Memorandum

To: *Deborah Sharpless, Carl Chamberlin, MDTA*

From: *Scott Allaire, Mark Feldman, CDM Smith*

Date: *December 12, 2022*

Subject: *I-95 Express Toll Lanes Northbound Extension Traffic and Revenue Study*

CDM Smith was asked by the Maryland Transportation Authority (MDTA) to analyze the proposed northbound extension of the existing I-95 Express Toll Lanes (ETLs). In addition to forecasting the impact of the extension on ETL traffic and revenue, this study evaluated whether the current permissible ranges of per mile toll rates would be sufficient to manage future traffic levels in the ETLs.

Project Description

The 'first segment or partial build' of the project, assumed to open in October 2024, will extend the northbound ETLs about 7.2 miles beyond the current terminus, from MD-43 to north of MD-152. There will be two express lanes throughout the extension, consistent with the current ETLs.

Direct access / egress to the ETLs will be added as follows:

- Access to I-95 NB ETLs from MD-43
- Egress from I-95 NB ETLs to MD-152

The full build of the project, assumed to open in October 2027, will extend the northbound ETLs about 4.5 miles beyond the terminus of the partial build, from MD-152 to 2 miles north of MD-24 and provide connecting ramps from I-695 Inner and Outer loops to the I-95 ETLs in the northbound direction. Additional access and egress points include those in the partial build project above, plus:

- Access to I-95 NB ETLs from I-695, both westbound and eastbound
- Access to I-95 NB ETLs from MD-152
- Egress from I-95 NB ETLs to MD-24

Toll Rates

Current per mile I-95 ETL toll rates are available at https://mdta.maryland.gov/TollRatesTables, which are copied below:

I-95 Express Toll Lanes | Toll Rate Schedule									
Vehicle Classification	***E-ZPass*** Maryland Rates			**Pay-By-Plate** Only available at Maryland toll facilities			**Video Toll Rates****		
	Peak	**Off-Peak**	**Overnight**	**Peak**	**Off-Peak**	**Overnight**	**Peak**	**Off-Peak**	**Overnight**
2 axle	**$1.54**	**$1.19**	**$0.49**	**$1.93**	**$1.49**	**$0.61**	**$2.54**	**$2.19**	**$1.49**
3 axle (heavy)	**$3.08**	**$2.38**	**$0.98**	**$3.85**	**$2.98**	**$1.23**	**$4.62**	**$3.57**	**$1.98**
4 axle (heavy)	**$4.62**	**$3.57**	**$1.47**	**$5.78**	**$4.46**	**$1.84**	**$6.93**	**$5.36**	**$2.47**
5 axle	**$9.24**	**$7.14**	**$2.94**	**$11.55**	**$8.93**	**$3.68**	**$13.86**	**$10.71**	**$4.41**
6+ axle	**$11.55**	**$8.93**	**$3.68**	**$14.44**	**$11.16**	**$4.59**	**$17.33**	**$13.39**	**$5.51**

**Video Toll Rates are 1.5 times the base toll rates with a minimum of $1 / maximum of $15 above the base rates.

I-95 Express Toll Lanes Northbound and Southbound Pricing Periods are:

NORTHBOUND	
Peak:	
Mon-Fri	3 pm - 7 pm
Sat	12 pm - 2 pm
Sun	2 pm - 5 pm
Off-Peak:	
Mon-Fri	5 am - 3 pm / 7 pm - 9 pm
Sat	5 am - 12 pm / 2 pm - 9 pm
Sun	5 am - 2 pm / 5 pm - 9 pm
Overnight:	
Mon-Sun	9 pm - 5 am

SOUTHBOUND	
Peak:	
Mon-Fri	6 am - 9 am
Sat	12 pm - 2 pm
Sun	2 pm - 5 pm
Off-Peak:	
Mon-Fri	5 am - 6 am / 9 am - 9 pm
Sat	5 am - 12 pm / 2 pm - 9 pm
Sun	5 am - 2 pm / 5 pm - 9 pm
Overnight:	
Mon-Sun	9 pm - 5 am

These toll rates are based on the following existing per mile toll rate ranges:

Motorcycle	Peak	Off-Peak	Overnight
E-ZPass	$0.11 to $0.18	$0.09 to $0.15	$0.04 to $0.15
Pay-by-Plate	$0.14 to $0.22	$0.11 to $0.19	$0.04 to $0.19
Video	$0.17 to $0.26	$0.13 to $0.23	$0.05 to $0.23

2-axle	Peak	Off-Peak	Overnight
E-ZPass	$0.22 to $0.35	$0.17 to $0.30	$0.07 to $0.30
Pay-by-Plate	$0.28 to $0.44	$0.21 to $0.38	$0.09 to $0.38
Video	$0.33 to $0.53	$0.26 to $0.54	$0.11 to $0.45

3-axle light	Peak	Off-Peak	Overnight
E-ZPass	$0.33 to $0.53	$0.26 to $0.45	$0.11 to $0.45
Pay-by-Plate	$0.41 to $0.66	$0.32 to $0.56	$0.13 to $0.56
Video	$0.50 to $0.79	$0.38 to $0.68	$0.16 to $0.68

3-axle-heavy	Peak	Off-Peak	Overnight
E-ZPass	$0.44 to $0.70	$0.34 to $0.60	$0.14 to $0.60
Pay-by-Plate	$0.55 to $0.88	$0.43 to $0.75	$0.18 to $0.75
Video	$0.66 to $1.05	$0.51 to $0.90	$0.21 to $0.90

4-axle light	Peak	Off-Peak	Overnight
E-ZPass	$0.55 to $0.88	$0.43 to $0.75	$0.18 to $0.75
Pay-by-Plate	$0.69 to $1.09	$0.53 to $0.94	$0.22 to $0.94
Video	$0.83 to $1.31	$0.64 to $1.13	$0.26 to $1.13

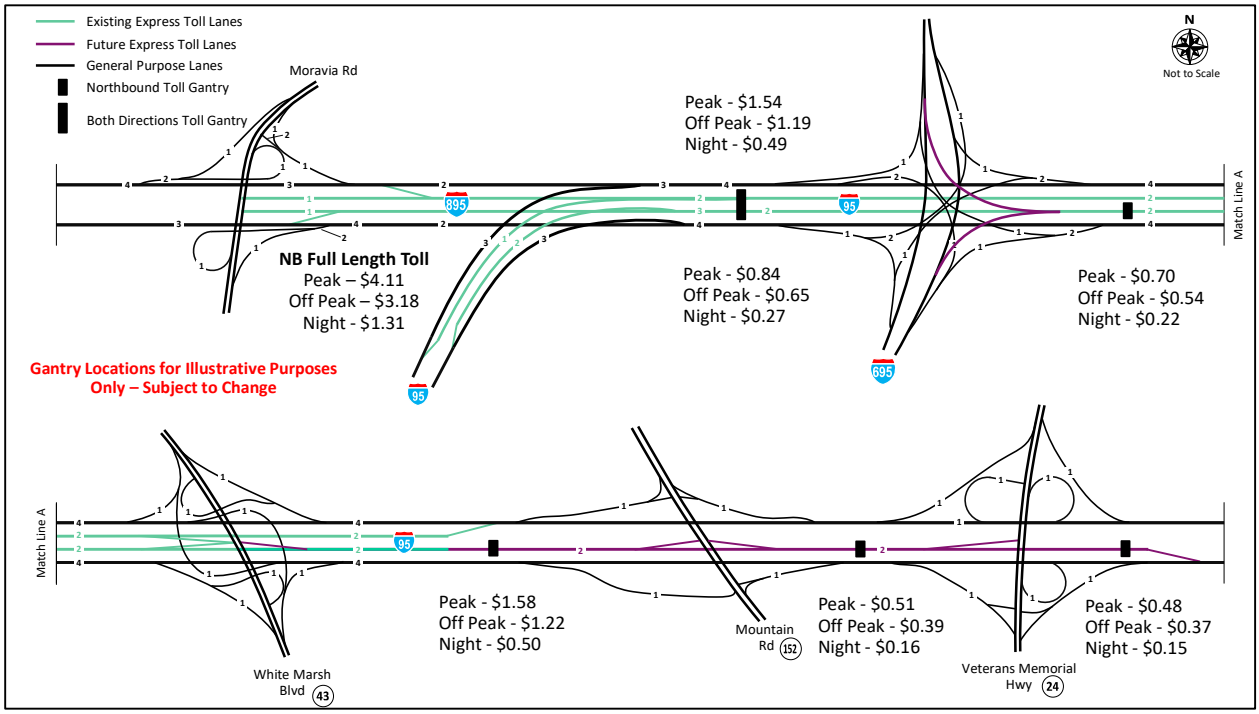
4-axle heavy	Peak	Off-Peak	Overnight
E-ZPass	$0.66 to $1.05	$0.51 to $0.90	$0.21 to $0.90
Pay-by-Plate	$0.83 to $1.31	$0.64 to $1.13	$0.26 to $1.13
Video	$0.99 to $1.58	$0.77 to $1.35	$0.32 to $1.35

5-axle	Peak	Off-Peak	Overnight
E-ZPass	$1.32 to $2.10	$1.02 to $1.80	$0.42 to $1.80
Pay-by-Plate	$1.65 to $2.63	$1.28 to $2.25	$0.53 to $2.25
Video	$1.98 to $3.15	$1.53 to $2.70	$0.63 to $2.70

6+-axle	Peak	Off-Peak	Overnight
E-ZPass	$1.65 to $2.63	$1.28 to $2.25	$0.53 to $2.25
Pay-by-Plate	$2.06 to $3.28	$1.59 to $2.81	$0.66 to $2.81
Video	$2.84 to $3.94	$1.91 to $3.38	$0.79 to $3.38

Figure 1 depicts the configuration of the full build northbound extension of the 95 ETLs and the gantry specific ETC toll rates under the assumed current per mile toll rate structure.

Figure 1 – Full Build Configuration



Historical Traffic and Revenue

Historical Transactions and Toll Revenue

Table 2 shows annual transactions and annual revenue from fiscal years 2017-22, in millions. Data is shown separately for passenger cars (PC) and trucks. PC are 2-axle vehicles, and trucks are 3+ axle vehicles. While the FY 2022 toll revenue would seem to indicate the facility has largely rebounded from the COVID-19 pandemic, the $14.1 million in collected revenue is impacted by a collection in backlog transaction and toll revenue and higher amounts of truck transactions than historical trends.

Table 2 – Annual I-95 ETL Transactions and Toll Revenue – in Millions

Fiscal Year	Annual Transactions (millions)			Annual Revenue (millions)		
	PC	**Truck**	**Total**	**PC**	**Truck**	**Total**
2017	8.614	0.400	9.014	$10.765	$1.713	$12.478
2018	8.915	0.478	9.393	$11.055	$2.093	$13.148
2019	9.331	0.538	9.868	$11.529	$2.392	$13.921
2020	7.341	0.448	7.789	$8.820	$1.931	$10.751
2021	4.840	0.362	5.202	$5.873	$1.880	$7.753
2022	8.321	0.679	9.000	$10.631	$3.459	$14.090

2022 vs 2019 ETL Usage

Table 3 and **Table 4** compare the average Monday-Thursday ETL volumes between calendar year 2019 and 2022 (through October 15th).

Table 3 – 2019 vs 2022 Average Weekday ETL Volumes

	Observed 2019					**Observed 2022**				
	AM Peak	Mid-Day	PM Peak	Night	Daily	AM Peak	Mid-Day	PM Peak	Night	Daily
PC	1,003	3,989	5,610	1,847	12,449	954	3,778	4,812	1,519	11,064
Trucks	122	326	190	315	953	164	448	279	400	1,290
TOTAL NORTHBOUND	1,125	4,315	5,800	2,163	13,402	1,118	4,226	5,092	1,919	12,354
PC	5,303	3,819	2,068	2,034	13,224	3,358	3,266	2,068	1,847	10,540
Trucks	179	257	142	296	874	207	315	210	351	1,083
TOTAL SOUTHBOUND	5,482	4,076	2,211	2,329	14,098	3,566	3,581	2,279	2,198	11,624
GRAND TOTAL	6,606	8,391	8,011	4,492	27,500	4,684	7,807	7,370	4,117	23,978

Note: AM Peak: 6AM-9AM, Midday: 9AM-3PM, PM Peak: 3PM-7PM, Night: 7PM-6AM

Table 4 – Percent Change in Average Weekday ETL Volumes, 2019 to 2022

	AM Peak	Mid-Day	PM Peak	Night	Daily
PC	-5%	-5%	-14%	-18%	-11%
Trucks	34%	37%	47%	27%	35%
TOTAL NORTHBOUND	-1%	-2%	-12%	-11%	-8%
PC	-37%	-14%	0%	-9%	-20%
Trucks	16%	22%	48%	19%	24%
TOTAL SOUTHBOUND	-35%	-12%	3%	-6%	-18%
GRAND TOTAL	-29%	-7%	-8%	-8%	-13%

Positive values in Table 4 mean an increase in 2022 volumes compared to 2019. Overall ETL volume has declined by about 13 percent between 2019 and 2022. Most notably, there have been decreases in peak period and direction volume among autos and light trucks; a 37 percent decrease southbound in the AM peak, and a 14 percent decrease northbound in the PM peak. The PM peak has been shown to be less affected by the propensity to work from home as it has a more diverse mix of trip purposes as compared to the AM peak which typically contains a higher share of work trips. More moderate decreases for passenger cars have occurred in the off peak. These are partially offset by 25-35 percent increases in truck ETL volume. The declines in peak period usage, particularly in the AM, reflect the current post-pandemic trend. Traffic modeling growth is applied to this trend.

Model Development

Baltimore Metropolitan Council (BMC) Model Description

BMC is in the process of transitioning from the trip based model (TBM) to an activity based model (ABM). The Baltimore Regional Transportation Board (BRTB) adopted InSITE_19, the latest ABM, for the Long Range Plan (LRP) update, the 2023-26 Transportation Improvement Program (TIP) conformity / mobile source emission analysis, and regional corridor analysis at their June 28, 2022 meeting. CDM Smith received files for InSITE_19 from the BMC, including highway networks and trip matrices for all model years (2019, 2025, 2035 and 2045).

Model Calibration

CDM Smith's standard approach to calibration and validation accounts for:

- Traffic volumes on the study corridor
- Traffic volumes on parallel routes and other relevant roads
- Speeds and travel times
- Travel patterns

We used 2019 as the base year for the full validation for the following reasons:

- Traffic data has been less stable since early 2020 due to the COVID-19 pandemic and subsequent variants
- Readily available traffic counts from previous studies and MDOT
- Consistency with the base year of the validated BMC model (InSITE_2019)

The adjustments made to the 2019 model included:

- Trip table adjustments to reflect observed travel patterns by time period from 2019 Streetlight Data (see discussion below)
- Modification of the I-95/I-695 interchange to reflect all ramp distances and connectivity more accurately
- Elimination of the time penalties used in the BMC model for other tolled facilities, i.e. the Harbor bridge and tunnels (which all initially had significantly lower volumes than recent count data indicated)
- The use of Origin-Destination Matrix Estimation (ODME) to adjust the trip matrices iteratively to better estimate observed traffic counts
- Modification of speed-volume relationships for all highways in the model, and particularly I-95 to reflect congestion levels more accurately by time of day.
- Increasing the truck value of time (VOT) to enable the model to assign the correct number of trucks to the ETLs
- Adjustments to the "reliability time" on the general purpose lanes parallel to the ETLs, a technique CDM Smith uses to model peoples' tendency to use toll lanes for travel time reliability, safety, and other reasons in addition to time savings.

Comparisons Between Validated Model and Observed Data

The tables in this section present comparisons between the model and observed data after the calibration adjustments. In all cases, we have improved the validation and believe the model is performing acceptably.

I-95 Volumes

Table 5 through Table 8 present comparisons between modeled and observed volumes on I-95, showing the actual volumes and the percentage differences. Tables 5 and 6 show this comparison for the total (general purpose lane plus ETL) volumes, at each mainline segment between

interchanges or access/egress locations where I-95 volumes change. Tables 7 and 8 show the comparison for ETL volumes alone.

Table 5 – 2019 Observed vs. Modeled Total I-95 Volumes

		Observed 2019					Model				
Location	Dir.	AM Peak	Mid-Day	PM Peak	Night	Daily	AM Peak	Mid-Day	PM Peak	Night	Daily
I-895 Btwn Moravia and Split	NB	4,864	9,806	12,357	8,160	35,188	5,414	10,420	13,160	8,644	37,638
Btwn ETL Entrance and Split	NB	6,025	17,079	19,362	14,240	56,705	6,215	16,773	19,084	14,076	56,148
Btwn Split and I-695	NB	10,889	26,885	31,718	22,400	91,893	11,628	27,193	32,244	22,721	93,786
Btwn I-695 and MD-43	NB	13,669	28,994	32,124	24,525	99,311	12,669	28,691	32,788	24,209	98,357
Btwn MD-43 and ETL Exit	NB	12,061	25,104	26,736	22,251	86,151	12,085	25,278	27,209	22,275	86,847
Btwn ETL Entrance and MD-43	SB	20,956	28,028	19,201	21,310	89,494	21,196	28,252	19,236	21,351	90,035
Btwn MD-43 and I-695	SB	23,172	32,297	22,011	24,390	101,869	24,507	32,325	21,892	24,689	103,413
Btwn I-695 and Split	SB	24,334	29,897	19,614	23,382	97,227	23,776	29,976	19,824	23,254	96,830
Btwn Split and ETL Exit	SB	13,709	19,481	12,244	15,760	61,194	13,183	19,048	12,064	15,404	59,699
I-895 Btwn Split and Moravia	SB	10,625	10,416	7,370	7,623	36,034	10,594	10,928	7,762	7,849	37,133

Table 6 – 2019 Modeled vs. Observed Percent Difference in Total I-95 Volumes

Location	Dir.	AM Peak	Mid-Day	PM Peak	Night	Daily
I-895 Btwn Moravia and Split	NB	11%	6%	7%	6%	7%
Btwn ETL Entrance and Split	NB	3%	-2%	-1%	-1%	-1%
Btwn Split and I-695	NB	7%	1%	2%	1%	2%
Btwn I-695 and MD-43	NB	-7%	-1%	2%	-1%	-1%
Btwn MD-43 and ETL Exit	NB	0%	1%	2%	0%	1%
Btwn ETL Entrance and MD-43	SB	1%	1%	0%	0%	1%
Btwn MD-43 and I-695	SB	6%	0%	-1%	1%	2%
Btwn I-695 and Split	SB	-2%	0%	1%	-1%	0%
Btwn Split and ETL Exit	SB	-4%	-2%	-1%	-2%	-2%

I-895 Btwn Split and Moravia	SB	0%	5%	5%	3%	3%

Table 7 – 2019 Observed vs. Modeled ETL Volumes

	Observed 2019					Model				
	AM Peak	Mid-Day	PM Peak	Night	Daily	AM Peak	Mid-Day	PM Peak	Night	Daily
NORTHBOUND	1,125	4,315	5,800	2,163	13,402	1,367	4,584	5,761	2,216	13,928
SOUTHBOUND	5,482	4,076	2,211	2,329	14,098	5,538	4,260	2,239	2,322	14,359
TOTAL	6,606	8,391	8,011	4,492	27,500	6,905	8,844	8,000	4,538	28,287

Table 8 – 2019 Modeled vs. Observed Percent Difference in ETL Volumes

	AM Peak	Mid-Day	PM Peak	Night	Daily
NORTHBOUND	22%	6%	-1%	2%	4%
SOUTHBOUND	1%	5%	1%	0%	2%
TOTAL	5%	5%	0%	1%	3%

Screenline and Other Critical Road Volumes

In addition to the study corridor itself, it is important for a model to be accurate with respect to volumes on critical routes that affect volumes on the study corridor. These typically include parallel roads and other major highway facilities near the study corridor.

Figure 2 shows a series of screenlines CDM Smith defined, numbered 1-4, which represent groups of major roads in the study corridor, including I-95 and several parallel roads. **Table 9** shows the percentage differences in modeled vs observed traffic volumes on these screenlines in aggregate. While each individual road on a screenline may be over- or under-assigned, the aim is for the model to validate well for the total traffic volumes on each screenline in total, by time period and direction.

Figure 2 – Validation Screenlines

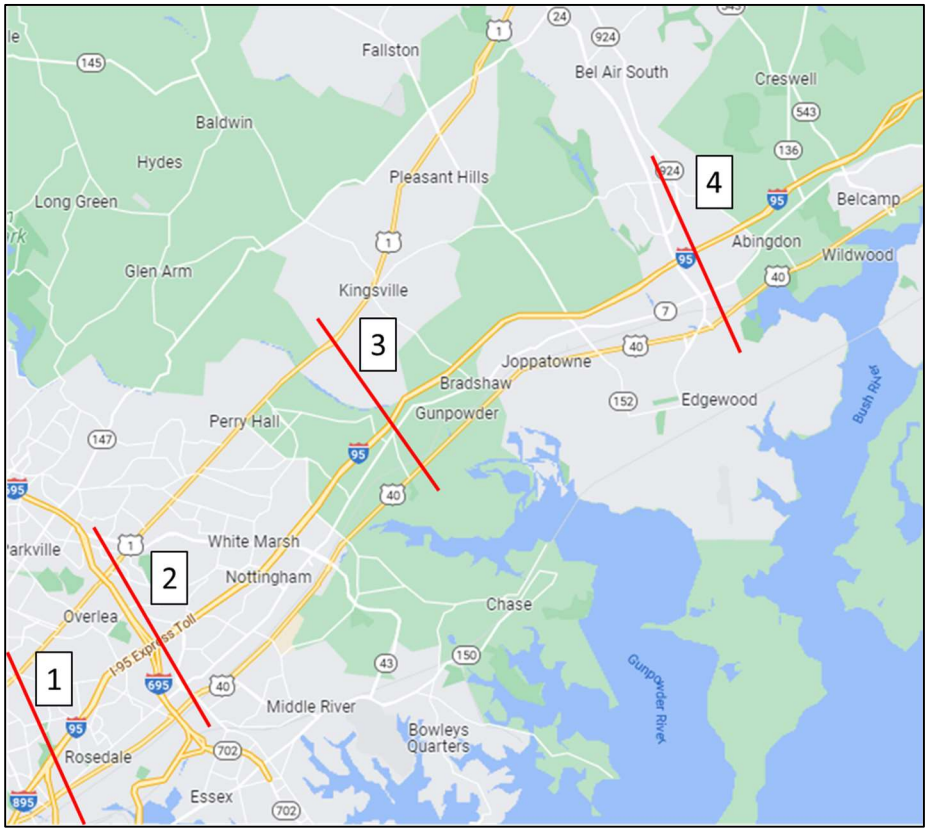


Table 9 – 2019 Modeled vs. Observed Percent Difference Screenline Volumes

#	Location	Dir.	AM Peak	Mid-Day	PM Peak	Night	Daily
1	Between I-895 Split and I-695	NB	-1%	-1%	-3%	0%	-1%
2	Between I-695 and MD-43	NB	4%	-1%	-1%	-1%	0%
3	Between MD-43 and MD-152	NB	-5%	-1%	-2%	-1%	-2%
4	North of MD-24	NB	-14%	-6%	-12%	-4%	-8%
1	Between I-895 Split and I-695	SB	-6%	-2%	-7%	-2%	-4%
2	Between I-695 and MD-43	SB	2%	0%	1%	1%	1%
3	Between MD-43 and MD-152	SB	-2%	0%	-6%	0%	-2%
4	North of MD-24	SB	-15%	-9%	-17%	-6%	-11%

Speeds

Table 10 shows the observed and modeled speeds for an average Monday-Thursday in 2019 on different sections of I-95 between the southern end of the ETLs and MD-543, the differences in speeds (modeled – observed). Travel time data was obtained from INRIX and average speeds were calculated for this data.

Table 10 – 2019 Observed vs. Modeled Average Travel Speeds

SECTION	Distance (miles)	Observed Average Speed (MPH, from INRIX)				Modeled Average Speed				Difference (Modeled – observed)			
		AM Peak	Mid-Day	PM Peak	Night	AM Peak	Mid-Day	PM Peak	Night	AM Peak	Mid-Day	PM Peak	Night
ETL Start to I-695	4.02	64	64	62	64	64	64	60	64	(0)	(0)	(1)	0
I-695 to ETL End	3.53	67	66	58	67	67	67	62	67	(0)	1	4	(1)
ETL End to MD 152	6.52	67	63	58	66	67	67	60	67	(0)	4	1	1
MD 152 to MD 24	2.39	67	62	63	67	67	67	64	67	0	5	1	(0)
MD 24 to MD 543	2.88	68	65	66	67	67	67	62	67	(1)	2	(3)	(0)
TOTAL NORTHBOUND	**19.34**	**67**	**64**	**61**	**66**	**66**	**66**	**61**	**66**	**(0)**	**2**	**1**	**0**
MD 543 to MD 24	2.95	67	64	65	67	62	66	65	67	(5)	2	0	(0)
MD 24 to MD 152	2.48	63	68	67	68	64	67	66	67	1	(1)	(1)	(2)
MD 152 to ETL Start	6.60	62	62	65	67	58	66	66	67	(3)	4	1	0
ETL Start to I-695	3.23	60	65	65	67	64	67	67	67	4	2	2	0
I-695 to ETL End	4.25	45	64	65	65	56	64	64	64	11	(0)	(1)	(1)
TOTAL SOUTHBOUND	**19.51**	**57**	**64**	**65**	**67**	**60**	**66**	**66**	**66**	**2**	**2**	**0**	**(0)**

2022 Validation to ETL Volumes

As discussed earlier in this memo, ETL volumes changed from 2019 to 2022, particularly with decreases in the AM in the southbound direction. Thus, in addition to the full calibration and validation for 2019, we felt it necessary to adjust trip-making assumptions to reflect the 'new normal' suggested by the 2022 ETL data. To do this, we used a combination of:

- "Select link" adjustments, reflecting changing levels of travel between TAZ pairs which specifically use I-95 in the current ETL corridor (either on the ETLs themselves or on parallel general purpose lanes). These adjustments were time period-, direction- and vehicle class-specific. Overall, the modeled daily volume on I-95 between the I-895 split and I-695 was reduced by about 8 percent, from 191,000 to 175,000.

- Vehicle class-specific adjustments to values of time, reflecting the high levels of inflation and the significant increase in truck usage relative to passenger cars since 2019.

Table 11 and **Table 12** compare the modeled and observed I-95 ETL volumes in the 2022 model after the above adjustments were made:

Table 11 – 2022 Observed vs. Modeled ETL Volumes

	Observed 2022					Model				
	AM Peak	Mid-Day	PM Peak	Night	Daily	AM Peak	Mid-Day	PM Peak	Night	Daily
NORTHBOUND	1,118	4,226	5,092	1,919	12,354	1,360	4,387	5,430	2,079	13,256
SOUTHBOUND	3,566	3,581	2,279	2,198	11,624	3,414	3,775	2,335	2,276	11,800
TOTAL	**4,684**	**7,807**	**7,370**	**4,117**	**23,978**	**4,774**	**8,162**	**7,765**	**4,355**	**25,056**

Table 12 – 2022 Modeled vs Observed Percent Difference in ETL Volumes

	AM Peak	Mid-Day	PM Peak	Night	Daily
NORTHBOUND	22%	4%	7%	8%	7%
SOUTHBOUND	-4%	5%	2%	4%	2%
TOTAL	2%	5%	5%	6%	4%

Future Demand

Initially, the 2025 and 2035 trip matrices from the BMC model were adjusted by the same amounts that the 2019 matrices were adjusted in the calibration, preserving the relative growth between model years. The 2022 matrices were taken as the average of the 2019 and 2025 matrices.

Subsequently, the 2025 and 2035 trip matrices were adjusted in a consistent manner with the 2022 adjustments to validate 2022 ETL volumes, discussed in the section above.

Traffic and Revenue Analysis

Tolling Assumptions

The "partial build" configuration, assumed to apply from October 31, 2024, to October 31, 2027, assumes the ETLs will rejoin the mainline just north of the MD 152 interchange. Additionally, the partial build configuration does not include the two northernmost gantries or the I-695 direct connector ramps.

Table 13 contains the tolling distances assumed in the forecasts, by which the per mile toll rates are multiplied to obtain tolls charged. The three configuration columns indicate which of the gantries are included in each configuration:

Table 13 – Assumed Gantry Tolling Distances (Subject to Change in Final Design)

Gantry	Direction	Configuration			Tolling Distance (miles)
		No Build	Partial Build	Full Build	
I-95 / I-895 to MD-43 (located south of I-695)	NB	x	x		7.0
I-95 / I-895 to I-695	NB			X	3.8
I-695 to MD-43	NB			X	3.2
MD-43 to MD-152	NB		x	X	7.2
MD-152 to MD-24	NB			X	2.3
MD-24 to ETL End	NB			X	2.2
MD-43 to I-95 / I-895	SB	x	x	X	7.0

Other key tolling assumptions include:

- A 95 percent market share in the input trip matrix for ETC payment method, resulting in close to a 97 percent ETC share among users of the ETLs, consistent with observed calendar year 2019 data.
- 3+-axle trucks, tolled in several different classes, were aggregated into a single 3+-axle truck class, and assumed to pay an average toll of 3.58 times the passenger car rate. This assumption was calculated from a weighted average of the actual 2019 calendar year axle volume distribution data.
- Values of time for the base year of 2019 were taken from the BMC model. For 2022, as part of the calibration to current ETL volumes, to reflect recent years of high inflation, they were increased by 10 percent for passenger cars in the peak periods, 5 percent in the off-peak periods, and 15 percent for trucks.
- Inflation, reflected in increased values of time, was set at 3.7 percent for 2022, 2.4 percent for 2023, and gradually decreasing to 2.0 percent per year by 2028 and thereafter.

2025 and 2035 Weekday T&R Estimates – Current Toll Rates

Table 14 and **Table 15** contains daily trip[1] and revenue estimates at current toll rates for 2025 and 2035, respectively, under the no build configuration. The 2022 no build results are also included for comparison. It is noteworthy that the 2025 daily total volume (31,351) is 14% higher than the 2019 observed total (27,500). This demonstrates that while recent volumes in 2022 have declined, the pre-pandemic congestion, delays, and safety issues would exacerbate under a no build scenario.

[1] Note that for forecasts, we refer to "trips" rather than transactions, because a given northbound trip may consist of more than one transaction (pass under a gantry). Currently, since there is only one gantry in each direction, each trip is a single transaction. This enables a direct comparison between current and future results.

Table 14 – Daily Trip Estimates, Average Monday-Thursday, No Build

Year / Direction		AM Peak (6-9 AM)	Mid-Day (9 AM – 3 PM)	PM Peak (3-7 PM)	Overnight (7 PM – 6 AM)	Daily Total
2022	NB	1,360	4,387	5,430	2,079	13,256
	SB	3,414	3,775	2,335	2,276	11,800
	Total	4,774	8,162	7,765	4,355	25,056
2025	NB	1,624	5,419	6,757	2,504	16,304
	SB	4,872	4,666	2,743	2,766	15,047
	Total	6,496	10,085	9,500	5,270	31,351
2035	NB	2,404	7,784	8,876	4,073	23,137
	SB	7,330	6,962	4,026	4,223	22,541
	Total	9,734	14,746	12,902	8,296	45,678

Table 15 – Daily Revenue Estimates, Average Monday-Thursday, No Build

Year / Direction		AM Peak (6-9 AM)	Mid-Day (9 AM – 3 PM)	PM Peak (3-7 PM)	Overnight (7 PM – 6 AM)	Daily Total
2022	NB	$1,963	$6,688	$9,975	$2,669	$21,295
	SB	$6,345	$5,588	$3,388	$3,248	$18,569
	Total	$8,308	$12,276	$13,364	$5,917	$39,864
2025	NB	$2,411	$8,304	$12,343	$3,269	$26,327
	SB	$8,979	$6,976	$4,056	$3,951	$23,962
	Total	$11,390	$15,280	$16,399	$7,220	$50,289
2035	NB	$3,793	$12,115	$16,220	$5,438	$37,566
	SB	$13,313	$10,670	$6,042	$5,996	$36,021
	Total	$17,106	$22,785	$22,262	$11,435	$73,588

Table 16 and **Table 17** contain similar estimates for the build configurations appropriate to each modeled year: 2025 partial build and 2035 full build.

Table 16 – Daily Trips Estimates, Average Monday-Thursday, Build

Year / Direction		AM Peak (6-9 AM)	Mid-Day (9 AM – 3 PM)	PM Peak (3-7 PM)	Overnight (7 PM – 6 AM)	Daily Total
2025 Partial Build	NB	1,432	5,877	7,741	1,961	17,011
	SB	4,873	4,669	2,741	2,766	15,049
	Total	6,305	10,546	10,482	4,727	32,060
2035 Full Build	NB	3,540	12,783	12,114	4,818	33,255
	SB	7,326	6,968	4,024	4,223	22,541
	Total	10,866	19,751	16,138	9,041	55,796

Table 17 – Daily Revenue Estimates, Average Monday-Thursday, Build

Year / Direction		AM Peak (6-9 AM)	Mid-Day (9 AM – 3 PM)	PM Peak (3-7 PM)	Overnight (7 PM – 6 AM)	Daily Total
2025 Partial Build	NB	$3,486	$14,887	$24,608	$4,352	$47,334
	SB	$8,980	$6,981	$4,054	$3,951	$23,966
	Total	$12,466	$21,868	$28,662	$8,303	$71,299
2035 Full Build	NB	$9,521	$36,814	$44,240	$12,856	$103,430
	SB	$13,247	$10,598	$5,996	$5,949	$35,791
	Total	$22,768	$47,413	$50,236	$18,804	$139,221

ETL Volumes at Highest Loading Point

Typically, express lanes are priced to operate at or near free flow conditions with maximum average hourly volumes as high as 1,650 to 1,750 vehicles per lane to ensure a high level of reliability.

Table 18 shows the estimated hourly per-lane ETL peak hour volumes corresponding to the above forecasts at current peak toll rate of 22 cents per mile. Even in 2035, the highest modeled volumes on the ETLs are estimated to be 1,534 vehicles per hour per lane, occurring between 5-6 PM northbound, just north of the I-695 direct ramps in the full build configuration. Thus, we believe that toll rate increases will not likely be necessary in the next 13 years to maintain acceptable ETL speeds and the current approved peak range of 22 to 35 cents per mile is still appropriate.

Table 18 – ETL Peak Hour Volumes Per Hour Per Lane, Current Toll Rates

Year	AM Peak Hour Southbound	PM Peak Hour Northbound
2022	658	749
2025 No Build	955	914
2025 Partial Build	955	957
2035 No Build	1,440	1,275
2035 Full Build	1,440	1,534

Estimated Annual Trips and Toll Revenue

No Build Annual Trips and Toll Revenue

Table 19 contains annual transactions and net revenue streams for fiscal years 2025 to 2035, assuming the NB extension is never built. The key assumptions in these streams are:

- Current toll rates are used.
- Factors to annualize the daily average Monday-Thursday estimates are based on 2019 I-95 ETL data

- Years in between 2025 and 2035 are interpolated using compound annual growth (CAGR).
- Fiscal years are taken as averages of successive calendar years.
- Video trips and revenue are reduced by 28.8 percent as an estimate for leakage.

Table 19 – No Build Annual Trip and Toll Revenue Streams

Fiscal Year	Annual Trips (000's)	Annual Revenue (000's)
2025	11,123	$16,617
2026	11,758	$17,588
2027	12,207	$18,268
2028	12,674	$18,975
2029	13,158	$19,709
2030	13,661	$20,472
2031	14,183	$21,264
2032	14,725	$22,088
2033	15,288	$22,944
2034	15,872	$23,833
2035	16,479	$24,757

Build Annual Trips and Toll Revenue

Table 20 contains annual transactions and net revenue streams for fiscal years 2025 to 2035, assuming opening dates of the partial build and full build northbound extension are October 31, 2024, and October 31, 2027, respectively. Other assumptions are the same as the no build streams above except for the following addition:

- Ramp up factors of 80 percent for the first year and 90 percent for the second year are applied to all trips not part of the current toll system, i.e. trips entering the toll lanes northbound at access points other than I-95 and I-895 at the southern end.

Table 20 – Build Annual Trip and Toll Revenue Streams

Fiscal Year	Annual Trips (000's)	Annual Revenue (000's)
2025	11,226	$19,954
2026	11,924	$23,804
2027	12,627	$26,005
2028	14,201	$30,508
2029	15,835	$35,281
2030	16,812	$38,404
2031	17,594	$40,649
2032	18,207	$42,126
2033	18,842	$43,657

2034	19,501	$45,246
2035	20,183	$46,894

Disclaimer

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

CDM Smith 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 of 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 MDTA. These estimates and projections may not be indicative of actual or future values, and are therefore subject to substantial uncertainty. Certain variables such as future developments, economic cycles, pandemics, government actions, climate change related events, or impacts related to advances in automotive technology etc. 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 the projections and other forward-looking statements contained within the report are based on reasonable assumptions as of the date of the report, such forward-looking statements involve risks and uncertainties that may cause actual results to differ materially from the results predicted. Therefore, following the date of this report, 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.

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