	(0.2)	190.2	0.6

Note: PC= Passenger Cars, CV= Commercial Vehicles

Portion of diverted traffic from BHT, 2016-2020

#### 4.5.1.5 Francis Scott Key Bridge

Table 4-6 provides forecasts of transactions and In-Lane Toll Revenue for the Francis Scott Key Bridge. In 2014 the total transactions were 10.4 million. In FY 2019 they are forecasted to increase to 11.5 million, and then to 11.8 million by FY 2024, an average annual percent growth of 1.2 percent. Commercial vehicles represent between 9 and 10 percent of all transactions throughout the forecast period. The revenue for this facility is estimated to increase from \$40.3 million in FY 2014 to \$44.3 million in FY 2019, and then to \$45.5 million in FY 2024. Conversion to AET at the Francis Scott Key Bridge was assumed to be completed by FY 2019. This was based on preliminary timelines provided by MDTA. The actual schedule for implementation will likely change.

**Table 4-6**  
**Francis Scott Key Bridge (I-695)**  
**Transactions and In-Lane Toll Revenue Estimates by Vehicle Class**

Fiscal Year	Transactions (millions)					
	PC		CV		Total	
	Transactions	Percent Change	Transactions	Percent Change	Transactions	Percent Change
2014	9.4		1.0		10.4	
2015	9.9	4.9	1.1	6.0	10.9	5.0
2016	10.1	2.5	1.1	1.5	11.2	2.4
2017	10.3	1.3	1.1	0.8	11.3	1.2
2018	10.3	0.6	1.1	0.5	11.4	0.6
2019	10.4	0.6	1.1	0.5	11.5	0.6
2020	10.4	0.5	1.1	0.5	11.5	0.5
2021	10.5	0.5	1.1	0.5	11.6	0.5
2022	10.5	0.5	1.1	0.5	11.7	0.5
2023	10.6	0.5	1.1	0.5	11.7	0.5
2024	10.7	0.5	1.1	0.5	11.8	0.5
	In-Lane Toll Revenues (\$ millions)					
	PC		CV		Total	
	Revenue	Percent Change	Revenue	Percent Change	Revenue	Percent Change
2014	\$ 22.9		\$ 17.4		\$ 40.3	
2015	24.0	5.1	18.4	6.0	42.5	5.5
2016	24.7	2.6	18.7	1.5	43.4	2.1
2017	25.0	1.3	18.9	0.7	43.8	1.1
2018	25.1	0.6	19.0	0.5	44.1	0.6
2019	25.3	0.7	19.0	0.5	44.4	0.6
2020	25.4	0.5	19.1	0.5	44.6	0.5
2021	25.6	0.5	19.2	0.5	44.8	0.5
2022	25.7	0.5	19.3	0.5	45.0	0.5
2023	25.8	0.5	19.4	0.5	45.2	0.5
2024	25.9	0.5	19.5	0.5	45.5	0.5

Note: PC= Passenger Cars, CV= Commercial Vehicles

#### 4.5.1.6 William Preston Lane Jr. Memorial (Bay) Bridge

In FY 2014, the William Preston Lane Jr. Memorial (Bay) Bridge processed a total of 12.8 million transactions, as presented in Table 4-7. Of these, 7 percent or 0.9 million were commercial vehicle transactions. Transactions are forecasted to reach an estimated 13.9 million by FY 2024, resulting in an average annual percent growth of 0.8 percent. Actual revenue of \$79.8 million was generated in FY 2014, and is forecasted to increase to \$86.7 million by FY 2024. This facility was assumed to be converted to AET in FY 2021. This was based on preliminary timelines provided by MDTA. The actual schedule for implementation will likely change.

**Table 4-7**  
**William Preston Lane Jr. Memorial Bridge (US 50/301)**  
**Transactions and In-Lane Toll Revenue Estimates by Vehicle Class**

Fiscal Year	Transactions (millions)					
	PC		CV		Total	
	Transactions	Percent Change	Transactions	Percent Change	Transactions	Percent Change
2014	11.9		0.9		12.8	
2015	12.0	0.7	0.9	3.1	12.9	0.8
2016	12.1	1.4	0.9	0.7	13.0	1.4
2017	12.3	1.2	0.9	0.6	13.2	1.2
2018	12.4	0.8	0.9	0.4	13.3	0.8
2019	12.4	0.6	0.9	0.3	13.4	0.6
2020	12.5	0.7	0.9	0.4	13.5	0.7
2021	12.6	0.7	0.9	0.4	13.6	0.7
2022	12.7	0.8	0.9	0.4	13.7	0.8
2023	12.8	0.8	0.9	0.4	13.8	0.8
2024	12.9	0.8	0.9	0.4	13.9	0.8
Fiscal Year	In-Lane Toll Revenues (\$ millions)					
	PC		CV		Total	
	Revenue	Percent Change	Revenue	Percent Change	Revenue	Percent Change
2014	\$ 54.3		\$ 25.4		\$ 79.8	
2015	54.7	0.7	26.2	3.1	80.9	1.5
2016	55.5	1.5	26.4	0.7	81.9	1.2
2017	56.2	1.2	26.5	0.6	82.8	1.0
2018	56.7	0.8	26.7	0.4	83.4	0.7
2019	57.1	0.7	26.7	0.3	83.8	0.6
2020	57.5	0.7	26.8	0.4	84.3	0.6
2021	57.9	0.8	26.9	0.4	84.9	0.6
2022	58.4	0.8	27.1	0.4	85.5	0.7
2023	58.9	0.9	27.2	0.4	86.1	0.7
2024	59.4	0.8	27.3	0.4	86.7	0.7

Note: PC= Passenger Cars, CV= Commercial Vehicles



#### 4.5.1.7 Harry W. Nice Memorial Bridge

Estimates of transaction and In-Lane Toll Revenue for the Harry W. Nice Memorial Bridge are provided in Table 4-8. The Bridge produced the lowest number of total transaction of the seven legacy facilities, reaching just 3.2 million in FY 2014, with commercial vehicles accounting for 6 percent of the total. This facility is estimated to have an average annual growth in transactions of 0.5 percent through FY 2024, when transactions are expected to reach 3.4 million, with the percent of commercial vehicles increasing slightly to 8 percent. Revenue in FY 2014 reached \$20.4 million and is forecasted to grow by 1.7 percent per year on average to FY 2019, when revenue of \$22.2 million is forecasted. From FY 2019 to FY 2024 revenue is estimated to grow at an average of 0.4 percent per year, reaching \$22.7 million.

**Table 4-8**  
**Harry W. Nice Memorial Bridge (US 301)**  
**Transactions and In-Lane Toll Revenue Estimates by Vehicle Class**

Fiscal Year	Transactions (millions)					
	PC		CV		Total	
	Transactions	Percent Change	Transactions	Percent Change	Transactions	Percent Change
2014	3.0		0.2		3.2	
2015	3.1	2.4	0.2	7.3	3.3	2.7
2016	3.2	1.2	0.2	5.7	3.4	1.5
2017	3.1	(0.0)	0.2	3.9	3.4	0.2
2018	3.1	(0.0)	0.2	2.2	3.4	0.1
2019	3.2	0.0	0.2	0.8	3.4	0.1
2020	3.2	0.0	0.2	1.0	3.4	0.1
2021	3.2	0.0	0.3	1.1	3.4	0.1
2022	3.2	0.0	0.3	1.4	3.4	0.1
2023	3.2	0.0	0.3	1.4	3.4	0.1
2024	3.2	0.0	0.3	1.0	3.4	0.1
Fiscal Year	In-Lane Toll Revenues (\$ millions)					
	PC		CV		Total	
	Revenue	Percent Change	Revenue	Percent Change	Revenue	Percent Change
2014	\$ 14.6		\$ 5.8		\$ 20.4	
2015	15.0	2.5	6.2	7.4	21.2	3.9
2016	15.2	1.2	6.6	5.8	21.7	2.6
2017	15.2	(0.0)	6.8	4.0	22.0	1.2
2018	15.2	(0.0)	7.0	2.2	22.1	0.7
2019	15.2	0.1	7.0	0.8	22.2	0.3
2020	15.2	0.0	7.1	1.0	22.3	0.4
2021	15.2	0.1	7.2	1.1	22.4	0.4
2022	15.2	0.1	7.3	1.4	22.5	0.5
2023	15.2	0.0	7.4	1.4	22.6	0.5
2024	15.2	0.0	7.5	1.0	22.7	0.4

Note: PC= Passenger Cars, CV= Commercial Vehicles

### 4.5.2 Systemwide Annual Transactions and In-Lane Toll Revenue Forecasts

Table 4-9 presents historical and forecasted In-Lane Toll Revenues from FY 2004 to FY 2024. Systemwide transactions have fluctuated between FY 2004 and FY 2014, but overall have decreased from 117.4 million on MDTA facilities in FY 2004 to 112.5 million in FY 2014, a total decrease of 4.2 percent, or 0.4 percent per annum. The historical fluctuations are largely due to both the negative effects of the Great Recession and the recent series of toll increases. During the FY 2004 to FY 2014 period, the number of systemwide transactions peaked at 121.5 million in FY 2011, resulting in revenue of \$311.9 million.

In the initial forecast year of FY 2015, transactions of 112.4 million have been forecasted, and are forecasted to grow to 119.3 million by FY 2024, or a total of 6.2 percent during the 10-year forecast period. This equates to a growth rate of 0.6 percent per annum. Total transactions are forecasted to reach 115.1 million by FY 2019, a growth of 2.3 percent over FY 2014. From FY 2019 to FY 2024 transactions are forecasted to increase from 115.1 million to 119.3 million, or a total of 3.7 percent. The revenue follows similar growth trends, increasing by a total of 6.5 percent from \$574.1 million in FY 2014 to \$611.5 million in FY 2024, equating to an average annual change of 0.6 percent.

## 4.6 “Other Toll Revenue”

In addition to In-Lane Toll Revenue, MDTA also collects Other Toll Revenue associated with the operation of its facilities. These can be summarized in six categories:

1. Commuter Plan: Unused Toll Revenue from pre-paid plan
2. Transponder Fees and Sales
  - a. Transponder sales (Legacy and ICC)
  - b. Monthly Service Fees (Legacy and ICC)
3. Violation Recovery
  - a. Civil Penalties
  - b. Violation Fees (Legacy, ICC, and I-95 Express Toll Lanes<sup>SM</sup>)
4. Commercial Vehicles Fees and Discounts
  - a. Post-Usage Discount
  - b. High Frequency Discount
  - c. Over-Size Permit Fee
5. Concession Revenues
6. Hatem E-ZPass<sup>®</sup> program

The following provides a description of each of the Other Revenue categories. The forecasts of these annual revenue streams are provided in Table 4-10.

**Table 4-9**  
**Historical and Forecasted Transactions and In-Lane Toll Revenue**

Table 4-9 Historical and Forecasted Transactions and IN-Lane Toll Revenue										
Fiscal Year	Transactions (millions)								Percent Growth	
	JFK	Hatem	BHT	FMT	FSK	Bay	Nice	Total		
2004 <sup>(1)</sup>	15.20	5.50	25.90	42.70	12.00	12.90	3.20	<b>117.40</b>	-	
2005 <sup>(1)</sup>	15.00	5.60	25.50	43.50	12.10	13.00	3.20	<b>117.90</b>	0.4	
2006	14.74	5.56	26.26	43.57	11.89	13.27	3.36	<b>118.65</b>	0.6	
2007	14.84	5.56	25.74	44.85	12.20	13.49	3.42	<b>120.11</b>	1.2	
2008	14.65	5.56	25.77	44.83	12.34	13.37	3.39	<b>119.91</b>	(0.2)	
2009	14.64	5.04	25.53	43.45	11.69	12.75	3.35	<b>116.45</b>	(2.9)	
2010 <sup>(1)</sup>	14.75	4.99	25.23	44.06	10.96	12.99	3.35	<b>116.33</b>	(0.1)	
2011	15.38	5.07	26.12	46.29	11.65	13.56	3.40	<b>121.46</b>	4.4	
2012 <sup>(1)</sup>	14.82	5.03	25.75	44.52	11.05	13.67	3.29	<b>118.13</b>	(2.7)	
2013 <sup>(1)</sup>	14.58	4.56	23.97	43.58	10.92	12.74	3.26	<b>113.61</b>	(3.8)	
2014 <sup>(1)</sup>	14.38	4.95	24.90	41.88	10.42	12.76	3.24	<b>112.52</b>	(1.0)	
2015	14.26	4.96	26.03	39.98	10.94	12.86	3.33	<b>112.36</b>	(0.1)	
2016	14.37	5.00	25.04	41.11	11.20	13.04	3.38	<b>113.14</b>	0.7	
2017	14.54	5.03	24.55	41.72	11.34	13.19	3.39	<b>113.75</b>	0.5	
2018	14.66	5.06	24.55	42.07	11.41	13.29	3.39	<b>114.44</b>	0.6	
2019	14.77	5.09	24.58	42.38	11.48	13.38	3.40	<b>115.08</b>	0.6	
2020	14.88	5.13	24.62	42.67	11.54	13.47	3.40	<b>115.70</b>	0.5	
2021	14.99	5.16	25.75	42.49	11.59	13.56	3.40	<b>116.94</b>	1.1	
2022	15.12	5.19	25.94	42.85	11.65	13.67	3.41	<b>117.82</b>	0.7	
2023	15.26	5.22	26.00	43.22	11.71	13.78	3.41	<b>118.60</b>	0.7	
2024	15.39	5.25	26.05	43.57	11.77	13.88	3.42	<b>119.33</b>	0.6	

Fiscal Year	Toll Revenue (\$ millions)								Percent Growth
	JFK	Hatem	BHT	FMT	FSK	Bay	Nice	Total	
2004 <sup>(1)</sup>	\$ 88.70	\$ 3.70	\$ 30.70	\$ 68.00	\$ 16.70	\$ 33.60	\$ 9.90	<b>\$ 251.30</b>	-
2005 <sup>(1)</sup>	94.60	3.70	34.70	82.70	19.20	33.50	10.00	<b>278.40</b>	10.8
2006	93.50	3.95	35.64	82.39	18.82	34.02	10.48	<b>278.80</b>	0.1
2007	94.62	3.82	35.11	84.68	19.24	34.39	10.43	<b>282.30</b>	1.3
2008	92.71	3.89	35.33	84.03	19.41	33.88	10.08	<b>279.33</b>	(1.1)
2009	95.14	2.07	35.61	82.97	18.56	32.51	9.77	<b>276.63</b>	(1.0)
2010 <sup>(1)</sup>	107.35	2.61	37.01	94.02	20.54	36.79	10.15	<b>308.47</b>	11.5
2011	107.39	2.82	37.85	95.32	20.78	37.62	10.15	<b>311.92</b>	1.1
2012 <sup>(1)</sup>	116.01	5.25	48.74	118.82	25.82	46.74	11.60	<b>372.98</b>	19.6
2013 <sup>(1)</sup>	121.86	7.80	52.05	135.61	28.94	52.40	12.97	<b>411.62</b>	10.4
2014 <sup>(1)</sup>	162.80	10.17	77.56	183.13	40.26	79.76	20.40	<b>574.08</b>	39.5
2015	161.37	10.44	81.23	177.46	42.48	80.93	21.19	<b>575.10</b>	0.2
2016	162.86	10.62	78.09	179.70	43.38	81.93	21.74	<b>578.32</b>	0.6
2017	164.89	10.75	76.53	181.88	43.84	82.79	21.99	<b>582.66</b>	0.8
2018	166.28	10.87	76.53	183.13	44.10	83.36	22.14	<b>586.40</b>	0.6
2019	167.32	10.97	76.65	184.21	44.35	83.82	22.21	<b>589.52</b>	0.5
2020	168.40	11.06	76.77	185.26	44.58	84.32	22.28	<b>592.67</b>	0.5
2021	169.54	11.15	80.40	186.34	44.80	84.86	22.37	<b>599.45</b>	1.1
2022	170.96	11.24	80.96	187.61	45.02	85.45	22.48	<b>603.72</b>	0.7
2023	172.45	11.33	81.16	188.92	45.25	86.07	22.58	<b>607.77</b>	0.7
2024	173.79	11.42	81.33	190.15	45.47	86.68	22.67	<b>611.50</b>	0.6

<sup>(1)</sup> Year of toll increase.  
 - Represents actual data.

**Table 4-10  
Other Toll Revenue Forecast**

Fiscal Year	Legacy Facilities' Other Revenues (\$ millions)										New Facilities' Other Revenues (\$ millions)									
	Service Fees and Sales			Violation Recovery			Commercial Vehicles				InterCounty Connector			ETLs						
	In-Lane Toll Revenue	Unused Pre-Paid Trip Revenue	Transponder Sales	Monthly Account Fees	Notice of Toll Due Fees	Civil Penalties	Violation Fees	Commercial Vehicle Post-Usage Discount	Commercial Vehicle High Frequency Discount	Over-size Permit Fee	Concession Revenue (footnote)	Hatem Z Pass Program	ICC Transponder Sales	ICC Monthly Account Fees	ICC Violation Fees	ICC Civil Penalties	ICC N OTD Fees	I-95 ETL Violation Fees	Total 'Other' Revenue	Total Revenue
2014	574.08	18.69	1.22	5.75	0.00	4.55	0.04	(5.89)	(0.64)	1.04	3.23	1.49	0.16	0.76	0.10	2.35	0.00	..	32.86	606.94
2015	575.10	18.79	1.23	5.81	..	4.59	..	(5.92)	(0.64)	1.05	5.48	1.50	0.16	0.77	0.10	2.36	0.00	0.10	35.98	611.08
2016	578.32	18.88	1.23	5.87	..	4.68	..	(5.95)	(0.64)	1.06	5.91	1.50	0.16	0.77	0.10	2.37	0.00	0.10	36.71	615.03
2017	582.66	18.98	1.24	5.93	..	4.78	..	(5.98)	(0.65)	1.07	5.99	1.51	0.16	0.77	0.10	2.39	0.00	0.10	37.06	619.72
2018	586.40	19.07	1.25	5.99	..	4.87	..	(6.01)	(0.65)	1.08	6.08	1.52	0.16	0.78	0.10	2.40	0.00	0.10	37.40	623.80
2019	589.52	19.17	1.25	6.05	..	4.97	..	(6.04)	(0.65)	1.09	6.16	1.53	0.17	0.78	0.10	2.41	0.00	0.10	37.75	627.27
2020	592.67	19.26	1.26	6.11	..	5.07	..	(6.07)	(0.66)	1.10	6.24	1.53	0.17	0.79	0.10	2.42	0.00	0.10	38.11	630.78
2021	599.45	19.36	1.27	6.17	..	5.17	..	(6.10)	(0.66)	1.11	6.32	1.54	0.17	0.79	0.10	2.43	0.00	0.10	38.46	637.91
2022	603.72	19.46	1.27	6.23	..	5.17	..	(6.13)	(0.66)	1.12	6.48	1.55	0.17	0.79	0.10	2.45	0.00	0.10	38.81	642.53
2023	607.77	19.55	1.28	6.29	..	5.17	..	(6.16)	(0.67)	1.14	7.38	1.56	0.17	0.80	0.10	2.46	0.00	0.10	39.99	647.76
2024	611.50	19.65	1.29	6.35	..	5.17	..	(6.20)	(0.67)	1.15	7.48	1.57	0.17	0.80	0.10	2.47	0.00	0.10	40.27	651.77

Source: Historical data from MdTA, Concession Revenue Forecast is 90% of the estimated concession revenue as prepared by Areas Inc., other projections CDM Smith

### 4.6.1 Commuter Plan

MDTA provides customers the option to enroll in a frequent commuter discount plan. The first plan allows commuters to pay \$1.40 per trip for 50 trips at the McHenry Tunnel, Baltimore Harbor Tunnel, Francis Scott Key Bridge, JFK Memorial Highway, and the Hatem Bridge. However, these trips must be used within 45 days. Another plan gives customers the option to pay \$2.10 per trip for 25 trips at the Bay Bridge and Nice Bridge, and similar to the first plan must be used within 45 days. This same plan is offered for the Nice Bridge as well. The final plan is slightly different, giving customers the option to pay \$3.00 per trip for 10 trips across the Bay Bridge that can be used Sunday through Thursday, with an expiration of 90 days.

Any remaining balance on accounts after the 45 day period is added to a separate account and called “Unused Toll Revenue.” As seen in Table 4-10, this value is expected to increase gradually through FY 2024 as toll rates increase.

### 4.6.2 Transponders/Accounts

As of July 1, 2009, the cost of an E-ZPass® transponder is \$9.00 for the Standard, \$15.00 for the Exterior, and \$50.00 for the Fusion. The Standard is the more typical windshield mounted transponder, the Exterior is mounted to a passenger car’s front license plate, and the Fusion is for commercial vehicles such as trucks and RVs. The forecast of future sales revenue is based on data provided by MDTA showing historical trends and the share of each transponder type as a percent of total sales.

In addition to transponder fees, account holders are subject to a monthly account fee of \$1.50. Starting November 1, 2011, accounts with three-or-more transactions per month were exempt from this fee, but any user with less than three transactions will be charged. Review of existing account activity and historic growth was taken into consideration to estimate the share of customers that are charged this fee, and it was used to estimate the future revenue stream. The estimates for these fees for both the ICC and the legacy facilities are presented separately in Table 4-10,

### 4.6.3 Violation Fees

Violation fees are charged to drivers who choose not to initially pay their toll. Historical data for FY 2014 were provided by MDTA. Estimates of future revenue for the legacy facilities were not developed due to the uncertain nature of these revenues. However, the estimated violation fees for the ICC and I-95 Express Toll Lanes<sup>SM</sup> are presented in Table 4-11. They were obtained from a forecast previously prepared by others.

### 4.6.4 Commercial Vehicles

There are two available discount programs for commercial vehicles with five-or-more-axles. The first plan is the post-usage plan, which is account specific and can be used on all eligible facilities. With this plan each account is assessed after 30 days and the post-usage discount is calculated based on the total toll usage. From existing data and historical trends the estimate for the fee was developed.

The other available discount plan is similar in that it is account specific and can be used on all eligible facilities. With this plan however, the account assessment after 30 days calculates the discount based on the total trips per transponder.

In addition to the two discount plans available to commercial vehicles, there is a fee for over-sized and/or overweight vehicles. As of May 1, 2009, a \$25 permit fee was charged and covered all Authority maintained roadways along the vehicle's route. This fee is a one-time charge and will not be applied at any tolling location.

The historic commercial account data provided by MDTA provided the trends and limited growth for these revenue streams.

#### 4.6.5 Concession Revenues

There are two travel plazas along JFK Highway that provide additional revenue to MDTA through concessions. Both facilities were newly renovated and reopened to the public in 2014. The Maryland House Travel Plaza opened on January 16, 2014 and the Chesapeake House Travel Plaza opened on August 5, 2014. As can be seen in Table 4-10, concession revenue was lower in 2014, a result of closures due to construction activity. However, revenue is expected to continually increase through 2024. The data and information used to develop the concession revenue forecast was provided to CDM Smith by MDTA based on revenue projections developed by Areas USA MDTP, LLC, the company that redeveloped and currently operates the two travel plazas. For purposes of this report, revenues paid to MDTA by Areas USA are assumed to be 90 percent of Areas USA's original estimates.

#### 4.6.6 Hatem E-ZPass® Program

The Hatem Bridge E-ZPass® Program provides drivers with two possible plan options. Choice A allows drivers with a two-axle vehicle to pay \$20 per year for unlimited trips plus a transponder fee without any additional fees or prepaid toll deposits. However, this plan allows the E-ZPass® to only be used on the Hatem Bridge, and cannot be used at other toll facilities or with other E-ZPass® discount plans. Choice B is an add-on to a standard E-ZPass® Maryland account. This allows drivers to pay \$20 per year for unlimited trips, plus a transponder charge if it's a new account. There are associated account maintenance fees as well as a pre-paid toll balance, but this plan also gives drivers a 10 percent discount off the cash rate at all Maryland toll facilities, excluding the Intercounty Connector, and can be combined with other discount plans.

### 4.7 Total Annual Revenue Forecasts

Table 4-11 presents a summary of the total systemwide In-Lane Toll Revenue and Other Toll Revenue forecast for FY 2015 through FY 2024, as well as historical data from FY 2010 to FY 2014. Figure 4-1 provides a graphical representation of the systemwide forecasted transactions and In-Lane and Other Toll revenue presented in Table 4-11. The historical data presented in the figure from FY 2010 through FY 2014 sets the forecast in perspective relative to recent actual trends. In-Lane Toll Revenues are forecasted to increase from \$574.1 million in FY 2014 to \$589.5 million in FY 2019, and to \$611.5 million in FY 2024. Other Toll Revenue representing approximately 5 to 6 percent of the total toll revenue is forecasted to grow from \$29.5 million in FY 2014, to \$33.5 million in FY 2019, and to \$35.8 million in FY 2024.

As discussed previously, In-Lane Toll Revenue is forecasted to increase by 0.6 percent per annum over the 10-year forecast period, while Other Toll Revenue are forecasted to increase by 2.0 percent per annum. The result is that total toll revenue for the legacy facilities is forecasted to increase by an average 0.7 percent per annum.

## 4.8 Total Monthly Transaction and Toll Revenue Forecasts

For purposes of budgeting and the tracking of actual versus forecasted transactions and revenue by MDTA, monthly forecasts of transactions and In-Lane Toll Revenue were also developed for FY 2015 and FY 2016. Table 4-12 summarizes these forecasts for the seven legacy facilities.


August was estimated to have the greatest number of transactions with 10.83 million in FY 2015 and 10.78 million in FY 2016. Alternatively, February represents the month with the fewest number of transactions at 7.35 million in FY 2015 and 7.89 million in FY 2016. In both years, the total number of E-ZPass® transactions is approximately 21 percent greater than the cash/video transactions for two-axle vehicles. Additionally, in both FY 2015 and FY 2016, E-ZPass® transactions represent approximately 34 percent of all two-axle vehicle transactions, and 83 percent of all three-or-more-axle vehicle transactions.

Similar to transactions, the highest In-Lane Toll Revenue is forecasted to occur in August of FY 2015 and FY 2016, with totals of \$54.4 million and \$55.5 million, respectively. Further, the lowest revenue is forecasted in February FY 2015 and FY 2016 at \$37.2 million and \$39.2 million, respectively. The total forecasted In-Lane Toll Revenue is \$575.1 million in FY 2015 and \$578.3 million in FY 2016.

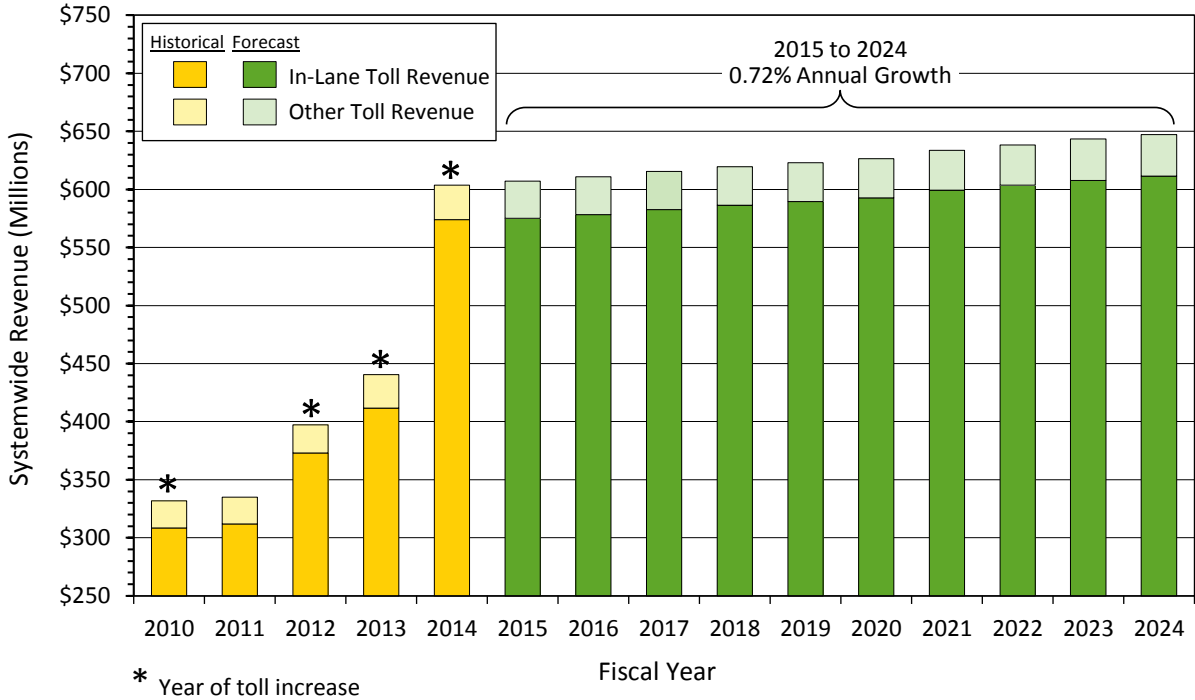
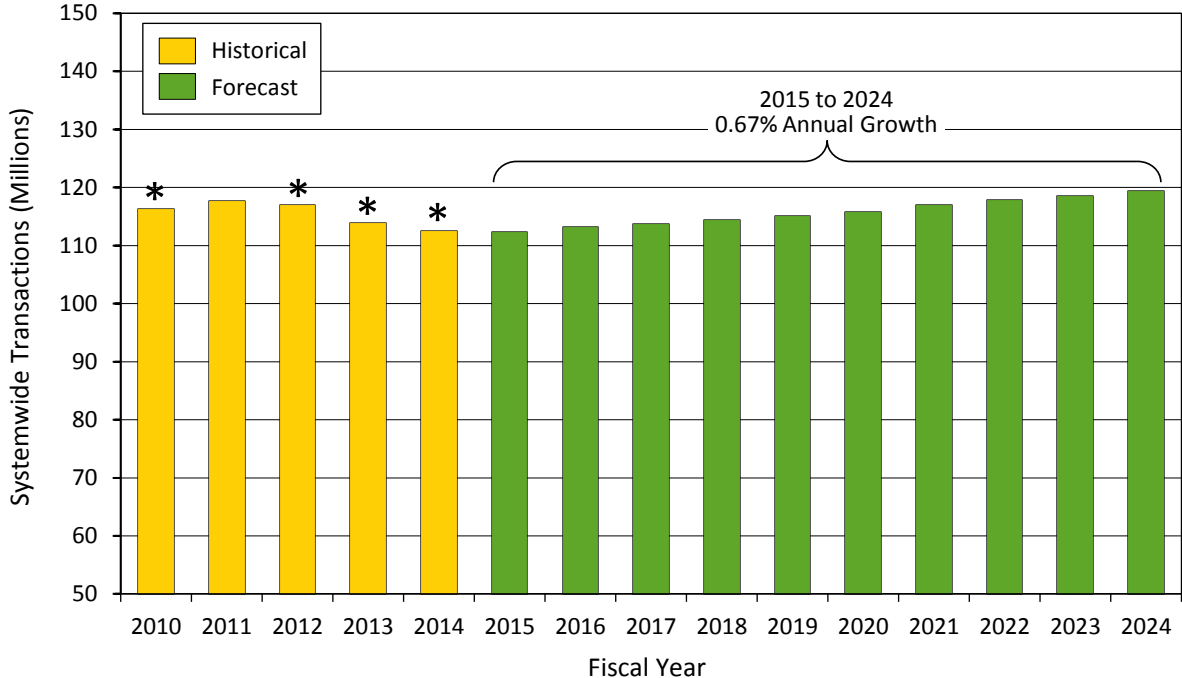
Table 4-13 provides a summary of the monthly In-Lane Toll Revenue, as well as Other Toll Revenue and Total Toll Revenue.

**Table 4-11**  
**In-Lane, Other and Total Revenue Forecasts (000)**

Fiscal Year	Toll Revenue (\$ millions)			Percent Change
	In-Lane	Other	Total	
2010	\$ 308.5	\$ 23.3	\$ 331.8	-
2011	312.0	23.0	335.0	1.0
2012	373.0	24.3	397.3	18.6
2013	411.6	29.0	440.6	10.9
2014	574.1	29.5	603.6	37.0
2015	575.1	31.9	607.0	0.6
2016	578.3	32.5	610.9	0.6
2017	582.7	32.9	615.5	0.8
2018	586.4	33.2	619.6	0.7
2019	589.5	33.5	623.0	0.6
2020	592.7	33.8	626.5	0.6
2021	599.5	34.2	633.6	1.1
2022	603.7	34.5	638.2	0.7
2023	607.8	35.5	643.3	0.8
2024	611.5	35.8	647.3	0.6

 - Represents actual data.

**Figure 4-1**  
**Historical and Forecasted Transactions and Toll Revenue**



\* Year of toll increase



**Table 4-12**  
**Monthly Transactions and In-Lane Toll**  
**Revenue by Method of Payment**  
**FY 2015 and FY 2016**

Month	Transactions (000s)										Total	
	2 axle					3+ axle						
	Full Fare					E-Z Pass						
	Commuters + Shoppers	MDTA	Non-MDTA	Total	Cash/Video	Official Duty	Hatem Plan A + Plan B	Total 2 Axle	E-Z Pass	Cash/Video		Total 3+ Axle
July-14	2,792	1,498	1,950	3,448	2,967	119	349	9,675	568	123	691	10,366
August-14	3,123	1,445	2,021	3,466	3,052	129	378	10,148	559	123	682	10,830
September-14	3,002	1,293	1,570	2,863	2,481	124	345	8,815	530	114	644	9,459
October-14	3,112	1,304	1,569	2,873	2,320	125	349	8,779	571	119	690	9,469
November-14	2,825	1,264	1,604	2,868	2,324	114	331	8,462	507	103	610	9,072
December-14	2,722	1,234	1,621	2,855	2,356	112	327	8,372	494	95	589	8,961
January-15	2,768	1,089	1,261	2,350	1,871	120	304	7,413	495	92	587	8,000
February-15	2,520	1,007	1,153	2,160	1,736	112	279	6,807	457	87	544	7,351
March-15	2,836	1,235	1,468	2,703	2,214	125	323	8,201	522	108	630	8,831
April-15	2,975	1,354	1,814	3,168	2,440	127	352	9,062	560	116	676	9,738
May-15	2,947	1,498	1,867	3,365	2,714	129	369	9,524	581	125	706	10,230
June-15	2,831	1,503	1,787	3,290	2,767	129	359	9,376	562	122	684	10,060
<b>FY 2015</b>	<b>34,453</b>	<b>15,724</b>	<b>19,685</b>	<b>35,409</b>	<b>29,242</b>	<b>1,465</b>	<b>4,065</b>	<b>104,634</b>	<b>6,406</b>	<b>1,327</b>	<b>7,733</b>	<b>112,367</b>
July-15	2,822	1,487	1,927	3,414	2,933	121	367	9,657	572	121	693	10,350
August-15	3,103	1,438	2,014	3,452	3,036	128	376	10,095	561	124	685	10,780
September-15	2,957	1,274	1,550	2,824	2,445	122	341	8,689	528	114	642	9,331
October-15	3,127	1,312	1,580	2,892	2,332	126	352	8,829	580	121	701	9,530
November-15	2,837	1,270	1,614	2,884	2,334	114	333	8,502	515	104	619	9,121
December-15	2,733	1,239	1,632	2,871	2,367	112	329	8,412	501	96	597	9,009
January-16	2,782	1,095	1,271	2,366	1,880	120	306	7,454	503	93	596	8,050
February-16	2,702	1,080	1,239	2,319	1,861	120	300	7,302	495	94	589	7,891
March-16	2,852	1,242	1,479	2,721	2,226	126	325	8,250	530	110	640	8,890
April-16	2,991	1,361	1,827	3,188	2,453	128	354	9,114	569	118	687	9,801
May-16	2,960	1,505	1,879	3,384	2,727	129	372	9,572	590	127	717	10,289
June-16	2,845	1,511	1,798	3,309	2,781	129	361	9,425	571	124	695	10,120
<b>FY 2016</b>	<b>34,711</b>	<b>15,814</b>	<b>19,810</b>	<b>35,624</b>	<b>29,375</b>	<b>1,475</b>	<b>4,116</b>	<b>105,301</b>	<b>6,515</b>	<b>1,346</b>	<b>7,861</b>	<b>113,162</b>

Note: Includes violation transactions.

**Table 4-12 Continued**  
**Monthly Transactions and In-Lane Toll Revenue by Method of Payment**  
**Legacy System Totals FY 2015 and FY 2016**



Month	In-Lane Toll Revenue (\$000s)											
	2 axle					3+ axle						
	Full Fare					E-Z Pass	Official Duty	Hattem Plan A + Plan B	Total 2 Axle	E-Z Pass	Cash/Video	Total 3+ Axle
	Commuters + Shoppers	MDTA	Non-MDTA	Total	Cash/Video							
July-14	\$ 4,283	\$ 6,556	\$ 10,526	\$ 17,082	\$ 15,028	\$ -	\$ -	\$ -	\$ 36,393	\$ 13,830	\$ 3,385	\$ 17,215
August-14	4,770	6,297	10,783	17,080	15,307	-	-	-	37,157	13,923	3,289	17,212
September-14	4,618	5,579	8,532	14,111	12,396	-	-	-	31,125	12,295	2,879	15,174
October-14	4,761	5,698	8,556	14,254	11,581	-	-	-	30,596	14,384	3,389	17,773
November-14	4,357	5,483	8,658	14,141	11,560	-	-	-	30,058	13,303	3,079	16,382
December-14	4,209	5,335	8,697	14,032	11,721	-	-	-	29,962	13,180	3,008	16,188
January-15	4,298	4,707	6,885	11,592	9,301	-	-	-	25,191	12,351	2,799	15,150
February-15	3,919	4,339	6,317	10,656	8,593	-	-	-	23,168	11,438	2,614	14,052
March-15	4,392	5,328	7,990	13,318	10,969	-	-	-	28,679	13,577	3,243	16,820
April-15	4,593	5,819	9,781	15,600	12,125	-	-	-	32,318	14,782	3,460	18,242
May-15	4,523	6,459	10,049	16,508	13,497	-	-	-	34,528	15,399	3,663	19,062
June-15	4,338	6,483	9,597	16,080	13,817	-	-	-	34,235	14,854	3,560	18,414
<b>FY2015</b>	<b>\$ 53,061</b>	<b>\$ 68,083</b>	<b>\$ 106,371</b>	<b>\$ 174,454</b>	<b>\$ 145,895</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 373,410</b>	<b>\$ 163,316</b>	<b>\$ 38,368</b>	<b>\$ 201,684</b>
July-15	4,295	6,437	10,284	16,721	14,688	-	-	-	35,704	14,599	3,426	18,025
August-15	4,743	6,271	10,745	17,016	15,239	-	-	-	36,998	14,942	3,570	18,512
September-15	4,551	5,503	8,425	13,928	12,225	-	-	-	30,704	13,290	3,146	16,436
October-15	4,788	5,734	8,621	14,355	11,652	-	-	-	30,795	14,118	3,348	17,466
November-15	4,378	5,513	8,716	14,229	11,621	-	-	-	30,228	13,059	3,043	16,102
December-15	4,229	5,364	8,757	14,121	11,784	-	-	-	30,134	12,940	2,976	15,916
January-16	4,322	4,736	6,938	11,674	9,355	-	-	-	25,351	12,130	2,770	14,900
February-16	4,205	4,657	6,789	11,446	9,219	-	-	-	24,870	11,631	2,678	14,309
March-16	4,420	5,363	8,053	13,416	11,038	-	-	-	28,874	13,314	3,202	16,516
April-16	4,618	5,855	9,850	15,705	12,196	-	-	-	32,519	14,512	3,419	17,931
May-16	4,546	6,497	10,118	16,615	13,573	-	-	-	34,734	15,118	3,618	18,736
June-16	4,361	6,521	9,663	16,184	13,898	-	-	-	34,443	14,581	3,516	18,097
<b>FY2016</b>	<b>\$ 53,456</b>	<b>\$ 68,451</b>	<b>\$ 106,959</b>	<b>\$ 175,410</b>	<b>\$ 146,488</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 375,354</b>	<b>\$ 164,234</b>	<b>\$ 38,712</b>	<b>\$ 202,946</b>
<b>Total</b>	<b>\$ 53,608</b>											<b>\$ 53,608</b>
												<b>\$ 54,369</b>
												<b>\$ 46,299</b>
												<b>\$ 48,369</b>
												<b>\$ 46,440</b>
												<b>\$ 46,150</b>
												<b>\$ 40,341</b>
												<b>\$ 37,220</b>
												<b>\$ 45,499</b>
												<b>\$ 50,560</b>
												<b>\$ 53,590</b>
												<b>\$ 52,649</b>
												<b>\$ 53,729</b>
												<b>\$ 55,510</b>
												<b>\$ 47,140</b>
												<b>\$ 48,261</b>
												<b>\$ 46,330</b>
												<b>\$ 46,050</b>
												<b>\$ 40,251</b>
												<b>\$ 39,179</b>
												<b>\$ 45,390</b>
												<b>\$ 50,450</b>
												<b>\$ 53,470</b>
												<b>\$ 52,540</b>

In-Lane Toll Revenues (\$000s) - Fiscal Year 2015 -

In-Lane Toll Revenues (\$000s) - Fiscal Year 2016 -

**Table 4-13**  
**Monthly Forecasted In-Lane Toll Revenue and Other Toll Revenue**

		<b>Toll Revenue (\$ millions)</b>		
	<b>Month</b>	<b>In-Lane</b>	<b>Other</b>	<b>Total</b>
<b>Fiscal Year 2015</b>	Jul-14	\$ 53.6	\$ 3.4	\$ <b>57.0</b>
	Aug-14	54.4	3.4	<b>57.8</b>
	Sep-14	46.3	2.9	<b>49.2</b>
	Oct-14	48.4	3.0	<b>51.4</b>
	Nov-14	46.4	2.9	<b>49.3</b>
	Dec-14	46.2	2.9	<b>49.0</b>
	Jan-15	40.3	2.5	<b>42.9</b>
	Feb-15	37.2	2.3	<b>39.5</b>
	Mar-15	45.5	2.8	<b>48.3</b>
	Apr-15	50.6	3.2	<b>53.7</b>
	May-15	53.6	3.4	<b>56.9</b>
	Jun-15	52.6	3.3	<b>55.9</b>
<b>Fiscal Year 2016</b>	Jul-15	\$ 53.7	\$ 3.4	\$ <b>57.1</b>
	Aug-15	55.5	3.5	<b>59.0</b>
	Sep-15	47.1	3.0	<b>50.1</b>
	Oct-15	48.3	3.1	<b>51.3</b>
	Nov-15	46.3	2.9	<b>49.3</b>
	Dec-15	46.1	2.9	<b>49.0</b>
	Jan-16	40.3	2.6	<b>42.8</b>
	Feb-16	39.2	2.5	<b>41.7</b>
	Mar-16	45.4	2.9	<b>48.3</b>
	Apr-16	50.5	3.2	<b>53.7</b>
	May-16	53.5	3.4	<b>56.9</b>
	Jun-16	52.5	3.3	<b>55.9</b>

## 4.9 Disclaimer

Current accepted professional practices and procedures were used in the development of these traffic and revenue estimates. However, as with any forecast of the future, it should be understood that there may be differences between forecasted and actual results caused by events and circumstances beyond the control of the forecasters. In formulating its estimates, CDM Smith has reasonably relied upon the accuracy and completeness of information provided (both written and oral) by the MDTA. CDM Smith also has relied upon the reasonable assurances of some independent parties and is not aware of any facts that would make such information misleading.

CDM Smith has made qualitative judgments related to several key variables in the development and analysis of the traffic and revenue estimates that must be considered as a whole; therefore selecting portions of any individual result without consideration of the intent of the whole may create a misleading or incomplete view of the results and the underlying methodologies used to obtain the results. CDM Smith gives no opinion as to the value or merit to partial information extracted from this report.

All estimates and projections reported herein are based on CDM Smith's experience and judgment and on a review of information obtained from multiple agencies, including the Maryland Transportation Authority. These estimates and projections may not be indicative of actual or future values, and are therefore subject to substantial uncertainty. Future developments cannot be predicted with certainty, and may affect the estimates or projections expressed in this report, such that CDM Smith does not specifically guarantee or warrant any estimate or projection contained within this report.

While CDM Smith believes that some of the projections or other forward-looking statements contained within the report are based on reasonable assumptions as of the date the input data were collected, such forward looking statements involve risks and uncertainties that may cause actual results to differ materially from the results predicted. Therefore, following such dates, CDM Smith will take no responsibility or assume any obligation to advise of changes that may affect its assumptions contained within the report, as they pertain to socioeconomic and demographic forecasts, proposed residential or commercial land use development projects and/or potential improvements to the regional transportation network.

# Appendix A

## Approved Toll Schedule

### PUBLIC NOTICE REMINDER: New Toll Rates Effective July 1, 2013

**REMINDER:** The Maryland Transportation Authority (MDTA), the State agency that owns, finances, operates and maintains Maryland's toll facilities, APPROVED at its September 22, 2011, public meeting the following changes to its toll structure **effective July 1, 2013:**

#### William Preston Lane, Jr., Memorial (Bay) Bridge (US 50/301) and Gov. Harry W. Nice Memorial Bridge (US 301)

Cash/Base Rates		
	Current	7/1/2013
2-axle	\$ 4.00	\$ 6.00
3-axle	\$ 8.00	\$ 12.00
4-axle	\$ 12.00	\$ 18.00
5-axle	\$ 24.00	\$ 36.00
6+-axle	\$ 30.00	\$ 45.00

Maryland E-ZPass Rates		
	Current	7/1/2013
Commuter	\$ 1.00	\$ 2.10
2-axle	\$ 3.60	\$ 5.40
3-axle		
4-axle	n/a	
5-axle		
6+-axle		

Video Toll Rates		
	Current	7/1/2013
2-axle	\$ 6.00	\$ 9.00
3-axle	\$ 12.00	\$ 18.00
4-axle	\$ 18.00	\$ 27.00
5-axle	\$ 36.00	\$ 51.00
6+-axle	\$ 45.00	\$ 60.00

**NOTE:** The Maryland E-ZPass two-axle toll rate provides a 10% discount off the Cash/Base rate (excludes the Intercountry Connector/MD 200). Visit [ezpassmd.com](http://ezpassmd.com) today.

#### Additional approved changes effective July 1, 2013:

- The price of the E-ZPass Hatem Bridge Choice "A" and "B" Plans increases to \$20 per year. The plans are offered for two-axle vehicles only and provide unlimited trips at the Hatem Bridge.
- The A-Series ticket program at the Hatem Bridge is being phased-out for vehicles with three or more axles. All A-Series tickets will have expired by this date. No refunds will be provided for A-Series tickets.
- The Bay Bridge Shoppers Discount Plan is \$30. The plan is available with E-ZPass and offers a 50% discount for 10 trips that are valid for 90 days, good Sunday through Thursday only.
- Reflected in the tables to the left, **commuter discount rates are now uniform for all fixed toll facilities** -- a 65% discount off the Cash/Base toll.

#### Baltimore Harbor Tunnel (I-895), Fort McHenry Tunnel (I-95/I-395) and Francis Scott Key Bridge (I-695)

Cash/Base Rates		
	Current	7/1/2013
2-axle	\$ 3.00	\$ 4.00
3-axle	\$ 6.00	\$ 8.00
4-axle	\$ 9.00	\$ 12.00
5-axle	\$ 18.00	\$ 24.00
6+-axle	\$ 23.00	\$ 30.00

Maryland E-ZPass Rates		
	Current	7/1/2013
Commuter	\$ 0.75	\$ 1.40
2-axle	\$ 2.70	\$ 3.60
3-axle		
4-axle	n/a	
5-axle		
6+-axle		

Video Toll Rates		
	Current	7/1/2013
2-axle	\$ 4.50	\$ 6.00
3-axle	\$ 9.00	\$ 12.00
4-axle	\$ 13.50	\$ 18.00
5-axle	\$ 27.00	\$ 36.00
6+-axle	\$ 34.50	\$ 45.00

#### John F. Kennedy Memorial Highway (I-95) and Thomas J. Hatem Memorial Bridge (US 40)

Cash/Base Rates		
	Current	7/1/2013
2-axle	\$ 6.00	\$ 8.00
3-axle	\$ 12.00	\$ 16.00
4-axle	\$ 18.00	\$ 24.00
5-axle	\$ 36.00	\$ 48.00
6+-axle	\$ 45.00	\$ 60.00

Maryland E-ZPass Rates		
	Current	7/1/2013
Commuter	\$ 1.50	\$ 2.80
2-axle	\$ 5.40	\$ 7.20
3-axle		
4-axle	n/a	
5-axle		
6+-axle		

Video Toll Rates		
	Current	7/1/2013
2-axle	\$ 9.00	\$ 12.00
3-axle	\$ 18.00	\$ 24.00
4-axle	\$ 27.00	\$ 36.00
5-axle	\$ 51.00	\$ 63.00
6+-axle	\$ 60.00	\$ 75.00

Commuter discount plans are available for customers with valid E-ZPass Maryland accounts driving two-axle vehicles. Plans for the Bay and Nice bridges are \$52.50 (effective July 1, 2013) and offer 25 trips. The Baltimore Regional Plan is \$70 (effective July 1, 2013) and offers 50 trips. Note: two "trips" are deducted at the Kennedy Highway and Hatem Bridge for the Baltimore Regional Plan because tolls are collected in one direction only. Plans end after 45 days or when all of the trips are used, whichever comes first.



For more information,  
visit [www.mdta.maryland.gov](http://www.mdta.maryland.gov).



## Appendix B

# Detailed Traffic and Revenue Forecasts by Facility

**Table B1 – John F. Kennedy Memorial Highway (I-95)**  
**Transactions and In-Lane Toll Revenue Estimates By Vehicle Class (millions/\$millions)**

Fiscal Year	Transactions (millions)					
	PC		CV		Total	
	Transactions	Percent Change	Transactions	Percent Change	Transactions	Percent Change
2014	12.7		1.7		<b>14.4</b>	
2015	12.6	(0.8)	1.7	(1.0)	<b>14.3</b>	<b>(0.8)</b>
2016	12.7	0.7	1.7	1.3	<b>14.4</b>	<b>0.8</b>
2017	12.8	1.2	1.7	1.3	<b>14.5</b>	<b>1.2</b>
2018	12.9	0.8	1.7	0.8	<b>14.7</b>	<b>0.8</b>
2019	13.0	0.8	1.7	0.3	<b>14.8</b>	<b>0.8</b>
2020	13.1	0.8	1.7	0.5	<b>14.9</b>	<b>0.7</b>
2021	13.2	0.8	1.8	0.5	<b>15.0</b>	<b>0.7</b>
2022	13.4	0.9	1.8	0.7	<b>15.1</b>	<b>0.9</b>
2023	13.5	0.9	1.8	0.7	<b>15.3</b>	<b>0.9</b>
2024	13.6	0.9	1.8	0.6	<b>15.4</b>	<b>0.9</b>

Fiscal Year	In-Lane Toll Revenues (\$ millions)					
	PC		CV		Total	
	Revenue	Percent Change	Revenue	Percent Change	Revenue	Percent Change
2014	\$ 94.9		\$ 67.9		<b>\$ 162.8</b>	
2015	94.2	(0.8)	67.2	(1.0)	<b>161.4</b>	<b>(0.9)</b>
2016	94.8	0.7	68.1	1.3	<b>162.9</b>	<b>0.9</b>
2017	96.0	1.2	68.9	1.3	<b>164.9</b>	<b>1.2</b>
2018	96.8	0.9	69.5	0.8	<b>166.3</b>	<b>0.8</b>
2019	97.6	0.8	69.7	0.3	<b>167.3</b>	<b>0.6</b>
2020	98.3	0.8	70.1	0.5	<b>168.4</b>	<b>0.7</b>
2021	99.1	0.8	70.4	0.5	<b>169.5</b>	<b>0.7</b>
2022	100.0	0.9	70.9	0.7	<b>171.0</b>	<b>0.8</b>
2023	101.0	1.0	71.5	0.7	<b>172.4</b>	<b>0.9</b>
2024	101.9	0.9	71.9	0.6	<b>173.8</b>	<b>0.8</b>

Note: PC= Passenger Cars, CV= Commercial Vehicles

**Table B2 – Thomas J. Hatem Memorial Bridge (US 40)**  
**Transactions and In-Lane Toll Revenue Estimates By Vehicle Class (millions/\$millions)**

Fiscal Year	Transactions (millions)					
	PC		CV		Total	
	Transactions	Percent Change	Transactions	Percent Change	Transactions	Percent Change
2014	4.8		0.2		4.9	
2015	4.8	0.1	0.2	5.0	5.0	0.3
2016	4.8	0.6	0.2	1.7	5.0	0.7
2017	4.8	0.7	0.2	0.8	5.0	0.7
2018	4.9	0.7	0.2	0.4	5.1	0.6
2019	4.9	0.7	0.2	0.2	5.1	0.6
2020	4.9	0.6	0.2	0.1	5.1	0.6
2021	5.0	0.6	0.2	0.1	5.2	0.6
2022	5.0	0.6	0.2	0.1	5.2	0.6
2023	5.0	0.6	0.2	0.1	5.2	0.6
2024	5.1	0.6	0.2	0.1	5.3	0.6
	In-Lane Toll Revenues (\$ millions)					
	PC		CV		Total	
	Revenue	Percent Change	Revenue	Percent Change	Revenue	Percent Change
2014	\$ 5.0		\$ 5.2		\$ 10.2	
2015	5.0	0.1	5.4	5.0	10.4	2.6
2016	5.1	1.7	5.5	1.7	10.6	1.7
2017	5.2	1.7	5.6	0.8	10.8	1.3
2018	5.3	1.8	5.6	0.4	10.9	1.0
2019	5.4	1.7	5.6	0.2	11.0	0.9
2020	5.5	1.7	5.6	0.1	11.1	0.9
2021	5.5	1.6	5.6	0.1	11.2	0.8
2022	5.6	1.6	5.6	0.1	11.2	0.8
2023	5.7	1.5	5.6	0.1	11.3	0.8
2024	5.8	1.5	5.6	0.1	11.4	0.8

Note: PC= Passenger Cars, CV= Commercial Vehicles



**Table B3 – Baltimore Harbor Tunnel (I-895)**  
**Transactions and In-Lane Toll Revenue Estimates By Vehicle Class (millions/\$millions)**

Fiscal Year	Transactions (millions)					
	PC		CV		Total	
	Transactions	Percent Change	Transactions	Percent Change	Transactions	Percent Change
2014	24.3		0.6		24.9	
2015	25.4	4.6	0.6	4.0	26.0	4.6
2016	24.5	(3.8)	0.6	(3.5)	25.0	(3.8)
2017	24.0	(2.0)	0.6	(2.0)	24.5	(2.0)
2018	24.0	0.0	0.6	0.0	24.5	0.0
2019	24.0	0.2	0.6	0.2	24.6	0.2
2020	24.1	0.2	0.6	0.2	24.6	0.2
2021	25.2	4.6	0.6	4.0	25.7	4.6
2022	25.4	0.7	0.6	0.2	25.9	0.7
2023	25.4	0.2	0.6	0.3	26.0	0.2
2024	25.5	0.2	0.6	0.2	26.1	0.2
	In-Lane Toll Revenues (\$ millions)					
	PC		CV		Total	
	Revenue	Percent Change	Revenue	Percent Change	Revenue	Percent Change
2014	\$ 69.5		\$ 8.1		\$ 77.6	
2015	72.8	4.8	8.4	4.1	81.2	4.7
2016	70.0	(3.9)	8.1	(3.5)	78.1	(3.9)
2017	68.6	(2.0)	8.0	(2.0)	76.5	(2.0)
2018	68.6	(0.0)	8.0	0.0	76.5	(0.0)
2019	68.7	0.2	8.0	0.2	76.7	0.2
2020	68.8	0.2	8.0	0.2	76.8	0.2
2021	72.1	4.8	8.3	4.0	80.4	4.7
2022	72.6	0.8	8.3	0.2	81.0	0.7
2023	72.8	0.3	8.4	0.2	81.2	0.3
2024	73.0	0.2	8.4	0.3	81.3	0.2

Note: PC= Passenger Cars, CV= Commercial Vehicles  
Assumes impacts of construction phases 2016-2020

**Table B4 – Fort McHenry Tunnel (I-95)**  
**Transactions and In-Lane Toll Revenue Estimates By Vehicle Class (millions/\$millions)**

Fiscal Year	Transactions (millions)					
	PC		CV		Total	
	Transactions	Percent Change	Transactions	Percent Change	Transactions	Percent Change
2014	38.3		3.6		<b>41.9</b>	
2015	36.4	(4.9)	3.6	0.1	<b>40.0</b>	<b>(4.5)</b>
2016	37.5	3.1	3.6	(0.0)	<b>41.1</b>	<b>2.8</b>
2017	38.1	1.6	3.6	(0.3)	<b>41.7</b>	<b>1.5</b>
2018	38.5	0.9	3.6	(0.2)	<b>42.1</b>	<b>0.8</b>
2019	38.8	0.8	3.6	(0.2)	<b>42.4</b>	<b>0.7</b>
2020	39.1	0.8	3.6	(0.2)	<b>42.7</b>	<b>0.7</b>
2021	38.9	(0.4)	3.5	(0.5)	<b>42.5</b>	<b>(0.4)</b>
2022	39.3	0.9	3.5	(0.2)	<b>42.8</b>	<b>0.8</b>
2023	39.7	1.0	3.5	(0.2)	<b>43.2</b>	<b>0.9</b>
2024	40.0	0.9	3.5	(0.2)	<b>43.6</b>	<b>0.8</b>
In-Lane Toll Revenues (\$ millions)						
	PC		CV		Total	
	Revenue	Percent Change	Revenue	Percent Change	Revenue	Percent Change
2014	\$ 115.0		\$ 68.1		<b>\$ 183.1</b>	
2015	109.2	(5.0)	68.2	0.1	<b>177.5</b>	<b>(3.1)</b>
2016	111.7	2.3	68.0	(0.3)	<b>179.7</b>	<b>1.3</b>
2017	114.1	2.1	67.8	(0.3)	<b>181.9</b>	<b>1.2</b>
2018	115.4	1.2	67.7	(0.2)	<b>183.1</b>	<b>0.7</b>
2019	116.6	1.0	67.6	(0.2)	<b>184.2</b>	<b>0.6</b>
2020	117.8	1.0	67.4	(0.2)	<b>185.3</b>	<b>0.6</b>
2021	119.0	1.0	67.3	(0.2)	<b>186.3</b>	<b>0.6</b>
2022	120.4	1.2	67.2	(0.2)	<b>187.6</b>	<b>0.7</b>
2023	121.9	1.2	67.0	(0.2)	<b>188.9</b>	<b>0.7</b>
2024	123.3	1.1	66.9	(0.2)	<b>190.2</b>	<b>0.6</b>

Note: PC= Passenger Cars, CV= Commercial Vehicles

Portion of diverted traffic from BHT, 2016-2020

**Table B5 – Francis Scott Key Bridge (I-695)**  
**Transactions and In-Lane Toll Revenue Estimates By Vehicle Class (millions/\$millions)**

Fiscal Year	Transactions (millions)					
	PC		CV		Total	
	Transactions	Percent Change	Transactions	Percent Change	Transactions	Percent Change
	Transactions	Change	Transactions	Change	Transactions	Change
2014	9.4		1.0		<b>10.4</b>	
2015	9.9	4.9	1.1	6.0	<b>10.9</b>	<b>5.0</b>
2016	10.1	2.5	1.1	1.5	<b>11.2</b>	<b>2.4</b>
2017	10.3	1.3	1.1	0.8	<b>11.3</b>	<b>1.2</b>
2018	10.3	0.6	1.1	0.5	<b>11.4</b>	<b>0.6</b>
2019	10.4	0.6	1.1	0.5	<b>11.5</b>	<b>0.6</b>
2020	10.4	0.5	1.1	0.5	<b>11.5</b>	<b>0.5</b>
2021	10.5	0.5	1.1	0.5	<b>11.6</b>	<b>0.5</b>
2022	10.5	0.5	1.1	0.5	<b>11.7</b>	<b>0.5</b>
2023	10.6	0.5	1.1	0.5	<b>11.7</b>	<b>0.5</b>
2024	10.7	0.5	1.1	0.5	<b>11.8</b>	<b>0.5</b>
	In-Lane Toll Revenues (\$ millions)					
	PC		CV		Total	
	Revenue	Percent Change	Revenue	Percent Change	Revenue	Percent Change
	Revenue	Change	Revenue	Change	Revenue	Change
2014	\$ 22.9		\$ 17.4		<b>\$ 40.3</b>	
2015	24.0	5.1	18.4	6.0	<b>42.5</b>	<b>5.5</b>
2016	24.7	2.6	18.7	1.5	<b>43.4</b>	<b>2.1</b>
2017	25.0	1.3	18.9	0.7	<b>43.8</b>	<b>1.1</b>
2018	25.1	0.6	19.0	0.5	<b>44.1</b>	<b>0.6</b>
2019	25.3	0.7	19.0	0.5	<b>44.4</b>	<b>0.6</b>
2020	25.4	0.5	19.1	0.5	<b>44.6</b>	<b>0.5</b>
2021	25.6	0.5	19.2	0.5	<b>44.8</b>	<b>0.5</b>
2022	25.7	0.5	19.3	0.5	<b>45.0</b>	<b>0.5</b>
2023	25.8	0.5	19.4	0.5	<b>45.2</b>	<b>0.5</b>
2024	25.9	0.5	19.5	0.5	<b>45.5</b>	<b>0.5</b>

Note: PC= Passenger Cars, CV= Commercial Vehicles

**Table B6 – William Preston Lane Jr. Memorial Bridge (US 50/301)**  
**Transactions and In-Lane Toll Revenue Estimates By Vehicle Class (millions/\$millions)**

Fiscal Year	Transactions (millions)					
	PC		CV		Total	
	Transactions	Percent Change	Transactions	Percent Change	Transactions	Percent Change
	Transactions	Change	Transactions	Change	Transactions	Change
2014	11.9		0.9		<b>12.8</b>	
2015	12.0	0.7	0.9	3.1	<b>12.9</b>	<b>0.8</b>
2016	12.1	1.4	0.9	0.7	<b>13.0</b>	<b>1.4</b>
2017	12.3	1.2	0.9	0.6	<b>13.2</b>	<b>1.2</b>
2018	12.4	0.8	0.9	0.4	<b>13.3</b>	<b>0.8</b>
2019	12.4	0.6	0.9	0.3	<b>13.4</b>	<b>0.6</b>
2020	12.5	0.7	0.9	0.4	<b>13.5</b>	<b>0.7</b>
2021	12.6	0.7	0.9	0.4	<b>13.6</b>	<b>0.7</b>
2022	12.7	0.8	0.9	0.4	<b>13.7</b>	<b>0.8</b>
2023	12.8	0.8	0.9	0.4	<b>13.8</b>	<b>0.8</b>
2024	12.9	0.8	0.9	0.4	<b>13.9</b>	<b>0.8</b>
	In-Lane Toll Revenues (\$ millions)					
	PC		CV		Total	
	Revenue	Percent Change	Revenue	Percent Change	Revenue	Percent Change
	Revenue	Change	Revenue	Change	Revenue	Change
2014	\$ 54.3		\$ 25.4		<b>\$ 79.8</b>	
2015	54.7	0.7	26.2	3.1	<b>80.9</b>	<b>1.5</b>
2016	55.5	1.5	26.4	0.7	<b>81.9</b>	<b>1.2</b>
2017	56.2	1.2	26.5	0.6	<b>82.8</b>	<b>1.0</b>
2018	56.7	0.8	26.7	0.4	<b>83.4</b>	<b>0.7</b>
2019	57.1	0.7	26.7	0.3	<b>83.8</b>	<b>0.6</b>
2020	57.5	0.7	26.8	0.4	<b>84.3</b>	<b>0.6</b>
2021	57.9	0.8	26.9	0.4	<b>84.9</b>	<b>0.6</b>
2022	58.4	0.8	27.1	0.4	<b>85.5</b>	<b>0.7</b>
2023	58.9	0.9	27.2	0.4	<b>86.1</b>	<b>0.7</b>
2024	59.4	0.8	27.3	0.4	<b>86.7</b>	<b>0.7</b>

Note: PC= Passenger Cars, CV= Commercial Vehicles

**Table B7 – Harry W. Nice Memorial Bridge (US 301)**  
**Transactions and In-Lane Toll Revenue Estimates By Vehicle Class (millions/\$millions)**

Fiscal Year	Transactions (millions)					
	PC		CV		Total	
	Transactions	Percent Change	Transactions	Percent Change	Transactions	Percent Change
	Transactions	Change	Transactions	Change	Transactions	Change
2014	3.0		0.2		<b>3.2</b>	
2015	3.1	2.4	0.2	7.3	<b>3.3</b>	<b>2.7</b>
2016	3.2	1.2	0.2	5.7	<b>3.4</b>	<b>1.5</b>
2017	3.1	(0.0)	0.2	3.9	<b>3.4</b>	<b>0.2</b>
2018	3.1	(0.0)	0.2	2.2	<b>3.4</b>	<b>0.1</b>
2019	3.2	0.0	0.2	0.8	<b>3.4</b>	<b>0.1</b>
2020	3.2	0.0	0.2	1.0	<b>3.4</b>	<b>0.1</b>
2021	3.2	0.0	0.3	1.1	<b>3.4</b>	<b>0.1</b>
2022	3.2	0.0	0.3	1.4	<b>3.4</b>	<b>0.1</b>
2023	3.2	0.0	0.3	1.4	<b>3.4</b>	<b>0.1</b>
2024	3.2	0.0	0.3	1.0	<b>3.4</b>	<b>0.1</b>
	In-Lane Toll Revenues (\$ millions)					
	PC		CV		Total	
	Revenue	Percent Change	Revenue	Percent Change	Revenue	Percent Change
	Revenue	Change	Revenue	Change	Revenue	Change
2014	\$ 14.6		\$ 5.8		<b>\$ 20.4</b>	
2015	15.0	2.5	6.2	7.4	<b>21.2</b>	<b>3.9</b>
2016	15.2	1.2	6.6	5.8	<b>21.7</b>	<b>2.6</b>
2017	15.2	(0.0)	6.8	4.0	<b>22.0</b>	<b>1.2</b>
2018	15.2	(0.0)	7.0	2.2	<b>22.1</b>	<b>0.7</b>
2019	15.2	0.1	7.0	0.8	<b>22.2</b>	<b>0.3</b>
2020	15.2	0.0	7.1	1.0	<b>22.3</b>	<b>0.4</b>
2021	15.2	0.1	7.2	1.1	<b>22.4</b>	<b>0.4</b>
2022	15.2	0.1	7.3	1.4	<b>22.5</b>	<b>0.5</b>
2023	15.2	0.0	7.4	1.4	<b>22.6</b>	<b>0.5</b>
2024	15.2	0.0	7.5	1.0	<b>22.7</b>	<b>0.4</b>

Note: PC= Passenger Cars, CV= Commercial Vehicles