



Bay Area Infrastructure Financing Authority  
 Bay Area Metro Center  
 375 Beale Street, Suite 800  
 San Francisco, CA 94105  
 TEL 415.778.6700  
 WEB www.mtc.ca.gov

## Memorandum

TO: BAIFA

DATE: February 15, 2019

FR: Executive Director

W. I. 6840

RE: Express Lanes Program Quarterly Report – 4<sup>th</sup> Quarter 2018

MTC issues Express Lanes Program reports quarterly. The report summarizes major developments, project schedules and risks, and compares forecast costs with BAIFA's Express Lanes Program Expenditure Plan as well as the operational performance of BAIFA's open express lanes. The attached report covers the fourth quarter of 2018, October 1 to December 31.

**I-680 Contra Costa Southern Segment Operations** – Highlights of fourth quarter performance include: (see *Appendix C* for more detail)

- Express lane trips were lighter in November and December due to the holidays. Still, over 2 million trips were made, with an average of 30,000 trips per day in December.
- Of all trips, 43% were declared as carpools, while only 4% had no FasTrak<sup>®</sup> account.
- For December peak period trips, express lane users traveled on average 8 to 9 miles per hour faster than neighboring lanes, slightly less than other months in the quarter.
- Peak period tolls paid remained fairly consistent. In December, the average toll paid in the northbound p.m. peak period was \$6.50. In the southbound a.m. peak period, it was \$5.80. In the middle of the day, the average toll paid was less than \$1.00.
- The highest posted toll to travel the entire corridor in each direction was \$8.50.
- CHP worked 91% of requested enforcement hours, and made 1,777 enforcement stops.

**Express Lanes Capital Delivery** – Project activity for the fourth quarter is highlighted below (see *Section I. Program Highlights* and *Section III. Capital Delivery* for more detail).

- **I-880 Alameda** – Installation of fiber and network communication hubs is complete. Installation of civil infrastructure, electric service connections and tolling equipment, construction of a retaining wall, and widening of the freeway continues. Two existing sign bridges will be replaced this spring, requiring some night time full closures of I-880. The project is projected to open in early 2020.
- **I-680 Contra Costa Northern Segment Southbound** – The civil contractor continues demolition of the median barrier, and is about to begin foundation work for overhead signs and new median barrier. Electrical services work is also underway. The project is projected to open in fall 2021.
- **I-80 Solano** – In March, Caltrans will apply for a Federal Infrastructure For Rebuilding America grant for this project, which is shelf-ready should construction funds become available.

  
 Steve Heminger

SH:lk

Attachments



# BAY AREA EXPRESS LANES



## MTC Express Lanes Quarterly Report 4<sup>th</sup> Quarter, October - December, 2018

Submitted: February 2019

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# I. PROGRAM HIGHLIGHTS

The purpose of this report is to summarize the progress of delivering Metropolitan Transportation Commission (MTC) Express Lanes. The report covers the fourth quarter of 2018, October 1 to December 31.

The California Transportation Commission (CTC) approved MTC’s application to implement and operate its 270-mile express lane network on October 27, 2011. Soon thereafter, work began to environmentally clear the first phase of express lane conversion projects and produce a Concept of Operations describing how the Express Lanes will operate. The first of MTC’s express lanes opened in October 2017 on I-680 in Contra Costa County. Several additional projects are at varying stages of development.

Project Development & Construction	4 <sup>th</sup> Quarter 2018 Highlights	Current Activities
<p><b>I-880 Alameda (ALA-880)</b>                      San Leandro to Milpitas  <i>Hegenberger Road/Lewelling Boulevard to Dixon Landing Road</i></p>	<ul style="list-style-type: none"> <li>• Caltrans finalized the design of fiber laterals to connect its freeway management equipment to the communications backhaul.</li> <li>• The toll system integrator continued installation of roadside cabinets and electrical in the southern portion of I-880 and prepared equipment for installation in the median.</li> <li>• The contractor completed installation of Backhaul fiber for the entire express lane corridor and of network hubs connecting field equipment to data centers in San Francisco, Martinez and Oakland.</li> <li>• Staff kept residents and stakeholders in the I-880 corridor informed about express lane construction.</li> </ul>	<ul style="list-style-type: none"> <li>• The express lane civil contractor continues to install civil infrastructure and PG&amp;E service connections from SR-92 to Hegenberger Rd.</li> <li>• The express lanes civil contractor continues to install a retaining wall in the freeway shoulder near Hacienda Ave. in Hayward and perform lane widening work to add access lanes into restricted sections of the express lanes.</li> <li>• The express lanes civil contractor will remove two existing overhead sign bridge structures at the SR-92 interchange and install two new ones.</li> <li>• The toll system integrator continues equipment installation from Dixon Landing Rd. to SR-92, and will start equipment installation from SR-92 to Hegenberger Rd.</li> <li>• The toll system integrator will install new, numeric HOV occupancy beacons on I-880 to support CHP enforcement of occupancy violations.</li> <li>• Monthly construction notices and ramp closure/detour notices continue to be sent. Staff is also preparing customer education materials and outreach strategies in advance of lane opening.</li> </ul>
<p><b>I-680 Contra Costa Southern Segment (CC-680 South)</b>                      Walnut Creek to San Ramon  <i>Livorna Road/Rudgear Road to Alcosta Boulevard</i></p>	<ul style="list-style-type: none"> <li>• See Appendix C for second quarter performance data.</li> </ul>	<ul style="list-style-type: none"> <li>• Project complete; see Appendix B for archived summary.</li> </ul>

Project Development & Construction	4 <sup>th</sup> Quarter 2018 Highlights	Current Activities
<p><b>I-680 Contra Costa Northern Segment Southbound (CC-680 North SB)</b></p> <p>Martinez to Walnut Creek <i>Marina Vista Boulevard to Rudgear Road/SR 242</i></p>	<ul style="list-style-type: none"> <li>Construction started October 1, 2018, and a ground-breaking event was held October 3, 2018.</li> <li>The civil contractor completed demolition of the median barrier between the Benicia-Martinez Bridge and SR-242 in December 2018.</li> </ul>	<ul style="list-style-type: none"> <li>The civil contractor will begin foundation work for overhead sign structures and new median barrier between the Benicia-Martinez Bridge and SR-242. The civil contractor continues demolition of the median barrier between SR-24 and Rudgear Rd., and will start construction of its replacement. The civil contractor continues electrical services work at various corridor locations.</li> <li>The replacement planting design continues to be updated to incorporate public feedback.</li> <li>Staff continues to negotiate a contract change order for the backhaul contractor to reroute in-use backhaul fiber in Walnut Creek prior to lane widening. The toll system integrator will coordinate with the civil and backhaul contractors during the re-routing of the backhaul fiber.</li> </ul>
<p><b>I-80 Solano (SOL-80)</b></p> <p>Fairfield to Vacaville <i>Red Top Road to I-505</i></p>	<ul style="list-style-type: none"> <li>No significant activity occurred since the project reached the Ready-to-List milestone in April 2018.</li> </ul>	<ul style="list-style-type: none"> <li>The project is shelf-ready should construction funds become available.</li> <li>Caltrans will submit this project for a Federal INFRA grant due in March 2019.</li> <li>MTC and STA staff continue to explore other potential funding sources.</li> </ul>
<p><b>Program Management</b></p>	<ul style="list-style-type: none"> <li>Staff presented to local transportation stakeholder groups about I-680 Contra Costa Express Lanes performance.</li> <li>Staff developed plans with other express lane operator staff to explain to stakeholders and the public about toll policy changes related to clean air vehicle and carpool occupancy requirements, subject to future BAIFA discussion and approval.</li> </ul>	<ul style="list-style-type: none"> <li>Staff is planning a ‘proof of concept’ to show how camera-based vehicle occupancy detection systems can be used to identify violators in a tolling environment.</li> <li>Staff released a Request For Information (RFI) in January 2019 to learn about smartphone app-based systems for vehicle occupancy declaration and verification.</li> <li>Staff continues to coordinate with other public agency staff on the possibility of the future US-101 express lanes in San Mateo County being operated by BAIFA.</li> <li>Staff is beginning to draft proposed changes to the Toll Ordinance in anticipation of I-880 opening, with an HOV-3 occupancy requirement, and clean air vehicle tolling.</li> </ul>
<p><b>Toll System</b></p>	<ul style="list-style-type: none"> <li>In October 2018, CHP began using the web-based toll tag look-up tool to enforce HOV occupancy in the express lane.</li> <li>In December 2018, the toll system integrator contract was extended to June 2023 to include the I-680 Northern Segment. The change removed the I-80 Solano express lanes from the contract. It will be added back when construction funding is secured.</li> </ul>	<ul style="list-style-type: none"> <li>The toll system integrator and the FasTrak® back office are testing an updated regional interface control document to enable the two systems to communicate and share 6C compliant data.</li> <li>Staff continues to work with the toll system integrator to address system bugs and to prepare for I-680 Southern Segment Operations Testing in February 2019.</li> </ul>

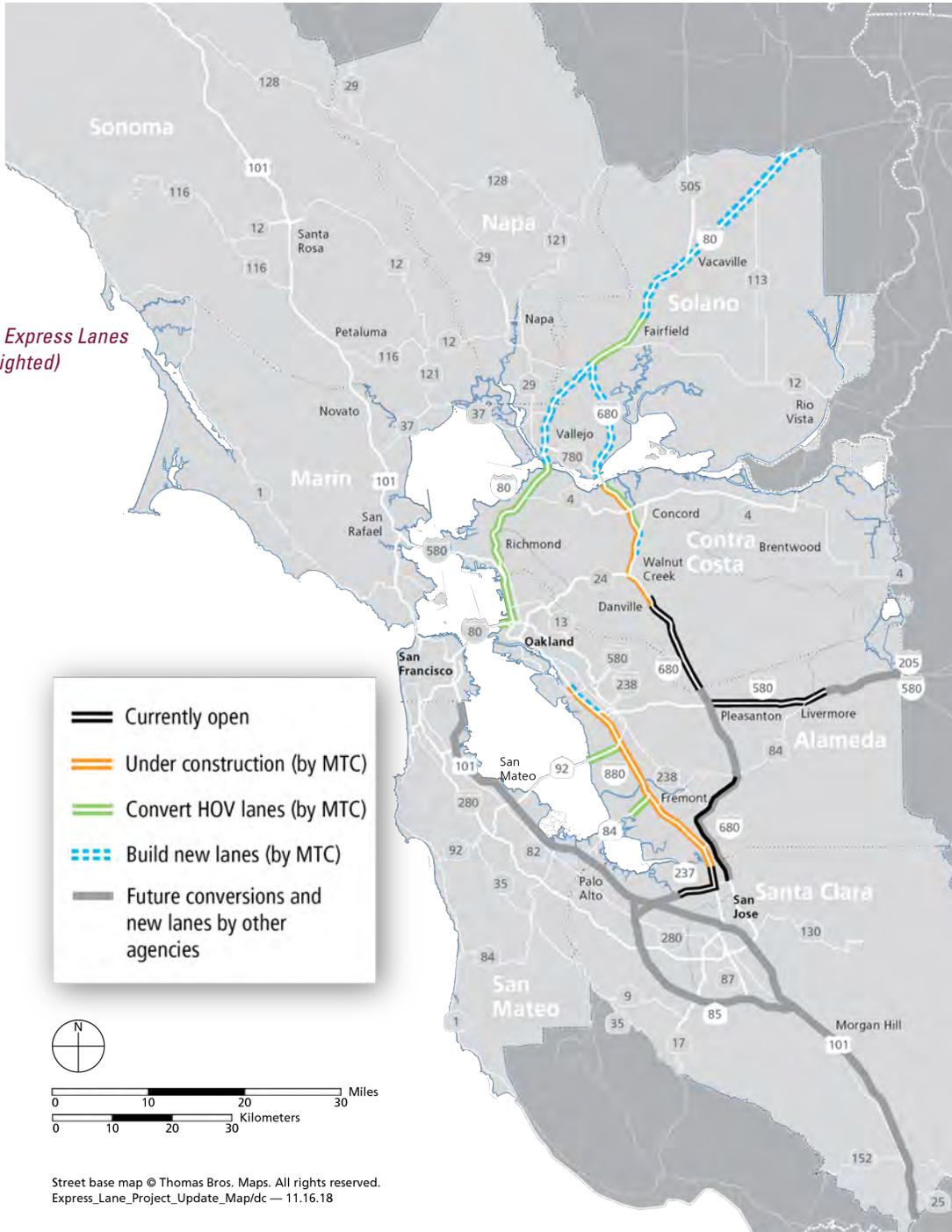


## B. Operating Authority

MTC and the Bay Area Toll Authority (BATA) have formed a joint powers authority to develop and operate MTC Express Lanes. The joint powers authority, known as the Bay Area Infrastructure Financing Authority (BAIFA), is composed primarily of representatives of the three counties where the express lanes are located: Alameda, Contra Costa and Solano. BAIFA is responsible for policy and operational decisions such as toll rates, project phasing and use of revenue.

The map below highlights MTC’s portion of Bay Area Express Lanes and shows where lanes will be converted from HOV lanes and where new lanes will be added.

Map of Bay Area Express Lanes  
(MTC lanes highlighted)



Street base map © Thomas Bros. Maps. All rights reserved.  
Express\_Lane\_Project\_Update\_Map/dc — 11.16.18

## C. MTC Express Lane Project Funding

MTC is using existing funding to convert existing HOV lanes to express lanes and to conduct environmental studies and design on some gap closure projects, so they are “shelf-ready” should construction funding become available. This will allow MTC to open as much of its 270-mile network as quickly as possible.

The table below lists the projects that comprise MTC Express Lanes according to current funding status.

County	Route	Project	Geographical Limits	Miles	Environmental	Design	Construction
<b>NEAR-TERM CONVERSIONS AND GAP CLOSURE OPPORTUNITY PROJECTS</b>							
ALA	880	I-880 Alameda	Between San Leandro and Milpitas <i>Hegenberger Rd./Lewelling Blvd. to Dixon Landing Rd.</i>	51	●	●	●
CC	680	I-680 Contra Costa Southern Segment	Between Walnut Creek and San Ramon <i>Livorna Rd./Rudgear Rd. to Alcosta Blvd.</i>	23	●	●	●
					<i>Project completed 2017</i>		
CC	680	I-680 Contra Costa Northern Segment Southbound	Martinez to Walnut Creek <i>Marina Vista Blvd. to Rudgear Rd.</i>	11	●	●	●
SOL	80	I-80 Solano	Fairfield to Vacaville <i>Red Top Rd. to I-505</i>	36	●	●	○
<b>MID-TERM CONVERSIONS AND GAP CLOSURE OPPORTUNITY PROJECTS</b>							
ALA/ CC	80	I-80 and Westbound Approaches to the Bay Bridge	Between Crockett and Bay Bridge <i>Cummings Skyway to Bay Bridge; I-80, I-580, I-880 and West Grand approaches to Bay Bridge</i>	44	◐	○	○
ALA/ SM	84	Dumbarton Bridge Western Approach	Fremont/Newark <i>I-880 to Dumbarton Bridge</i>	3	●	○	○
ALA/ SM	92	San Mateo Bridge Westbound Approach	Hayward <i>I-880 to San Mateo Bridge</i>	3	●	○	○
CC	680	I-680 Contra Costa Northbound Express Lane Completion	Walnut Creek to Benicia <i>North Main St. to Marina Vista Blvd.</i>	9	○	○	○

### KEY

● Funded   ◐ Partially Funded   ○ Unfunded

ALA = Alameda,

CC = Contra Costa,

SM = San Mateo,

SOL = Solano

# III. CAPITAL DELIVERY

## A. Schedule

The schedule summary below reflects the “open to traffic” dates of the original “baseline” schedule, and the current completion forecast for the projects that are fully funded.

Project	Baseline Opening	Forecast Opening	Confidence Level	Detail Page
<b>I-880 Alameda (ALA-880)</b> San Leandro and Milpitas <i>Hegenberger Rd./Lewelling Blvd. to Dixon Landing Rd.</i>	Spring 2019	Spring 2020	●	15
<b>I-680 Contra Costa Southern Segment (CC-680 South)</b> Walnut Creek and San Ramon <i>Livorna Rd./Rudgear Rd. to Alcosta Blvd.</i>	Fall 2016	Fall 2017 Actual	●	A-5
<b>I-680 Contra Costa Northern Segment Southbound (CC-680 North SB)</b> Martinez to Walnut Creek <i>Marina Vista Blvd. to Rudgear Rd.</i>	Fall 2018	Fall 2021	●	19

**KEY**

- Within schedule shown.
- Identified potential risks that may significantly impact schedule if not mitigated. See *Section III.D Risk Management Plan* for further discussion of schedule risk.
- Known impact to schedule, changes forthcoming.

## B. Capital Costs

The cost summary below shows: 1) the costs of each express lane [corridor or segment] including planning, design and construction of the civil infrastructure, and installation and integration of the backhaul communications and toll system, and 2) programwide costs including planning and design, and implementation of centralized elements of the backhaul network and toll system. The total cost estimate includes the full estimated cost to complete MTC Express Lanes. The approved Expenditure Plan fully funds the first three projects listed below, the environmental and design phases for the I-80 projects in Solano County, and the environmental phase for the westbound approaches to the San Mateo and Dumbarton Bridges. The expended-as-of amounts shown represent the amount of BATA Express Lane funds expended through December 31, 2018. The confidence level assessment reflects potential risks to each project budget; for more information, see Section III.D Risk Management Plan.

Project <sup>(1)</sup>	Total Cost Estimate <sup>(2)</sup>	Cost Estimate, Funded Phases <sup>(3)</sup>	Regional Measure 2 Funds (allocated)	Other Funding (allocated)	BATA Express Lane Funds <sup>(4)</sup>			Percent Complete <sup>(5)</sup>	Confidence Level <sup>(6)</sup>
					July 2018 Amendment	Sept. 2018 Amendment	Expended as of 12/31/18		
<b>NEAR-TERM CONVERSIONS AND GAP CLOSURE OPPORTUNITY PROJECTS</b>					<i>Costs shown in millions of escalated dollars</i>				
I-880 Alameda	139.1	139.1			135.5	139.1	84.7	65%	●
I-680 Contra Costa Southern Segment	54.0	54.0			55.6	54.0	52.3	98%	●
I-680 Contra Costa Northern Segment Southbound <sup>(7)</sup>	127.4	127.4	19.4	54.3	51.3	53.6	6.1	25%	●
I-80 Solano	228.2	33.3	15.2		19.0	18.1	11.2	20%	●
Centralized Toll System	32.4	32.4			33.6	32.4	20.0	75%	●
Program Planning, Coordination & Management	28.4	28.4			28.4	28.4	19.4	80%	●
Program Contingency	6.1	6.1			5.1	2.9			●
Capitalized Start-up O&M	16.0	16.0			16.0	16.0	4.8		●
<b>MID-TERM CONVERSIONS AND GAP CLOSURE OPPORTUNITY PROJECTS</b>									
I-80 Alameda/Contra Costa and Westbound approaches to the Bay Bridge (I-80, I-580, I-880, West Grand)	193.0	5.0	5.0						
Dumbarton Bridge Westbound Approach (SR-84)	9.0	0.3			0.3	0.3	0.3	5%	
San Mateo Bridge Westbound Approach (SR-92)	10.0	0.4			0.4	0.4	0.4	5%	
I-680 Contra Costa Northbound Express Lane Completion <sup>(8)</sup>	390.0	21.5	1.5	20.0				5%	
Centralized & Program Costs & Start-Up O&M - Gap Closures & Future Conversions	TBD								
<b>TOTALS</b>	<b>1,233.6</b>	<b>463.9</b>	<b>41.1</b>	<b>74.3</b>	<b>345.2</b>	<b>345.2</b>	<b>199.0</b>	<b>60%</b>	

<sup>(1)</sup> Other Gap Closure and Extension projects not shown: ALA-880 extension northbound from Lewelling to Hegenberger; SOL-80 gap closure from Carquinez Bridge to Red Top Road; SOL-80 extension east of I-505; SOL-680 gap closure from Benicia to Cordelia

<sup>(2)</sup> Total Cost Estimate represents current estimated cost to complete each project.

<sup>(3)</sup> Cost Estimate, Funded Phases represents current estimated cost to complete phases that are funded for each project.

<sup>(4)</sup> BATA Express Lane Funds represent the funds that have been allocated from the BATA budget.

<sup>(5)</sup> Percent completes shown are based on the achievement of major milestones, whether those milestones were completed using BAIFA funds or other funds. Projects that have completed milestones using other funds include I-680 Contra Costa Northern Segment Southbound and I-80 Solano.

<sup>(6)</sup> ● = Within budget, ● = identified potential risks that may significantly exceed budget if not mitigated, ● = Known impacts to budget - changes forthcoming.

<sup>(7)</sup> Cost represents the total for HOV Completion and Conversion to Express Lanes. Other funds committed to the HOV Completion portion include Measure J (\$38.7M) and STIP (\$15.6M).

<sup>(8)</sup> Represents completion of HOV lane through Walnut Creek to SR-242 and conversion of existing HOV lane north of SR-242, which were previously listed separately.

## C. Change Management

The change management process captures the changes in the program that have an impact on the approved scope, schedule and budget baselines. There were no changes to the MTC Express Lanes Program budget in the fourth quarter.

## D. Risk Management Plan

MTC manages risk at both the program and contract level by identifying risks that could negatively impact the program’s cost and schedule, and assigning responsibility to the person best positioned to manage each risk. Risks managed at the contract level are associated with contingency funding authorized by BAIFA for specific contracts. Risks managed at the program level would draw upon the program contingency line item in the Express Lanes Expenditure Plan. Staff regularly review the risk exposure and mitigation plans at both the contract and program level.

Chart #1 shows the median risk exposure for the program-level risks using Monte Carlo analysis. As of December 31, 2018, the risk exposure stands at \$5.9 million, which is higher than the \$5.6 million reported last quarter. This increase is due to new risk related to Caltrans-driven changes to toll system work as well as the potential for BAIFA to request installation of Vehicle Occupancy Detection (VOD) cameras on the I-880 corridor.

Chart #2 tracks the program’s cost forecast and risk exposure as compared to the authorized program budget. Consistent with the amendment to the Expenditure Plan that was adopted on September 26, 2018, the amount of BATA Express Lane Funds allocated to specific express lanes projects is \$342.3 million, plus program contingency, for a total authorized budget of \$345.2 million.

The current program contingency of \$2.9 million would fall short if the risk exposure of \$5.9 million were to be realized. While there are few individual risks with major cost impacts, there

are many risks with minor cost impacts, resulting in an overall significant risk exposure. Staff remains diligent in managing cost and risk while seeking new funding opportunities.

The top contributors to the program-level risk exposure and the associated mitigation strategies are as follows:

### I-880 Alameda

- The most significant risk that could affect cost relates to the location of a pricing sign on I-880 southbound in a restricted access portion of the express lane. The team is evaluating the need to relocate signage and the cost associated with design change and construction. More broadly, the project team is evaluating toll system integrator design changes for their impact on sign, reader and equipment placement, and to ensure any changes are sequenced with civil work now, avoiding the need to re-mobilize the civil contractor later.
- Another risk to cost relates to Caltrans requiring BAIFA and other express lanes operators to change the agreed-upon approach to segment pricing, affecting the toll system, pricing signs and public information. MTC staff is coordinating with express lanes operators to educate Caltrans staff about its position and set the expectation that I-880 proceeds based on its approved plans and permits.
- The most significant risk that could affect schedule relates to a Caltrans-managed repaving project in the corridor.

Chart #1: Median Risk Exposure (\$M)

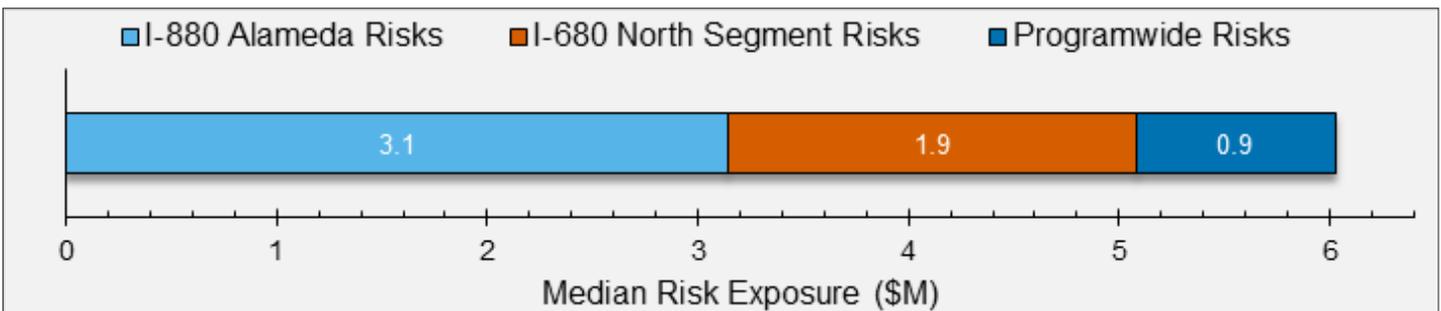


Chart #1 shows the contribution of each project’s risks toward the total program risk exposure. Risk exposure is calculated using Monte Carlo simulation.

Coordination issues with the project may delay completion of express lanes and impact the open-to-traffic date. Now that the repaving work is underway, MTC staff continues to work with Caltrans to coordinate construction activities and minimize lane closures. MTC staff may ask Caltrans for permission to stripe the express lanes in late summer 2019 including changes in access configuration even though they would operate as HOV lanes until tolling starts. Additional schedule risks could result from delays in hook-ups to the AT&T communication network for the Backhaul, delays in installation of power drops by PG&E and delays in handoff of backhaul infrastructure affecting completion of backhaul network integration. Staff is actively monitoring these risks.

contract delivery caused by unanticipated field conditions, contract specifications, weather and PG&E utility connections.

- The most significant risks that could affect cost relate to the increased cost of review and oversight by Caltrans and unforeseen difficulties in relocating a fiber backhaul in Walnut Creek. The project team is actively tracking oversight costs and adjusting construction plans as required.

**Programwide Risks**

- Potential changes to state or national interoperability requirements may cause changes to design or operational policy that may have cost impacts for MTC’s Express Lanes Program. The California Toll Operators Committee has a goal that all operators will be able to read and process 6C transactions by spring of 2019. This requires tuning toll tag readers for the I-680 Contra Costa Southern Segment and making sure that the toll system and FasTrak® back office communicate and process 6C transactions correctly, and thus may have cost impacts for MTC’s Express Lanes. This risk is being managed by participating in the development plan of the transition from Title 21 compliant toll technology to 6C compliant toll technology.

**I-680 Contra Costa Northern Segment Southbound**

- The most significant risk that could affect schedule relates to a Caltrans-managed safety project in the corridor. Coordination with the project may delay completion of express lanes work and impact the open-to-traffic date. MTC and Caltrans staff continue to look for ways to coordinate the construction sequence that would reduce the overall schedule. Additional schedule risks are being actively monitored, including potential delay to civil

**Chart #2: Program Cost Forecast and Risk Exposure vs. Authorized Budget (\$M)**

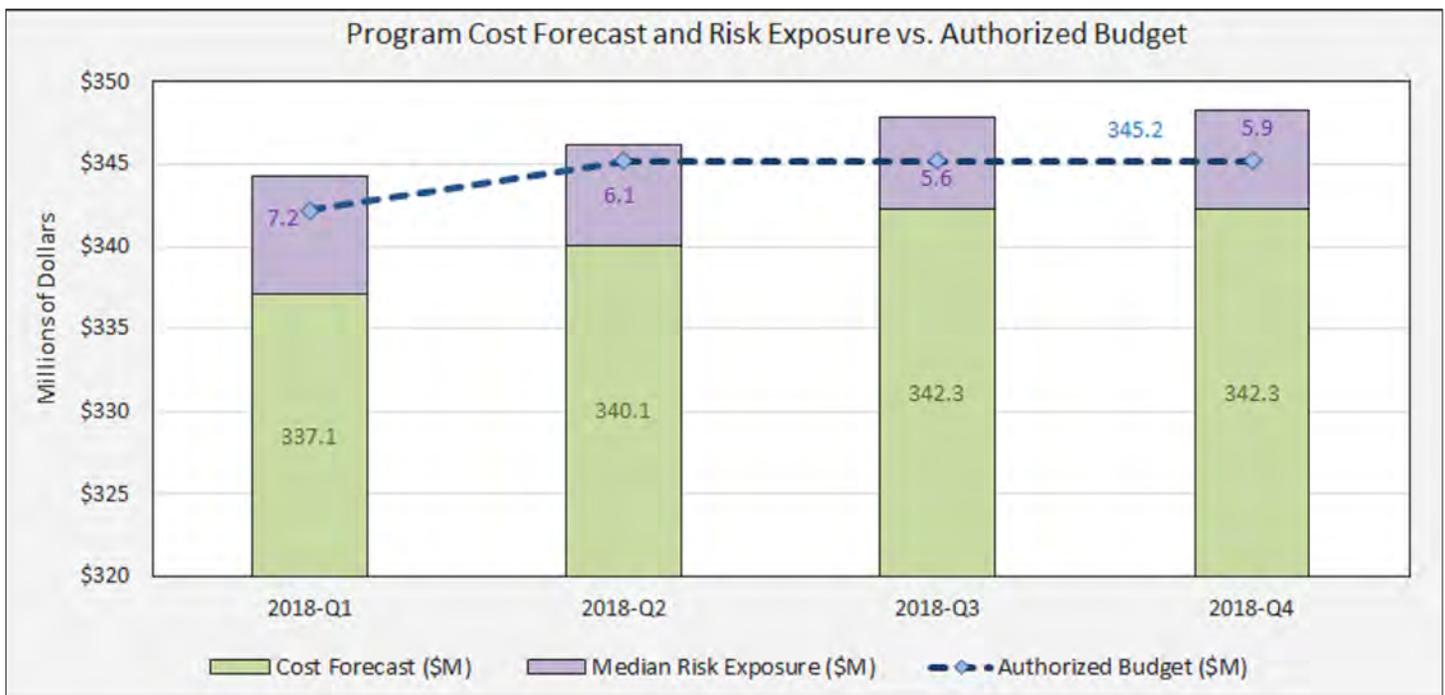


Chart #2 shows the program cost forecast and risk exposure as compared to the authorized program budget.

## E. Active Capital Project Summaries

### Centralized Functions

#### Toll System and Program Management, Planning and Regional Coordination

##### Total Estimated Cost

\$32.4 million for the Centralized Toll System  
\$28.4 for Program Planning, Coordination and Management

##### Schedule

Centralized Toll System was ready for the opening of the I-680 Contra Costa Southern Segment on October 9, 2017.

Program Planning, Coordination and Management is ongoing through the opening of the funded projects.

##### Project Description

The Centralized Toll System includes the elements of the toll system that are needed to toll all the express lanes, as well as the backhaul communications network components, such as fiber optic cable and leased line services, that transport toll data from MTC lanes to host and toll operations data centers. Centralized toll system work includes designing and implementing the hardware and software for dynamic tollsetting and trip building, integration with the FasTrak® Customer Service Center, and acquiring spare parts.

Program management, planning and regional coordination tasks include managing the expenditure plan, cost, schedule and risk; developing the express lane business rules and toll ordinance; conducting customer education and outreach; building out the Regional Operations Center and developing operating procedures; planning for future express lanes; and coordinating with partner agencies to offer a seamless experience for drivers.

##### Program Management Highlights and Progress

- Staff continued to coordinate with other public agency staff on the possibility of the future US-101 express lanes in San Mateo County being owned and operated by BAIFA.
- Staff completed a pilot of camera-based vehicle occupancy detection systems to learn about the strengths and weaknesses of the technology.

##### Current Program Management Activities

- Staff is planning a 'proof of concept' to show how camera-based vehicle occupancy detection systems can be used to identify violators in a tolling environment and charge them the toll they should have paid.
- Staff released a Request For Information (RFI) in January 2019 to learn about smartphone app-based systems for vehicle occupancy declaration and verification. Staff will share RFI findings with MTC's Operations Committee prior to making a decision to procure and pilot the technology.
- Staff continues to coordinate with other public agency staff on the possibility of the future US-101 express lanes in San Mateo County being operated by BAIFA.
- Staff is beginning to draft proposed changes to the Toll Ordinance in anticipation of I-880 opening, with an HOV-3 occupancy requirement, and clean air vehicle tolling.

## Toll System Highlights and Progress

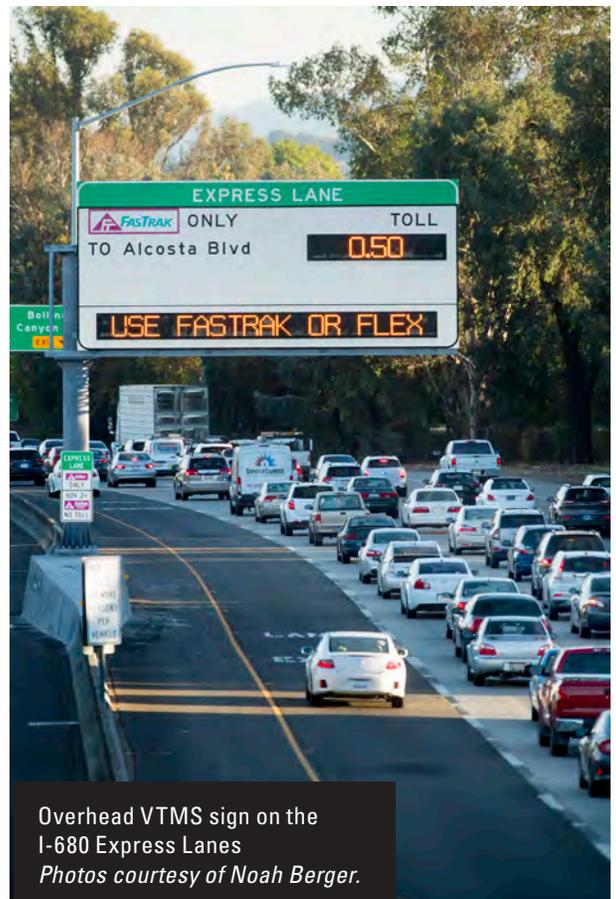
- The construction contract for the backhaul communications network for the host data centers and I-680 Contra Costa Southern Segment was awarded in December 2015.
- The toll operations staffing contract was awarded in March 2016.
- Final toll system host and software design was approved in March 2016, and Factory Acceptance Testing of hardware and software was held in June 2016.
- Primary toll system host hardware was installed at the Benicia-Martinez Bridge toll plaza in November 2016 and communications were established with the field equipment. Back-up operations hardware was also installed at the Traveler Information Center (TIC) located at Caltrans District 4 in Oakland.
- Buildout of the Regional Operations Center was finished in March 2017.
- The integrator completed the formal First Zone Test, which was the first field test to compile live lane transactions into a single trip, in May 2017 and the Communications End-to-End Testing for the toll systems communications network in June 2017.
- The toll system began using the full backhaul network as of June 2017.
- The integrator completed Corridor Testing, which fully tested the entire toll and communications system, in August 2017 and finished installing and commissioned all field equipment in September 2017.
- The integrator and the FasTrak® Customer Service Center completed Production Readiness Testing of the data exchange in September 2017.
- The toll system went live to the public on October 9, 2017.
- In May 2018, the integrator completed the Disaster Recovery Test to demonstrate the failover process to a redundant toll system is functional.
- In October 2018, CHP began using the web-based toll tag look-up tool to enforce HOV occupancy in the express lane.
- In December 2018, the toll system integrator contract was extended to June 2023 to include the I-680 Northern Segment. The change removed the I-80 Solano express lanes from the contract. It will be added back when construction funding is secured.

## Current Toll System Activities

- The toll system integrator and the FasTrak® back office are testing an updated regional interface control document to enable the two systems to communicate and share 6C compliant data. The goals are for the toll system to read 6C toll tags, create trips and send them to the back office for processing by spring 2019 and to allow for discount tolling of clean air vehicles by the launch of I-880.
- Staff continues to work with the toll system integrator to address system bugs and to prepare for I-680 Southern Segment Operations Testing in February 2019.



Closed-circuit television (CCTV) camera.  
*Photos courtesy of Noah Berger.*



Overhead VTMS sign on the I-680 Express Lanes  
*Photos courtesy of Noah Berger.*

## I-880 Alameda (ALA-880)

### Oakland to Milpitas

#### Hegenberger Road/Lewelling Boulevard to Dixon Landing Road

#### Total Cost Estimate

\$139.1 million

#### Scheduled Open Date

Spring 2020

#### Project Description

The project converts the existing I-880 HOV lanes that run from Hegenberger Road to Dixon Landing Road in the southbound direction and from Dixon Landing Road to Lewelling Boulevard in the northbound direction to express lanes.

The conversion involves lane striping and installing sign structures, signs, FasTrak<sup>®</sup> toll tag readers, traffic monitoring video cameras, lighting, a data communications network and California Highway Patrol observation areas. The highway is also being widened in three locations to accommodate merge lanes into and out of the express lanes. It will result in 51 express lane miles between Oakland and Milpitas.

The express lanes conversion project is being coordinated with a median barrier reconstruction project and a pavement resurfacing project, both led by Caltrans. The median barrier reconstruction project installed foundations and other infrastructure required for the express lanes for a large portion of the corridor.

#### Project Highlights and Progress

- Public open house was held in March 2015.
- Preliminary engineering report and environmental document were completed in October 2016.
- Caltrans approved the mid-day hours of operation assessment in December 2016.
- Caltrans issued the encroachment permit for the civil construction contract in June 2017.
- The express lanes civil contractor began construction in September 2017.
- Caltrans approved the toll system design and issued the encroachment permit for the toll system integrator in March 2018.
- Civil infrastructure installation and PG&E service connections from Dixon Landing Rd. to SR-92 were completed as of October 2018.
- MTC's express lanes scope of work to be delivered through Caltrans' median barrier contract was completed in the second quarter of 2018, including barrier demolition, express lane sign structure foundations and light foundations.
- Caltrans finalized the design of fiber laterals to connect its freeway management equipment to the communications backhaul in December 2018. Installation will be added to the express lane civil construction contract as a change order.
- The toll system integrator continued installation of toll system roadside cabinets and electrical in the southern portion of I-880 in the fourth quarter of 2018 and prepared equipment for median barrier installation.



- The contractor completed installation of Backhaul fiber for the entire express lane corridor and network hubs connecting field equipment to data centers in San Francisco, Martinez and Oakland in December 2018.
- Staff kept residents and stakeholders in the I-880 corridor informed about express lane construction.

and install two new ones in the second quarter of 2019. The work requires full closure of I-880 southbound. Closure will occur over several nights. Detour plans have been approved by Caltrans and the City of Hayward. Advanced notification will be provided to the public.

### Current Project Activities

- The express lane civil contractor will continue work on civil infrastructure installation and PG&E service connections from SR-92 to Hegenberger Rd., which is 80% complete.
- The express lanes civil contractor will continue to install a retaining wall in the freeway shoulder near Hacienda Ave. in Hayward and perform lane widening work to add access lanes into restricted sections of the express lanes.
- The express lanes civil contractor will remove two existing overhead sign bridge structures at the SR-92 interchange

- The toll system integrator will continue equipment installation from Dixon Landing Rd. to SR-92, which is 25% complete, and will start equipment installation from SR-92 to Hegenberger Rd. in February 2019. Toll system equipment installation is expected to be complete in fall 2019.
- The toll system integrator will install new, numeric HOV occupancy beacons on I-880 to support CHP enforcement of occupancy violations.
- Monthly construction notices and ramp closure/detour notices continue to be sent. Staff is also preparing customer education materials and outreach strategies in advance of lane opening.

### Project Schedule by Phase



### Project Cost

Total Cost Estimate <sup>(1)</sup>	Cost Estimate, Funded Phases <sup>(2)</sup>	Regional Measure 2 Funds (allocated)	Other Funding (allocated)	BATA Express Lane Funds <sup>(3)</sup>			Percent Complete <sup>(4)</sup>
				July 2018 Amendment	Sept. 2018 Amendment	Expended as of 12/31/18	
139.1	139.1			135.5	139.1	84.7	65%

The cost estimate for this project includes planning, design, construction, utilities, backhaul communications and toll system integration.

Costs shown in millions of escalated dollars.

(1) Total Cost Estimate represents current estimated cost to complete each project.  
 (2) Cost Estimate, Funded Phases represents current estimated cost to complete phases that are funded for each project.  
 (3) BATA Express Lane Funds represent the funds that have been allocated from the BATA budget.  
 (4) Percent complete shown is based on the achievement of major milestones whether those milestones were completed using BAIFA funds or other funds.

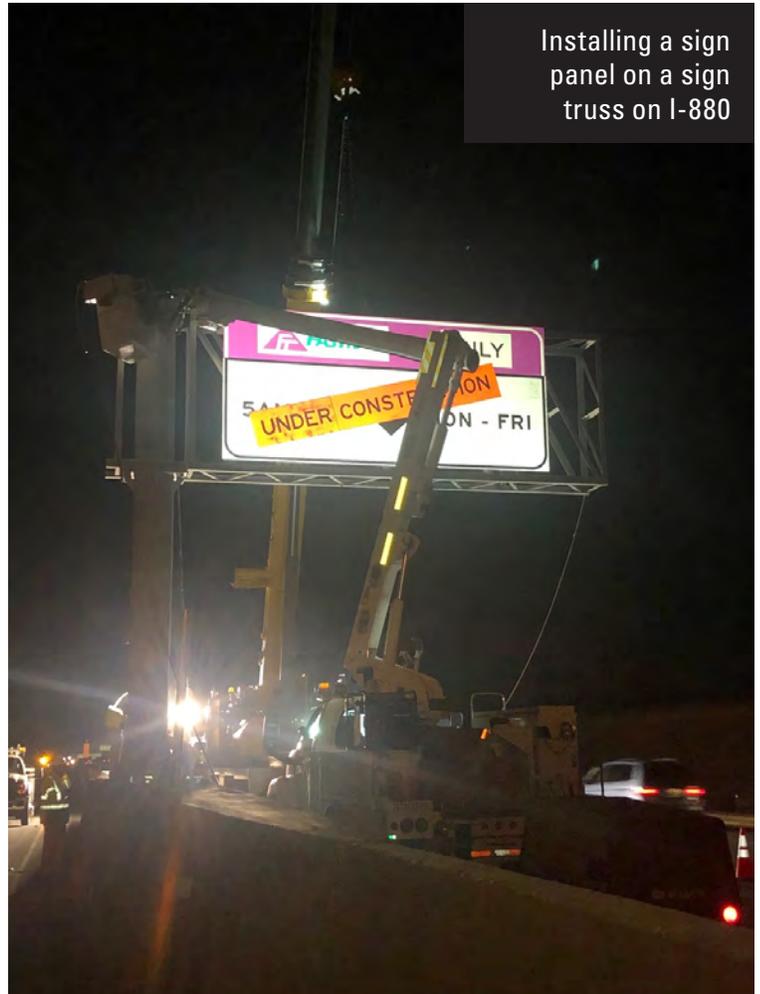
Setting an overhead signpost on I-880



Setting a sign truss on a sign post on I-880



Installing a sign panel on a sign truss on I-880



## I-680 Northern Segment Southbound (CC-680 North SB)

### Martinez to Walnut Creek

#### Benicia Bridge to Rudgear Road

#### Total Cost Estimate

\$127.4 million (\$53.6 million to be funded by BAIFA)

#### Scheduled Open Date

Fall 2021

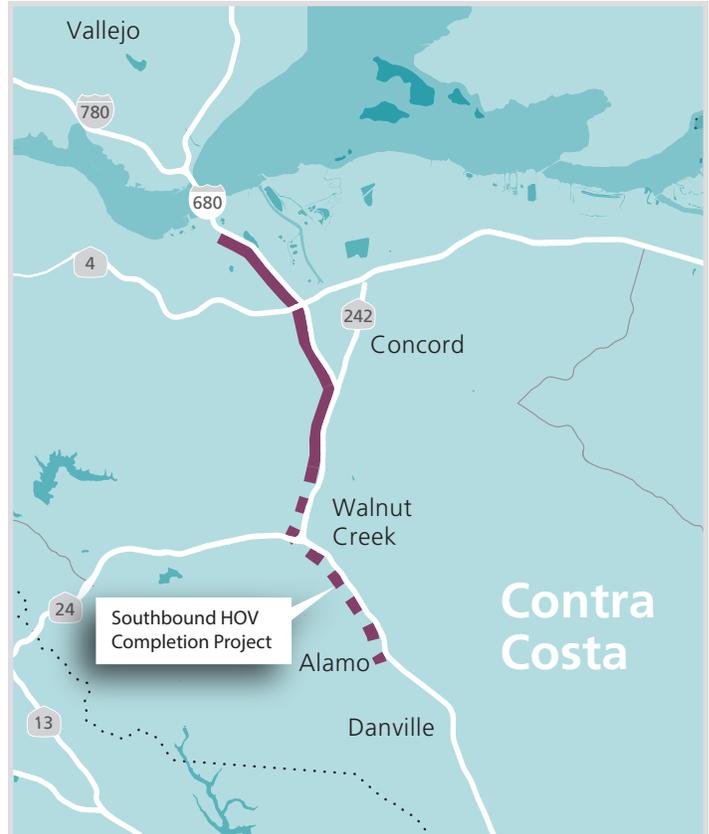
#### Project Description

The project will convert 11 miles of the existing HOV lane on southbound I-680 from just south of Marina Vista Avenue in Martinez to North Main Street in Walnut Creek into an express lane. It also includes express lane elements for the I-680 Southbound HOV Completion Project. Once complete, I-680 will have a continuous southbound express lane from Martinez to the Alameda County line.

Civil construction will be delivered by the Contra Costa Transportation Authority (CCTA). MTC will install toll and communications equipment and will operate the express lanes.

#### Project Highlights and Progress

- Caltrans accepted the Traffic Operation Analysis Report in October 2015, and agreed with the mid-day hours of operation analysis in early 2017.
- Caltrans signed the environmental document in December 2016 and approved the Project Report in August 2017.
- Project staff met with the Walnut Creek Mayor and city staff in May 2017 to review the construction plan and impacts.
- Environmental revalidation was completed in September 2017. The Office of U.S. Fish and Wildlife Service provided concurrence that the project is not likely to adversely affect any known federally listed species.
- A contract to remove trees along southbound I-680 in Walnut Creek between South Main Street and Livorna Road was awarded in October 2017, and work was completed in December 2017.
- All utility relocations were completed as of August 2018.
- Construction started October 1, 2018, and a ground-breaking event was held October 3, 2018.
- The civil contractor completed demolition of the median



barrier between the Benicia-Martinez Bridge and SR-242 in December 2018.

- In December 2018, the toll system integrator contract was extended to June 2023 to include the I-680 Northern Segment.

#### Current Project Activities

- The civil contractor is set to begin foundation work for overhead sign structures and new median barrier between the Benicia-Martinez Bridge and SR-242. The civil contractor continues demolition of the median barrier between SR-24 and Rudgear Rd., and will start construction of its replacement. The civil contractor continues electrical services work at various corridor locations.
- The replacement planting design continues to be updated to incorporate public feedback.

### Current Project Activities (continued)

- Staff continues to negotiate a contract change order for the backhaul contractor to reroute in-use backhaul fiber in Walnut Creek prior to lane widening. Reroute of fiber will be completed near the start of construction in early 2019.
- The toll system integrator will coordinate with the civil and backhaul contractors during the re-routing of the backhaul

fiber. The integrator will disconnect and reconnect live I-680 Southern Segment toll equipment from the old to the new fiber with no planned disruption to toll operations.

- The toll system integrator is preparing to submit for encroachment permits from Caltrans. Concurrently, Caltrans is preparing the construction Cooperative Agreement with BAIFA for Caltrans’ oversight services of the toll system integrator contract.

### Project Schedule by Phase



### Project Cost

Total Cost Estimate <sup>(1)</sup>	Cost Estimate, Funded Phases <sup>(2)</sup>	Regional Measure 2 Funds (allocated)	Other Funding (allocated)	BATA Express Lane Funds <sup>(3)</sup>			Percent Complete <sup>(4)</sup>
				July 2018 Amendment	Sept. 2018 Amendment	Expended as of 12/31/18	
127.4	127.4	19.4	54.3	51.3	53.6	6.1	25%

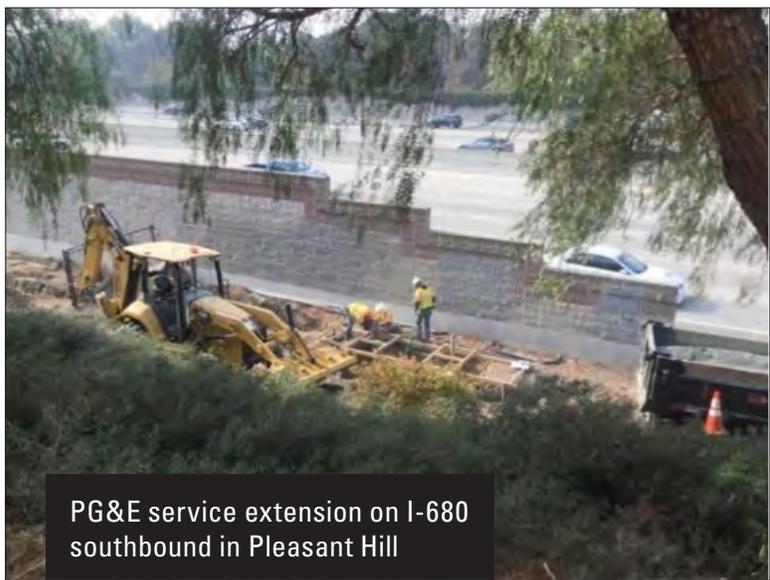
The cost estimate for this project includes planning, design, construction, utilities, backhaul communications and toll system integration.

Costs shown in millions of escalated dollars.

(1) Total Cost Estimate represents current estimated cost to complete each project.  
 (2) Cost Estimate, Funded Phases represents current estimated cost to complete phases that are funded for each project.  
 (3) BATA Express Lane Funds represent the funds that have been allocated from the BATA budget.  
 (4) Percent complete shown is based on the achievement of major milestones whether those milestones were completed using BAIFA funds or other funds.



Concrete barrier demolition on I-680 in Walnut Creek



PG&E service extension on I-680 southbound in Pleasant Hill



PG&E service extension on I-680 southbound in Concord

## I-80 Solano (SOL-80)

### Fairfield to Vacaville

#### Red Top Road to I-505

#### Total Cost Estimate

\$228.2 million

#### Scheduled Open Date

End of 2021, subject to funding

#### Project Description

This project will convert the existing eastbound and westbound HOV lanes to express lanes between Red Top Road and Air Base Parkway in Fairfield. Conversion work includes striping lanes and installing sign gantries, signs, FasTrak® toll tag readers and traffic-monitoring video cameras.

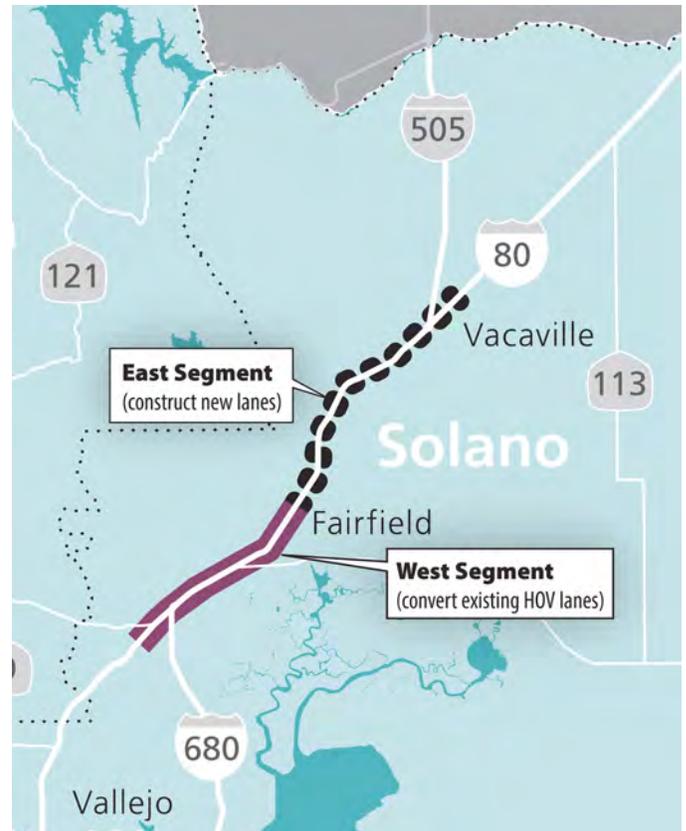
The project will also construct new eastbound and westbound lanes between Air Base Parkway and I-505 in Vacaville. In this section, the highway will be widened along with the installation of express lane striping, signage and equipment. The project will result in 36 miles of express lanes on I-80 in Solano County.

The Solano Transportation Authority (STA) is the lead agency for environmental clearance and civil design.

Caltrans will advertise and award the construction contract, and a blended Caltrans/STA team will administer construction. MTC will install toll and communications equipment and will operate the express lanes.

#### Project Highlights and Progress

- A public open house was held in August 2015.
- The preliminary engineering report and environmental document were completed in December 2015.
- The final design document was approved by Caltrans in March 2018.
- The project reached the Ready-to-List milestone in April 2018.



#### Current Project Activities

- The project is shelf-ready should construction funds become available.
- Caltrans will submit this project for a Federal INFRA grant due in March 2019.
- MTC and STA staff continue to explore other potential funding sources.

### Project Schedule by Phase



\* Funding for these activities is not yet secured.

### Project Cost

Total Cost Estimate <sup>(1)</sup>	Cost Estimate, Funded Phases <sup>(2)</sup>	Regional Measure 2 Funds (allocated)	Other Funding (allocated)	BATA Express Lane Funds <sup>(3)</sup>			Percent Complete <sup>(4)</sup>
				July 2018 Amendment	Sept. 2018 Amendment	Expended as of 12/31/18	
228.2	33.3	15.2		19.0	18.1	11.2	20%

The cost estimate for this project includes planning, design, construction, utilities, backhaul communications and toll system integration.

Costs shown in millions of escalated dollars.

- <sup>(1)</sup> Total Cost Estimate represents current estimated cost to complete each project.
- <sup>(2)</sup> Cost Estimate, Funded Phases represents current estimated cost to complete phases that are funded for each project.
- <sup>(3)</sup> BATA Express Lane Funds represent the funds that have been allocated from the BATA budget.
- <sup>(4)</sup> Percent complete shown is based on the achievement of major milestones whether those milestones were completed using BAIFA funds or other funds.

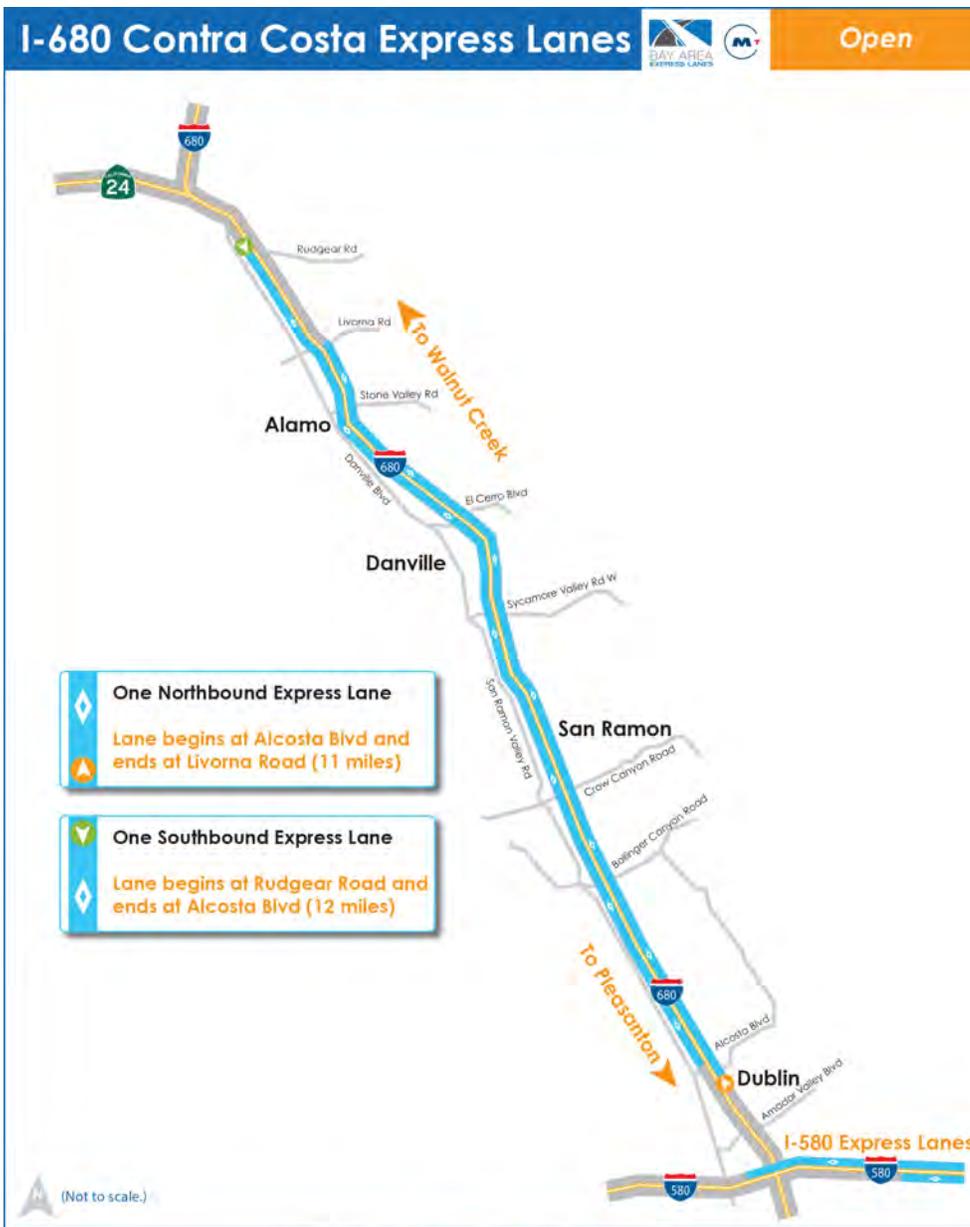
# IV. OPERATIONS

## I-680 Contra Costa Express Lanes

The I-680 Contra Costa Express Lanes opened October 9, 2017. The lanes run 11 miles northbound from Alcosta Boulevard to Livorna Road and 12 miles southbound from Rudgear Road to Alcosta Boulevard. Regional Operations Center staff monitor equipment and lane performance, make toll rate adjustments, and coordinate with the California Highway Patrol (CHP) and Caltrans on incident management. The FasTrak® Customer Service Center issues toll tags, handles toll invoicing and collections, and provides customer service. Toll tag and vehicle occupancy requirements are enforced automatically by the

toll system and manually by the CHP under contract to BAIFA. A ‘backhaul’ fiber network and supplemental leased-line services offer fast and secure transfer of tolling data. Roadway maintenance is also funded by the express lanes. Program and contractor staff perform public outreach and education, track and report on program performance and analyze traffic, and support operations in other ways as needed. Operating revenue and expenses are reported quarterly to BAIFA.

See **Appendix C** for a summary of this quarter’s express lanes performance.



### Rules of the Road

- Hours are Monday through Friday, 5 a.m. – 8 p.m.
- Tolls change based on traffic congestion; there is no maximum toll
- All vehicles in the express lane must use a FasTrak® or FasTrak Flex® toll tag
- Carpools of 2 or more people, eligible clean air vehicles, motorcycles and transit buses travel toll-free with a properly set FasTrak Flex® toll tag
- Learn more at [expresslanes.511.org](http://expresslanes.511.org)

# APPENDICES

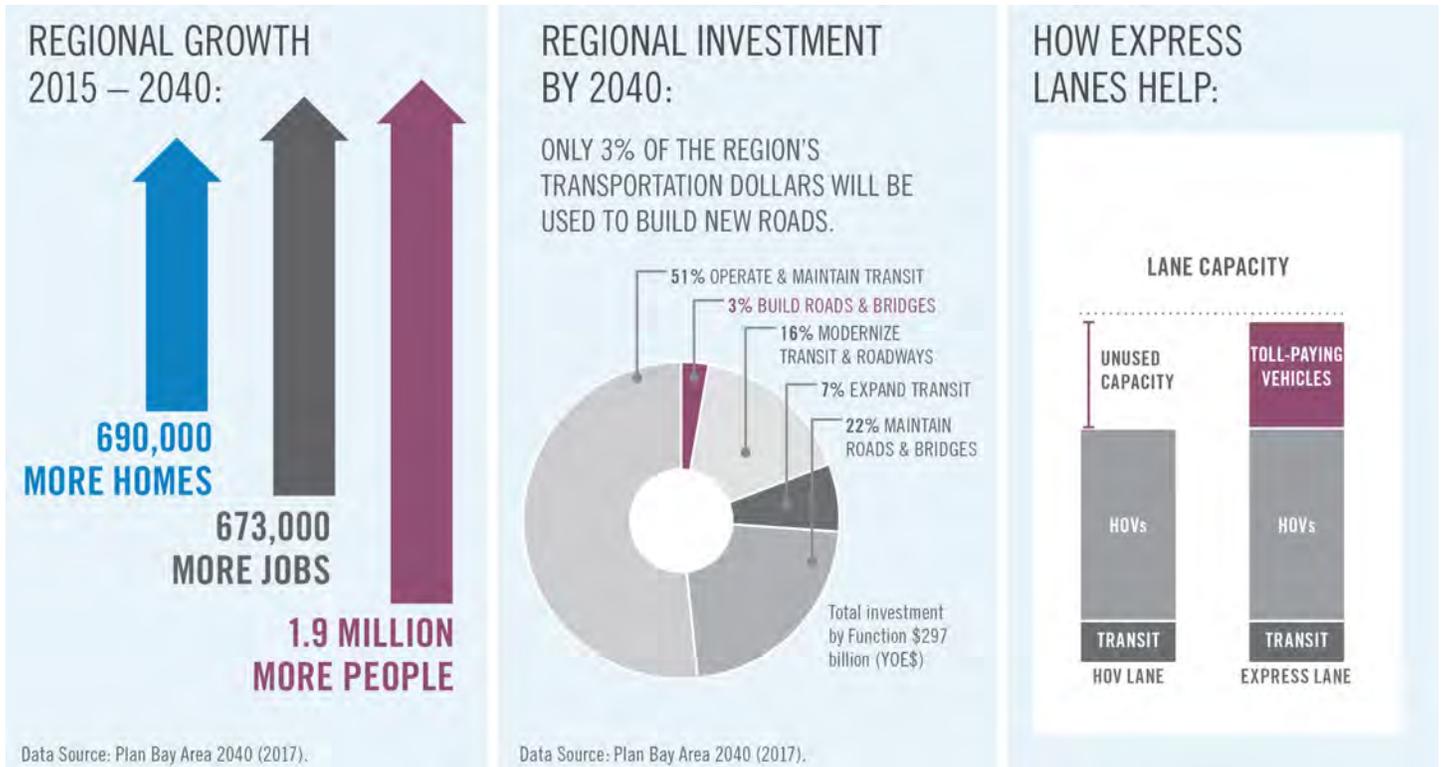
# APPENDIX A

## Express Lanes Overview

### 1. Why Express Lanes?

The Bay Area lacks the necessary transportation funding and land to build enough transportation capacity to keep up with regional growth. Bay Area Express Lanes maximize use of our highways by A) filling any empty space in existing HOV lanes,

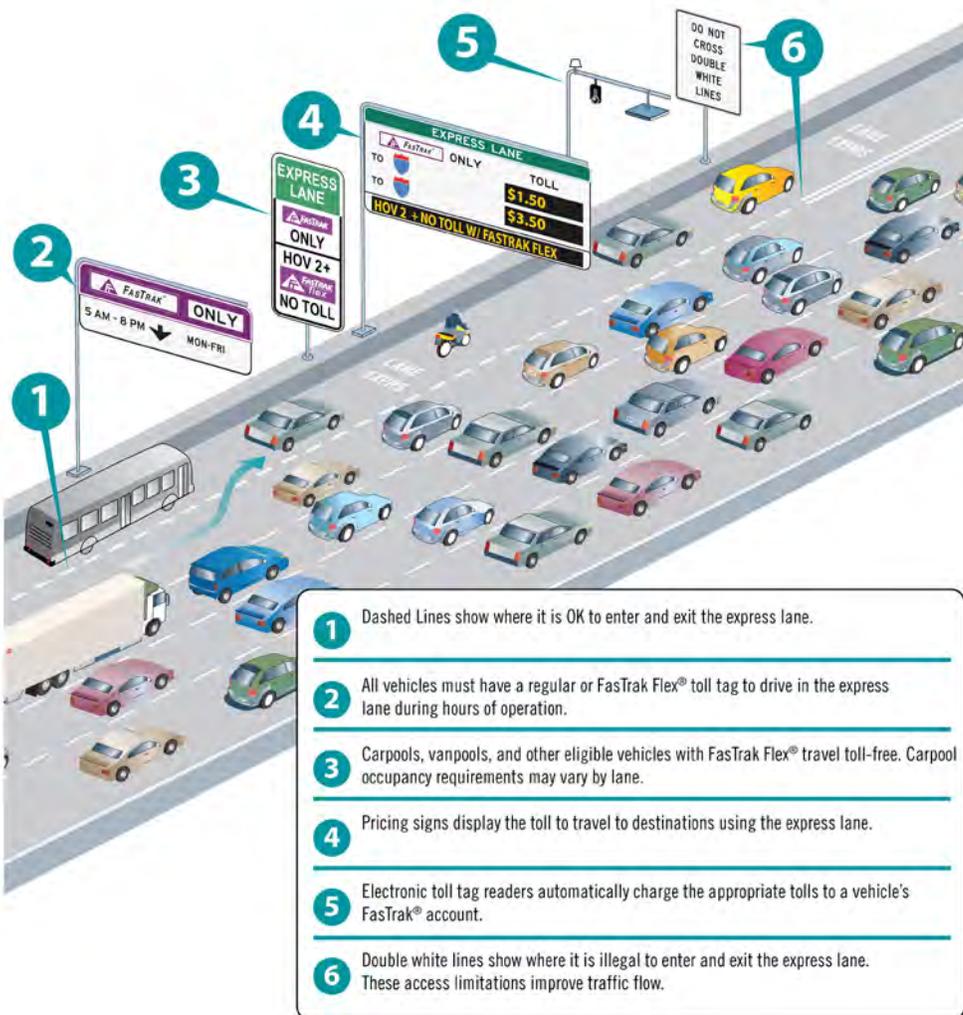
B) improving operations in existing HOV lanes through better carpool enforcement and strategies to prevent lane slowdowns, and C) filling gaps in the HOV lane system to encourage more carpooling.



## 2. How Express Lanes Work

MTC Express Lanes are free to carpools, vanpoolers, motorcycles, eligible clean air vehicles and transit buses. Solo drivers can choose to pay tolls to use the lanes. Tolls for solo drivers will be collected electronically via FasTrak®, as on Bay Area toll bridges. Overhead electronic pricing signs will display the current toll rates, which will increase as traffic congestion increases and decrease as traffic congestion decreases.

On MTC Express Lanes, carpools, qualifying clean-air vehicles and other toll-exempt vehicles must use a FasTrak Flex® toll tag set to “2” or “3+” to travel toll-free. Solo drivers pay to use the lanes with either a standard FasTrak® toll tag or a FasTrak Flex® toll tag set to “1.” Drivers should move the switch before driving.



The figure to the left explains how to use Bay Area Express Lanes. MTC Express Lanes will be mostly “open” access, meaning drivers will enter and exit the express lanes similar to how they enter and exit HOV lanes today. Areas in locations prone to excessive weaving or with safety issues will have limited access to restrict entry and exit at these locations. Signage and lane striping will identify the limited entry and exit locations. Limited access is a way to improve travel speeds in express lanes.

### 3. System Technology and Elements

MTC Express Lanes are implemented by overlaying communications equipment on new and existing freeway infrastructure. Express lanes implementation requires four discrete elements that are integrated through design, construction and operations, including:

#### Civil Infrastructure (Highway Modifications)

For lane conversions, the civil infrastructure consists of sign structures, sign panels, lane striping, and conduit work for power and communications. For gap closure and extension projects, the civil infrastructure includes highway widening to add lanes as well as the signage and communications equipment required for conversions.

The civil contractor will put in place the foundations and structures upon which the toll systems contractor will install the toll equipment. In addition, the civil contractor will construct the infrastructure necessary to provide power and communications to the toll system.

#### Toll System

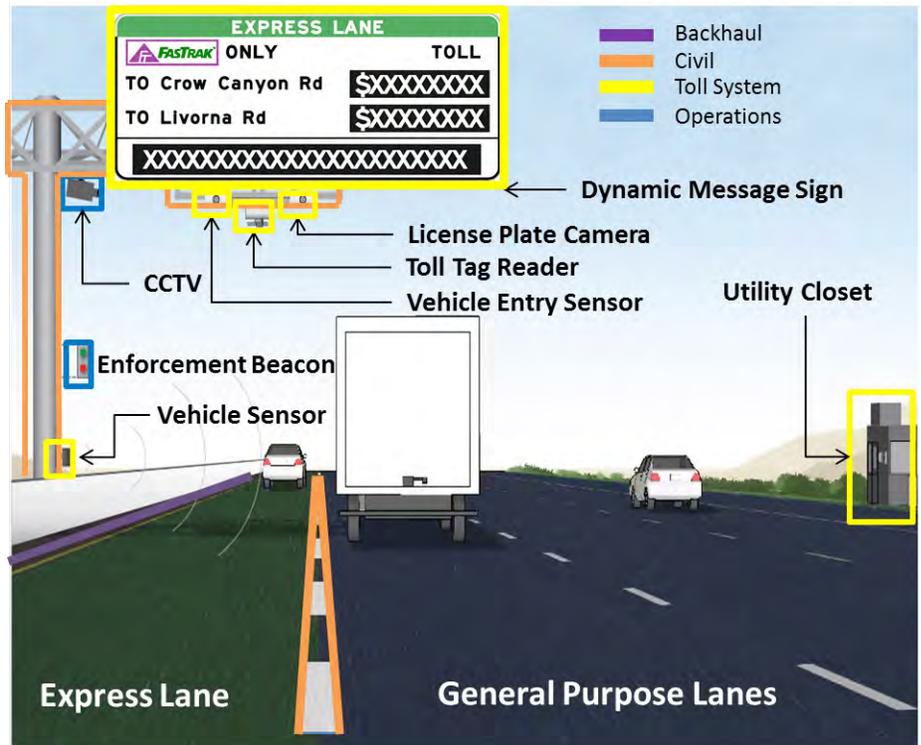
The toll system consists of two components, the in-lane system and the back-end "host" system. The lane system consists of all the equipment on the highway needed to operate the toll system including toll tag readers, cameras and vehicle detection. The host system serves as the brain of the toll system, which collects and processes all the data from the highway and sends it to the regional customer service center for billing.

#### Backhaul Communications Network

The backhaul network is the communication line along which data collected in the lanes is sent to the toll host system, operations center and regional customer service center. The backhaul contractor will install new conduit and communications fiber as well as utilize existing Caltrans, BART and other infrastructure to build the network. The backhaul network is being designed with the expectation that it will become part of a broader regional communications network.

#### Operations

The operations element consists of everything that is needed to successfully operate the express lanes including: an operations center, the regional customer service center, enforcement, public outreach, performance monitoring and ongoing maintenance. An express lanes Regional Operations Center will be established in the Bay Area Metrocenter building in San Francisco where operators will actively monitor the condition of the lanes and coordinate with Caltrans and the California Highway Patrol to ensure that the lanes operate efficiently.



For illustrative purposes only

# APPENDIX B

## Completed Capital Project Summaries

### I-680 Contra Costa Southern Segment (CC-680 South)

#### Walnut Creek to San Ramon

#### Livorna Road/Rudgear Road to Alcosta Boulevard

#### Total Program Estimate

\$55.6 million

#### Open Date

Fall 2017

#### Project Description

The project converts existing HOV lanes to express lanes on I-680 from Rudgear Road to Alcosta Boulevard in the southbound direction and from Alcosta Boulevard to Livorna Road in the northbound direction. It will result in 23 express lane miles through San Ramon, Danville, Alamo and southern Walnut Creek. No widening or additional lanes will be added to the freeway.

This conversion project includes striping lanes and installing sign gantries, signs, FasTrak<sup>®</sup> toll tag readers, and traffic monitoring video cameras. In addition, the project installs equipment and observation areas to help the California Highway Patrol enforce proper use of the lanes.

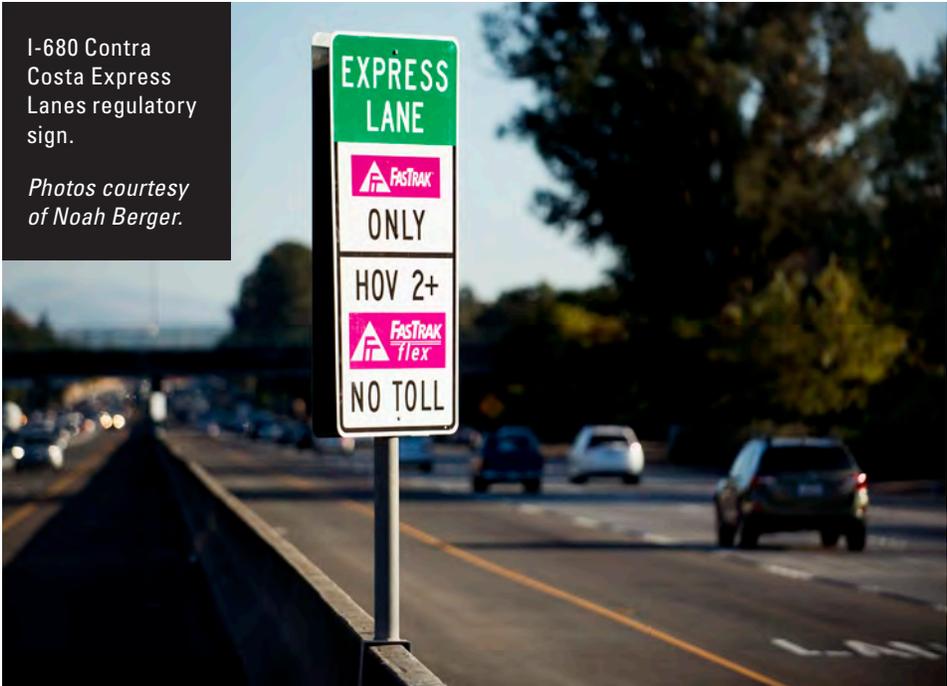
#### Project Highlights and Progress

- Public open house was held in March 2014.
- Preliminary engineering report and environmental document were completed in August 2014.
- Final design for both the backhaul communication network and the toll system were completed in December 2015.
- Final roadway design was completed in April 2015. Civil construction was completed in May 2017.
- Backhaul contractor completed installation of 26 miles of fiber optic cable in June 2017.
- Corridor Testing was completed in August 2017.
- Toll system equipment and software was finalized and tested in September 2017.
- Backhaul operations and maintenance started in October 2017.
- The toll system went live to the public on October 9, 2017.

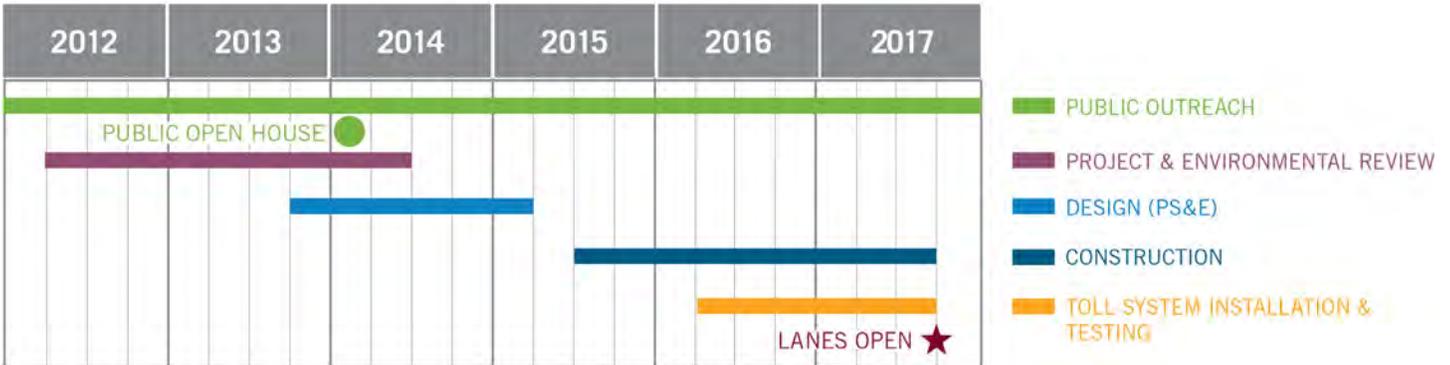


### Current Project Activities

- The integrator is fine tuning field equipment and addressing punch list items in preparation for Operations Testing in summer of 2018. This test verifies the toll system meets all specifications and leads to the maintenance phase of operations.
- The Backhaul contractor completed project 'as-built' documentation and is performing ongoing operations of the communications network.
- Beginning in this Quarterly Report, since civil construction is complete and the express lanes are open, this capital project will be archived in Appendix B and no further updates will be made to the project summary.



### Project Schedule by Phase



### Project Cost

Program Estimate <sup>(1)</sup>	Cost Forecast <sup>(2)</sup>	Regional Measure 2 Funds (allocated)	BATA Express Lane Funds <sup>(3)</sup>			Physical % Complete <sup>(4)</sup>
			Dec. 2015 Amendment	June 2017 Amendment	Expended through 3/31/18	
55.6	55.6		55.6	55.6	49.7	98%

The program estimate for this project includes planning, design, construction, utilities, backhaul communications and toll system integration.

Costs shown in millions of escalated dollars.

(1) Program estimate represents current estimated cost to complete each project.  
 (2) Cost forecast represents current estimated cost to complete phases that are funded for each project.  
 (3) BATA Express Lane Funds represent the funds that have been allocated from the BATA budget.  
 (4) Physical percent complete shown is based on the achievement of major milestones whether those milestones were completed using BAIFA funds or other funds.

# APPENDIX C

## I-680 Contra Costa Express Lanes Operations Report

# I-680 Contra Costa Express Lanes Performance

## 4<sup>th</sup> Quarter, October – December 2018



Bay Area Infrastructure Financing Authority

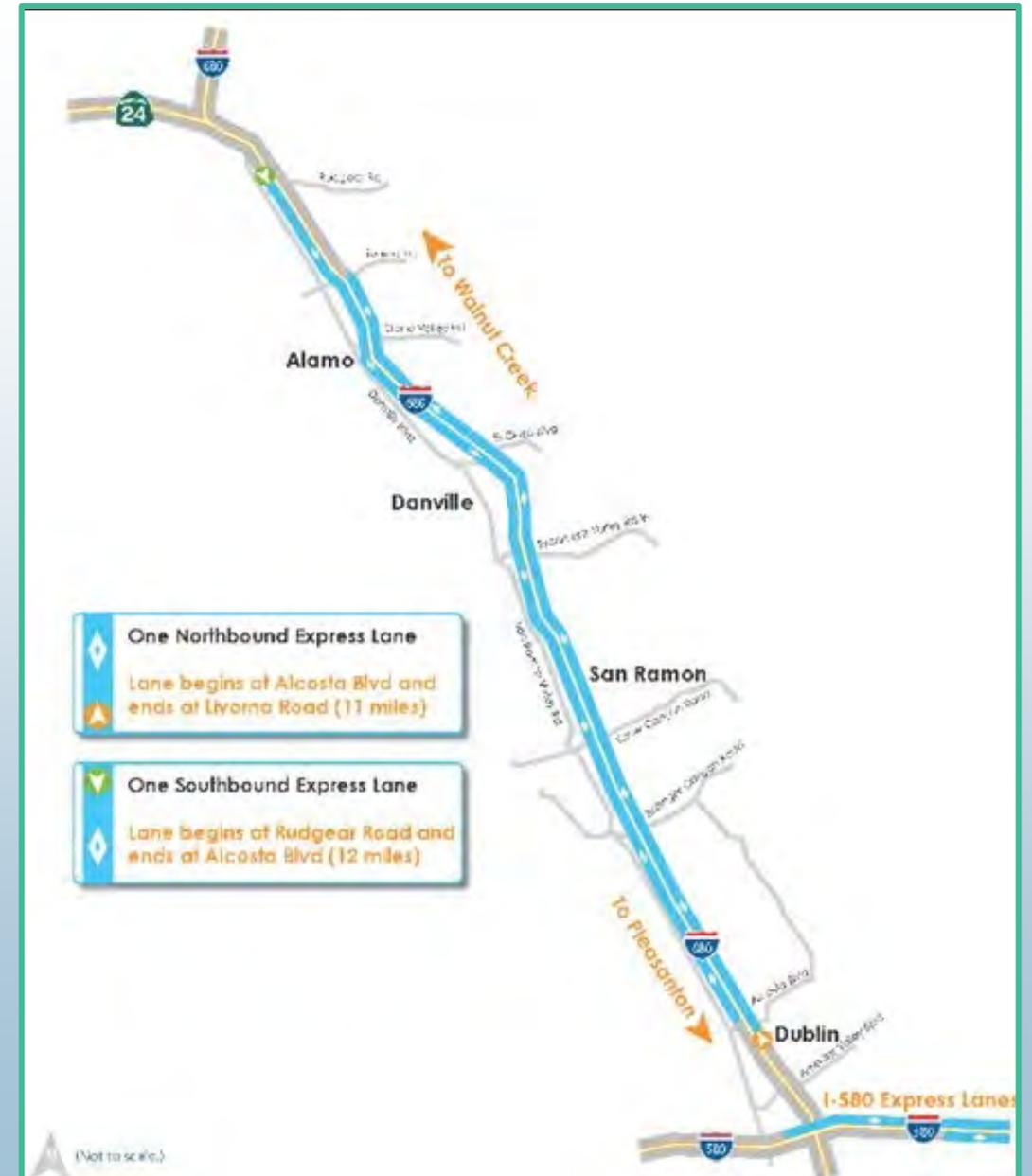
Submitted: February 2019



METROPOLITAN TRANSPORTATION COMMISSION

# Rules of the Road

- Hours: 5 a.m. to 8 p.m. Monday-Friday
- FasTrak<sup>®</sup> required
- Carpools (2+), clean-air vehicles & motorcycles toll-free with FasTrak Flex<sup>®</sup>



# Summary of Performance Highlights

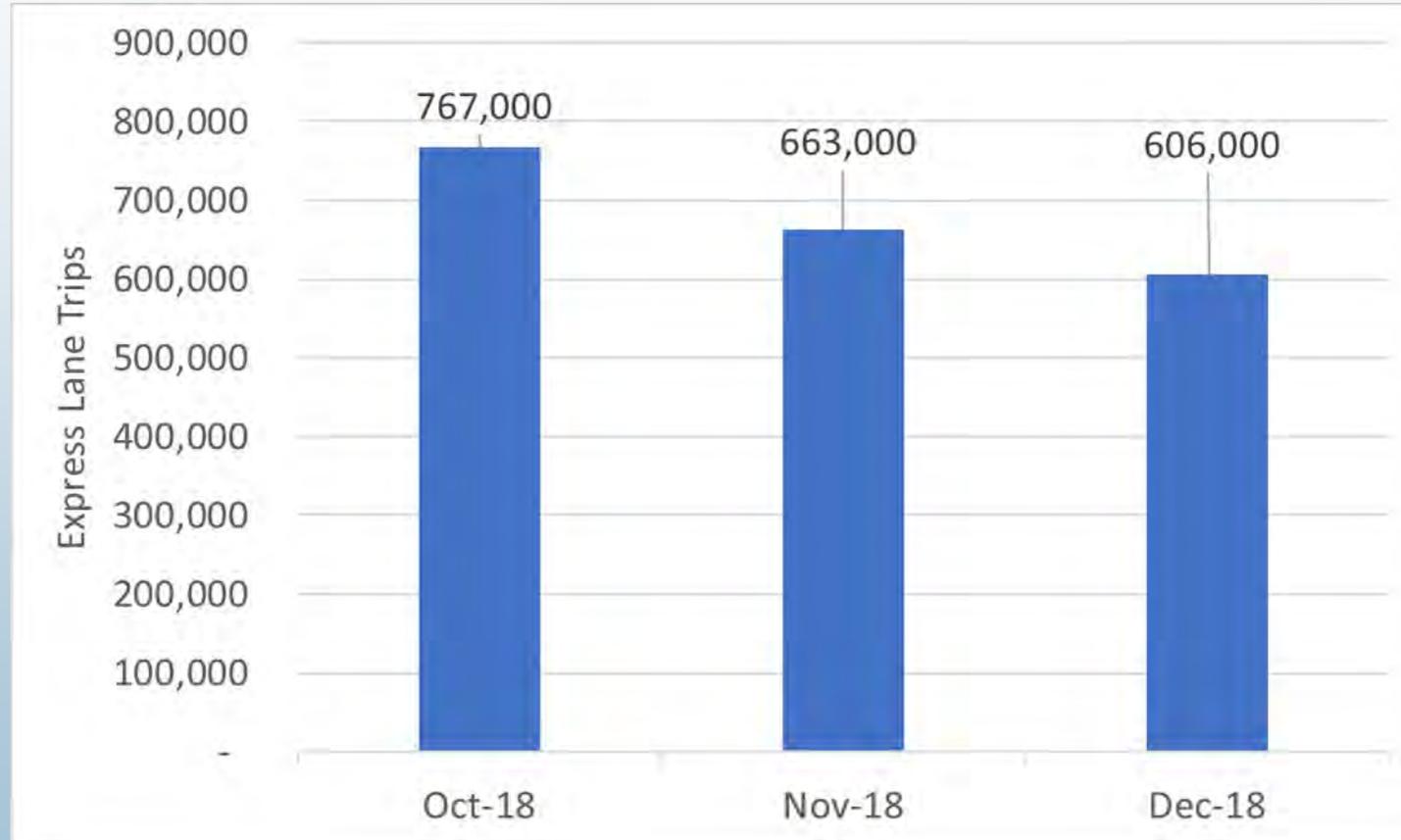


- There were over 2 million trips in the express lanes from October through December 2018, with an average of 30,000 trips per day in December. Trips were lighter in November and December due to the holidays.
- In December, 43% of trips were by vehicles declared as carpools. Vehicles without FasTrak<sup>®</sup> accounts represented 4% of all trips.
- In the peak periods, express lane users were able to travel at speeds that were 8 to 9 miles per hour faster than the general purpose lanes in December, on average.
- Peak period tolls paid remained almost the same over the quarter. In December, the average toll paid in the northbound p.m. peak period was \$6.50. In the southbound a.m. peak period it was \$5.80. In the middle of the day, it was less than \$1.00. The toll amounts paid in this quarter decreased compared to last quarter due to lighter holiday traffic.
- The highest posted toll to travel the entire corridor during the quarter was \$8.50, which was reached in the a.m. and p.m. peak periods in both directions.



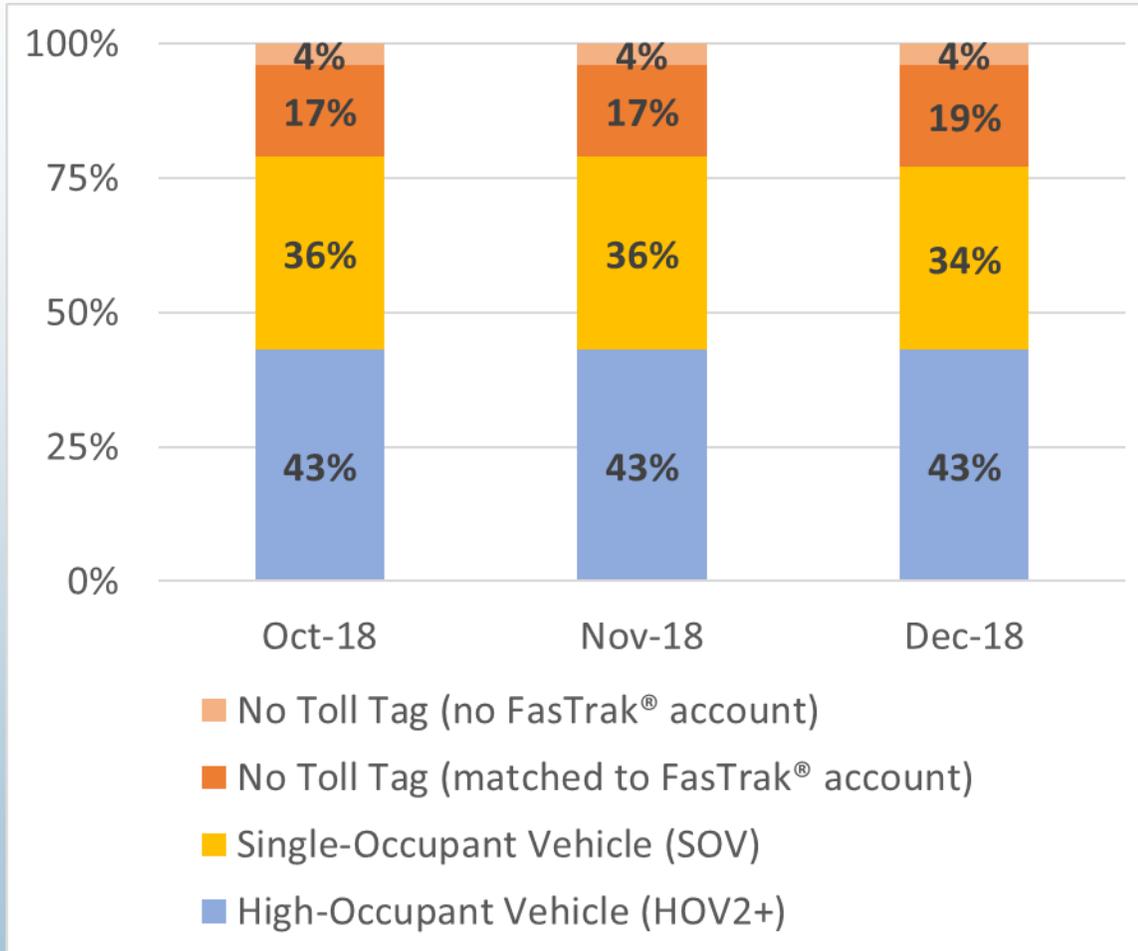
# Express Lane Trips

In total, there were over 2 million trips taken in the express lanes between October and December 2018. Average daily trips varied from 33,000 in October to 30,000 in December.



*Includes toll-free trips, tolled trips and violation trips taken during express lane hours.*

# Express Lane Trip Types



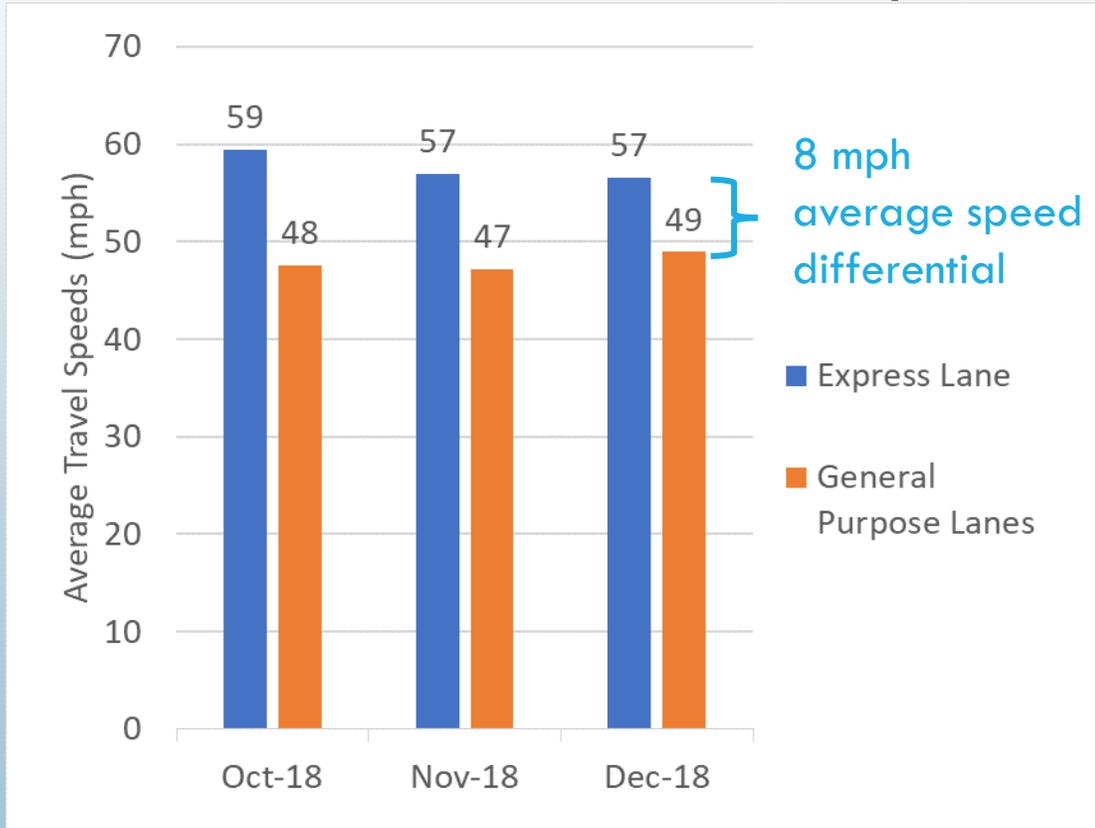
- The share of vehicles declared as carpools, including clean air vehicles eligible to use the lanes toll-free, held steady at 43%.
- Paying customers represented 53% of all users. This includes single occupant vehicles and users with no toll tag that were matched to a FasTrak® account.
- This quarter, 4% of trips were by users without a FasTrak® account (violators).

*Percentages of SOVs and HOVs are based on toll tag settings detected by the toll system.*

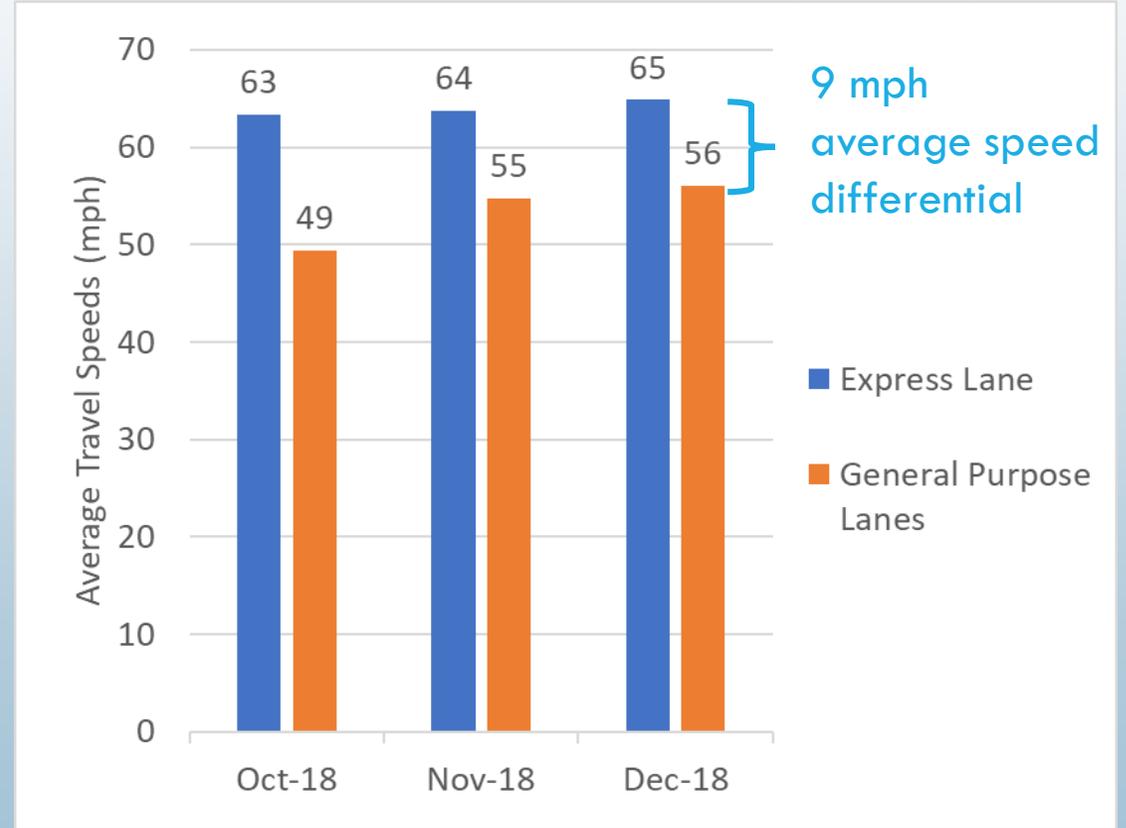
# Traffic Speeds

Speeds in the express lanes were an average of 8 to 14 miles faster than those in the general purpose lanes.

### Northbound P.M. Peak Hour (5 - 6pm)



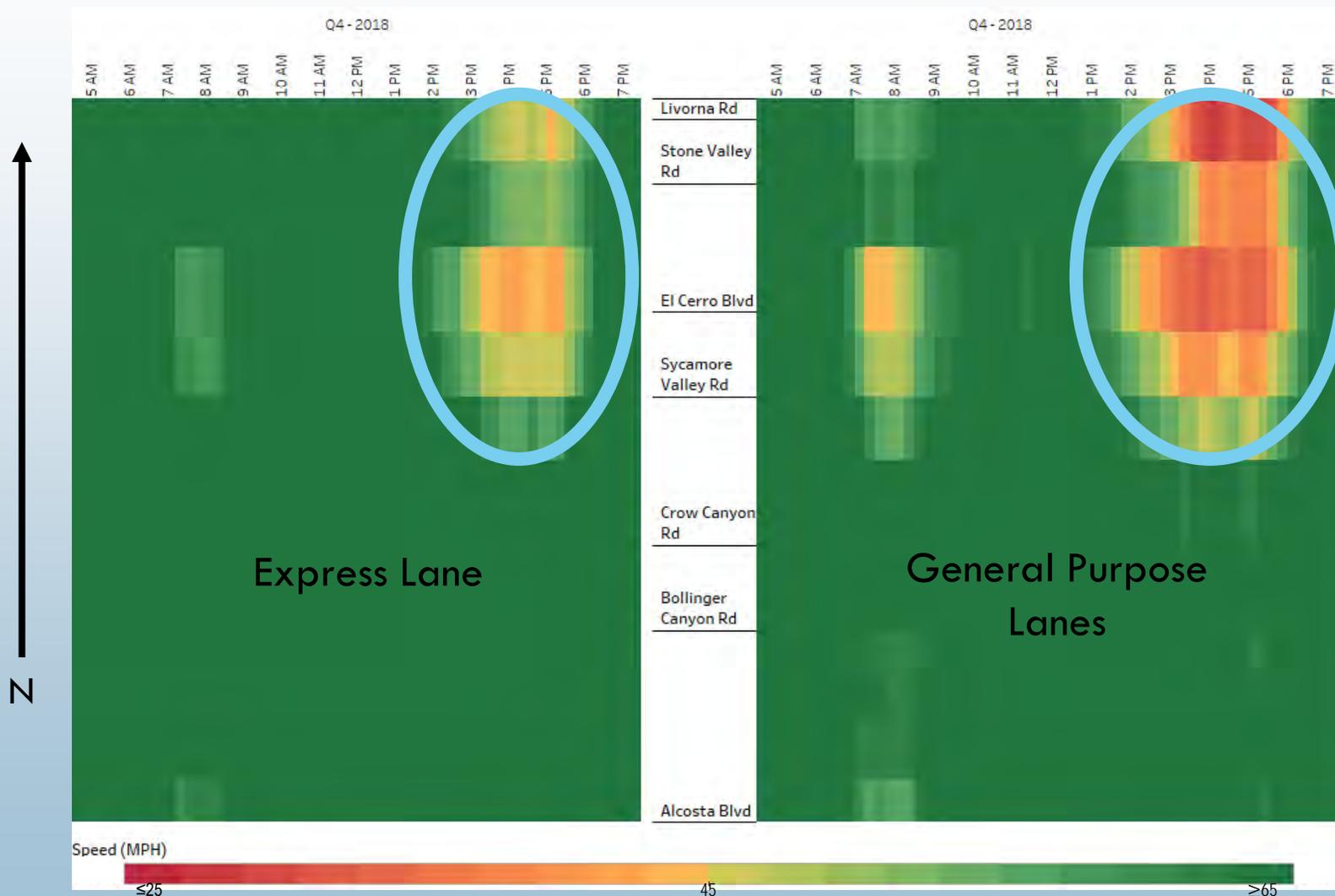
### Southbound A.M. Peak Hour (8 - 9am)



Speeds are averaged over the distance of the express lane. Peak hours are defined as the hours with lowest average corridor speeds across all lanes.

# Northbound Corridor Speeds

(October 1 – December 31)

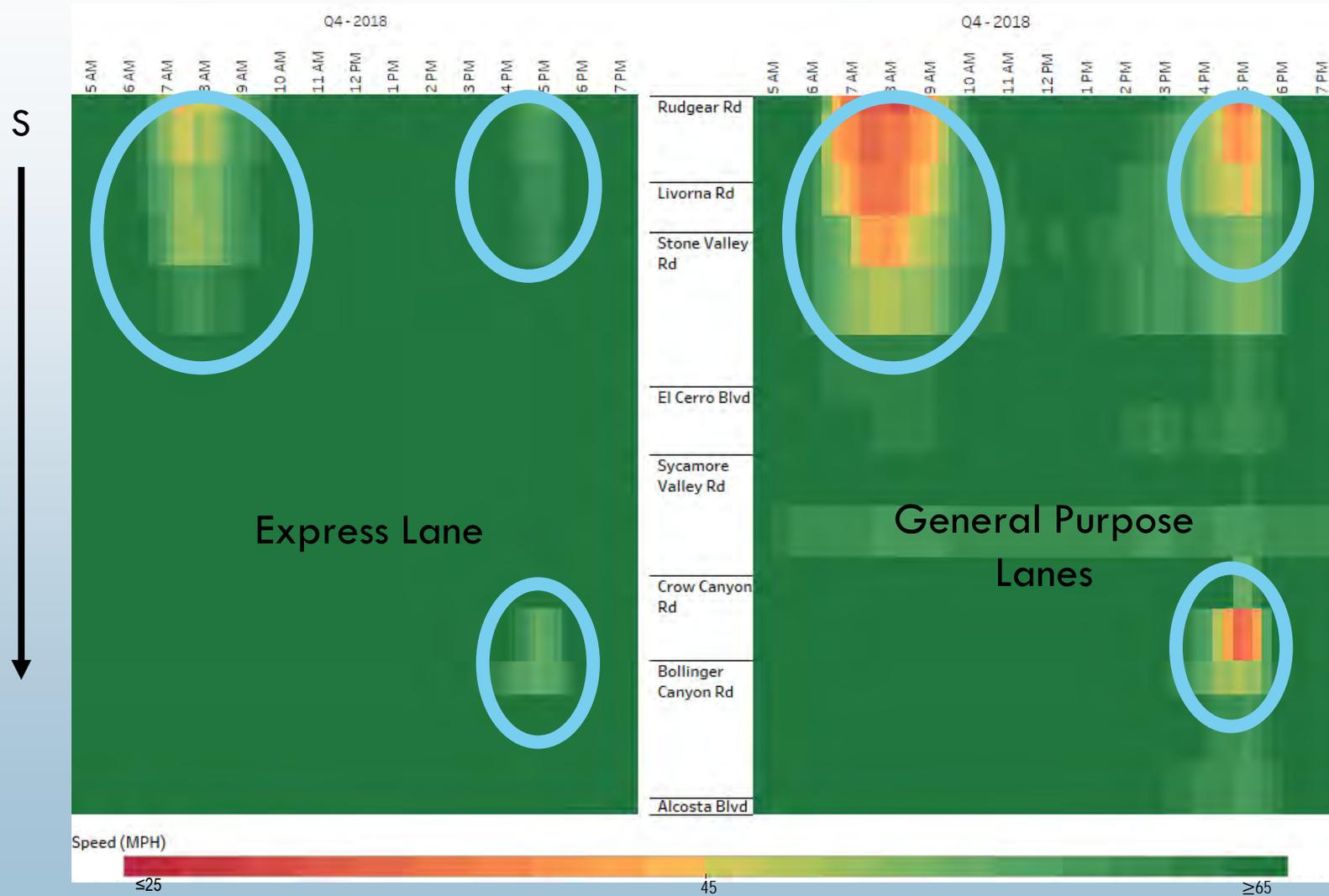


Congestion originating north of the express lane regularly caused the slowdowns shown in the general purpose lanes in the p.m. peak period.

In the congested areas circled at left, express lane users were able to travel faster than vehicles in the general purpose lanes during the peak hour by an average of 11 mph in October, 10 mph in November, and 8 mph in December.

Traffic flowed well in all lanes during the middle of the day, 10 a.m. to 1 p.m.

# Southbound Corridor Speeds (October 1 – December 31)



As shown in the congested areas circled on the right, slowdowns regularly occurred in the general purpose lanes between Rudgear Rd. and El Cerro Blvd. in both the a.m. and p.m. peak periods, and between Crow Canyon Rd. and Bollinger Canyon Rd. in the p.m. peak.

As shown on the left, express lane users were able to travel faster than vehicles in the general purpose lanes during the peak hour by an average of 14 mph in October, 9 mph in November, and 9 mph in December.

# Northbound Tolls

(October 1 – December 31)

The graph below shows the average toll paid by time of day for the northbound direction. The highest toll posted to travel the entire corridor was \$8.50.



# Southbound Tolls

(October 1 – December 31)

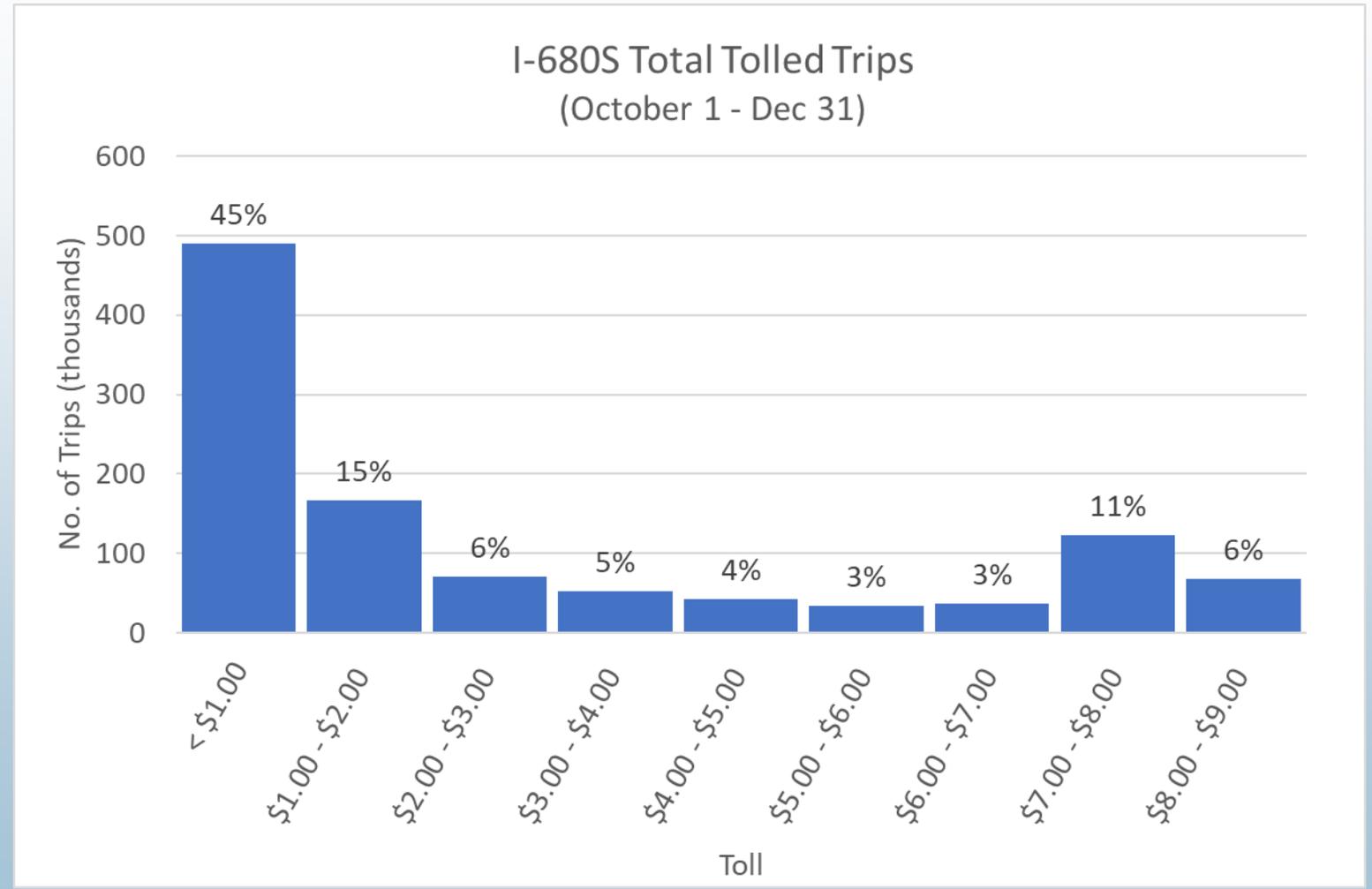
The graph below shows the average toll paid by time of day for the southbound direction. The highest toll posted to travel the entire corridor was \$8.50.



# Trip Length & Toll Distribution

(October 1 – December 31)

- 60% of users paid \$2 or less.
- Only 6% of users paid the highest posted toll.
- Average trip length for all trip types:
  - daily: 5.6 mi
  - a.m. peak, southbound: 6.6 mi
  - p.m. peak, northbound: 6.3 mi

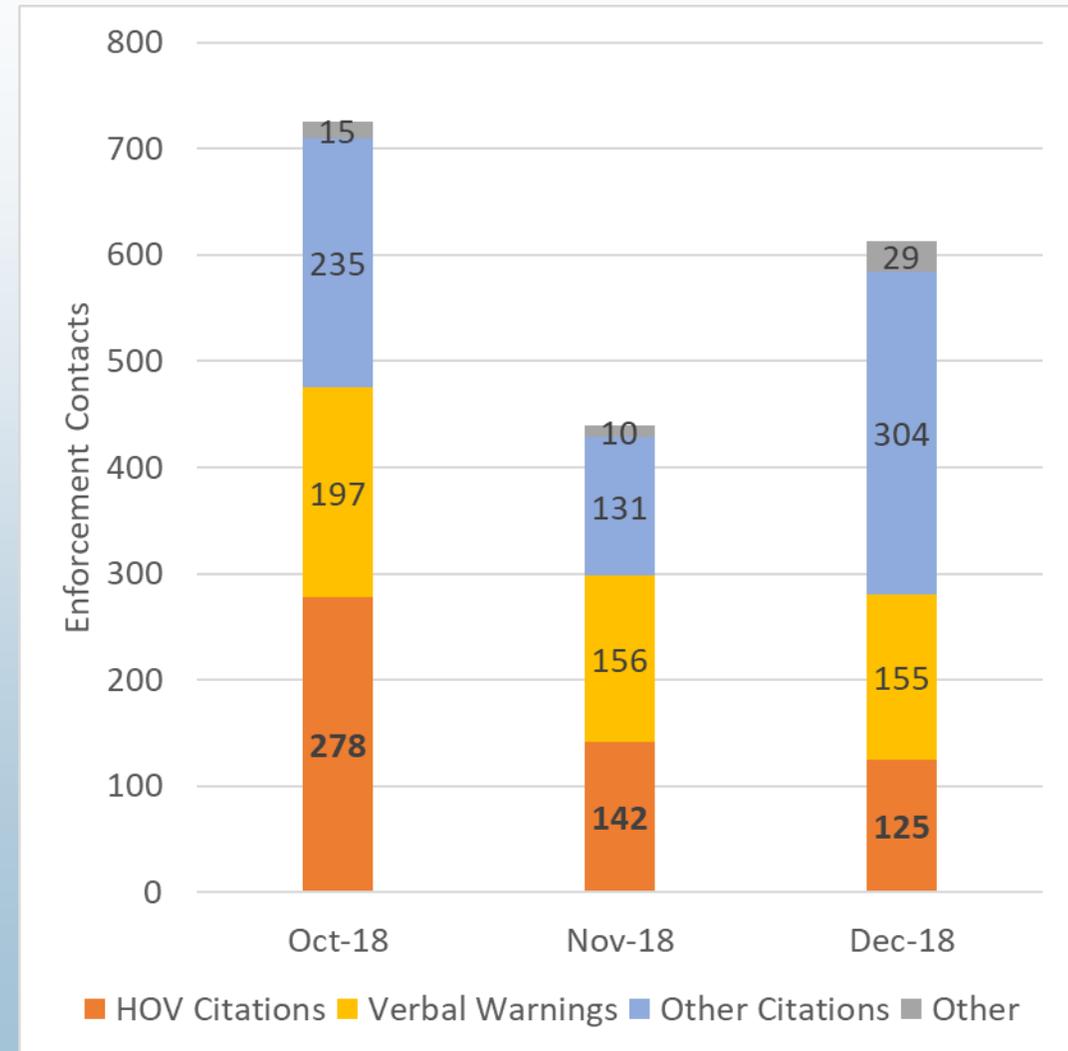
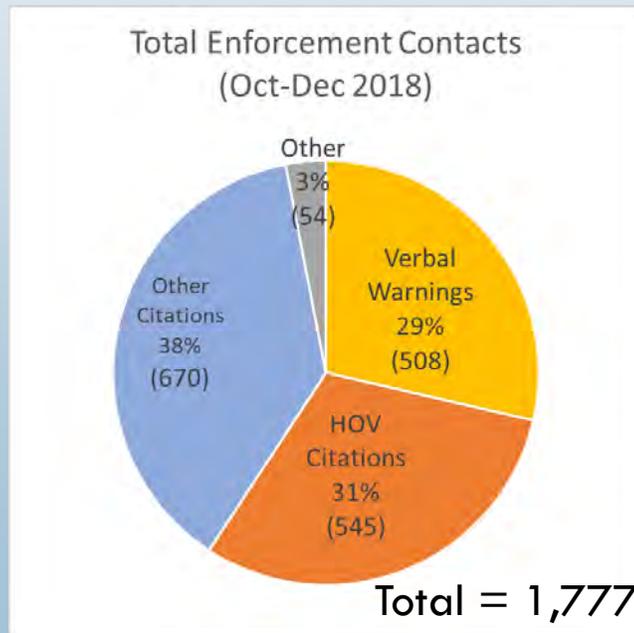


N = 1,083,056 tolled trips

# CHP Enforcement

(October 1 – December 31)

- CHP made 1,777 enforcement contacts, 31% of which resulted in citations for HOV occupancy violations.
- CHP filled 91% of 1,280 requested hours of enforcement.



For more information, go to: [mtc.ca.gov/express-lanes](https://mtc.ca.gov/express-lanes)

