

Memorandum



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Date October 22, 2019
To Cheryl Lewis-Orr
From Neal Cohen
Subject **I-95 ETL T&R Update Existing and Extension**

Jacobs was retained to conduct an update to the traffic and toll revenue estimates for Interstate 95 Express Toll Lanes (ETLs) operated and maintained by the Maryland Transportation Authority (MDTA). In addition, analysis was conducted to understand the potential traffic and toll revenue for the extension of the northbound ETLs 10 miles to the north.

Jacobs conducted and developed the original forecast of traffic and toll revenue for the I-95 ETLs in 2013 in anticipation of the opening in late 2014. The original analysis is documented in the report titled "I-95 Express Toll Lanes Comprehensive Traffic and Toll Revenue Study" dated December 2013. The majority of the analysis was conducted in the spring of 2013 with finalization of the report at the end of the year.

Since the original analysis was conducted, Jacobs has updated the forecast against actual results annually similar to the analysis documented in this memo. The purpose of these updates is to provide input into MDTA budgets.

This memo reviews the existing conditions of the facility including traffic levels and speeds, and revised estimates of traffic and toll revenue for the existing I-95 ETL facility. In addition, the extension is analyzed, reviewing both existing traffic demand, development of a toll diversion model, and estimates of traffic and toll revenue for the I-95 ETL extension. Thus, the sections are as follows:

1. I-95 ETL Existing Facility – Project Description
 - 1.1. Data Collection/Summary
 - 1.2. Updated Traffic and Toll Revenue Forecasts
 - 1.3. Future Toll Schedule Changes to Manage Traffic
2. I-95 ETL Northbound Extension – Project Description
 - 2.1. Data Collection/Summary
 - 2.2. Traffic and Revenue Forecasts
3. Total Traffic and Revenue Forecasts
4. Limits and Disclaimers

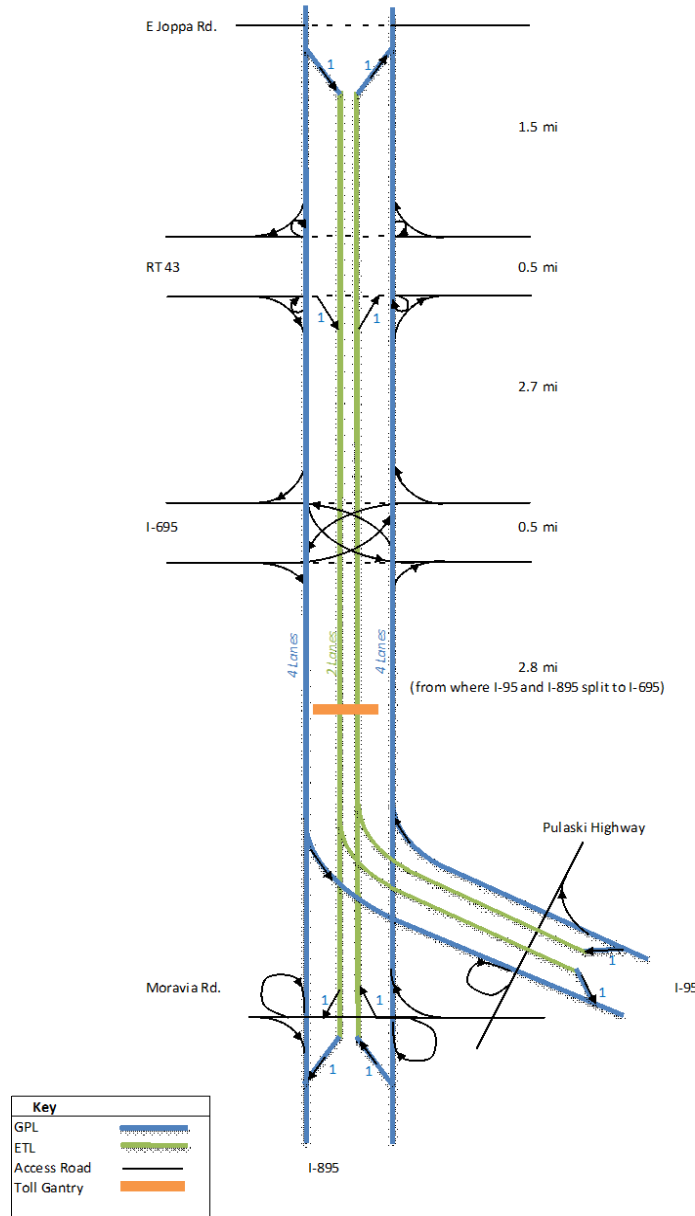
1. I-95 ETL Existing Facility - Project Description

The I-95 Express Toll Lanes (ETLs) are two lanes in each direction running parallel to the I-95 general-purpose (GP) lanes for approximately 7.5 miles north of Baltimore from north of White Marsh Boulevard (MD 43) to the split of I-95/I-895 about 4 miles north of the Baltimore Harbor. Figure 1 and Figure 2 provide the project location and the details as to access to the ETLs from the GP lanes, respectively.

Figure 1: I-95 ETL Project Location Map



Figure 2: I-95 ETL Existing Stick Diagram



The facility offers faster travel speeds as compared to the general-purpose lanes during congested times of the day. Key to the forecast of traffic and toll revenue on these ETLs is the determination of the levels of congestion on the GP lanes into the future and the propensity for motorists to pay a toll to avoid such congestion.

The toll schedule for the I-95 ETLs is by time of day, specific by direction and day of the week. The toll rates were lowered in FY16 (July 1, 2015), and remain unchanged since that time. The passenger car toll

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rates are shown in Table 1 and time period for the toll rates are shown in Table 2. It is assumed that the current toll rates will be in effect throughout the forecast period.

Table 1: I-95 ETL Passenger Car Toll Rates

Time Period	FY15 Rates	FY19 Rates
Peak	\$1.75	\$1.54
Off-Peak	\$1.40	\$1.19
Night	\$0.70	\$0.49

Note: Video Toll Rates are 1.5 times the E-ZPass toll rates with a minimum of \$1 / maximum of \$15 above the E-ZPass rates.

Table 2: I-95 ETL Toll Schedule Time Periods

	Weekday	Saturday	Sunday
Time Period	Southbound		
Peak	6 AM to 9 AM	12 PM to 2 PM	2 PM to 5 PM
Off-Peak	5 AM to 6 AM; 9 AM to 9 PM	5 AM to 12 PM; 2 PM to 9 PM	5 AM to 2 PM; 5 PM to 9 PM
Night	9 PM to 5 AM		
	Northbound		
Peak	3 PM to 7 PM	12 PM to 2 PM	2 PM to 5 PM
Off-Peak	5 AM to 3 PM; 7 PM to 9 PM	5 AM to 12 PM; 2 PM to 9 PM	5 AM to 2 PM; 5 PM to 9 PM
Night	9 PM to 5 AM		



1.1 Data Collection/Summary

In this section the data that were collected for this analysis are identified and the salient elements from those data as they affect the T&R forecast are analyzed.

1.1.1 Data Collected

For this analysis the following data were collected from the MDTA to supplement our existing databases:

1. Traffic Data
 - a. SHA traffic counts; and
 - b. Speed data from MDTA readers on the ETLs and GP lanes, separately.
2. Toll Revenue Data
 - a. Monthly and Annual E-ZPass toll revenue by vehicle class; and
 - b. Monthly and Annual paid video revenue by vehicle class.

In addition to the data collected above specifically for this analysis, our databases and experience with existing managed lane systems and usage were used, as is typical on these projects.



1.1.2 Traffic and Toll Revenue

The historical annual traffic and toll revenue for FY2015 through FY2019 are presented by vehicle class and payment type in Table 3 (FY2015), Table 4 (FY2016), Table 5 (FY2017), Table 6 (FY2018) and Table 7 (FY2019). The data show that there is an extremely high passenger car share as well as E-ZPass percentage for FY2015 through FY2019. The vehicle class percent share in each table adds to 100 percent reading down the table with sums provided by car and truck. The percent ETC shown in the final column of the tables is for each specific vehicle class across the rows of the table.

Table 3: ETL Traffic and Toll Revenue by Vehicle Class and Payment Type – FY2015 (December 2014 to June 2015)

Vehicle Class	E-ZPass	Video	Total	% Vehicle Class	% ETC
Transactions					
Car	3,747,950	57,847	3,805,797	96.5%	98.5%
Truck	133,882	5,954	139,836	3.5%	95.7%
Total	3,881,832	63,801	3,945,633	100.0%	98.4%
Toll Revenue					
Car	\$5,244,604	\$120,329	\$5,364,933	87.3%	97.8%
Truck	\$771,721	\$9,055	\$780,776	12.7%	98.8%
Total	\$6,016,325	\$129,384	\$6,145,709	100.0%	97.9%

Table 4: ETL Traffic and Toll Revenue by Vehicle Class and Payment Type – FY2016 (July 2015 to June 2016)

Vehicle Class	E-ZPass	Video	Total	% Vehicle Class	% ETC
Transactions					
Car	7,752,270	204,022	7,956,292	96.3%	97.4%
Truck	295,749	13,584	309,333	3.7%	95.6%
Total	8,048,019	217,606	8,265,625	100.0%	97.4%
Toll Revenue					
Car	\$9,641,558	\$412,271	\$10,053,829	88.3%	95.9%
Truck	\$1,303,913	\$27,452	\$1,331,365	11.7%	97.9%
Total	\$10,945,471	\$439,723	\$11,385,194	100.0%	96.1%

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Table 5: ETL Traffic and Toll Revenue by Vehicle Class and Payment Type – FY2017 (July 2016 to June 2017)

Vehicle Class	E-ZPass	Video	Total	% Vehicle Class	% ETC
Transactions					
Car	8,367,883	263,322	8,631,205	95.6%	96.9%
Truck	382,620	17,085	399,705	4.4%	95.7%
Total	8,750,503	280,407	9,030,910	100.0%	96.9%
Toll Revenue					
Car	\$10,240,285	\$524,730	\$10,765,014	86.3%	95.1%
Truck	\$1,678,824	\$34,124	\$1,712,948	13.7%	98.0%
Total	\$11,919,108	\$558,854	\$12,477,962	100.0%	95.5%

Table 6: ETL Traffic and Toll Revenue by Vehicle Class and Payment Type – FY2018 (July 2017 to June 2018)

Vehicle Class	E-ZPass	Video	Total	% Vehicle Class	% ETC
Transactions					
Car	8,697,183	218,025	8,915,208	94.9%	97.6%
Truck	464,036	13,667	477,703	5.1%	97.1%
Total	9,161,219	231,692	9,392,911	100.0%	97.5%
Toll Revenue					
Car	\$10,585,779	\$469,314	\$11,055,093	84.1%	95.8%
Truck	\$2,063,521	\$29,446	\$2,092,967	15.9%	98.6%
Total	\$12,649,300	\$498,760	\$13,148,060	100.0%	96.2%

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Table 7: ETL Traffic and Toll Revenue by Vehicle Class and Payment Type – FY2019 (July 2018 to June 2019)

Vehicle Class	E-ZPass	Video	Total	% Vehicle Class	% ETC
Transactions					
Car	9,119,309	211,628	9,330,937	94.6%	97.7%
Truck	521,035	16,481	537,516	5.4%	96.9%
Total	9,640,344	228,109	9,868,453	100.0%	97.7%
Toll Revenue					
Car	\$11,062,269	\$463,882	\$11,526,151	82.8%	96.0%
Truck	\$2,358,803	\$36,025	\$2,394,827	17.2%	98.5%
Total	\$13,421,071	\$499,907	\$13,920,978	100.0%	96.4%

Traffic and toll revenue by month were also reviewed and are presented Table 8 and Figure 3 (ETL Traffic by Month) and Table 9 and Figure 4 (ETL Toll Revenue by Month). Monthly growth in traffic and toll revenue is quite large in specific months, which is common for managed lane facilities, specifically in the early years.

Table 8: ETL Traffic by Month (FY15 to FY19)

Month	FY15	FY16	FY17	FY18	FY19	FY18 to FY19	
						Absolute Growth	% Growth
Jul		646,335	809,286	841,204	849,490	8,286	1.0%
Aug		833,649	852,663	910,280	902,671	-7,609	-0.8%
Sep		648,335	702,868	713,701	727,604	13,903	1.9%
Oct		749,627	761,186	795,708	844,524	48,816	6.1%
Nov		755,746	756,373	794,684	866,582	71,898	9.0%
Dec	398,374	722,575	754,126	757,283	825,534	68,251	9.0%
Jan	439,591	526,351	646,974	640,994	669,733	28,739	4.5%
Feb	406,215	561,057	575,068	672,188	645,765	-26,423	-3.9%
Mar	553,842	720,938	689,348	769,203	792,831	23,628	3.1%
Apr	719,665	674,724	830,158	796,115	927,137	131,022	16.5%
May	734,606	693,601	823,981	863,249	930,541	67,292	7.8%
Jun	693,340	732,687	828,879	838,302	886,041	47,739	5.7%
FY	3,945,633	8,265,625	9,030,910	9,392,911	9,868,453	475,542	5.1%
FYTD*	3,945,633	8,265,625	9,030,910	9,392,911	9,868,453	475,542	5.1%
Q1	-	2,128,319	2,364,817	2,465,185	2,479,765	14,580	0.6%
Q2	398,374	2,227,948	2,271,685	2,347,675	2,536,640	188,965	8.0%
Q3	1,399,648	1,808,346	1,911,390	2,082,385	2,108,329	25,944	1.2%
Q4	2,147,611	2,101,012	2,483,018	2,497,666	2,743,719	246,053	9.9%

Figure 3: ETL Traffic by Month (FY15 to FY19)

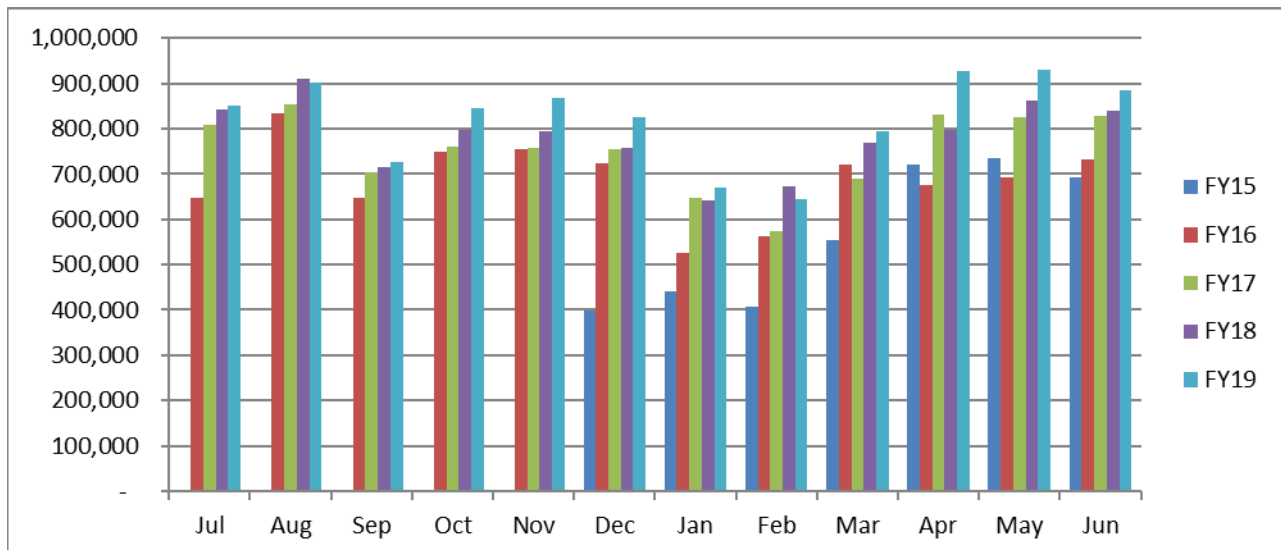
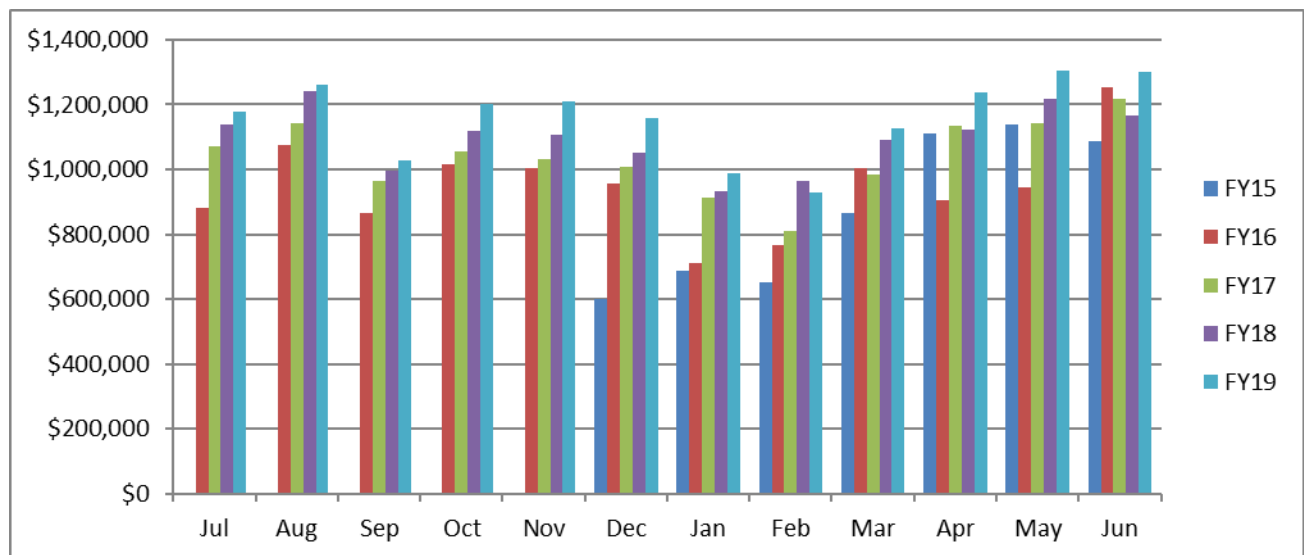


Table 9: ETL Toll Revenue by Month (FY15 to FY19)

Month	FY15	FY16	FY17	FY18	FY19	FY18 to FY19	
						Absolute Growth	% Growth
Jul		\$882,454	\$1,071,759	\$1,138,515	\$1,177,347	\$38,832	3.4%
Aug		\$1,073,767	\$1,144,096	\$1,241,630	\$1,260,659	\$19,029	1.5%
Sep		\$864,654	\$964,334	\$996,538	\$1,028,899	\$32,361	3.2%
Oct		\$1,016,845	\$1,054,222	\$1,118,261	\$1,200,562	\$82,301	7.4%
Nov		\$1,003,773	\$1,031,790	\$1,106,255	\$1,211,108	\$104,853	9.5%
Dec	\$602,088	\$957,697	\$1,007,192	\$1,052,678	\$1,157,787	\$105,109	10.0%
Jan	\$687,419	\$709,807	\$914,534	\$932,171	\$986,735	\$54,564	5.9%
Feb	\$650,605	\$767,367	\$810,432	\$963,337	\$930,373	-\$32,964	-3.4%
Mar	\$867,064	\$1,002,253	\$983,668	\$1,089,911	\$1,128,616	\$38,705	3.6%
Apr	\$1,112,133	\$906,069	\$1,133,774	\$1,124,613	\$1,236,720	\$112,107	10.0%
May	\$1,138,891	\$945,966	\$1,143,452	\$1,218,200	\$1,303,217	\$85,017	7.0%
Jun	\$1,087,509	\$1,254,542	\$1,218,710	\$1,165,952	\$1,298,955	\$133,003	11.4%
FY	\$6,145,709	\$11,385,193	\$12,477,962	\$13,148,060	\$13,920,978	\$772,918	5.9%
FYTD*	\$6,145,709	\$11,385,193	\$12,477,962	\$13,148,060	\$13,920,978	\$772,918	5.9%
Q1	\$0	\$2,820,875	\$3,180,189	\$3,376,683	\$3,466,905	\$90,222	2.7%
Q2	\$602,088	\$2,978,314	\$3,093,204	\$3,277,193	\$3,569,457	\$292,264	8.9%
Q3	\$2,205,088	\$2,479,427	\$2,708,634	\$2,985,419	\$3,045,724	\$60,305	2.0%
Q4	\$3,338,533	\$3,106,577	\$3,495,936	\$3,508,765	\$3,838,892	\$330,127	9.4%

Figure 4: ETL Toll Revenue by Month (FY15 to FY19)



These growth rates were taken into account when considering the continuation of growth on the ETLs outside of that due to benefits of travel time savings from congestion in the general-purpose lanes, discussed in the next section.



1.1.3 Speed Review

One of the critical data items to review are the speeds in the ETLs and the general-purpose lanes by time-of-day and day-of-week. As the tolled ETLs are adjacent to the toll-free general-purpose lanes, it is the travel time savings in the form of higher travel speeds that provide value to motorists. A small portion of travel time savings is imbedded in the speed limit differential, such that the ETLs have a speed limit that is five (5) miles per hour (mph) higher than the GPs. There are other benefits as well such as an increase in perceived safety, ease of use and other items detailed later in this memo. For the purely quantitative part of the analysis Table 10 and Figure 5 (southbound) and Table 11 and Figure 6 (northbound) present the FY2019 average speeds for the ETLs while Table 12 and Figure 7 (southbound) and Table 13 and Figure 8 (northbound) present the FY2019 average speeds in the general-purpose lanes.

Note that the average speeds in the general-purpose lanes dip to about 48 mph during the SB peak period and about 49 mph for the NB peak period during the week. During off-peak times the speeds are very similar. These speed differentials from the ETLs provide about a one to three-minute time savings on average during the peak period. There is certainly volatility to those peak periods speeds over the course of a year and perceived time savings could be slightly more as a result.



Table 10: Average Speeds (MPH) by Hour and Day of the Week in the Corridor, Southbound Express Toll Lanes for the Past 12 Months

Hour	Sun	Mon	Tue	Wed	Thu	Fri	Sat
12:00AM - 1:00AM	68.8	69.5	68.0	67.5	68.3	68.5	68.4
1:00AM - 2:00AM	68.5	68.7	67.4	67.7	68.0	67.9	68.4
2:00AM - 3:00AM	68.4	68.5	67.4	68.2	68.3	67.6	68.3
3:00AM - 4:00AM	68.0	68.9	68.2	69.2	68.8	68.3	68.1
4:00AM - 5:00AM	69.3	71.2	70.4	70.7	70.7	70.0	68.6
5:00AM - 6:00AM	70.6	71.3	72.1	72.8	72.5	71.9	70.5
6:00AM - 7:00AM	72.3	68.3	68.5	69.3	69.0	70.5	71.8
7:00AM - 8:00AM	72.4	62.3	57.1	60.8	59.0	69.6	72.3
8:00AM - 9:00AM	72.3	66.9	60.3	65.6	64.8	70.8	72.3
9:00AM - 10:00AM	72.0	70.2	70.9	70.6	70.3	70.9	71.7
10:00AM - 11:00AM	71.8	70.6	70.5	70.1	70.0	70.3	71.2
11:00AM - 12:00PM	71.4	70.0	68.6	69.8	69.7	70.4	70.9
12:00PM - 1:00PM	71.4	70.2	70.1	69.8	69.8	70.2	70.9
1:00PM - 2:00PM	71.0	70.0	68.6	70.1	69.7	70.1	70.6
2:00PM - 3:00PM	70.7	69.8	69.8	70.2	69.6	68.9	70.4
3:00PM - 4:00PM	70.4	69.7	69.8	68.8	69.6	67.5	70.7
4:00PM - 5:00PM	70.4	70.3	70.4	70.6	70.0	68.8	70.7
5:00PM - 6:00PM	70.4	69.8	69.9	70.4	69.9	69.5	70.8
6:00PM - 7:00PM	70.3	69.4	70.3	70.1	70.0	69.5	71.0
7:00PM - 8:00PM	70.1	69.3	70.0	69.6	69.7	69.6	70.7
8:00PM - 9:00PM	70.1	69.3	69.4	69.0	69.1	68.9	69.7
9:00PM - 10:00PM	69.9	68.9	69.0	68.6	68.8	68.5	69.4
10:00PM - 11:00PM	70.2	69.3	69.0	69.0	69.1	68.8	69.2
11:00PM - 12:00AM	69.9	67.3	68.5	68.8	68.6	68.7	68.6

Figure 5: Average Speeds (MPH) by Hour and Day of the Week in the Corridor, Southbound Express Toll Lanes for the Past 12 Months

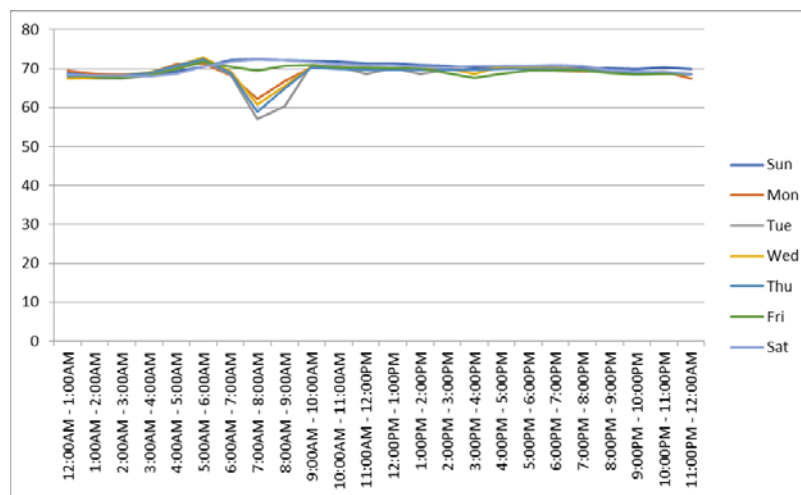
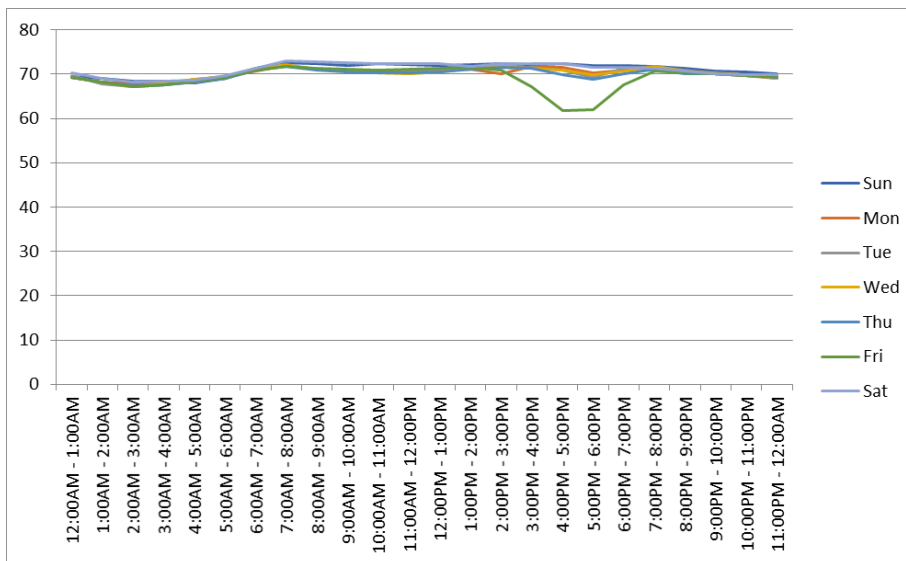




Table 11: Average Speeds (MPH) by Hour and Day of the Week in the Corridor, Northbound Express Toll Lanes for the Past 12 Months

Hour	Sun	Mon	Tue	Wed	Thu	Fri	Sat
12:00AM - 1:00AM	69.6	69.3	69.7	69.3	69.2	69.2	70.4
1:00AM - 2:00AM	69.0	68.2	67.7	68.3	68.2	68.2	69.0
2:00AM - 3:00AM	68.5	68.1	67.2	67.2	67.5	67.2	68.3
3:00AM - 4:00AM	68.5	67.7	67.6	68.0	67.7	67.6	68.4
4:00AM - 5:00AM	68.0	68.9	68.1	68.9	68.2	68.3	68.6
5:00AM - 6:00AM	69.1	69.5	69.1	69.5	69.0	69.3	69.7
6:00AM - 7:00AM	71.4	70.7	71.3	71.3	70.9	70.9	71.3
7:00AM - 8:00AM	72.7	71.9	71.9	72.3	71.8	71.7	72.9
8:00AM - 9:00AM	72.3	71.1	71.1	71.2	71.0	71.3	72.8
9:00AM - 10:00AM	72.1	70.8	70.7	70.7	70.4	71.2	72.7
10:00AM - 11:00AM	72.3	70.8	70.7	70.4	70.3	71.0	72.3
11:00AM - 12:00PM	72.3	70.8	70.6	70.1	70.2	71.2	72.4
12:00PM - 1:00PM	72.0	71.0	71.1	70.6	70.6	71.3	72.4
1:00PM - 2:00PM	72.1	71.2	71.8	71.3	71.1	71.6	71.8
2:00PM - 3:00PM	72.3	70.1	71.8	71.5	71.5	70.8	72.3
3:00PM - 4:00PM	72.2	71.8	71.5	71.4	71.2	67.2	72.4
4:00PM - 5:00PM	72.3	71.5	70.9	70.9	69.9	61.9	72.4
5:00PM - 6:00PM	71.9	70.4	69.2	69.9	68.8	62.0	71.5
6:00PM - 7:00PM	71.9	70.9	71.4	70.7	70.1	67.6	71.6
7:00PM - 8:00PM	71.7	71.5	71.8	71.8	71.1	70.7	71.3
8:00PM - 9:00PM	71.3	70.6	71.0	70.6	70.0	70.4	70.7
9:00PM - 10:00PM	70.6	70.0	70.1	70.3	70.0	70.1	70.0
10:00PM - 11:00PM	70.4	69.6	69.9	69.9	69.7	69.7	70.0
11:00PM - 12:00AM	70.0	69.1	69.3	69.2	69.2	69.6	69.9

Figure 6: Average Speeds (MPH) by Hour and Day of the Week in the Corridor, Northbound Express Toll Lanes for the Past 12 Months



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Table 12: Average Speeds (MPH) by Hour and Day of the Week in the Corridor, Southbound General-Purpose Lanes for the Past 12 Months

Hour	Sun	Mon	Tue	Wed	Thu	Fri	Sat
12:00AM - 1:00AM	68.7	69.7	68.5	67.3	68.5	68.7	68.8
1:00AM - 2:00AM	68.7	69.7	66.9	68.2	68.8	68.6	69.3
2:00AM - 3:00AM	69.0	69.3	68.0	68.4	68.6	68.3	69.1
3:00AM - 4:00AM	68.7	69.7	68.9	67.9	69.7	68.9	69.3
4:00AM - 5:00AM	69.6	70.9	70.5	70.6	70.4	70.3	70.1
5:00AM - 6:00AM	71.1	67.4	68.6	69.1	68.6	69.1	71.1
6:00AM - 7:00AM	72.1	62.4	60.6	62.8	62.7	65.2	71.5
7:00AM - 8:00AM	72.7	56.8	47.8	51.0	53.2	64.2	71.6
8:00AM - 9:00AM	72.0	60.6	48.0	54.3	57.8	66.8	71.2
9:00AM - 10:00AM	70.9	67.6	67.6	66.0	64.0	67.9	69.1
10:00AM - 11:00AM	69.3	67.9	68.3	67.8	67.4	67.0	68.4
11:00AM - 12:00PM	69.0	67.7	68.3	66.5	67.4	67.6	68.6
12:00PM - 1:00PM	69.4	66.8	68.2	65.5	67.2	67.0	67.1
1:00PM - 2:00PM	69.1	68.5	67.5	66.7	67.5	66.5	67.8
2:00PM - 3:00PM	66.3	67.2	68.3	66.4	67.6	64.5	67.6
3:00PM - 4:00PM	67.6	67.0	67.4	66.1	67.3	64.3	67.8
4:00PM - 5:00PM	68.3	67.9	67.8	67.3	67.2	64.9	68.0
5:00PM - 6:00PM	67.3	67.2	66.9	67.8	66.9	64.6	67.6
6:00PM - 7:00PM	66.5	68.0	68.6	68.4	68.2	65.6	68.7
7:00PM - 8:00PM	67.7	68.6	69.5	68.7	68.5	66.1	69.0
8:00PM - 9:00PM	67.9	68.7	69.0	68.4	68.2	66.2	68.0
9:00PM - 10:00PM	68.0	68.2	67.1	68.3	67.8	66.6	67.9
10:00PM - 11:00PM	67.6	69.1	66.2	68.6	68.6	67.4	68.3
11:00PM - 12:00AM	69.3	68.8	67.4	68.7	68.9	68.1	68.7

Figure 7: Average Speeds (MPH) by Hour and Day of the Week in the Corridor, Southbound General-Purpose Lanes for the Past 12 Months

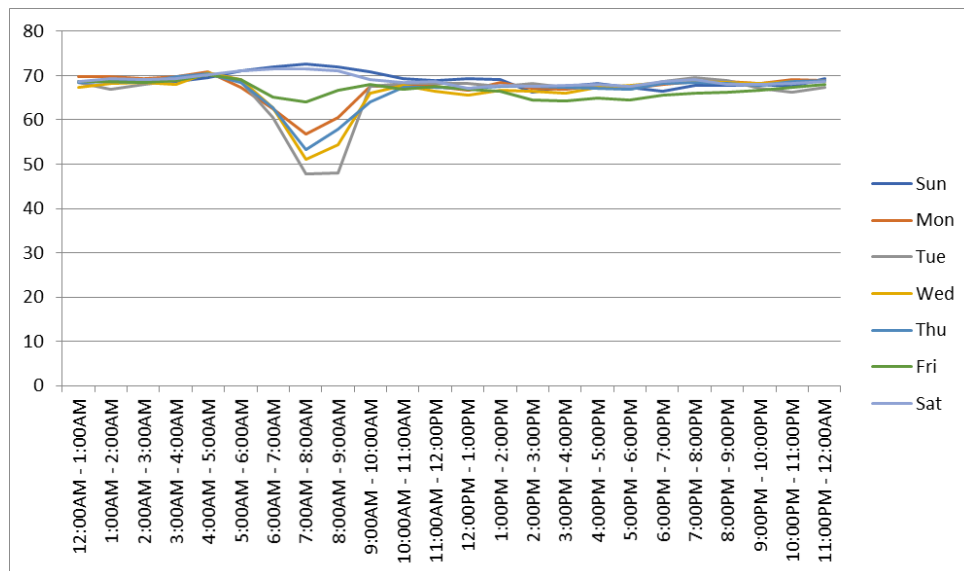
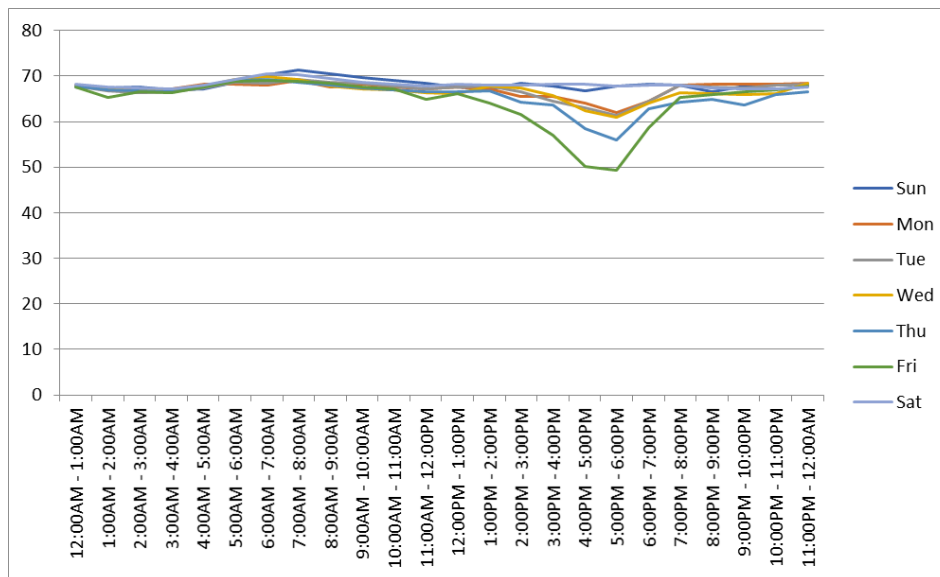




Table 13: Average Speeds (MPH) by Hour and Day of the Week in the Corridor, Northbound General-Purpose Lanes for the Past 12 Months

Hour	Sun	Mon	Tue	Wed	Thu	Fri	Sat
12:00AM - 1:00AM	67.6	67.9	67.7	67.7	67.9	67.7	68.2
1:00AM - 2:00AM	67.4	67.1	66.8	67.1	66.9	65.3	67.6
2:00AM - 3:00AM	67.5	67.0	66.4	66.7	66.7	66.6	67.5
3:00AM - 4:00AM	66.9	67.1	66.6	66.9	66.6	66.4	67.2
4:00AM - 5:00AM	67.2	68.3	67.3	67.7	67.6	67.6	68.0
5:00AM - 6:00AM	68.6	68.2	68.6	69.2	69.0	68.9	69.3
6:00AM - 7:00AM	70.3	68.0	68.5	69.9	69.2	69.1	70.4
7:00AM - 8:00AM	71.4	69.1	69.2	69.2	68.7	68.7	70.2
8:00AM - 9:00AM	70.6	67.5	68.7	67.8	67.9	68.4	69.4
9:00AM - 10:00AM	69.6	68.3	68.3	67.1	67.3	67.6	68.7
10:00AM - 11:00AM	69.1	67.7	67.8	67.0	66.9	67.1	68.1
11:00AM - 12:00PM	68.4	67.2	67.1	66.3	66.6	64.9	67.8
12:00PM - 1:00PM	67.6	67.7	67.6	66.2	66.4	66.1	68.2
1:00PM - 2:00PM	67.2	67.2	67.8	67.7	66.7	64.1	67.9
2:00PM - 3:00PM	68.4	65.4	66.5	67.3	64.3	61.6	68.0
3:00PM - 4:00PM	67.9	65.6	64.4	65.7	63.7	57.0	68.1
4:00PM - 5:00PM	66.8	64.0	62.9	62.4	58.5	50.1	68.1
5:00PM - 6:00PM	67.7	61.9	61.4	60.9	55.9	49.2	67.7
6:00PM - 7:00PM	68.2	64.4	64.4	64.0	62.8	58.7	68.0
7:00PM - 8:00PM	68.1	68.0	68.1	66.3	64.2	65.2	67.9
8:00PM - 9:00PM	66.6	68.1	67.5	66.0	65.0	65.9	67.3
9:00PM - 10:00PM	67.7	68.1	67.4	66.0	63.7	66.5	67.1
10:00PM - 11:00PM	68.0	68.2	68.0	66.2	65.8	66.9	67.2
11:00PM - 12:00AM	68.1	68.3	68.2	68.3	66.6	67.8	67.6

Figure 8: Average Speeds (MPH) by Hour and Day of the Week in the Corridor, Northbound General-Purpose Lanes for the Past 12 Months





Previously in this section, the volatility of speeds in the general-purpose lanes was mentioned as a potential indication of perceived time savings by motorists as opposed to actual average time savings. This volatility can be shown in the distribution of peak period speeds in the general-purpose lanes for the peak period in each direction. While the average is 45 to 55 miles per hour during these peak time periods, as shown in Figure 9 (southbound) and Figure 10 (northbound), there are occurrences of much lower speeds that influence driver behavior. This volatility is considered in the forecasting model as well.

Figure 9: Southbound General-Purpose Lanes Speeds, Weekday AM Peak Hour (7AM to 8AM)

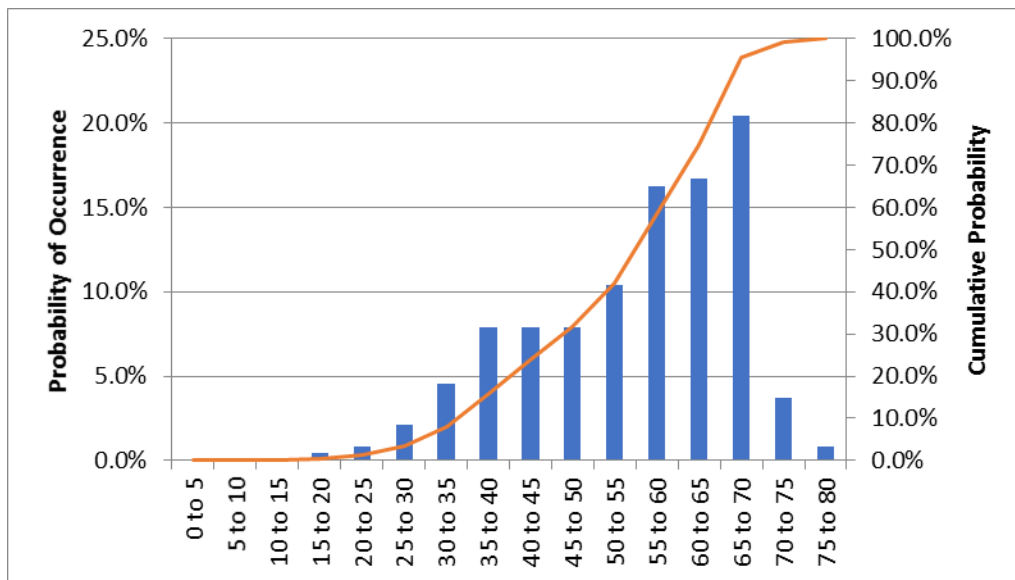
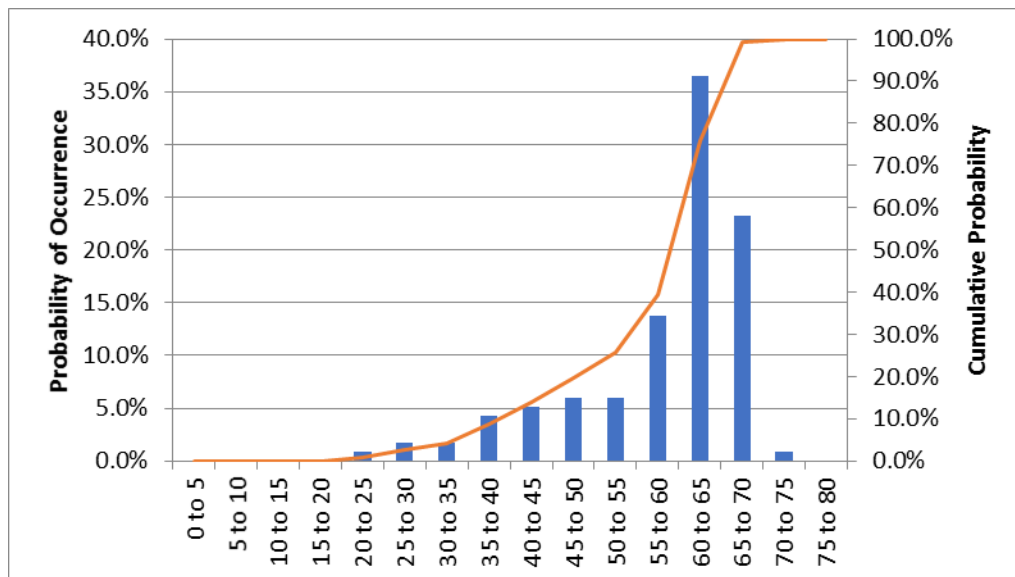


Figure 10: Northbound General-Purpose Lanes Speeds, Weekday PM Peak Hour (5PM to 6PM)





A similar analysis was conducted for the ETLs to understand the potential need for changes in the toll rate. One of the goals of the ETLs is to provide free flow speeds which are generally considered to be between 45 and 50 mph. As shown in Figure 11 (southbound) and Figure 12 (northbound), this is achieved the vast majority of the time for each direction during their respective peak. In the future it may be the case that the toll rate for the northbound PM peak hour should be raised to maintain speed goals for the MDTA.

Figure 11: Southbound Express Toll Lanes Speeds, Weekday AM Peak Hour (7AM to 8AM)

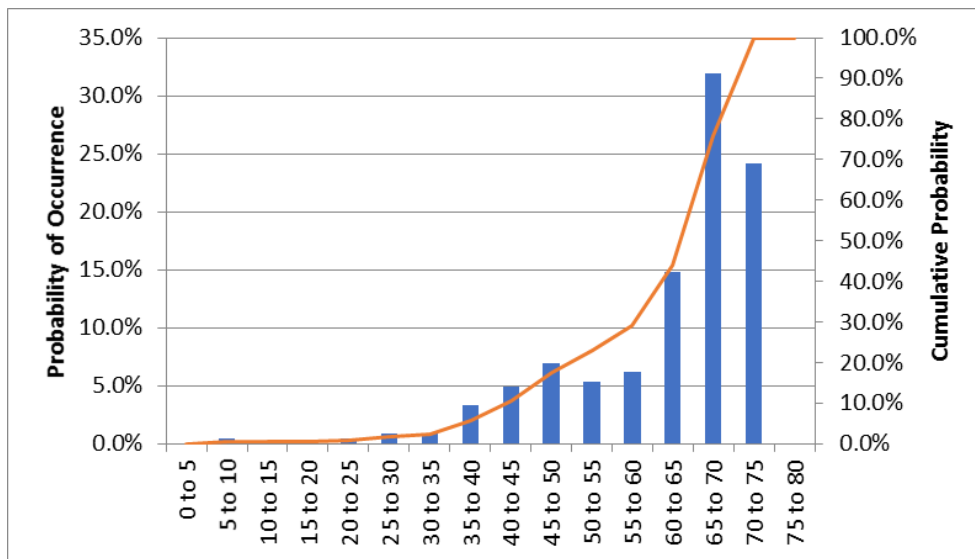
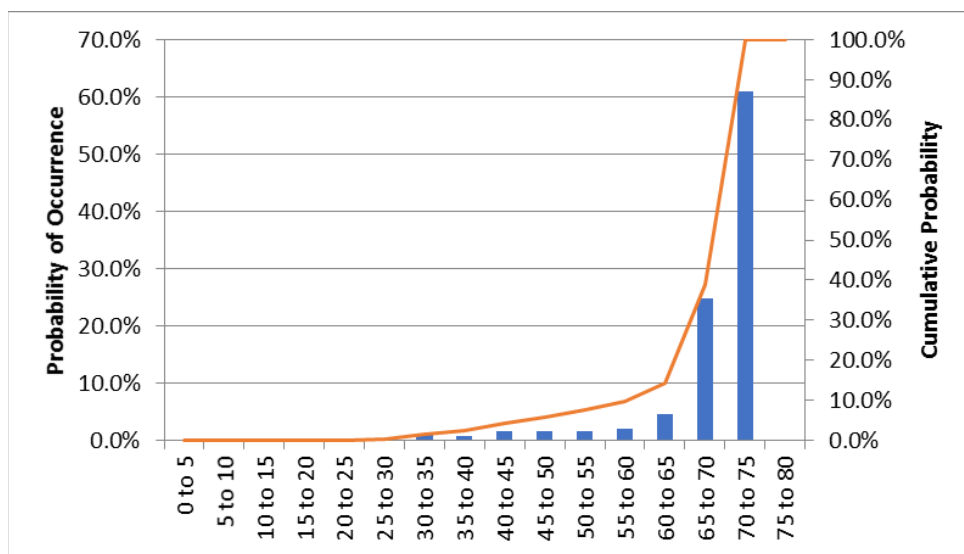


Figure 12: Northbound Express Toll Lanes Speeds, Weekday PM Peak Hour (5PM to 6PM)





1.1.4 Possible Reasons for ETL Usage Apart from Time Savings

Over the years conducted managed lane analyses we have reviewed potential reasons for high ETL usage in the face of limited time savings so as to mitigate these during the modeling effort if necessary. Previous analysis documented the high level of one-time users which points to a potential correction of behavior after taking it once or twice. Table 14 provides a description of potential reasons and the resulting action taken for the modeling process. Generally, it is estimated that over time, usage of the ETLs will be more dependent upon travel time savings and not curiosity, unfamiliarity or the like.

Table 14: Possible Reasons for ETL Usage

Potential Reason	Analysis	Modeling Mitigation
Construction on General Purpose Lanes causing restrictions	No known construction on GP lanes that would encourage ETL usage	None
Spot congestion at entry points	No known spot congestion at entries	None
Confusion over signage	The signs show that E-ZPass should use the left lanes as motorists approach the entries to the ETLs. This signage is similar to signage at the tunnels and JFK Memorial where E-ZPass uses the leftmost lanes. It is possible that motorists with E-ZPass simply follow the signs.	Phase out one time users
Navigation directions pushing motorists into ETLs	Apple Maps, Yahoo Maps and Tom Tom provided guidance to use the ETLs; Google Maps, Mapquest and Bing Maps directs motorists to GP Lanes	Users will use navigation advice once or twice before making decision to take GP Lanes
Perceived value of lanes because of pricing	Possibly a Veblen Good - provides status of relatively low cost	Continue some usage regardless of future time savings
"Tourist" usage - i.e. trying something once to see how it works	Frequency data seems to suggest that this may be the case	Removal of one time users over the years as motorists become familiar with the corridor
Fear of potential slowdown in GP lanes with value seen in the reliability and perceived safety/comfort of the ETLs	This is a reason for managed lane usage across the nation and appears to be applicable to this facility	Continue some usage regardless of future time savings



1.2 Updated Traffic and Revenue Forecasts

Due to the unique nature of the facility, motorists will slowly learn the relative benefit of the facility and for the various reasons stated in the preceding documentation; usage will lower to match actual travel time savings between the ETLs and the general-purpose lanes.

The forecasting model was revised to account for the current level of usage with slow removal of that usage over the course of few years as unfamiliar motorists become familiar with the corridor. The forecasting model does consider the continual introduction of first-time users to the facility, which allows for more usage throughout the forecast.

The Draft FY 2019-2025 Consolidated Transportation Program as sent to Jacobs was reviewed to address potential impacts that any proposed projects may have on the ETLs. No potential impacts were found and this forecast assumes the construction of the northbound extension will be implemented according to the latest schedule as documented in subsequent sections of this memo.

The forecast assumes the current toll schedule will be in place through 2029. The estimates of traffic and toll revenue are provided in Table 15. The figures shown for FY2015 through FY2019 are actual results. The high growth from FY2015 to FY2016 is mostly a function of FY2015 only being open for 6-½ months. Even with this accommodation there is higher growth than would normally be considered as a function of the ramp-up for any new facility. The growth from FY2016 to FY2017 did continue to be strong and then tempered a bit from FY2017 to FY2018 then increased again from FY2018 to FY2019. For the first quarter of FY2020, the number of transactions on the I-95 ETLs is up 3.8 percent and toll revenue is up 4.4 percent.

The forecast assumes moderate growth (with slightly decreasing growth rates) through FY2022. The 2.6 to 2.0 percent growth rate for the next few years is a function of estimated general background growth on the I-95 corridor. General background growth is the year over year growth of traffic in the corridor, from longer distance trips which may or may not be related to local land development changes. Revenue is expected to grow slightly higher than traffic due to more of the traffic within the peak period during which toll rates are higher. In the longer term, growth is expected to increase above the estimated background growth rate of two percent as congestion builds as compared to current conditions. During the peak period it is estimated that average speeds in the general-purpose lanes will not change dramatically over the forecast period, but that the reliability of travel will continue to deteriorate and therefore motorists will increasingly choose the ETLs as an insurance policy against delay. The forecast presented represents a conservative view of potential revenue. The ETLs are highly sensitive to congestion in the general-purpose lanes. The forecasting model estimates that the congestion in the general-purpose lanes will be limited during the forecast period but if background growth exceeds one percent, specifically in the peak periods, it is possible that the transactions and toll revenue will exceed forecast. The annual growth for the ETL are based on the historical trends of traffic in the I-95 corridor, background growth assumptions, and engineering judgement. The ETL traffic demand has shown little correlation to traffic or speed on the I-95 general purpose lanes since opening.



Table 15: I-95 ETL Traffic and Toll Revenue Estimates

Annual T&R Estimates for I-95 Express Toll Lanes (Section 100)				
Fiscal Year	Traffic		Toll Revenue	
	Volume	Annual Growth	Amount	Annual Growth
2015 *	3,945,633		\$6,145,709	
2016 *	8,265,625	109.5%	\$11,385,193	85.3%
2017 *	9,030,910	9.3%	\$12,477,962	9.6%
2018 *	9,392,911	4.0%	\$13,148,060	5.4%
2019 *	9,868,453	5.1%	\$13,920,978	5.9%
2020	10,363,000	5.0%	\$14,696,000	5.6%
2021	10,571,000	2.0%	\$15,152,000	3.1%
2022	10,809,000	2.2%	\$15,675,000	3.5%
2023	11,063,000	2.3%	\$16,231,000	3.6%
2024	11,334,000	2.4%	\$16,823,000	3.7%
2025	11,623,000	2.5%	\$17,454,000	3.8%
2026	11,931,000	2.6%	\$18,126,000	3.9%
2027	12,259,000	2.7%	\$18,842,000	4.0%
2028	12,608,000	2.8%	\$19,605,000	4.1%
2029	12,980,000	2.9%	\$20,419,000	4.2%

*FY2015 - FY2019 are actual results

1.3 Future Toll Schedule Changes to Manage Traffic

The forecast in the preceding section is predicated on the existing toll schedule being in place for the full forecast period. On average, it is estimated that the current toll schedule by hour by day will be sufficient to manage traffic into the future. Furthermore, for the traffic and toll revenue forecast for the ten-year period it is estimated that any small changes to the toll schedule to manage traffic that is discussed in this section will not have a significant impact on revenue.

It is anticipated that there may be individual days into the future that may require increased tolls to effectively manage traffic demand on the ETLs. This would exclude any anomalies such as traffic accidents.

From review of the speed and traffic data on the ETLs on individual days and hours there is currently sufficient capacity to handle the future demands, but the Friday PM peak period does demonstrate volatility that could require management techniques if so desired by the MDTA. On average the traffic can double during the Friday PM Peak and speeds in the non-merging section of the ETLs will be maintained to 45 miles per hour. Therefore, any management of traffic through increases of toll rates would most likely be a function of dynamically pricing the lanes, in which toll rates could change in real time to manage specific anticipated congestion issues on the ETLs.



It is recommended that any changes to the toll schedule for the Friday PM Peak be consistent with overall goals of the corridor and project. There would be opportunities to manage traffic in real time, through dynamic pricing, if the MDTA would like to do so. However, if the MDTA would consider the average day as the basis for any toll changes then the current schedule should be sufficient for the forecast period.

1.4 Potential Revenue Reductions from Toll Modernization Plan

Jacobs estimates that the proposed Toll Modernization Plan (TMP) will have negligible effects on both traffic and revenue of the I-95 ETLs. Following are highlights of the plan:

New vehicle classes with lower rates. Toll rates would be reduced 50 percent for motorcycles, and would be cut 25 and 17 percent, respectively, for “light” vehicles towing one- and two-axle trailers, such as those used for watercraft or landscaping equipment. These new categories would take effect by September 2020.

Pay By Plate. This new payment method allows tolls to be automatically billed to credit cards at the same rate that cash customers pay today for all facilities except the Intercountry Connector/MD 200 (ICC) and I-95 Express Toll Lanes (ETL). For the all-electronic ICC and ETL, customers who use this method will pay at least 20 percent less than the Pay-by-Invoice (Video Toll) rate and 25% more than the *E-ZPass* rate. Pay By Plate benefits infrequent toll customers as well as those who do not want to maintain a prepaid *E-ZPass* balance. This option would be available by June 2020.

Discount for Early Payment of Video Tolls. A 15 percent discount for Pay-by-Invoice (Video Tolling) customers who pay the toll before their invoices are mailed and within a predetermined time period would take effect by December 2020. Since MDTA won’t have to send out a bill, the agency can pass these savings on to the customer.

The MdTA estimated the following overall impacts (i.e., on all facilities) from the TMP:

PROPOSED TOLL ADJUSTMENTS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
1. Expanded & New Vehicle Classes	\$2.66M	\$2.68M	\$2.71M	\$2.74M	\$2.77M
2. New Payment Option	\$1.53M	\$1.55M	\$1.56M	\$1.58M	\$1.60M
3. Video Toll Early Payment Discount	\$1.32M	\$1.33M	\$1.35M	\$1.36M	\$1.38M
Total	\$5.51M	\$5.56M	\$5.62M	\$5.68M	\$5.75M
					Grand Total \$28.12M*

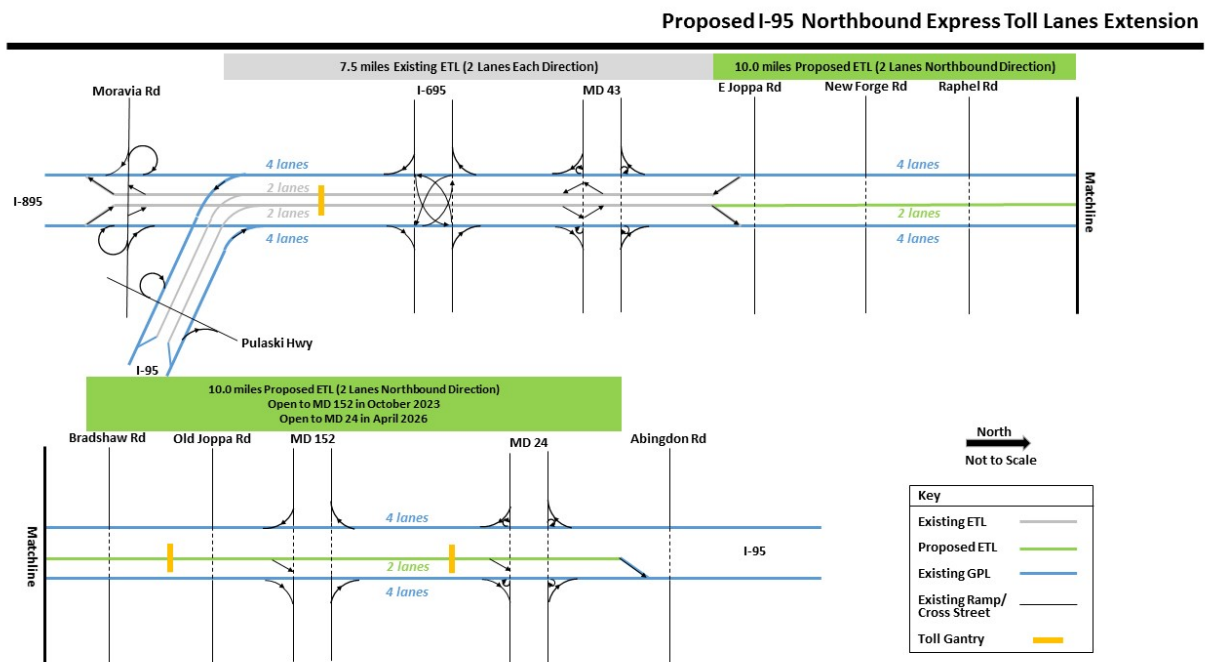
* Customer savings assume a full year

Source: <https://mdta.maryland.gov/TollModernization/Home>

2. I-95 ETL Northbound Extension - Project Description

The extension of the I-95 ETLs to the north has been analyzed in many different forms for several years. For this analysis, an email from MDTA on October 17, 2019 defines the infrastructure. The improvement is defined as an additional two northbound ETLs from the current northern limit of the ETLs to MD 24, an extension of approximately 10 miles. The extension is planned to open in two phases: the first phase (to MD 152) will open in October 2023 and the second phase, to MD 24, will open in April 2026. In addition, there are other improvements such as improved connections on the general-purpose lanes for operational enhancements. The stick diagram with the number of lanes that includes both the existing ETLs and proposed extension are presented in Figure 13. The analysis assumes two additional gantries in the full Northbound extension: one toll gantry south of the first exit on the northbound extension (MD 152) and another toll gantry located between MD 152 and MD 24.

Figure 13: I-95 ETL – Existing and Extension Stick Diagram



It was also assumed that the toll structure would be identical to the existing I-95 ETLs, with time of day pricing as well as the same base per-mile rates as shown in Table 16 and Table 17. These would represent the lowest rates to be used and could be increased as a function of traffic management on the ETLs during the forecast period.

Memorandum



I-95 ETL T&R Update Existing and Extension

Table 16: I95 ETL NB Extension Time of Day Tolling Assumed

Time Period	Weekday	Saturday	Sunday
	Northbound		
Peak	3 PM to 7 PM	12 PM to 2 PM	2 PM to 5 PM
Off-Peak	5 AM to 3 PM; 7 PM to 9 PM	5 AM to 12 PM; 2 PM to 9 PM	5 AM to 2 PM; 5 PM to 9 PM
Night	9 PM to 5 AM		

Table 17: I-95 ETL NB Extension Car E-ZPass Toll Charges Assumed

Time Period	Toll Charge		
	Existing	Existing to MD 152	MD 152 to MD 24
Peak	\$1.54	\$1.54	\$0.66
Off-Peak	\$1.19	\$1.19	\$0.51
Night	\$0.49	\$0.49	\$0.21



2.1 Data Collection/Summary

In this section the pertinent traffic data that were collected for the analysis of the northbound extension of the ETLs is presented. These data include traffic volumes and speed data, as the demand and the implication of the demand on the roadway network in the form of congested speeds are the key drivers of traffic and revenue on the ETLs. This and the preceding information regarding the existing ETLs built the basis of the traffic and toll revenue forecasts for the extension.

Historical traffic volumes on the I-95 Corridor are shown in Table 18, including those within the existing sections of the ETLs and those in the northern extension. The northern section appears to have approximately 85 percent of the volume as the southern (existing) section, which shows strong demand for the full corridor from the Harbor to MD 24. The annual growth rates for the time period from 2008 to 2018 are presented as well, including the compounded annualized growth rate for the full period. As shown, it appears that the background growth rate for the corridor is historically between approximately one and two percent.

Table 18: I-95 Historical Traffic Counts by Section

I-95 Historical Traffic Counts by Section				
Year	Section 100 (Existing)		Northern Extension (Section 200)	
	I-895 to I-695	I-695 to MD 43	MD 43 to MD 152	MD 152 to MD 24
2009	164,443	159,303	160,880	146,750
2010	165,104	159,944	161,521	147,341
2011	165,275	160,105	161,682	144,542
2012	166,105	160,915	162,493	144,983
2013	166,549	173,324	165,972	152,715
2014	166,381	173,155	165,815	152,875
2015	178,425	176,150	159,150	149,075
2016	182,171	186,910	162,491	152,211
2017	186,542	191,401	166,392	155,562
2018	185,423	190,252	165,393	154,633
Annual Growth Rates				
2009-2010	0.4%	0.4%	0.4%	0.4%
2010-2011	0.1%	0.1%	0.1%	-1.9%
2011-2012	0.5%	0.5%	0.5%	0.3%
2012-2013	0.3%	7.7%	2.1%	5.3%
2013-2014	-0.1%	-0.1%	-0.1%	0.1%
2014-2015	7.2%	1.7%	-4.0%	-2.5%
2015-2016	2.1%	6.1%	2.1%	2.1%
2016-2017	2.4%	2.4%	2.4%	2.2%
2017-2018	-0.6%	-0.6%	-0.6%	-0.6%
2009-2018	1.3%	2.0%	0.3%	0.6%

Similarly speed data were collected to understand the current average congestion levels in the corridor for northbound traffic by day of the week and by hour. These data are presented in Table 19 and Figure 14. These speeds in the northern section would of course improve with the implementation of the additional capacity and operational improvements planned for the corridor, but these data do provide a solid base conditions in which current motorists are facing. It is with these similarities of congestion that

Memorandum



I-95 ETL T&R Update Existing and Extension

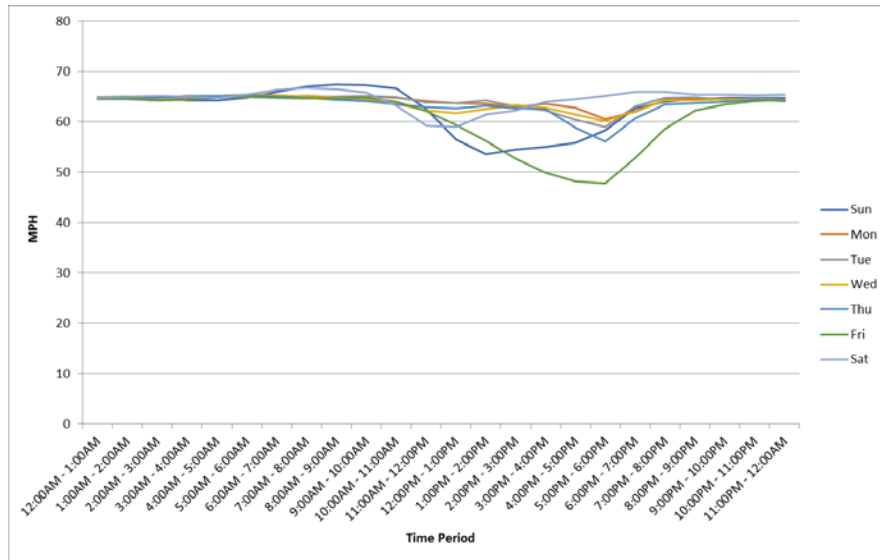
provide support to use the forecasting models of the existing ETLs to provide budget revenue estimates for the northern section.

Table 19: I-95 ETL Extension Section Average Speeds FY2019

Hour	Sun	Mon	Tue	Wed	Thu	Fri	Sat
12:00AM - 1:00AM	64.9	64.9	64.6	64.8	64.7	64.6	64.8
1:00AM - 2:00AM	65.1	65.0	64.5	64.8	64.5	64.7	65.1
2:00AM - 3:00AM	65.1	64.7	64.2	64.7	64.7	64.2	65.2
3:00AM - 4:00AM	64.3	64.8	64.9	65.2	65.1	64.4	65.1
4:00AM - 5:00AM	64.3	64.9	65.0	65.2	65.2	64.8	64.7
5:00AM - 6:00AM	64.7	65.0	65.0	65.5	65.3	65.2	65.5
6:00AM - 7:00AM	66.0	64.8	64.7	65.3	65.1	64.8	66.3
7:00AM - 8:00AM	67.1	65.2	64.8	65.0	64.8	64.7	66.8
8:00AM - 9:00AM	67.4	64.9	65.0	64.7	64.4	64.7	66.5
9:00AM - 10:00AM	67.3	65.1	65.2	64.6	64.1	64.8	65.8
10:00AM - 11:00AM	66.7	64.8	64.9	63.5	63.5	63.9	63.2
11:00AM - 12:00PM	62.6	64.1	63.8	62.3	62.9	62.1	59.3
12:00PM - 1:00PM	56.4	63.8	63.7	61.8	62.6	59.4	58.9
1:00PM - 2:00PM	53.6	63.6	64.2	62.5	63.2	56.2	61.5
2:00PM - 3:00PM	54.4	63.0	63.1	63.3	62.7	52.7	62.3
3:00PM - 4:00PM	55.0	63.5	62.3	62.9	62.5	49.9	64.0
4:00PM - 5:00PM	55.8	62.8	60.4	61.5	58.8	48.3	64.5
5:00PM - 6:00PM	58.4	60.5	59.0	60.1	56.1	47.8	65.2
6:00PM - 7:00PM	62.7	62.1	63.0	62.2	60.7	52.7	66.0
7:00PM - 8:00PM	64.0	64.4	64.7	64.2	63.4	58.6	65.9
8:00PM - 9:00PM	64.5	64.7	64.9	64.3	63.7	62.3	65.4
9:00PM - 10:00PM	64.8	64.5	64.4	64.5	64.0	63.4	65.4
10:00PM - 11:00PM	64.8	64.4	64.7	64.4	64.4	64.1	65.3
11:00PM - 12:00AM	64.8	64.5	64.6	64.3	64.2	64.3	65.4



Figure 14: I-95 ETL Extension Section Average Speeds FY2019



2.2 Traffic and Revenue Forecasts

Based on the preceding data including the detailed data from the performance of the existing ETLs, the traffic and toll revenue forecasting model was updated to include the new infrastructure of the NB extension as well as the applicable toll structure and rates as shown in Table 20. As stated earlier, the assumed opening of the first NB extension portion between MD 43 and MD 152 is in October 2023. The second portion between MD 152 and MD 24 is anticipated to open in April 2026. For the initial portion to MD 152, a very small and short ramp-up period was estimated as it connects to the existing tolled system. No ramp-up period was assumed for the section between MD 152 and MD 24 as it feeds directly into, and is a very short continuation of, the extension to MD 152. The ramp-up period for the first portion is estimated to last for two years: FY2024 at 90 percent and FY2025 at 95 percent, of total model demand, respectively. All other assumptions are consistent from the existing ETL forecast including payment and vehicle class, payment rates and the like. The annual growth rates for the ETL Northbound extension are based upon historic trends, background traffic growth and engineering judgement.



Table 20: Annual T&R Estimates for I-95 ETL NB Extension

Annual T&R Estimates for I-95 Express Toll Lanes (Section 200)				
Fiscal Year	Traffic		Toll Revenue	
	Volume	Annual Growth	Amount	Annual Growth
2024 ⁽¹⁾	2,962,000		\$4,398,000	
2025 ⁽²⁾	4,326,000	46.0%	\$6,447,000	46.6%
2026 ⁽³⁾	5,406,000	25.0%	\$7,274,000	12.8%
2027	5,599,000	3.6%	\$7,559,000	3.9%
2028	5,793,000	3.5%	\$7,844,000	3.8%
2029	5,987,000	3.3%	\$8,128,000	3.6%

(1) Assumed opening of the NB Extension to MD 152 (including ramp-up) in October 2023

(2) Assumed continuing ramp-up period of the NB Extension

(3) Assumed opening of the NB Extension to MD 24 in April 2026

3. Total Traffic and Revenue Forecasts

The combination of the transactions and toll revenue for both the existing I-95 ETLs and the northbound extension are presented in Table 21.



Table 21: Annual T&R Estimates for I-95 ETLs – Total System

Annual T&R Estimates for I-95 Express Toll Lanes - Total System				
Fiscal Year	Traffic		Toll Revenue	
	Volume	Annual Growth	Amount	Annual Growth
2015 ⁽¹⁾	3,945,633		\$6,145,709	
2016 ⁽¹⁾	8,265,625	109.5%	\$11,385,193	85.3%
2017 ⁽¹⁾	9,030,910	9.3%	\$12,477,962	9.6%
2018 ⁽¹⁾	9,392,911	4.0%	\$13,148,060	5.4%
2019 ⁽¹⁾	9,868,453	5.1%	\$13,920,978	5.9%
2020	10,363,000	5.0%	\$14,696,000	5.6%
2021	10,571,000	2.0%	\$15,152,000	3.1%
2022	10,809,000	2.3%	\$15,675,000	3.5%
2023	11,063,000	2.3%	\$16,231,000	3.5%
2024 ⁽²⁾	14,296,000	29.2%	\$21,221,000	30.7%
2025 ⁽³⁾	15,949,000	11.6%	\$23,901,000	12.6%
2026 ⁽⁴⁾	17,337,000	8.7%	\$25,400,000	6.3%
2027	17,858,000	3.0%	\$26,401,000	3.9%
2028	18,401,000	3.0%	\$27,449,000	4.0%
2029	18,967,000	3.1%	\$28,547,000	4.0%

(1) FY2015 - FY2019 are actual results

(2) Assumed opening of the NB Extension to MD 152
(including ramp-up) in October 2023

(3) Assumed continuing ramp-up period of the NB Extension

(4) Assumed opening of the NB Extension to MD 24 in April 2026



Table 22 shows the monthly estimates of traffic and toll revenue for FY2020.

Table 22 - FY2020 - Monthly Traffic and Toll Revenue Estimates

FY2020			
Monthly Traffic and Toll Revenue Estimates			
Month/Year	Traffic	Toll Revenue	Average Toll
July 2019	905,000	\$1,244,000	\$1.37
August 2019	910,000	\$1,281,000	\$1.41
September 2019	760,000	\$1,094,000	\$1.44
October 2019	890,000	\$1,272,000	\$1.43
November 2019	913,000	\$1,283,000	\$1.41
December 2019	870,000	\$1,227,000	\$1.41
January 2020	706,000	\$1,046,000	\$1.48
February 2020	681,000	\$986,000	\$1.45
March 2020	836,000	\$1,196,000	\$1.43
April 2020	977,000	\$1,310,000	\$1.34
May 2020	981,000	\$1,381,000	\$1.41
June 2020	934,000	\$1,376,000	\$1.47
FY2020	10,363,000	\$14,696,000	\$1.42

July/August/September are preliminary results



4. Limits and Disclaimers

It is Jacobs' opinion that the traffic and toll revenue estimates provided herein are reasonable and that they have been prepared in accordance with accepted industry-wide practice. However, given the uncertainties within the current economic climate, it is important to note the following assumptions which, in our opinion, are reasonable:

- This limited synopsis presents the highlighted results of Jacobs' consideration of the information available as of the date hereof and the application of our experience and professional judgment to that information. It is not a guarantee of any future events or trends.
- The traffic and toll revenue estimates will be subject to future economic and social conditions, demographic developments and regional transportation construction activities that cannot be predicted with certainty.
- The estimates contained in this report, while presented with numeric specificity, are based on a number of estimates and assumptions which, though considered reasonable to us, are inherently subject to economic and competitive uncertainties and contingencies, most of which are beyond the control of the MDTA and cannot be predicted with certainty. In many instances, a broad range of alternative assumptions could be considered reasonable. Changes in the assumptions used could result in material differences in estimated outcomes.
- Jacobs' traffic and toll revenue estimations only represent our best judgment and we do not warrant or represent that the actual toll revenues will not vary from our estimates.
- We do not express any opinion on the following items: socioeconomic and demographic forecasts, proposed land use development projects and potential improvements to the regional transportation network.
- The standards of operation and maintenance on all of the system will be maintained as planned within the business rules and practices.
- The general configuration and location of the system and its interchanges will remain as discussed in this report.
- Access to and from the system will remain as discussed in this report.
- No other competing highway projects, tolled or non-tolled are assumed to be constructed or significantly improved in the project corridor during the project period, except those identified within this report.
- Major highway improvements that are currently underway or fully funded will be completed as planned.
- The system will be well maintained, efficiently operated, and effectively signed to encourage maximum usage.
- No reduced growth initiatives or related controls that would significantly inhibit normal development patterns will be introduced during the estimate period.



- There will be no future serious protracted recession during the estimate period.
- There will be no protracted fuel shortage during the estimate period.
- No local, regional, or national emergency will arise that will abnormally restrict the use of motor vehicles.

In Jacobs' opinion, the assumptions underlying the projections provide a reasonable basis for the revenue projections and operating expenses. However, any financial projection is subject to uncertainties. Inevitably, some assumptions used to develop the projections will not be realized, and unanticipated events and circumstances may occur. There are likely to be differences between the projections and actual results, and those differences may be material. Because of these uncertainties, Jacobs makes no guaranty or warranty with respect to the projections disclosed in this Study

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