

# EMERGING ISSUES IN PRICED MANAGED LANE NETWORK IN VIRGINIA

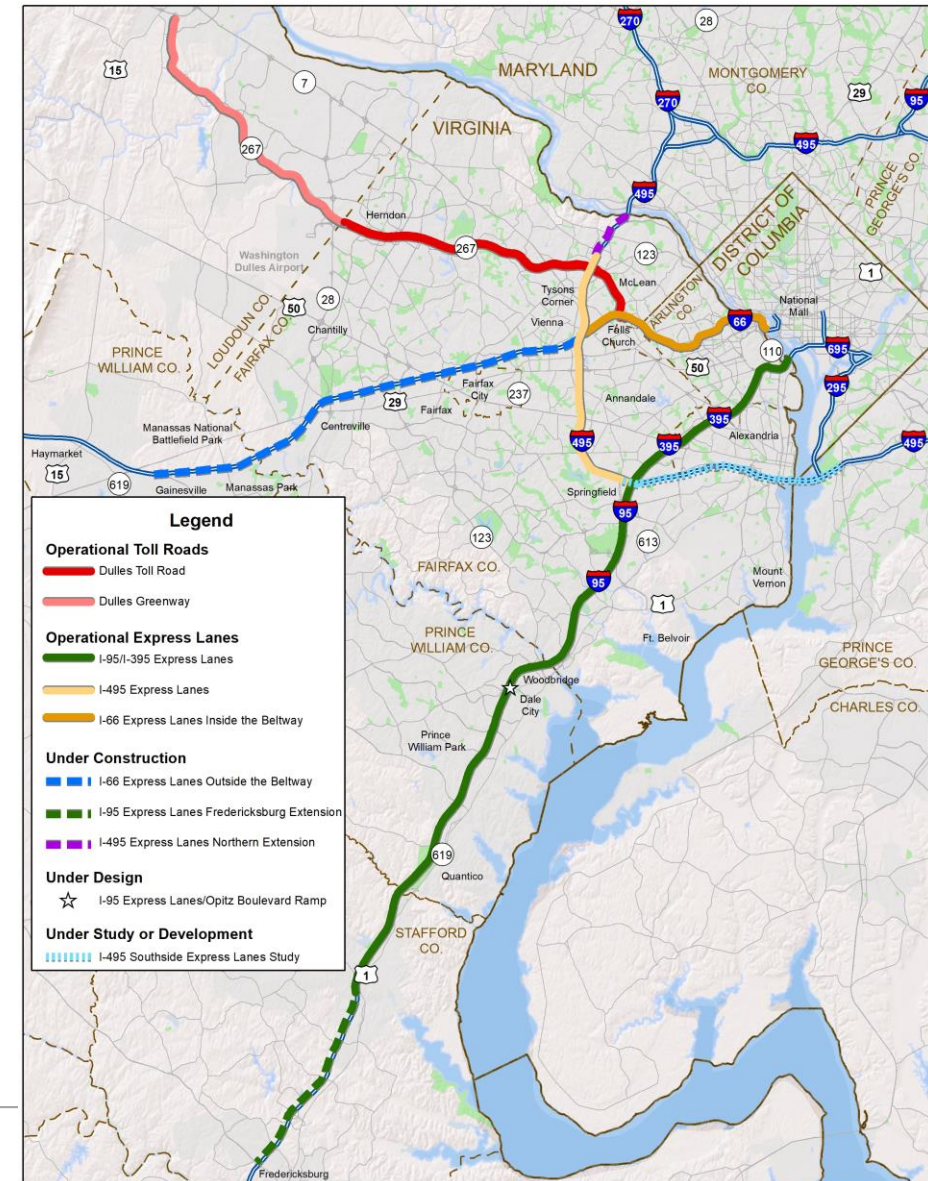
April 14, 2022

 **Jeong Yun Kweun, Ph.D.**

Program Manager, Office of Public-Private Partnerships, Virginia Department of Transportation

# Northern Virginia Regional Express Lanes /Toll Roads Network

- In Northern Virginia (NOVA),  
110+ mile express lanes / toll roads  
network by late 2022.
  - 90+ mile express lanes network under  
operation / construction
  - 28 miles of toll roads under operations
- NOVA express lanes /toll roads network  
increases trip reliability across a network  
of systems and increase roadway safety  
and operational efficiencies.



# Challenges During Development Phase

- Driver behavior is impacted by existing express lanes (i.e. “network effect”) and must be accounted for when considering additional improvements.
- Express lanes are more complex to model than traditional toll roads.
- Modeling a network of express lanes further increases the complexity.
- NOVA express lane have many variables:
  - Tolling policies, including differing segmental tolls
  - Owners/operators
  - Operating rules
  - HOV policies
  - Configuration
  - Concession length



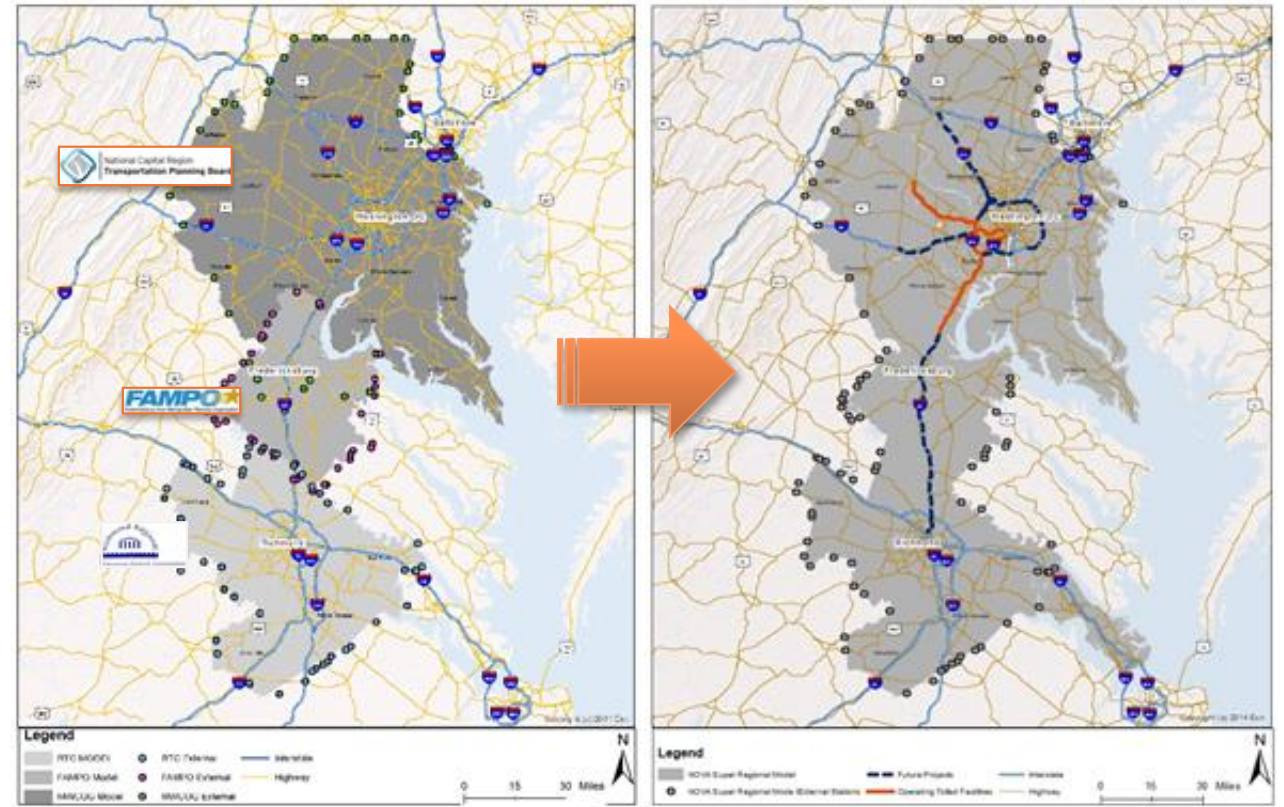
# Comparison of NOVA Express Lane / Toll Roads Network Operations

Facility	Operators	Concession Term	Tolling	HOV Policy	ML/GP Lane Configuration	ML Hours of Operation	Heavy Commercial Vehicles	AAWDT (2019)
I-66 Inside	VDOT	--	Dynamic	HOV2+ going to HOV3+	ML: 2-3	Weekdays EB: 5:30 - 9:30 am WB: 3:00 - 7:00 pm	Not allowed	80k - 140k
I-66 Outside	Cintra	2066	Dynamic	HOV3+	ML: 2 GP: 3-4	24/7	Allowed	130k - 190k
I-495 Capital Beltway	Transurban	2087	Dynamic	HOV3+	ML: 2 GP: 4-5	24/7	Not allowed	140k - 275k
I-95	Transurban	2087	Dynamic	HOV3+	ML: 2-3 Reversible GP: 3-5	Weekdays NB: 2:00 - 11:00 am SB: 1:00 pm - Midnight  Saturday SB: Midnight - 2:00 pm NB: 4:00 pm - Midnight	Not allowed	70k - 260k
I-395	Transurban	2087	Dynamic	HOV3+	ML: 3 Reversible GP: 3-4	Sunday NB: All day		205k - 260k
Dulles Toll Road	MWAA	--	Fixed	HOV2+ on 1 lane (peak periods)	Not ML	24/7 (GP Only)	Allowed	145k - 175k
Dulles Greenway	TRIP II	2056	Variable	--	Not ML	24/7 (GP Only)	Allowed	35k - 50k



# Why a Super Regional Model (SRM)?

- The SRM addresses challenges of a network of express lanes / toll roads spanning 3 MPO regions:
  - Addresses toll choice needs in terms of using individual or combinations of express lanes.
  - Additional “decision points” for long-distance trips when traversing express lane facilities under different toll pricing algorithms.
  - Analyzes travel behavior (trip interaction and toll integration) across a network of tolled facilities and express lanes.
- Combined model region with 5,996 TAZs covers roughly 10,600 sqm. over 40 counties/jurisdictions.



Maintained integrity of each constituent model and standardized mode input variables / parameters while enhancing specific model components and creating mutual benefits across model geographies.

# The SRM Approach

Current approach is an improved version of the corridor-level modeling approach:

- Allows for accounting of crossover traffic between projects while retaining operational characteristics of individual projects.
- SRM becomes better with every project study.
- Enables review of long-distance trips that use multiple corridors.
- Enables continuous incorporation of observed data to enhance understanding of travel characteristics.
- Tailored toll choice functions introduce “decision points.”
  - Enable trips to simulate route choice between tolled and toll-free corridors.
  - Simulate interactions between multiple tolled facilities within the regional network.

## Regional Toll Choice Structure



21 functions developed individually for auto VOT & VOR by trip purpose (work and non-work trips)



# Benefits for Future Project Planning

## Off-the-Shelf Tool for Developing Pipeline for P3 Projects

- Eliminates initial effort obtaining and adapting the model when a project is introduced
- Saves time on initial model calibration, model runs, and troubleshooting
- Enhancements made on studied corridors retained for new studies
- Established on-going data collection channels
- Benefits through improved asset evaluation process and time/cost savings

## Makes Long-Trips/Truck Modeling Possible

- Long trips such as truck trips can be properly modeled only in regional platforms like the SRM
- Includes truck modeling enhancements through an independent study
- A regional truck SP survey, making the SRM a perfect platform for regional truck tolling evaluations

## Act Local, Think Global!

- A global planning tool that considers the interconnectivity of the entire express lanes/toll roads network
- Allows to assess impacts of a corridor improvement on the entire express lane network
- Could serve as a regional planning tool by identifying future network bottlenecks and prioritizing projects

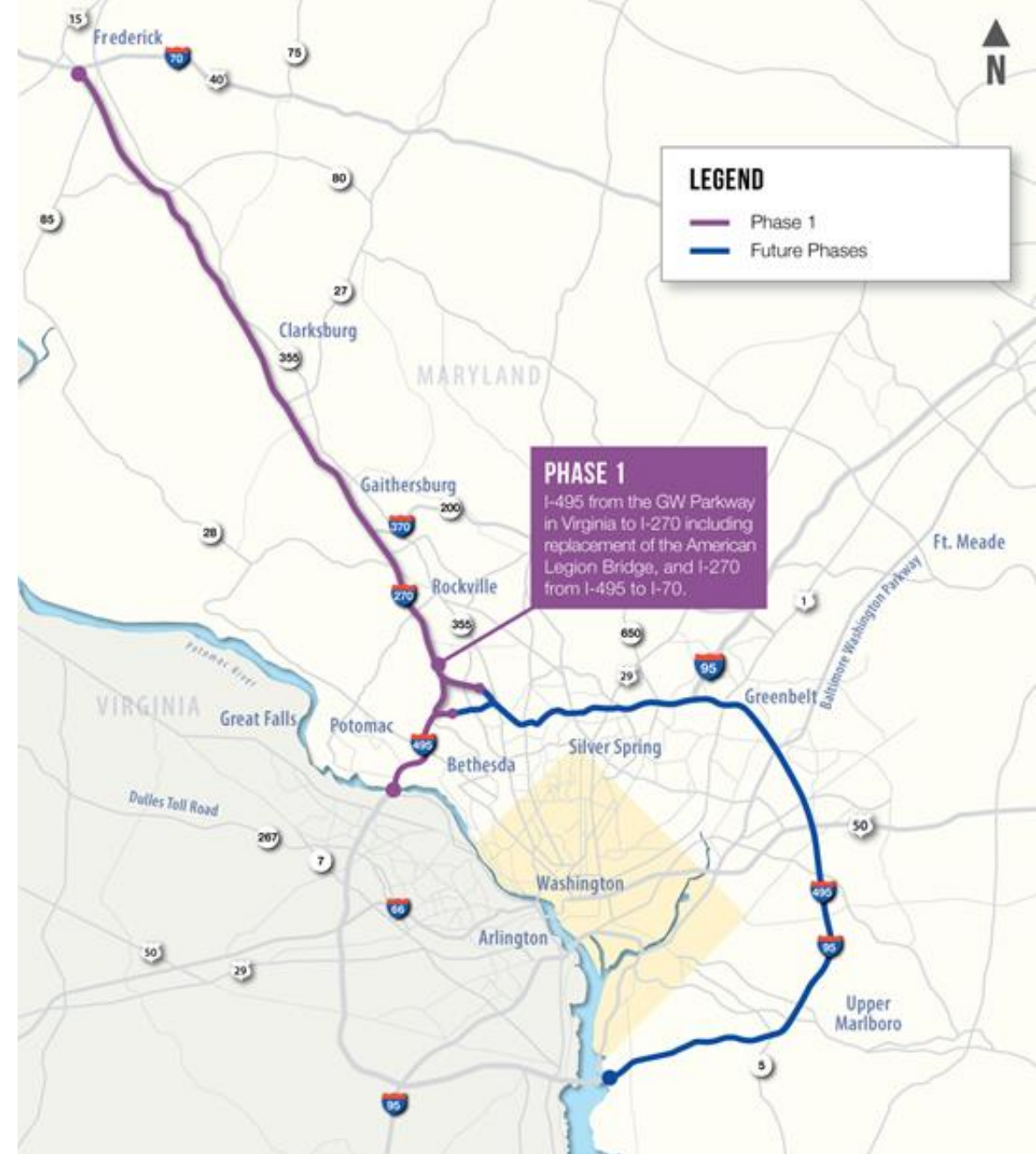
# **Emerging Issues in Priced Managed Lanes Op Lanes Maryland**

**April 14, 2022**

**Jeffrey T. Folden, P.E., DBIA**  
Director, I-495 & I-270 P3 Office



# Op Lanes Maryland

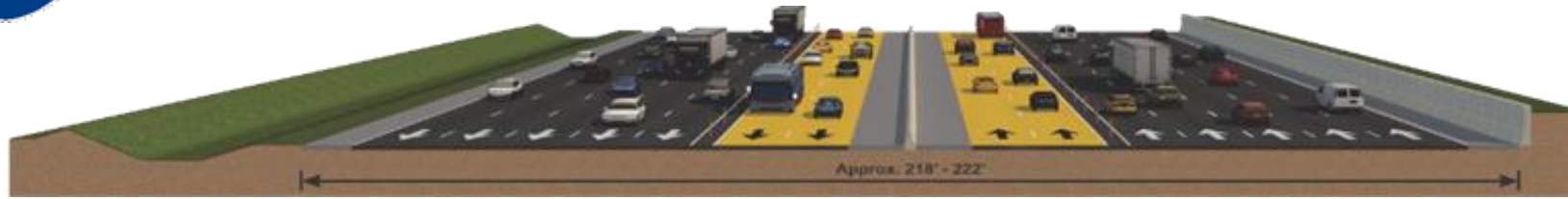


# New American Legion Bridge I-270 to I-70 Traffic Relief Plan

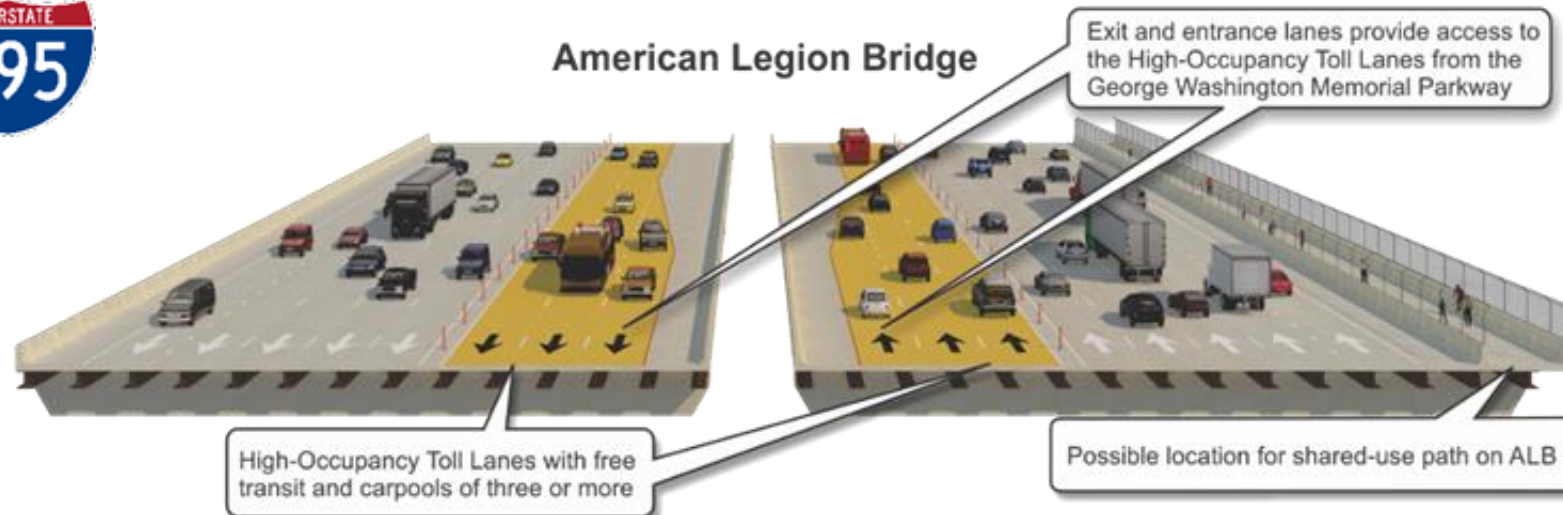
- **Phase 1 South** is I-495 from the George Washington Memorial Parkway to I-270 and I-270 from I-495 to I-370
- **Phase 1 North** is I-270 from I-370 to I-70 and is a separate study that is in Pre-NEPA Phase



# Preferred Alternative – Phase 1 South



Convert existing HOV lane to HOT lane and add one HOT lane in each direction

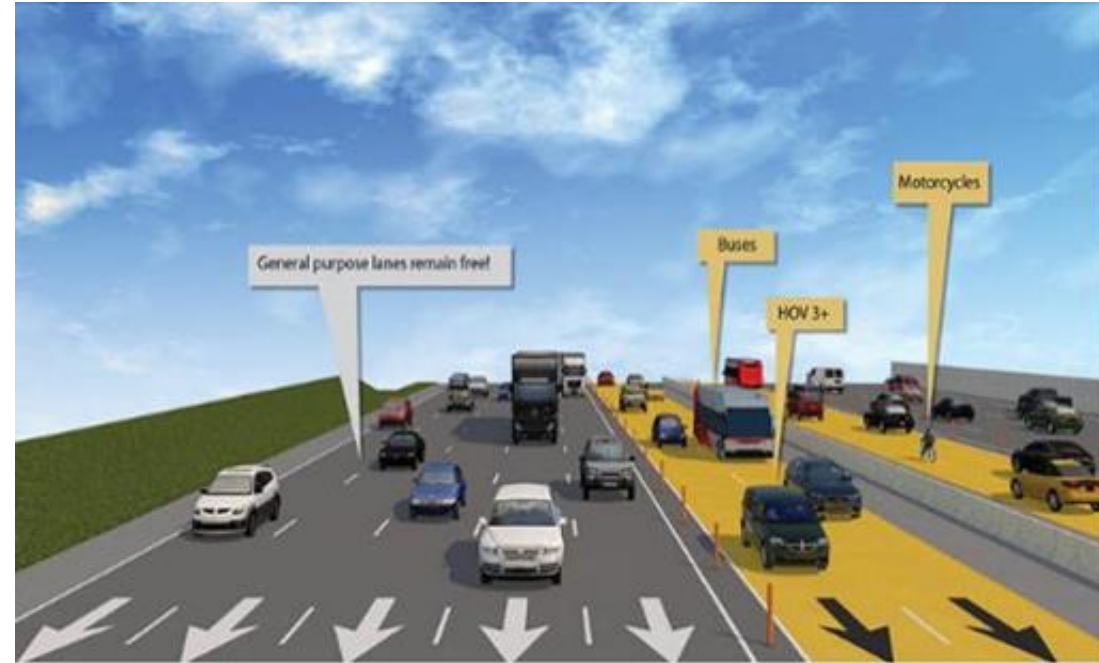


*View of ALB from Virginia looking north towards Maryland*

Add two HOT lanes in each direction

# Tolling Components

- The **Maryland Transportation Authority (MDTA)** must fix, revise, and set toll rates in Maryland
- MDTA Board approved Final Toll Rate Ranges on November 18, 2021, for Phase 1 South.
- Dynamic Pricing components:
  - Payment Methods – *E-ZPass*, Pay-By-Plate, Video Tolling
  - Toll Rate Range – Minimum and maximum rate/mile and minimum toll – includes axle multipliers
  - Soft Rate Cap – Rate cannot be exceeded unless speed is reduced, or vehicle volume increases to predetermined thresholds
  - Discount/Free Passage – HOV 3+; Buses; motorcycles
  - Escalation Factors – Effectively manages demand and ensures reliability for HOT lanes in the future



[mdta.maryland.gov/ALB270TollSetting](https://mdta.maryland.gov/ALB270TollSetting)



# Maryland and Virginia Coordination

Maryland and Virginia working together to coordinate Maryland's Phase 1 South project and Virginia's 495 NEXT project

## Key Elements:

- Provide a new American Legion Bridge and new bicycle and pedestrian access to connect trails on both sides of Potomac River.
- Final agreement will define how Maryland and Virginia projects will “interface” including:
  - Design and construction requirements
  - Operations and maintenance roles
  - Seamless regional dynamic toll lane network with each state operating its system independently





Note: VDOT 495 NEXT  
project limits shown in  
blue.

# I-495 at George Washington Memorial Parkway Bird's Eye View Rendering – Looking North



Note: VDOT 495 NEXT  
project limits shown in  
blue.



## I-495 at George Washington Memorial Parkway Bird's Eye View Rendering – Looking North



Note: VDOT 495 NEXT  
project limits shown in  
blue.

2

# I-495 at George Washington Memorial Parkway Bird's Eye View Rendering – Looking North



# Next Steps

- Complete Bi-State Agreement Between MDOT and VDOT
- Further Coordinate Design and Construction
  - With MDOT Phase Developer
  - With VDOT and its Concessionaire
- Address Business Rule Differences
  - Technology
  - Operational Policies
    - Toll collection
    - Enforcement
    - Violations
- Customer Service



# More Information and Progress Updates

[OpLanesMD.com](https://OpLanesMD.com)

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# A Practical Approach to Successful Managed Lane Network Management: Private and Public Operators in DFW



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TRB Webinar Series  
April 14, 2022  
Hosted by Committee ACP35 Managed Lanes Committee

# DFW's 100+ mile TEXpress Network includes diverse cross-sections, operators, and delivery methods



		Lane Config per direction	L	Operator	Develop- ment
1	635 East (2024)	3-4 GPL 2 ML	15 mi	Public	DB
2	NTE (2014)	3-4 GPL 2 ML	13 mi	Private	DBFOM + Rev
	NTE 35W (2019)	2 GPL 2 ML	10 mi	Private	DBFOM + Rev
3	DFW Connector	3 GPL 2 ML	6 mi	Public	DBOM
4	SH-183 "Midtown"	3 GPL 1 ML	11 mi	Public	DB
5	I-30	4 GPL 2 ML (Rev)	17 mi	Public	DBB
6	IH-35E	3 GPL 2 ML (Rev)	18 mi	Public	DB
7	LBJ (2013)	3-5 GPL 2-3 ML	13 mi	Private	DBFOM + Rev
8	SH-114/SL 12	3 GPL 1 ML	10 mi	Public	DB

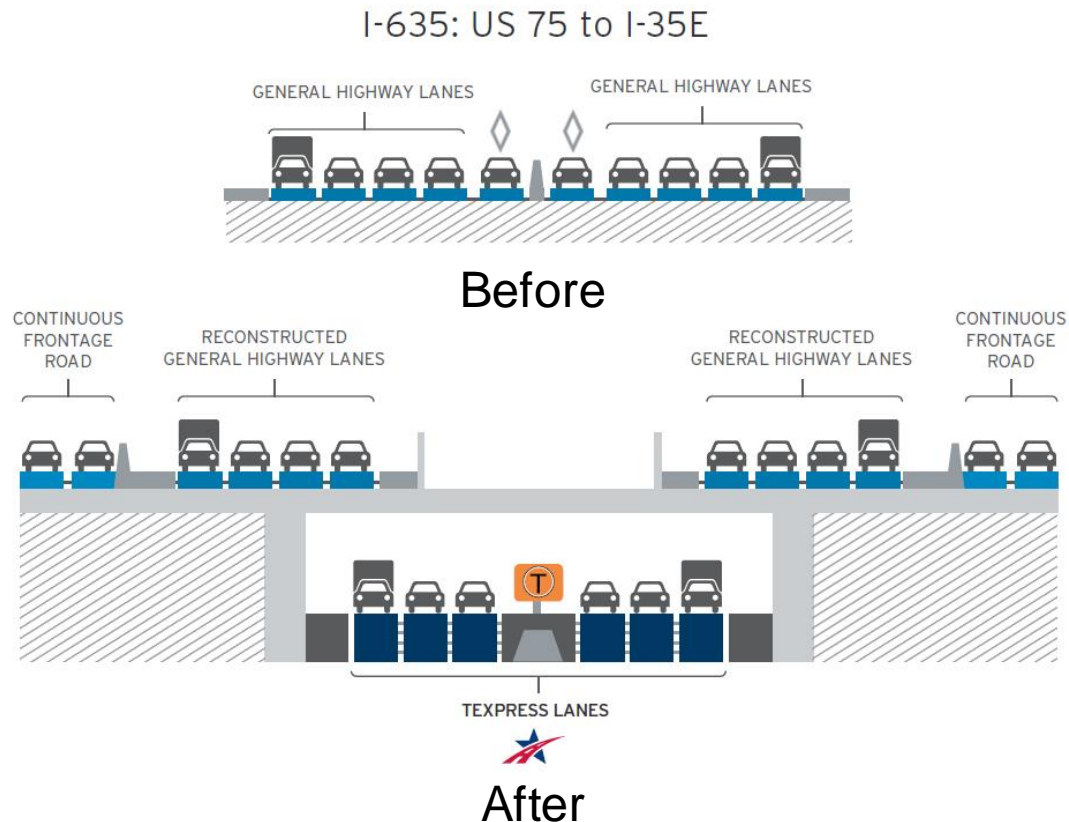


# Public-Private Partnerships (PPP) allow for allocation of risks between the public and private sector



# P3 delivery methods used for high-complexity projects

IH-635 “LBJ” TEXpress is one of several projects delivered as a P3 in DFW. LBJ’s “no higher, no wider” mandate led to an innovative, complex construction solution; transfer of construction and operational risks.



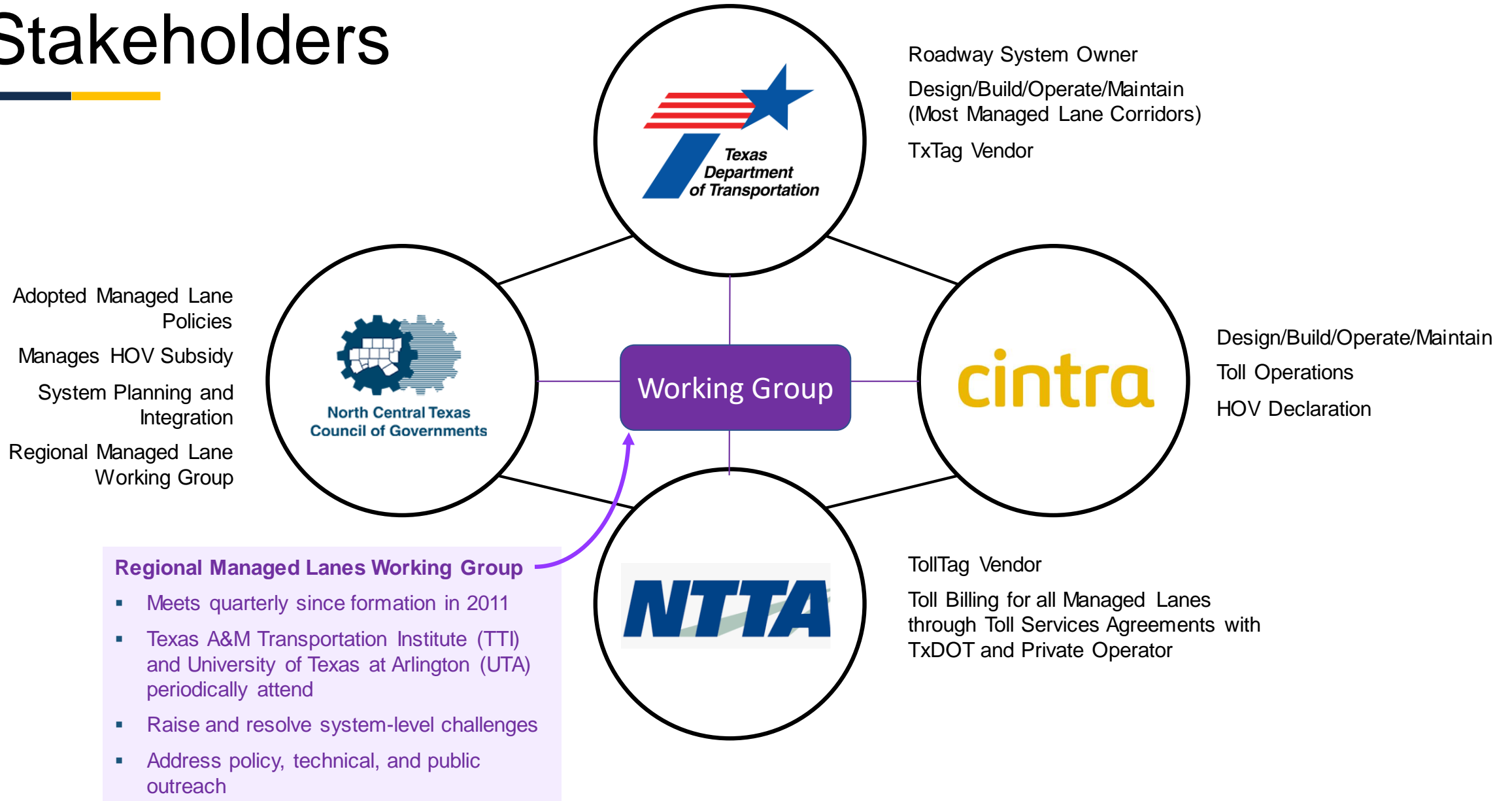
# MPO & Regional Transportation Council Involvement

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1. Develops Metropolitan Transportation Plan
2. Fosters local support from local and regional political subdivisions
3. Partners with our local toll project entity (NTTA)
4. Approves additional funds and creates “backstop”
5. Developed key components of the tolling business terms for Express Lanes in the Region



# Stakeholders





# DFW Network Policies Reflect Three Objectives

**Superior Infrastructure** with excellent on-road and technical infrastructure.

**Operational Excellence** and the promise of a fast and reliable trip every day separates MLs from other solutions.

**Public Understanding** and support for the policies necessary to have successful managed lanes.



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I'M LOOKING FOR...

I NEED TO CONTACT... 

AGENCY  
ADMINISTRATION

AGING  
SERVICESECONOMIC  
DEVELOPMENT

EMERGENCY  
PREPAREDNESS

ENVIRONMENT &amp; DEVELOPMENT

EXECUTIVE  
DIRECTOR

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PUBLIC  
SAFETY

## REGIONAL DATA

WORKFORCE  
SOLUTIONS

TRANSPORTATION



[Home](#) > [Transportation](#) > [About Transportation](#) > [Committees](#) > [Regional Transportation Council](#) > [Toll Policies](#)

## Toll Policies

- Policy on Excess Toll Revenue Sharing
- Policy on Excess Toll Revenue Sharing for Managed Lanes
- Business Terms for Toll Roads on State Highways
- Toll Managed Lane Policies
- Express Lane/High Occupancy Vehicle Lane Policies
- RTC Position Regarding Local Government and Transportation Provider Input

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# Network-wide policies provide operational excellence and enhance public understanding

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## Soft & Hard Infrastructure

- **Design** meets or exceeds TxDOT standards
- Consistent **signage** standards
- **Segmental-based tolling** and consistent toll rate dynamic message signs
- **Transaction processing** and tag distribution by NTTA; allows unified billing and consistent policies

## Operational Policy

- Real-time dynamic rates after first 6 months of operation
- Soft cap of \$0.75/mi (2010\$)
- Rules for exceeding cap established by region
- Guarantee of 50 mph on ML
- HOV Discount of 50% during peak hours (currently 2+). MPO reimburses operators for HOV discounts
- Business rules by operator
- Truck multipliers

## Public Outreach

- Consistent messaging for managed lanes by connecting the PR teams
- Data performance sharing: with TxDOT, transparency on accident rates, operational standards, etc.

# Highlight #1: Segment tolling and consistent signage afford the development of a growing, interconnected network

TEXpress lanes offer highway-to-highway connections and connect seamlessly to one another.

Segmental tolling and consistent signage vocabulary needed to achieve at scale.





# Highlight #2: Consistent Pricing Policies include Real-Time Dynamic Pricing with a Soft Cap

## The Basics

- Everyone can use the MLs, including trucks and vehicles without a tag
- Fixed pricing in the first six months of operation; real-time dynamic pricing thereafter
- Full toll rate for single occupant vehicles
- Trucks pay a fixed multiplier on the full toll rate, varies by vehicle shape/sized
- 50% toll rate for HOV (2+), only during rush hours



# Highlight #2: Consistent Pricing Policies include Real-Time Dynamic Pricing with a Soft Cap

## Toll Policies Balance Innovation and Prioritize Performance

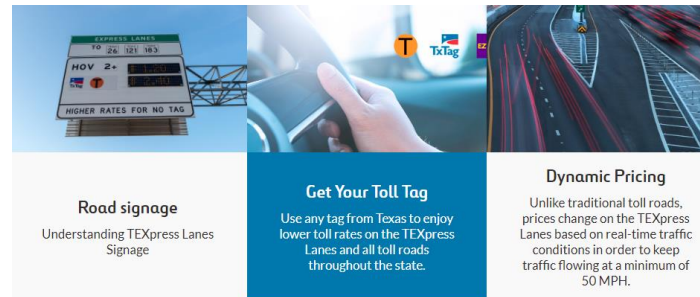
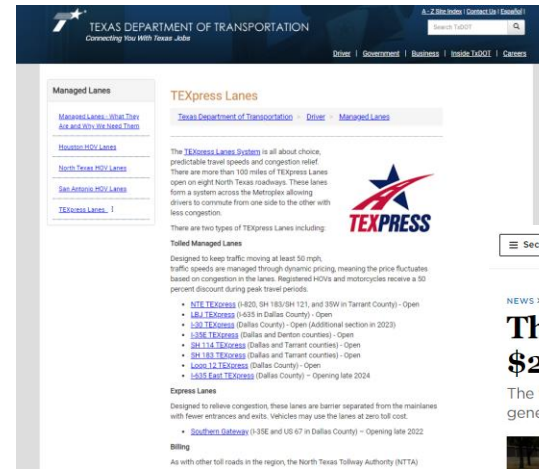
- Utilizes Soft Cap methodology, currently ~\$1.00/mi indexed to CPI; no hard cap beyond the soft cap
- Below Cap – operator has freedom and flexibility to manage demand
- Above Cap – only permitted if speeds or volumes exceed pre-defined thresholds and
- Achieves the goal of demand management but with some contractual limitations



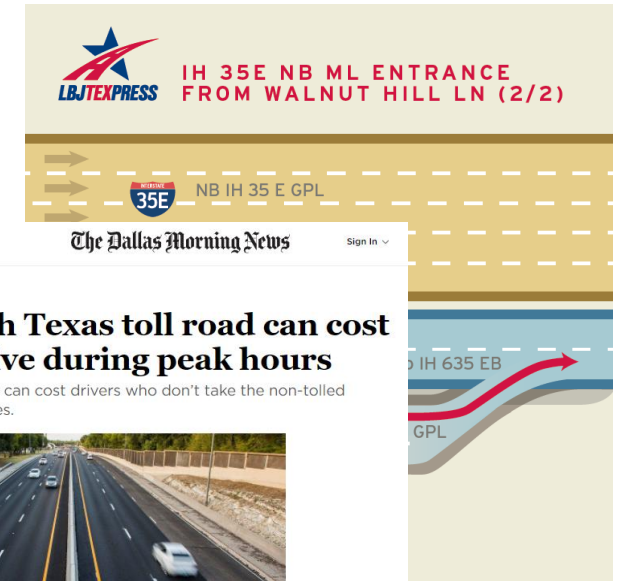
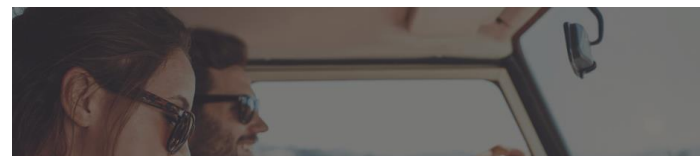
# Highlight #3: Consistent messaging, branding between operators and stakeholders

TEXpress brand used across all priced managed lane corridors, regardless of operator.

Public relations and Government Relations teams stay connected through regular meetings, ensure consistency of messaging and information to media, elected officials.



How To Use TEXpress Lanes



# A Practical Approach to Successful Managed Lane Network Management: Private and Public Operators in DFW

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Special thanks to Dan Lamers at NCTCOG, Matt Click at HNTB and ACP35, Ning Zhang at LBJ/NTE/35W TEXpress and Teresita Sarmiento & Melissa Meyer at TxDOT for your support in making this presentation

TRB Webinar Series

April 14, 2022

Hosted by Committee ACP35 Managed Lanes Committee

*connect with John & John*



John Brady



John Hudspeth



# EMERGING ISSUES IN PRICED MANAGED LANES NETWORK

## Bay Area & CA Perspective

Murali Ramanujam

Santa Clara Valley  
Transportation Authority (VTA)

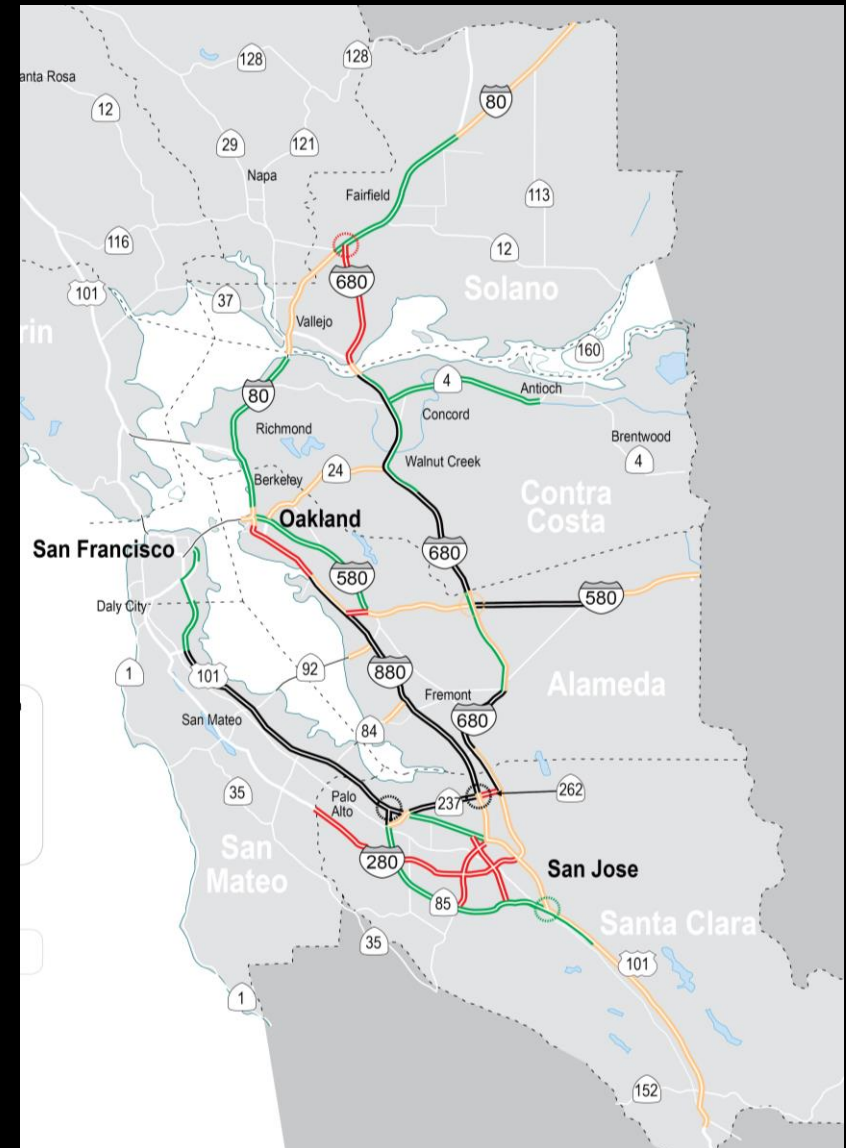
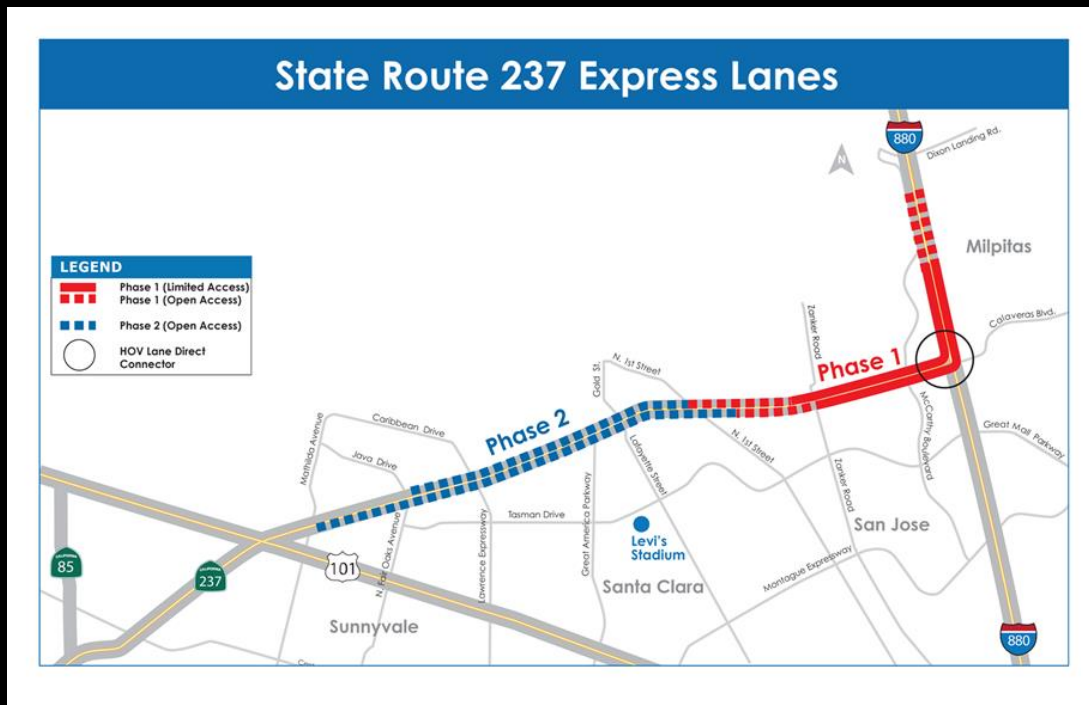




## EVOLUTION OF EXPRESS LANES IN THE BAY AREA



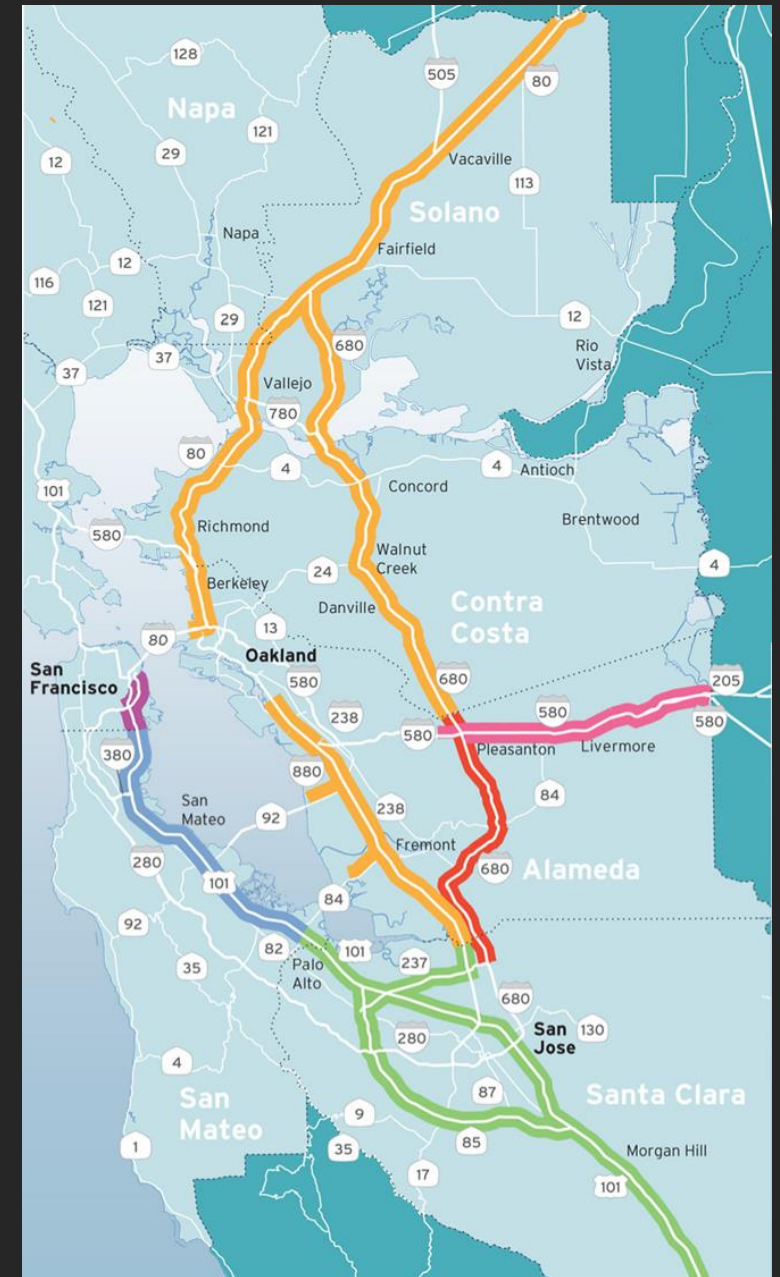
# CORRIDOR TO NETWORK



Source: Metropolitan Transportation Commission

# BAY AREA EXPRESS LANES NETWORK

800 directional lane miles  
of express lanes being  
delivered



Source: Metropolitan Transportation Commission



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# **BAY AREA EXPRESS LANES OPERATORS**

**I-680 Sunol Express Lanes Joint Powers Authority**

**Santa Clara Valley Transportation Authority (VTA)**

**Alameda County Transportation Commission (ACTC)**

**Bay Area Infrastructure Financing Authority (BAIFA)**

**San Mateo County Express Lanes Joint Powers Authority  
(SMCELJPA)**

**Communication**

**Collaboration**

**Coordination**





# INFORMAL PEER EXCHANGE

Exchange of information between peer agencies was a great asset to successful policy implementation



# STRATEGIC PLAN

Technical Working Group



Executive Steering Committee



Memorandum Of Understanding (MOU)

## Connecting the Bay Area

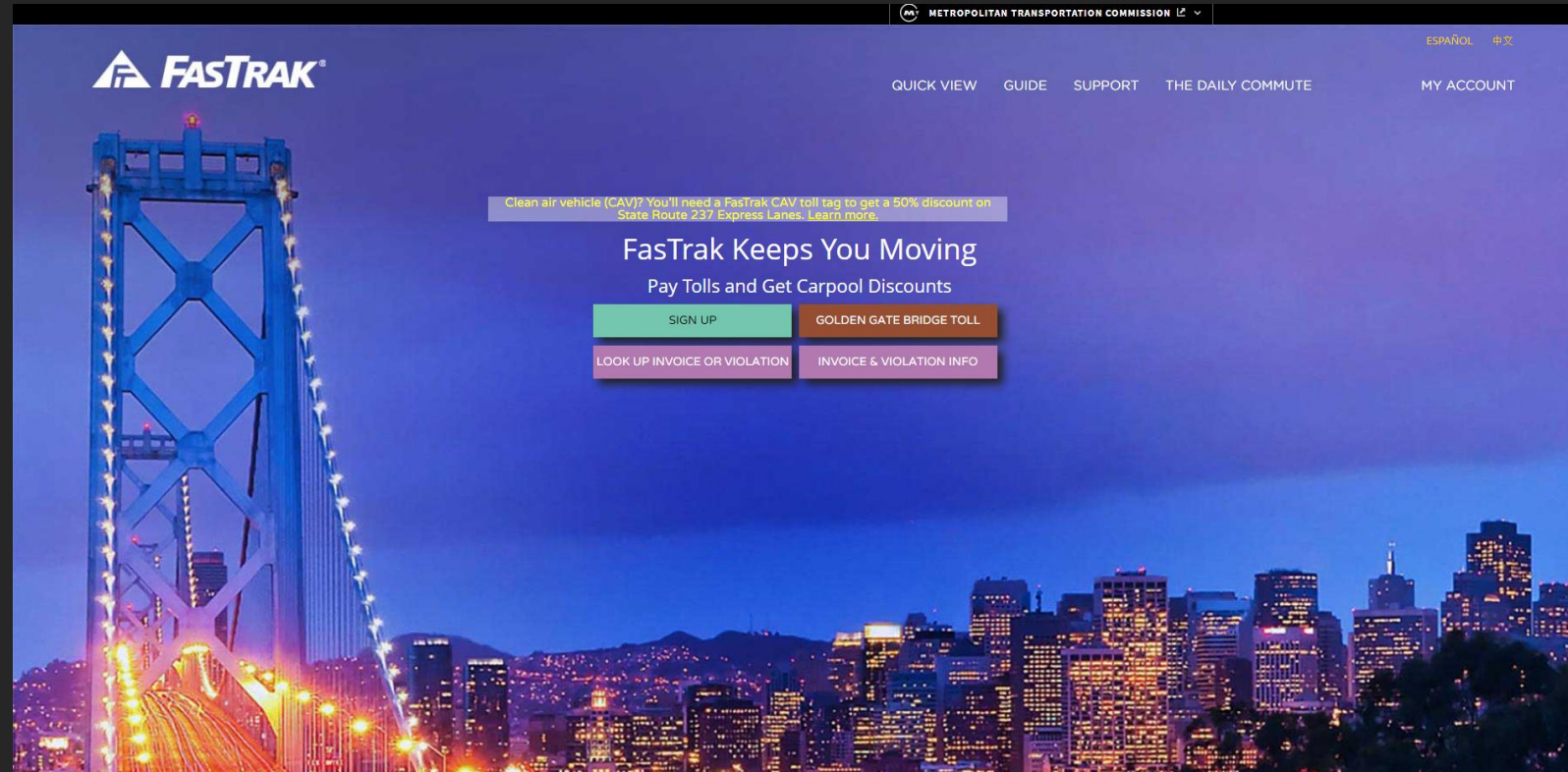
Express Lanes Network 2021 Strategic Plan  
April 2, 2021



# OPERATIONALLY SEAMLESS

**One back office and  
regional customer  
service center**

**Serves all Bay Area  
Express Lanes, Golden  
Gate and Bay Area  
Bridges users**





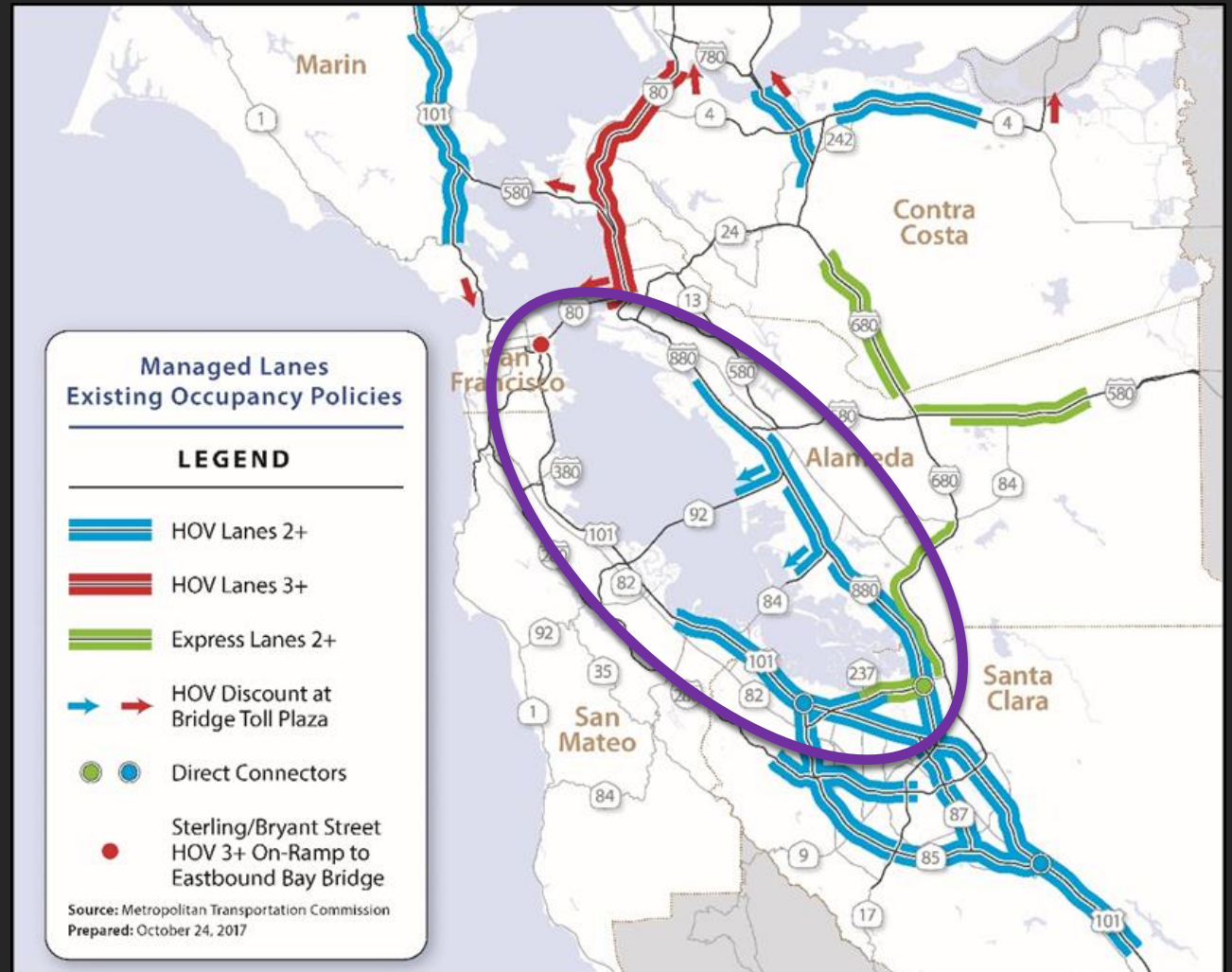
# CONSISTENT RULES

Hours of Operations

Minimum occupancy  
requirement

Transponder  
requirement

Same discount  
policy and exemptions



Source: Metropolitan Transportation Commission

# COMMON ENFORCEMENT PORTAL

One portal from where  
Highway Patrol officers  
can sign into the various  
Bay Area Express Lanes  
corridors

**Bay Area Express Lanes Portal**



**I-680**  
Pleasanton to Milpitas  
(Southbound)



**I-580**  
Livermore to Dublin



**I-680**  
Benicia Bridge to Dublin



**SR-237**  
Milpitas to Sunnyvale



**I-880**  
Oakland to Milpitas



**US-101/SR-85**  
Palo Alto to Sunnyvale

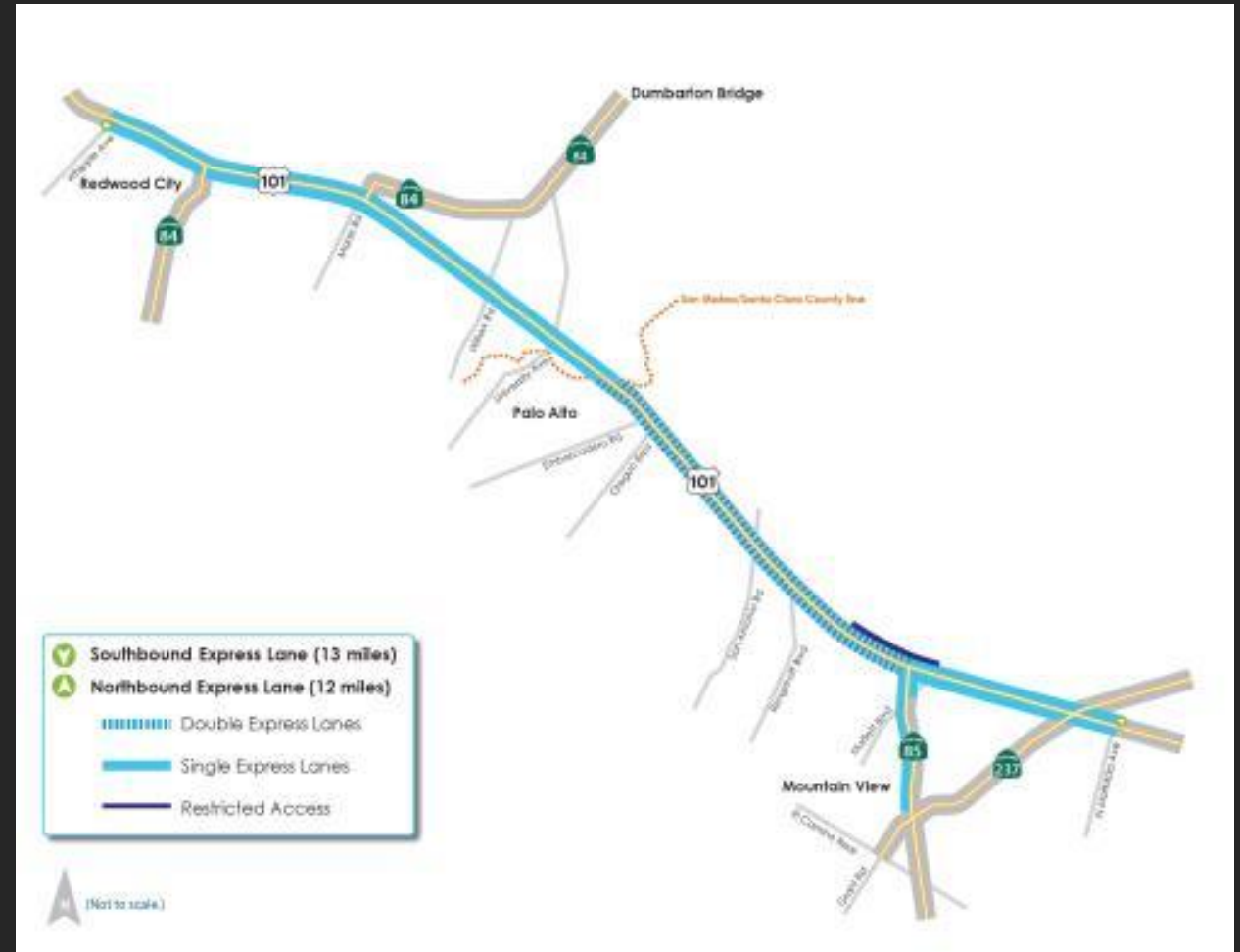


**US-101**  
Menlo Park to Redwood City

# KEY ACCOMPLISHMENTS

Seamless interface  
between corridors

Joint opening of  
corridors



Source: <https://511.org/driving/express-lanes/us-101-express-lanes>



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# **CALIFORNIA TOLL OPERATORS COMMITTEE**

**Northern and Southern CA**

**Coalition of 14 Agencies &  
48 toll facilities**



**Interoperability**

**Technology**

**Operating**

**Policies**

**Customer service**

**Legislation**

**Administrative framework**

**COLLABORATIVE  
WORK ON  
TOLLING AREAS**

# CTOC COMMITTEE STRUCTURE





# REGULAR MEETINGS

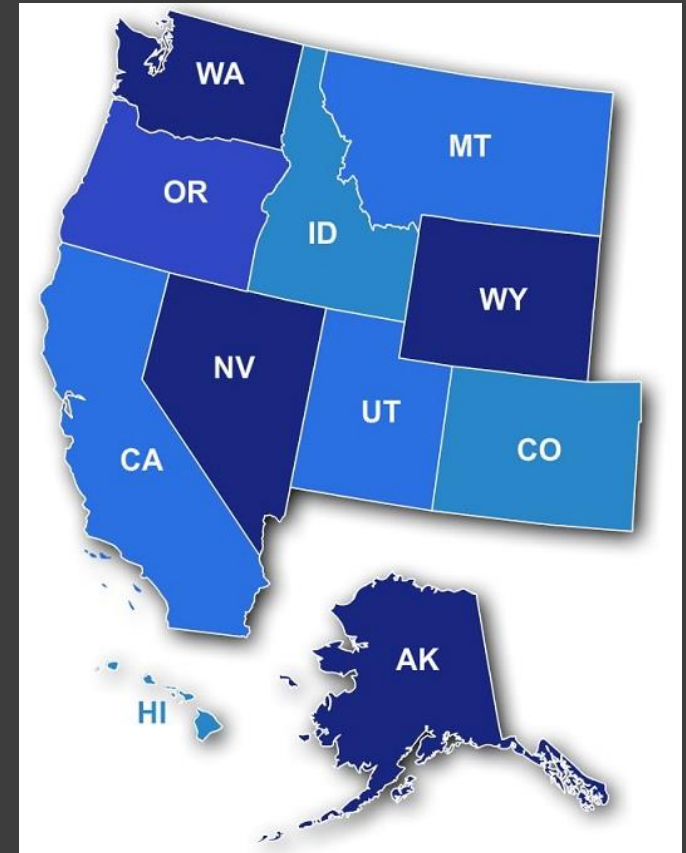
Quarterly meetings

Two in person meetings



# WESTERN REGION TOLL OPERATORS

- Promote innovation and interoperability related to toll processing and revenue collection
- Serve as a resource for toll project planning, development and operations
- Central interface to professional organizations (IBTTA and ATI)



Source: <https://sites.google.com/site/misskucharskigeography/home/west>

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**Thank you!**

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**Santa Clara Valley Transportation  
Authority (VTA)**