

# MEMO

TO:

**Kelly Brown, Colorado Transportation Investment Office (CTIO)**

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**REF**

Central I-70 Express Lanes

**DATE**

January 6, 2024

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**SUBJECT**

Dynamic Pricing Parameters Setting – Central 70

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## 1. Introduction

AtkinsRéalis has been tasked by the Colorado Transportation Investment Office (CTIO) with dynamic pricing parameters setting on the Central I-70 Express Lanes (C-70 ELs). The C-70 ELs went live on July 11, 2023, with a Time-of-Day (TOD) pricing scheme based on prior traffic and revenue studies and historical traffic patterns.

## 2. Project Limits and Tolling

The 10-mile-long C-70 ELs extend from I-25 to Chambers Road. There are three designated entry and three designated exit points along the Express Lanes in each direction. Entering and exiting the C-70 ELs at non-designated locations is illegal. Drivers pay the same toll price for any distance travelled along the C-70 ELs; in one direction.

## 3. Operations Policy

The operations policy for the C-70 ELs is summarized below:

- Hours of operation: 24 hours a day, 7 days a week, 365 days a year.
- High occupancy vehicles with three or more passengers (HOV3+) use the Express Lanes for free.
- Motorcycles use the Express Lanes for free.
- Vehicles with four or more axles pay a surcharge of \$25.

- The current tolling regime is Time-of-Day (TOD) pricing. The tolling regime will become dynamic in March of 2024.

A comparative table of operations policies for all Colorado express lanes, including the C-70 ELs, is provided in **Appendix 1**.

## 4. Dynamic Pricing Parameters

Pursuant to the CTIO amended toll rate setting and adjustment policy (November 2023), three primary criteria of the dynamic pricing algorithm will be evaluated for each Express Lane. The three criteria include:

1. Minimum and maximum toll rates
2. Rate change interval (5 minutes to 15 minutes)
3. Maximum increment and decrement (5 cents to 50 cents)

These three dynamic pricing algorithm criteria will function as a framework so that the goals of the CTIO Tolling Policy listed in *Section 4 Express Lanes toll rates setting objectives (revenue versus throughput maximization)* continue to be met.

### 4.1 Minimum and Maximum Toll Rates

- **Minimum toll rate:** The minimum AVI toll rate of \$1.50 is set to cover the AVI toll systems and operation costs (the same minimum AVI rate applies to the current TOD pricing).
- **Maximum toll rate:** The maximum AVI toll rate is set to manage demand during peak hours to maintain the desired traffic level of service in the Express Lanes. Based on current traffic conditions (Refer to Appendix 2) with maximum toll rates set at \$4.50, speeds in the Express Lanes are nearing the 45mph threshold required by FHWA. Based on modelling the highest peaks and given that the C-70 ELs are still in the ramp-up stage (25% historical ramp up on Colorado Express Lanes between first and second year of operation), it is recommended to set the maximum allowable toll rate at \$5.50.

### 4.2 Rate Change Interval

The rate change interval is set to allow the dynamic pricing algorithm to respond to rapid demand fluctuations. A range of 5 min to 15 min is recommended based on current traffic patterns and speed of traffic volume ramp-ups.

### 4.3 Maximum Increment and Decrement

- **Maximum increment:** the maximum increment is set to manage an abrupt increase in traffic demand. Based on our analysis, a maximum increment of 50 cents is recommended.

- **Maximum decrement:** the maximum decrement is set to attract vehicles to the Express Lanes once the desired level of service is reached. A maximum decrement rate of 20 cents is recommended.

## 5. License Plate Tolling (LPT) Surcharge

License plate tolling (LPT) costs more than AVI tolling due to additional back-office costs and LPT leakage. Therefore, LPT rates are developed by imposing a surcharge on the AVI toll rates. Additionally, the C-70 EIs eastbound direction has three toll points while the westbound direction has two toll points. Hence, the LPT rates for the eastbound direction will be higher than those for the westbound direction.

- LPT surcharge covers back-office additional cost and LPT leakage.
- LPT leakage is assumed at 40 percent based on historical data.
- LPT leakage includes uncollectable and unbillable LPT transactions.
- LPT additional costs are related to image review and other systems.
- The LPT surcharge is recommended at 150%.

## 6. Summary Recommendations

- Minimum toll rate: \$1.50
- Maximum toll rate: \$5.50
- Rate change interval: 5-15 minutes
- Maximum increment: 50 cents
- Maximum decrement: 20 cents

**Appendix 3** shows a comparison of maximum toll rates per mile for all tolled roadways operating in the United States.

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## APPENDIX 1: Express Lanes Operations Policies

	C-70 Express Lanes	C-470 Express Lanes	US 36 Express Lanes	I-25 North Express Lanes	I-25 Central Express Lanes (reversible)	I-70 Mountain Express Lane
<b>Open 24/7</b>	Yes	Yes	Yes	Yes	No <sup>2</sup>	No <sup>1</sup>
<b>Tolling Regime</b>	Dynamic	Time-of-day (TOD)	Time-of-day (TOD)	Time-of-day (TOD)	Time-of-day (TOD)	Time-of-day (TOD)
<b>HOV Discount</b>	HOV3+ free <sup>3</sup>	No discount	HOV3+ free <sup>3</sup>	HOV3+ free <sup>3</sup>	HOV3+ free <sup>3</sup>	No discount
<b>Motorcycle Policy</b>	Free	Free	Free	Free	Free	No discount
<b>Trucks / Trailers</b>	\$25 surcharge for 4+ axles	\$25 surcharge per zone for 4+ axles	\$25 surcharge per toll point for 4+ axles	\$25 surcharge for 4+ axles (for each Segment 2 and 3)	\$25 surcharge for 4+ axles	Not allowed
<b>Transit Buses</b>	Allowed	Allowed, but no transit routes exist currently	Allowed	Allowed	Allowed	Not allowed

<sup>1</sup>Open on weekends, holidays, and on special occasions.

<sup>2</sup>On weekdays, southbound travel is open from 5 a.m. to 11 a.m., northbound travel is open from noon to 3 a.m. On weekends, northbound lanes are open from Friday noon until Monday 3 a.m.

<sup>3</sup>HOV3+ vehicles must have an ExpressToll account and Switchable HOV transponder to avail discount.

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## APPENDIX 2: Analysis of Current TOD Pricing

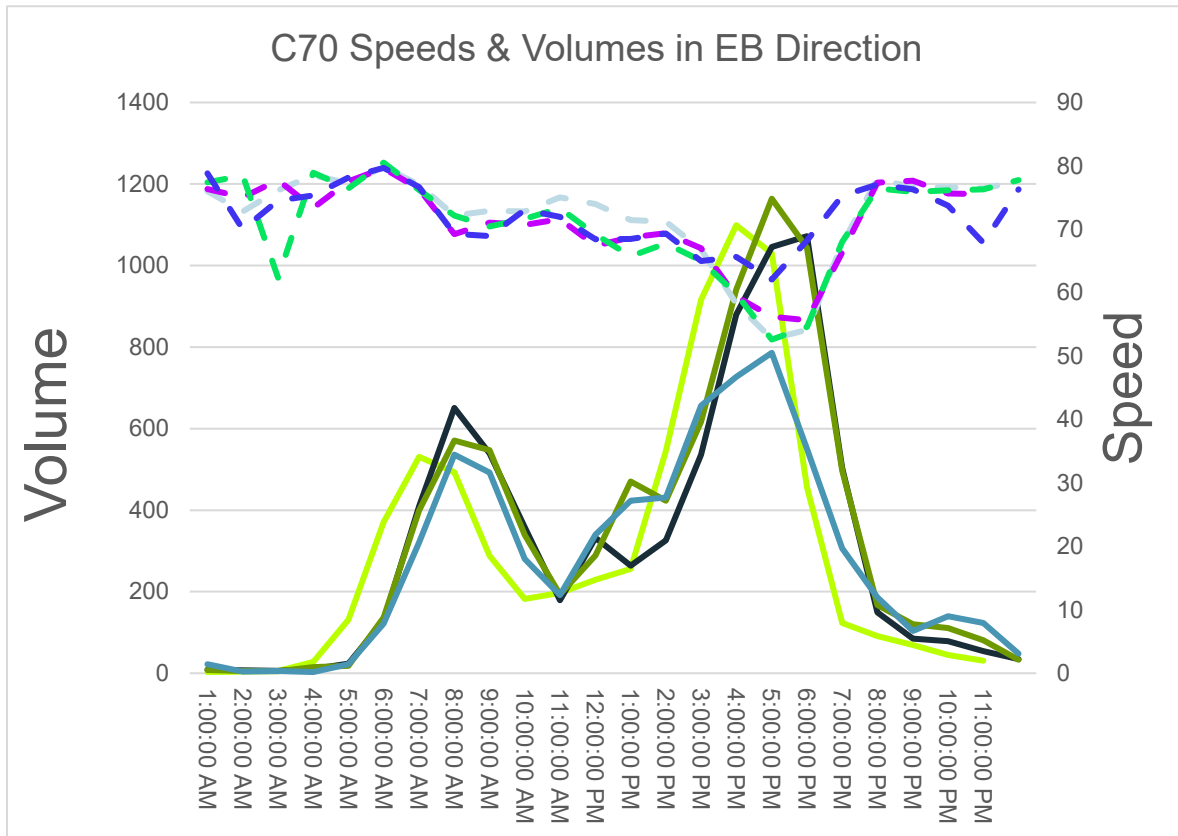


Figure 1: C-70 Speeds and Volumes in EB Direction

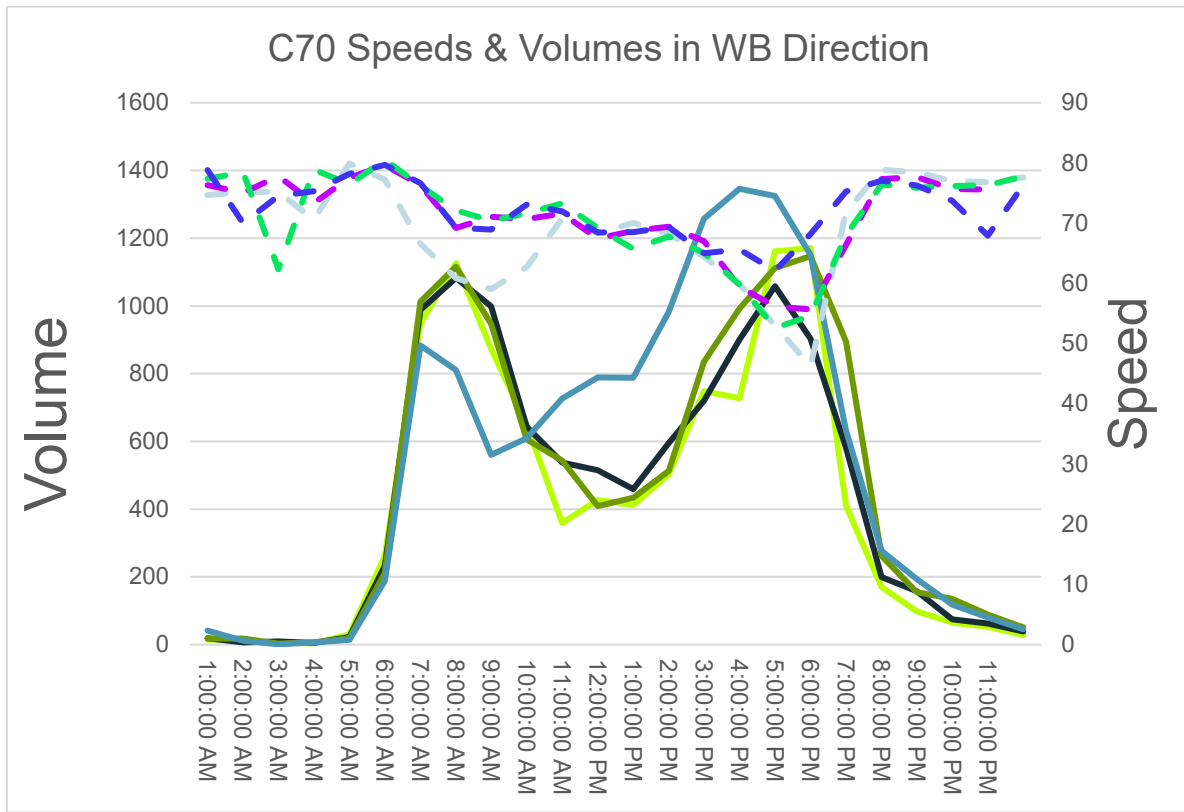


Figure 2: C-70 Speeds and Volumes in WB Direction

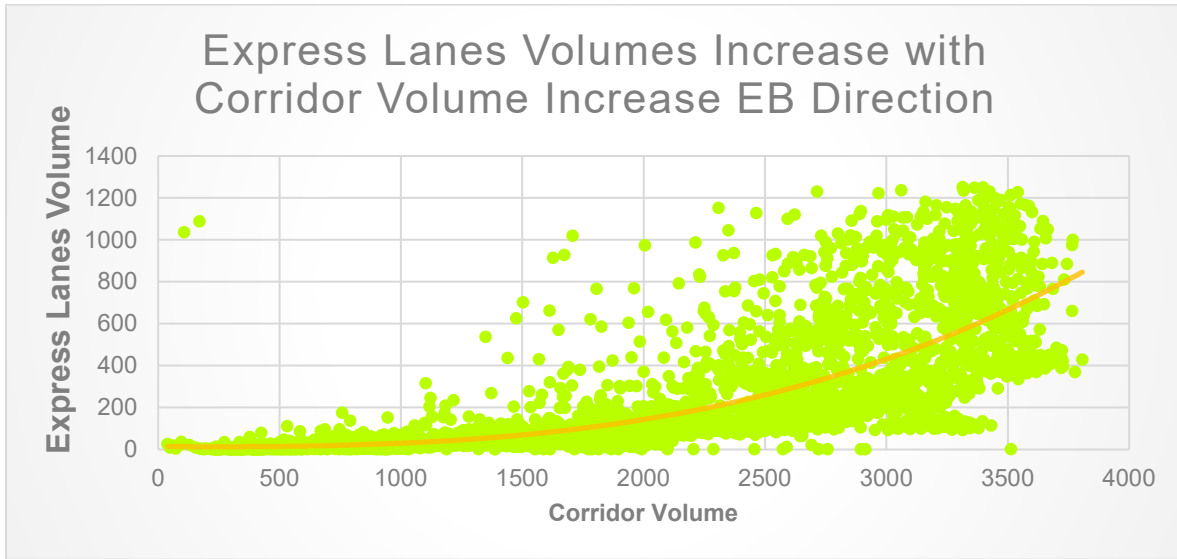


Figure 3: Express Lanes and Corridor Volumes EB Direction

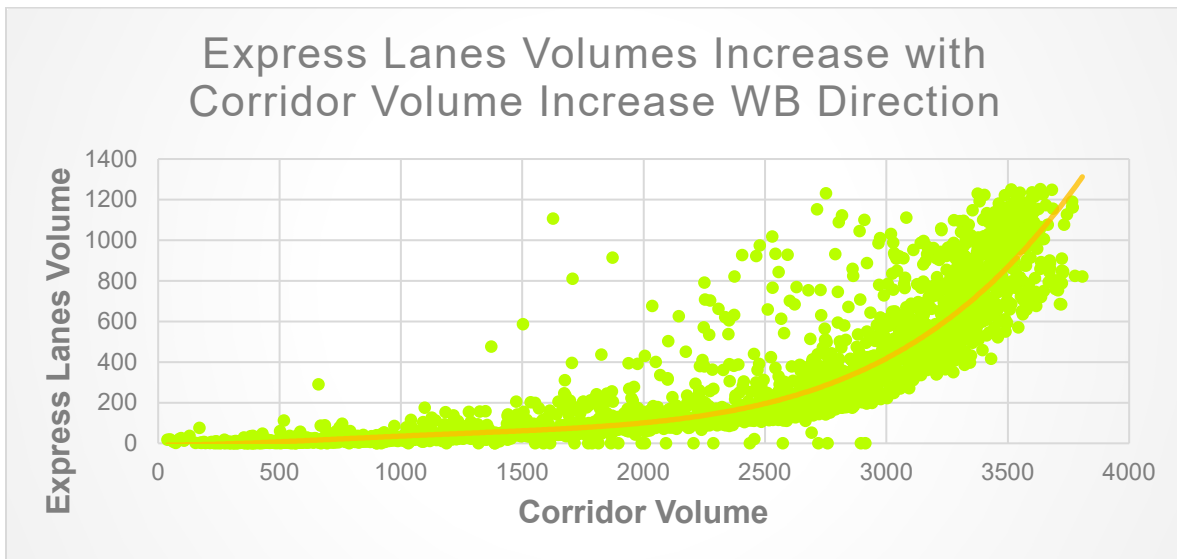


Figure 4: Express Lanes and Corridor Volumes WB Direction

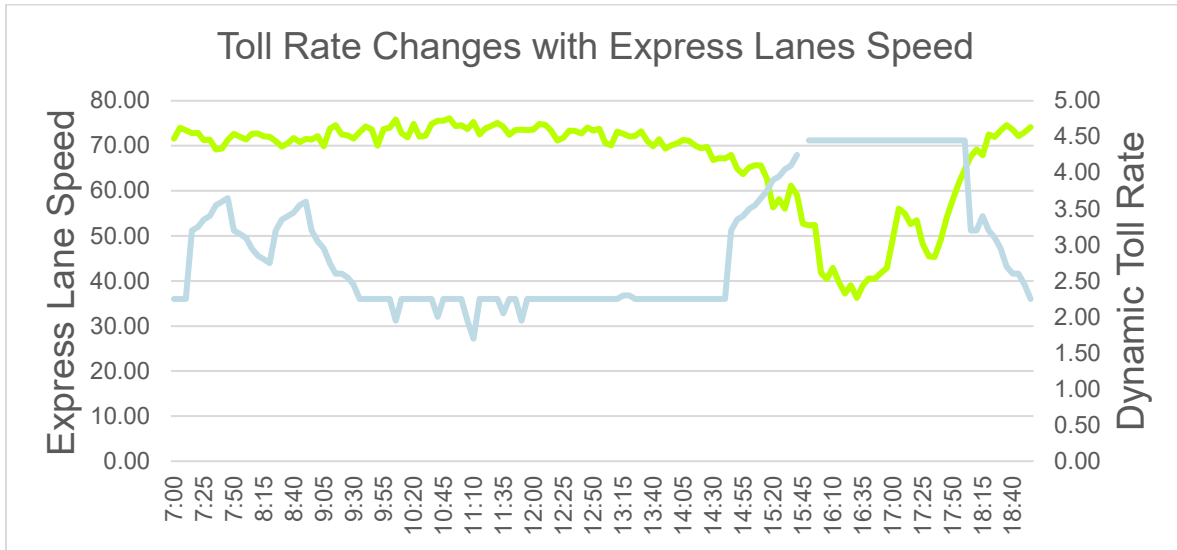


Figure 5: Dynamic Pricing Testing from March 2023



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## APPENDIX 3: Toll Rates Per Mile

