

AGENDA

TRANSPORTATION ADVISORY COMMITTEE

Monday, October 28, 2019

1:30 p.m.

1001 17th St.

1st Fl. Aspen/Birch Conference Rm.

1. Call to Order
2. Public Comment
3. September 28, 2019 TAC Meeting Summary
(Attachment A)

INFORMATIONAL ITEMS

4. Briefing on the Colorado High Performance Transportation Enterprise (HPTE) Colorado Express Lanes Master Plan
(Attachment B) Steve Cook – Nick Farber, HPTE
5. Briefing on Regional Air Quality Council (RAQC) Updates
(Attachment C) Robert Spotts
6. Briefing on 2018 Annual Report on Roadway Traffic Congestion in the Denver Region
(Attachment D) Robert Spotts
7. Briefing on 2050 Metro Vision Regional Transportation Plan (2050 MVRTP) Scenarios
(Attachment E) Jacob Riger
8. Briefing on Environmental Justice Analysis for the 2050 Metro Vision Regional Transportation Plan
(Attachment F) Matthew Helfant

ADMINISTRATIVE ITEMS

9. Member Comment/Other Matters
 - Poll for combined November/December meeting date:
 - November 25th
 - December 2nd
 - December 9th
 - Nominating Panel for election of Transportation Advisory Committee Chair and Vice-Chair for 2020/2021
 - TAC 2020 Meeting Schedule

Persons in need of auxiliary aids or services, such as interpretation services or assisted listening devices, are asked to contact DRCOG at least 48 hours in advance of the meeting by calling (303) 480-6744.



10. Next Meeting – TBD

11. Adjournment

ATTACH A

ATTACHMENT A

MEETING SUMMARY
TRANSPORTATION ADVISORY COMMITTEE
Monday, September 23, 2019

MEMBERS (OR VOTING ALTERNATES) PRESENT:

Jeff Dakenbring	Arapahoe County-City of Centennial
Bryan Weimer	Arapahoe County
Megan Davis	Boulder County-City of Louisville
Tom Schomer (Alternate)	Broomfield, City and County
Kent Moorman	Adams County-City of Thornton
David Gaspers	Denver, City and County
Ryan Billings (Alternate)	Denver, City and County
Ron Papsdorf	Denver Regional Council of Governments
John Cotten (Chair)	Douglas County-City of Lone Tree
Art Griffith	Douglas County-Town of Castle Rock
Phil Greenwald	Boulder County-City of Longmont
Tim Hester	Aviation
Andrea LaRew	Business
Kristin Kenyon (Ex Officio)	Federal Transit Administration
Carson Priest	TDM/Nonmotorized
Dawn Sluder (Alternate)	Non-RTD Transit
Aaron Bustow (Alternate)	FHWA
Brodie Ayers (Alternate)	Colorado Department of Transportation-DTR
Paul Jesaitis	CDOT Region 1
Jim Eussen (Alternate)	CDOT Region 4
Steve Durian	Jefferson County
Debra Baskett	Jefferson County-City of Westminster
Amanda Brimmer (Alternate)	Regional Air Quality Council
Bill Sirois (Alternate)	Regional Transportation District
Kevin Ash	Weld County-Town of Frederick

OTHERS PRESENT:

Mac Callison (Alternate)	Arapahoe County-City of Aurora
Long Nguyen (Alternate)	Adams County
Tom Reiff (Alternate)	Douglas County-Town of Castle Rock
Richard Zamora (Alternate)	CDOT Region 1
Chris Hudson (Alternate)	Douglas County-Town of Parker

Public: Myron Hora, WSP USA; Ted Heyd, Alta Planning & Design; Steve Sherman, Danny Herrmann, JoAnn Mattson, Jordan Rudel, CDOT Region 1; Kiernan Maletsky CU-Denver/HDR

DRCOG staff: Jacob Riger, Todd Cottrell, Steve Cook, Sang Gu Lee, Mark Northrop, Matthew Helfant, Melinda Stevens, Emily Lindsey, Beth Doliboa, Greg MacKinnon, Derrick Webb, Lisa Houde, Lawrence Tilong

Call to Order

Chair John Cotten called the meeting to order at 1:32 p.m.

Public Comment

There was no public comment.

Chair Cotten introduced Jeff Dakenbring (Arapahoe County-City of Centennial) as a new TAC member

Summary of August 26, 2019 meeting

The meeting summary was accepted.

ACTION ITEMS

Discussion on recommendations for amendments to the 2020-2023 Transportation Improvement Program (TIP)

Todd Cottrell presented the 2020-2023 Transportation Improvement Program (TIP) amendments. DRCOG's transportation planning process allows for Board-approved amendments to the current TIP on an as-needed basis. These amendments involve the addition, deletion of projects, or adjustments to existing projects that do not impact funding for other projects in the TIP.

TIP Amendments

- **New Project** **US-36 Emergency Repairs**
Add \$20.43 million State Transportation Commission Contingency funding for emergency repairs
- **2008-076** **R1 FASTER Pool**
Add 7 new pool projects using available TIP project funding
- **2016-035** **30th St. and Colorado Ave. Bike/Ped Underpass**
Roll funding forward to FY 2020 in new TIP and add \$8.050 million in local overmatch
- **2018-014** **I-25 Capacity Improvements: Castle Rock to El Paso County Line**
Add \$8 million in Federal Freight funding to add a southbound truck climbing lane and \$50,000 for various wildlife elements

Kent Moorman asked CDOT to explain why \$8 million is proposed for the I-25 gap project instead of corridors such as I-70 or US-85. Paul Jesaitis explained that this is an already active project and due to unanticipated cost increases, the \$8 million is being requested for this project.

Tom Reiff wanted to know what the approval process was for the R1 FASTER Pool projects. Paul Jesaitis stated that each project had to meet a certain benefit-cost threshold.

Art Griffith MOVED to recommend to the Regional Transportation Committee the attached amendments to the 2020-2023 Transportation Improvement Program (TIP). The motion was seconded by Steve Durian and passed unanimously.

Discussion on recommendations of projects to be funded through the Community Mobility Planning and Implementation (CMPI) set-aside of the 2020-2023 Transportation Improvement Program (TIP)

Emily Lindsey and Derrick Webb presented funding recommendations to the committee. The purpose of the CMPI set-aside is to support small area planning and small infrastructure projects that contribute to key outcomes within Metro Vision and the Metro Vision Regional Transportation Plan. In May 2019, DRCOG issued a call for letters of intent. Full applications were due July 31, 2019. A total of 32 applications were submitted for consideration and the total federal request for all projects was \$7,027,419. After applications were received, staff organized an internal Project Review Panel that recommended [these projects for funding](#).

Kent Moorman MOVED to recommend to the Regional Transportation Committee the projects above be funded through the CMPI Set-Aside of the DRCOG 2020–2023 TIP. The motion was seconded by Art Griffith and passed unanimously.

INFORMATIONAL ITEMS

Briefing on Central I-25 PEL (Planning and Environmental Linkages)

Steve Sherman of CDOT presented on this topic. CDOT is conducting the I-25 Central PEL study for the six-mile segment of I-25 between Santa Fe Drive and 20th Street in central Denver. This effort is considering environmental, community, economic, safety, and mobility goals in the planning process to develop project alternatives. The PEL will also focus on the potential role of technology to address the corridor's traffic, safety, and mobility issues. The study is expected to be completed in late 2019.

David Gaspers asked for clarification about whether the potential re-alignment of the tracks at Burnam Yard would be on the east side, west side, or right down the middle. Mr. Sherman stated there are only concepts at this point in time, not firm plans.

Art Griffith asked if the railroad track on the west side of the South Platte River is going to be looked at as a future transit corridor. Mr. Sherman responded that there are no plans as of yet, but it would not be precluded by current concepts.

Briefing on Post Transportation Improvement Program (TIP) Assessment

Todd Cottrell presented on the post TIP assessment. Every four years after a TIP is adopted by the Board, DRCOG staff assesses the completed cycle to collect feedback and lessons learned on the TIP development process. Topics typically include policy development and adoption, project eligibility, evaluation criteria, selection process, as well as any other technical, policy, or procedural issues desired for discussion. Since the 2020-2023 TIP process introduced a new Dual Model Process, an expanded review process will be started.

Briefing on Updates for the 2050 Metro Vision Regional Transportation Plan (MVRTP)

Jacob Riger presented a status of current and near-term 2050 MVRTP activities. DRCOG staff has been engaged in several initial public and stakeholder outreach efforts. All initial efforts are intended to inform/educate the public and stakeholders about the 2050 MVRTP planning process, identify issues, set the vision, and hear priorities. These efforts are being guided by the draft 2050 MVRTP Public Engagement Strategy, which is based on DRCOG's public engagement plan. Of the several activities DRCOG staff will be working on for the 2050 MVRTP over the next several months, two are especially important: scenario planning and developing the RTP financial plan. Jacob gave an overview of the financial plan development process, and noted that TAC would discuss scenario planning at its October meeting.

Kent Moorman wanted to know how the financial plan will incorporate toll roads and facilities. Mr. Riger stated that staff works with HPTE and toll highway authorities to understand their revenues and expenditures.

Bryan Weimer asked what process is followed to determine the need for certain goals to be met. Mr. Riger stated that the DRCOG Board's unanimous adoption of Metro Vision in 2017 set a clear framework for what the region wants to achieve by 2040 as expressed in part by Metro Vision's performance targets. So far, the region is not on track to meet most of the transportation-focused targets. Therefore, a primary focus of the 2050 MVRTP planning process is to identify what projects, investments, and strategies would best address Metro Vision's performance targets.

Mac Callison asked how regional projects are identified in the plan and how funds are allocated. Mr. Riger responded that there has historically been a balance in the financial plan of maintaining the current system while also addressing significant new growth. Specific revenue sources may also have constraints on how they can be spent.

Art Griffin wanted to know if there is a plan to use the subregional forums for allocating revenues to major projects. Mr. Riger stated that there will be an active role for the forums throughout the process, but the financial plan is a regionally-focused exercise, and the forums' specific role is to be determined.

Briefing on the DRCOG Regional Transportation Operations (RTO) Program

Steve Cook and Greg MacKinnon presented this program to the committee. The DRCOG Board adopted the 2020-2023 Transportation Improvement Program (TIP) in August that included the Regional Transportation Operations & Technology (RTO&T) TIP set-aside program. \$5 million per year has been allocated to the RTO&T program, an increase of 19% over the previous TIP. The amount reflects the Board's commitment to advanced technologies that improve transportation operations and mobility services. In January, the TAC was provided an informational briefing about the RTO&T Set-Aside Program, which contains two components:

- RTO&T Improvement Program of projects (~\$3.5 million per year)
- DRCOG Regional Traffic Operations Program (~\$1.5 million per year)

Art Griffin wanted to know how much money has been spent in the last 10 years on items related to the RTO&T. Mr. MacKinnon stated that the estimated amount has been around \$3.5 - \$4 million per year.

Megan Davis wanted to know if the maps displayed everything that has been improved upon or are there other projects that have been accomplished in other corridors, just not presently shown. Mr. MacKinnon explained that the maps show what has been accomplished to date; other regions may not be reflected, but there is documentation of improvements in other corridors of the region.

Paul Jesaitis wanted to know what percentage or improvement has been achieved with the use of advanced traffic signal controllers in the region. Mr. MacKinnon replied that there is about a 40% improvement due to the high-resolution data that can be received.

Briefing on State Transportation Funding Allocation

Ron Papsdorf presented on this topic. Over the past three years, the Colorado Legislature has enacted three transportation funding bills that increase short-term revenues to CDOT for state highways and transit:

- SB17-267
- SB18-001
- SB19-262

The Transportation Commission will begin discussing options and priorities for allocating these revenues. Therefore, it is not yet known how the Commission will allocate the funds, whether the Commission will identify one or more statewide programs such as asset management as a priority, or whether a funding target will be established for each CDOT region. In the meantime, DRCOG will be considering several options and priorities to be able to weigh in on and respond to those deliberations and decisions. DRCOG is using the 2040 MVRTP, the 2020-2023 TIP Waiting List, and Regional Vision Zero preliminary High Injury Network as starting points to identify a mix of freeway and urban arterial projects that emphasize safety and multimodal mobility.

Art Griffin wanted to know why such a large portion of funding is shown for surface treatment for Region 1. Paul Jesaitis clarified that funds are intended for surface treatment and asset management.

Kent Moorman wanted to know why some of the 2040 MVRTP projects are greyed out. Mr. Papsdorf clarified that those projects are already funded, under construction, or complete. Mr. Moorman clarified that managed lanes on I-25 from E-470 to SH-7 are not yet funded.

Jacob Riger commented that from the feedback heard from the committee, members seem to agree with the staff-proposed approach to identify specific projects and staff would continue with this approach in working with CDOT.

ADMINISTRATIVE ITEMS

Member Comment/Other Matters

There were no comments from members. The meeting adjourned at 3:22 p.m. The next meeting is scheduled for October 28, 2019.

ATTACH B

ATTACHMENT B

To: Chair and Members of the Transportation Advisory Committee
From: Steve Cook, Transportation Modeling and Operations Manager
(303) 480-6749 or scook@drcog.org

Meeting Date	Agenda Category	Agenda Item #
October 28, 2019	Informational	4

SUBJECT

Briefing on the Colorado High Performance Transportation Enterprise (HPTE) Colorado Express Lanes Master Plan.

PROPOSED ACTION/RECOMMENDATIONS

N/A

ACTION BY OTHERS

N/A

SUMMARY

The HPTE has initiated the Colorado Express Lanes Master Plan (ELMP) <https://www.codot.gov/programs/expresslanes/express-lanes-master-plan>. The ELMP process began just over a year ago and is scheduled to be completed near the end of this year. It will identify and prioritize corridors in Colorado with the potential of benefitting from express lanes.

At the October TAC meeting, HPTE staff will provide an update on the ELMP, with specific reference to alternative corridors being evaluated.

PREVIOUS DISCUSSIONS/ACTIONS

PROPOSED MOTION

N/A

ATTACHMENT

1. CDOT presentation

ADDITIONAL INFORMATION

If you need additional information, please contact Steve Cook, Travel Model and Transportation Operations Manager, at 303-480-6749 or scook@drcog.org or Nicholas Farber, HPTE, at 720-248-8544 or nicholas.farber@state.co.us.



COLORADO
HPT
PARTNER. INNOVATE. ACCELERATE.

Colorado

Express Lanes

Master Plan



OVERVIEW

Colorado Express Lanes Master Plan Development

**The High Performance Transportation
Enterprise (HPTE)**

Express Lanes vs. Toll Roads

Benefits of Express Lanes

Express Lanes in Colorado

**Performance of Colorado's Express
Lanes**

Public perception of Express Lanes

Express Lanes Master Plan

How you can help

The High Performance Transportation Enterprise (HPTE)

Public Private Partnerships

Express Lanes

Innovative Finance Think Tank

What does HPTE do?



Required to “*aggressively pursue*” innovative means of more efficiently financing important transportation projects:

- Public Private Partnerships
- Operating concession agreements
- User fee-based project financing (tolls)
- Annual performance payment agreements



Exists to *make Coloradans' commutes better*

Express Lanes vs. Toll Roads

- An Express Lane is a lane-based choice in which drivers can use the same road but choose whether or not to drive in the Express Lanes or general purpose lanes
- A toll road is route-based, all drivers on the road pay a toll



Express Lanes Myths



Express Lanes are:

- Not toll roads, where every driver must pay to use any of the lanes. Express Lanes are a choice and always offered along with free general purpose lanes
- Not owned by privately-held companies. CDOT always owns the road.
- Not autobahn race tracks. Law enforcement patrols these corridors and drivers must obey the laws

CHOICE

EXPRESS LANES

- Reduce delay on most seriously congested corridors
- Use toll pricing to manage congestion
- Maintain reliable travel times now and in the future
- Promote transit and carpooling (where viable)
- Always offered along free general purpose lanes

Express Lanes Benefits

The road to daycare should be easy.



I-70 MTN US36 I-25 CENTRAL I-25 NORTH 7:00am

Toll Rate: \$1.30

Time Saved:
15 Min

EXPRESS LINES

expresslanes.codot.gov

Express Lanes. When it matters most.



I-70 MTN US36 I-25 CENTRAL I-25 NORTH 7:00am

Toll Rate: \$1.30

Time Saved:
15 Min

EXPRESS LINES

expresslanes.codot.gov

- Express Lanes are there when drivers need them most – to catch a plane, pick kids up from daycare or get to a meeting
- Express Lanes help with traffic congestion not only for the Express Lanes users, but also for drivers in the general purpose lanes. With more cars travelling in the Express Lanes, general purpose lanes carry fewer cars, which helps relieve some of the traffic congestion
- They provide a long-term solution to improving Colorado's roads and enhancing mobility even as our state's population grows and transportation funding becomes less predictable

Express Lanes in Colorado



- Colorado's first Express Lanes – the I-25 Central reversible lanes – opened in 2006
- There are currently Express Lanes in operation on the I-25, US 36 and I-70 mountain corridors
- Different corridors vary in design, pricing structure and operation based on local needs
- Colorado has the distinction of being the state with the most Express Lanes outside of urban areas
- Express Lanes have resulted in improved speeds on all corridors

Existing Colorado Toll Roads and Express Lanes

US 36

I-25 Central (downtown to US 36)

I-25 North: 120th Avenue to US 36

I-70 Mountain Express Lane

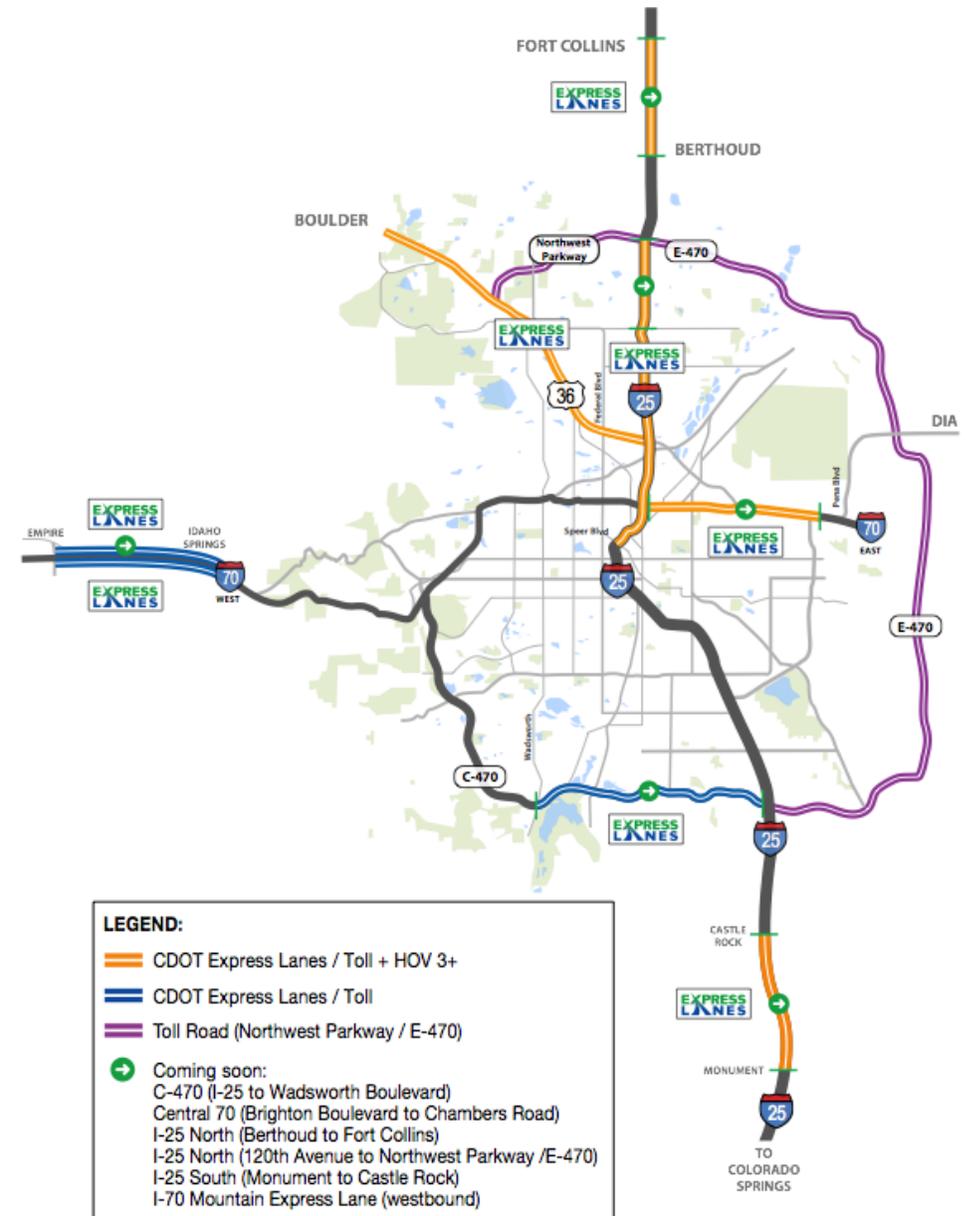
C-470 (construction)

Central 70 (construction)

I-25 North: 120th Avenue to E-470 (construction)

I-25 North: Berthoud to Fort Collins (construction)

I-25 South Gap: Monument to Castle Rock (construction)

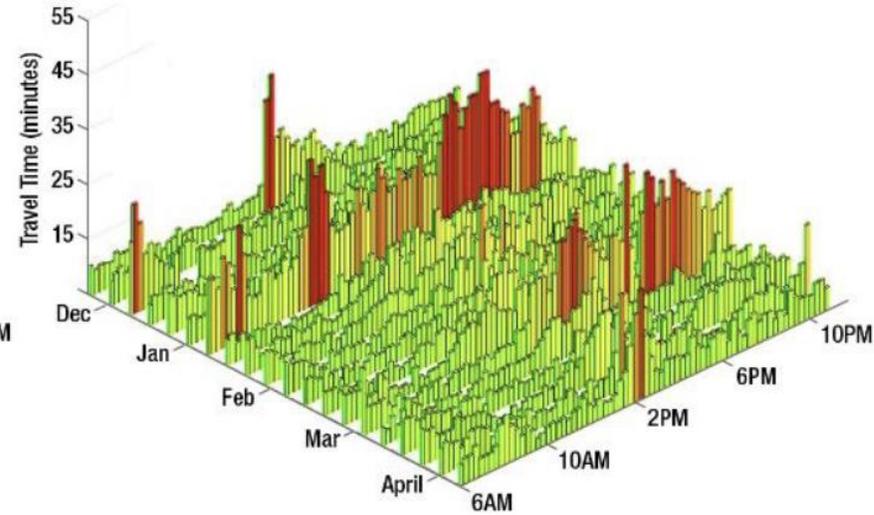
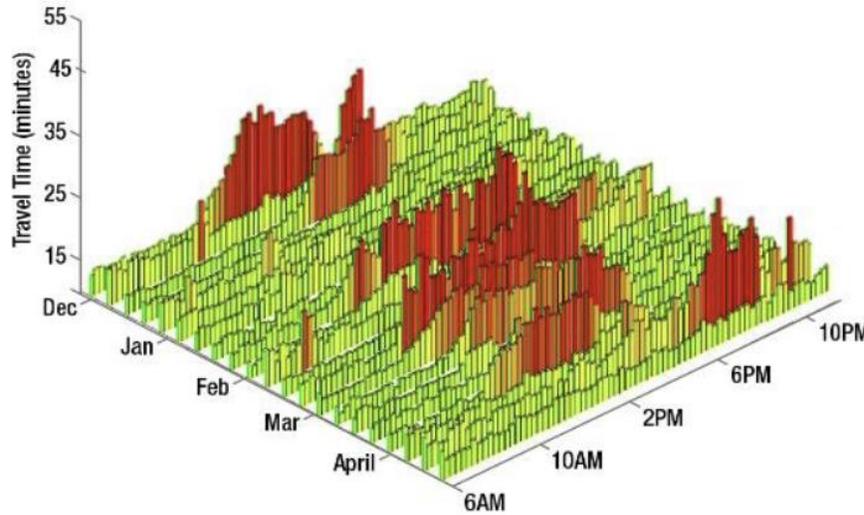


Consistent, more reliable speeds and 26-52% reduced travel times

**2014 Sunday Travel Times
(Pre-Mountain Express Lane)**

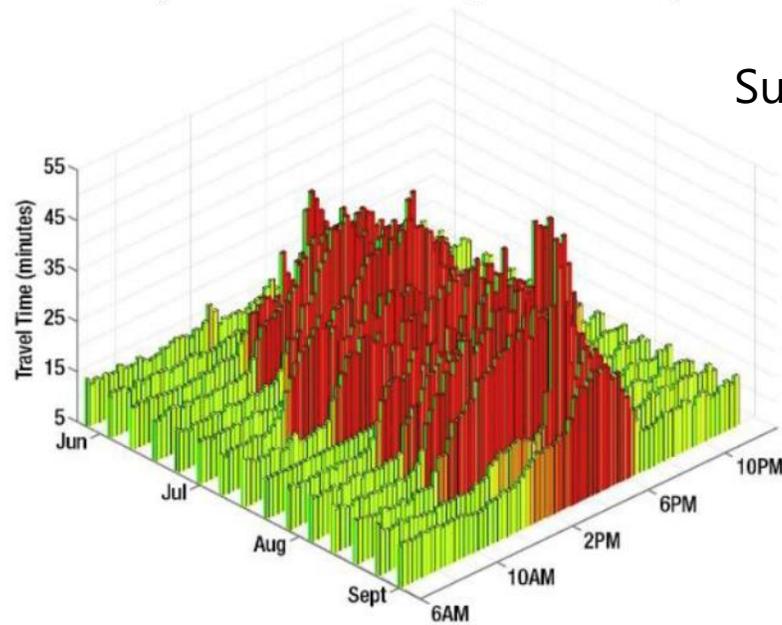
**2018 Sunday Travel Times
(Mountain Express Lane Operational)**

Winter



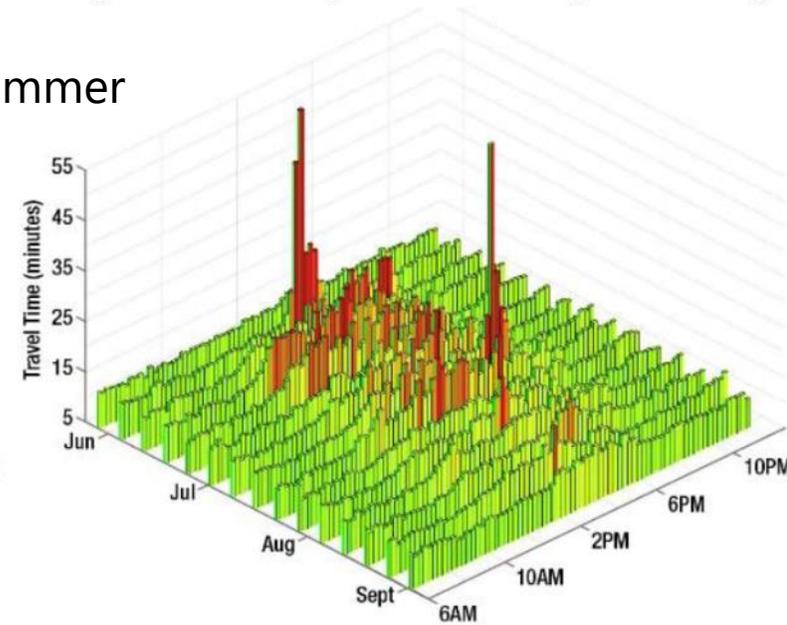
Consistent, more reliable speeds and 26-52% reduced travel times

**2014 Sunday Travel Times
(Pre-Mountain Express Lane)**



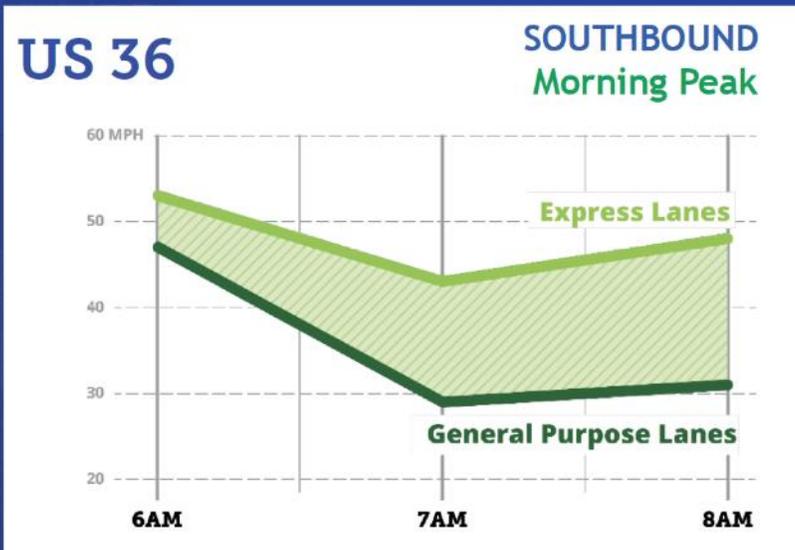
**2018 Sunday Travel Times
(Mountain Express Lane Operational)**

Summer

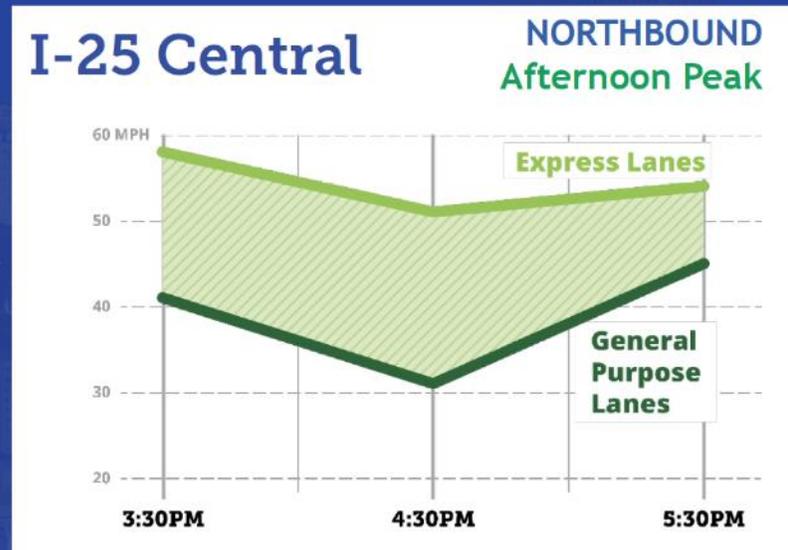


US 36 and I-25 Central Express Lanes

Peak period speed differences between Express Lanes and general purpose lanes



- Morning peak period - 7 to 16 mph (westbound)
- Afternoon peak period - 10 to 17 mph (eastbound)
- Between 2014 and 2016, travel times decreased by 14.5 percent even with a 6.2 percent increase in volume on US 36



- Morning peak period - 6 to 16 mph (southbound)
- Afternoon peak period - 9 to 20 mph (northbound)

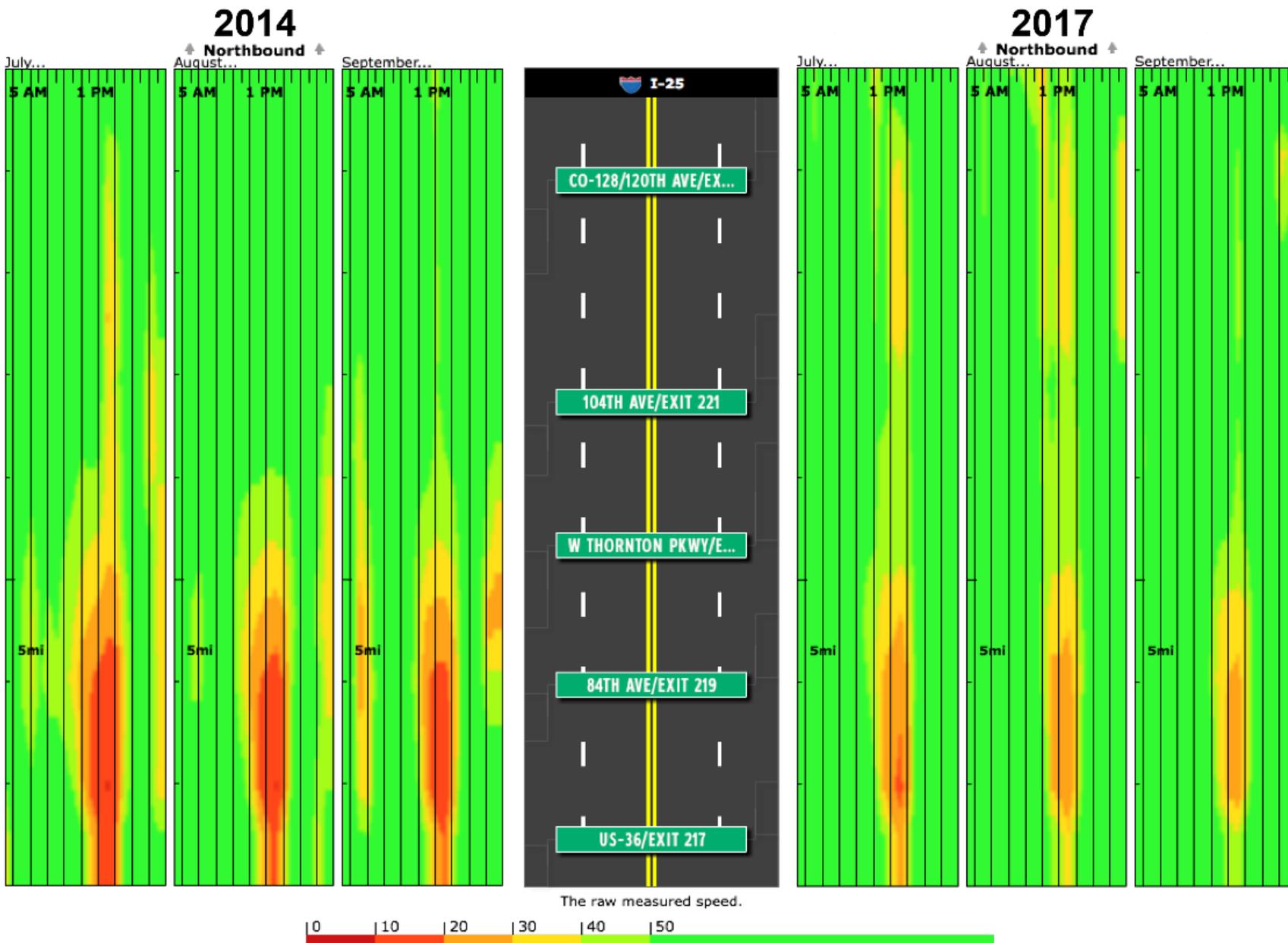
Northbound Speed on I-25 between US-36/Exit 217 and CO-128/120th Ave/Exit 223 using INRIX data

Averaged by 1 hour for July 2014 (every Tue, Wed and Thu), For August 2014 (every Tues, Wed and Thu), and for September 2014 (every Tue, Wed and Thu)

Averaged by 1 hour for July 2017 (every Tue, Wed and Thu), For August 2017 (every Tues, Wed and Thu), and for September 2017 (every Tue, Wed and Thu)

North I-25 120th Avenue to US 36 Express Lanes Results Northbound 2014 to 2017

EXPRESS LANE
SPEED AVERAGED



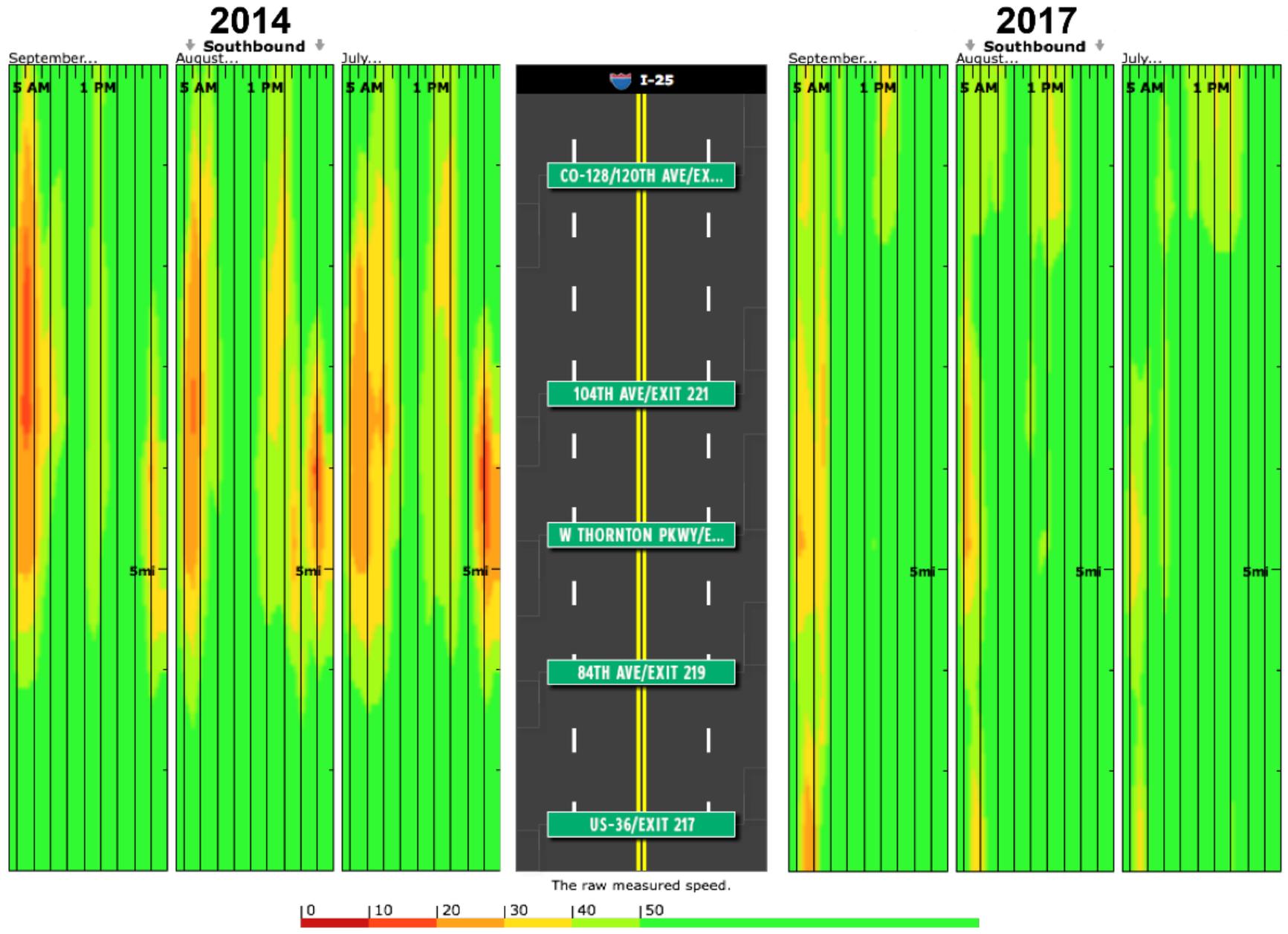
Southbound Speed on I-25 between US-36/Exit 217 and CO-128/120th Ave/Exit 223 using INRIX data

Averaged by 1 hour for July 2014 (every Tue, Wed and Thu), For August 2014 (every Tues, Wed and Thu), and for September 2014 (every Tue, Wed and Thu)

Averaged by 1 hour for July 2017 (every Tue, Wed and Thu), For August 2017 (every Tues, Wed and Thu), and for September 2017 (every Tue, Wed and Thu)

North I-25 120th Avenue to US 36 Express Lanes Results Southbound 2014 to 2017

EXPRESS LANE
SPEED AVERAGED



Public Perception of Express Lanes



- Most people can see the value in Express Lanes when it benefits them directly. They can see the value in situations where they really need to save time personally
- Many people in Colorado do not have experience with Express Lanes
- Common misperceptions about Express Lanes include:
 - They are only for the rich
 - They represent a form of double taxation
 - They are synonymous with toll roads
 - They won't address long-term congestion problems

The Future of Express Lanes Planning

- The HPTE is leading efforts to develop an Express Lanes Master Plan to identify and prioritize corridors with the potential of benefitting from Express Lanes
- Efforts include gathering public input and working with stakeholders to determine the best solutions based on local transportation needs and issues

Less drive time.
Less time to
drive you nuts.

I-70
MTN

US36

I-25
CENTRAL

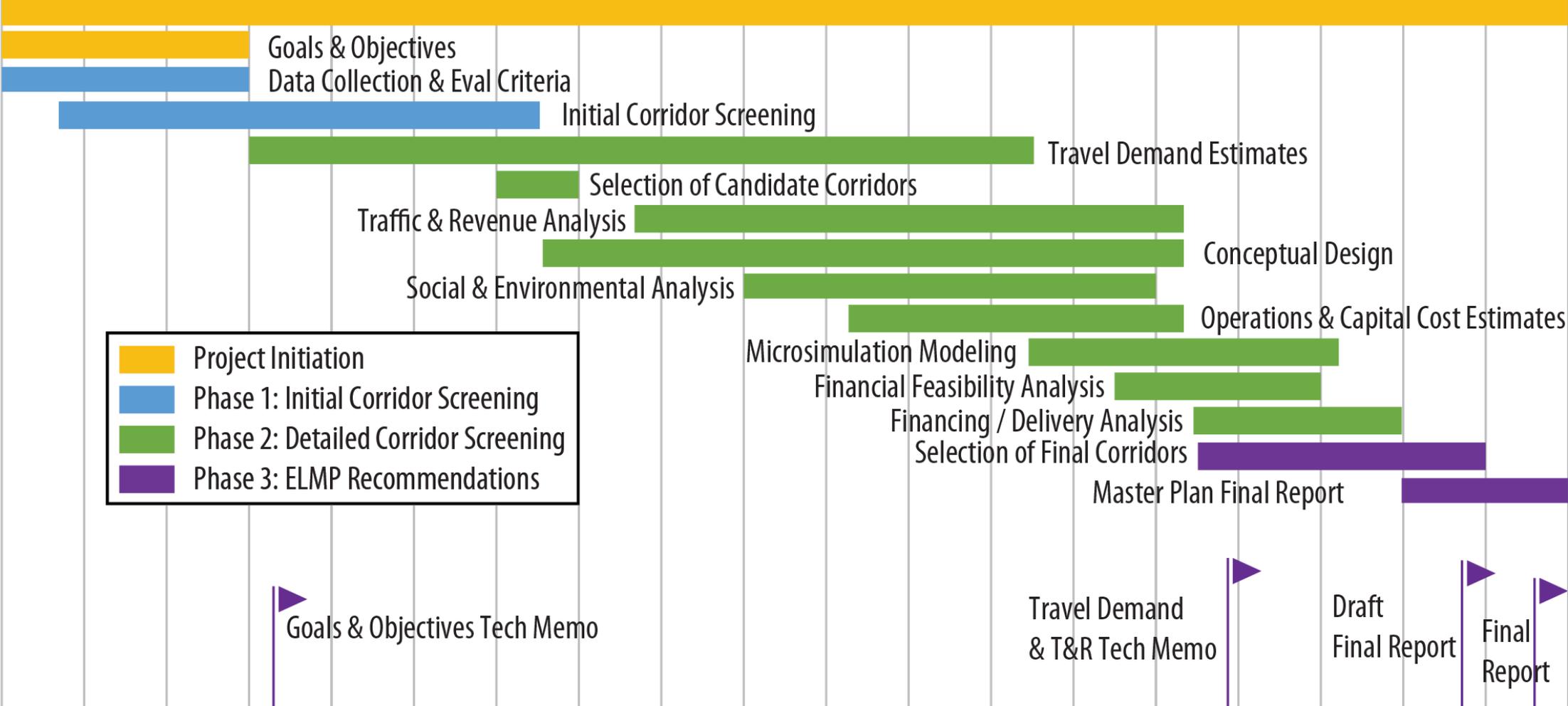
I-25
NORTH

Cost: \$6

Home in time for homework

Express Lanes.
When it matters most.

**EXPRESS
LANES**
expresslanes.codot.gov



■	Project Initiation
■	Phase 1: Initial Corridor Screening
■	Phase 2: Detailed Corridor Screening
■	Phase 3: ELMP Recommendations



Goals and Objectives

Express Lane Goals & Objective Activity – Workshop #1

Multi-Modal Options
Public Acceptance
Travel Reliability
Technological Capability
Financial Feasibility

Person Throughput
System Connectivity
Long-Range Viability
Physical Feasibility



Evaluation Criteria

Metrics Organized by Tiers & Category

Phase 1 (Initial Screening)

Existing Congestion

- Speed
- Travel Time Index (TTI)
- Planning Time Index (PTI)

Acceptance

- Public & Jurisdictional Acceptance
- Planned Roadway Widening

Transit & Connectivity

- Transit Service
- System Connectivity

Physical Feasibility

Phase 2 (Detailed Evaluation)

Traffic Performance

- Peak-period Person Throughput
- Peak-period Freight Throughput
- Trip Reliability

Connectivity

- System Connectivity

Acceptance

- Public & Jurisdictional Acceptance

Viability for CAV Vehicles

Financial Feasibility

- Projected Net Revenue
- Projected Net Present Value

Environmental Impacts

- Air Quality

Physical Feasibility

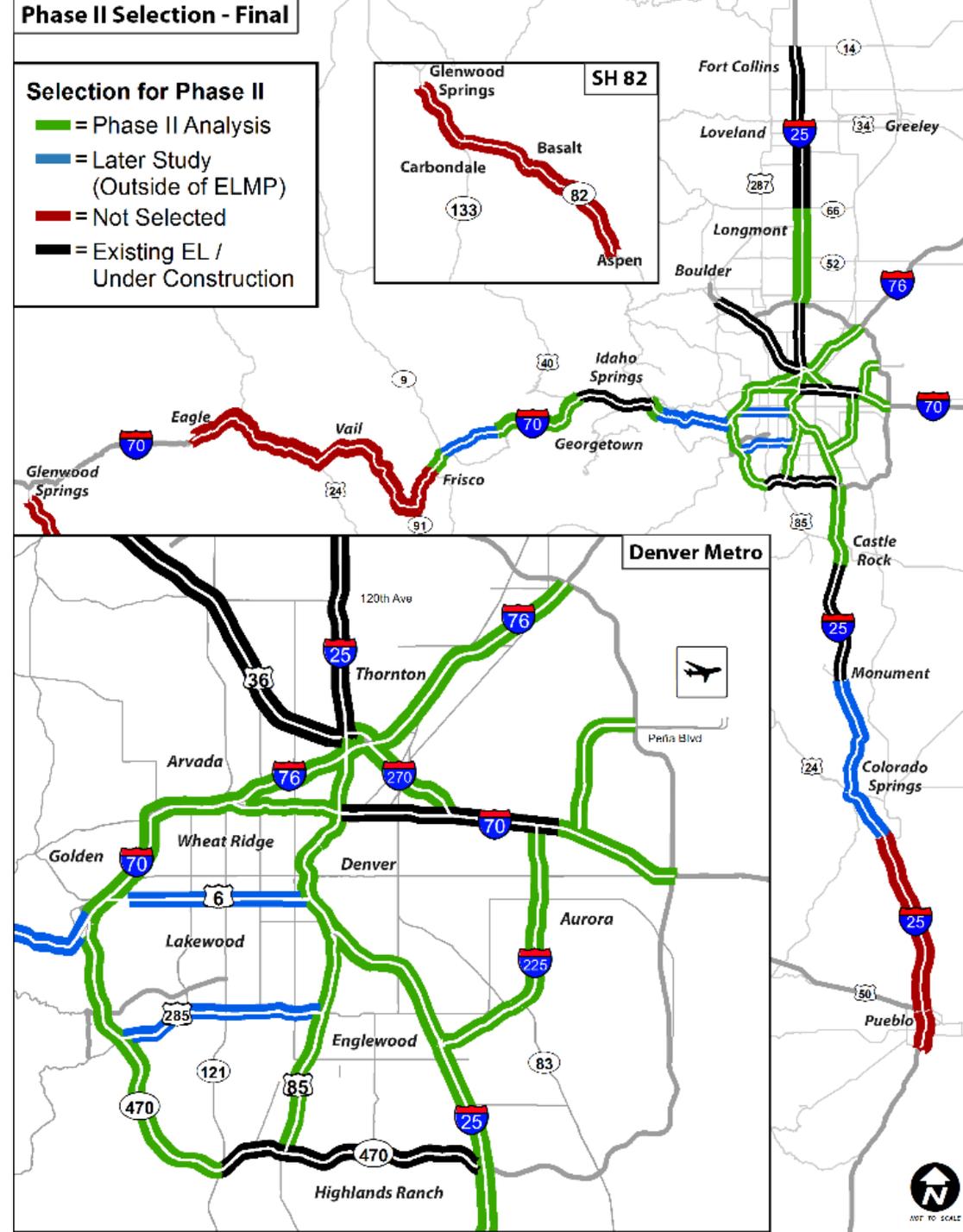
- Planning Level Cost Estimates

Corridor	Direction	From	To	Traffic Performance										Transit & Connectivity				Acceptance				Physical Feasibility							
				INRIX Speed AM (Peak-Hour)		INRIX Speed PM (Peak-Hour)		INRIX TTI AM (Peak-Hour)		INRIX TTI PM (Peak-Hour)		INRIX PTI AM (Peak-Hour)		INRIX PTI PM (Peak-Hour)		System Connectivity		Adequacy of Transit Service		Transit & Connectivity Score		Public & Jurisdictional Acceptance		Planned Capacity Enhancement		Acceptance Score		Physical Feasibility	
				Value	Score	Value	Score	Value	Score	Value	Score	Value	Score	Value	Score	Value	Score	Value	Score	Value	Score	Value	Score	Value	Score	Value	Score	Value	Score
I-25	NB	CO 119	CO 402	70	0.0	54	3.0	1	0.0	1.2	0.0	1	0.0	2.5	3.0	1.00	Exist / Const	5.0	Bustang	5.0	5.00	Manageable	5.0	STIP	5.0	5.00	Manageable	5.0	
I-25	SB	CO 402	CO 119	42	5.0	70	0.0	1.6	3.0	1	0.0	8.3	5.0	1	0.0	2.17	Exist / Const	5.0	Bustang	5.0	5.00	Manageable	5.0	STIP	5.0	5.00	Manageable	5.0	
I-25	NB	E-470	CO 119	72	0.0	73	0.0	1	0.0	1	0.0	1	0.0	1	0.0	0.00	Exist / Const	5.0	Bustang	5.0	5.00	Involved	3.0	L RTP	3.0	3.00	Manageable	5.0	
I-25	SB	CO 119	E-470	71	0.0	68	0.0	1	0.0	1	0.0	1	0.0	1.6	0.0	0.00	Exist / Const	5.0	Bustang	5.0	5.00	Involved	3.0	L RTP	3.0	3.00	Manageable	5.0	
I-25	NB	Santa Fe Dr	20th Street	33	3.0	9	5.0	1.7	3.0	6	5.0	2.8	3.0	9.7	5.0	4.00	Exist / Const	5.0	Bustang	5.0	5.00	Involved	3.0	L RTP	3.0	3.00	Difficult	0.0	
I-25	SB	20th Street	Santa Fe Dr	27	5.0	27	5.0	2.1	5.0	2	5.0	2.7	3.0	3.6	5.0	4.67	Exist / Const	5.0	Bustang	5.0	5.00	Involved	3.0	L RTP	3.0	3.00	Difficult	0.0	
I-25	NB	I-225	Santa Fe Dr	27	5.0	13	5.0	2.2	5.0	4.6	5.0	3	3.0	7.5	5.0	4.67	None	0.0	Bustang	5.0	2.50	Involved	3.0	None	0.0	1.50	Difficult	0.0	
I-25	SB	Santa Fe Dr	I-225	10	5.0	11	5.0	5.7	5.0	5.3	5.0	8.7	5.0	8.7	5.0	5.00	None	0.0	Bustang	5.0	2.50	Involved	3.0	None	0.0	1.50	Difficult	0.0	
I-25	NB	C-470	I-225	23	5.0	15	5.0	2.8	5.0	3.9	5.0	4.3	5.0	8.6	5.0	5.00	Exist / Const	5.0	Bustang	5.0	5.00	Involved	3.0	None	0.0	1.50	Difficult	0.0	
I-25	SB	I-225	C-470	45	3.0	40	3.0	1.3	3.0	1.6	3.0	1.9	0.0	3.9	5.0	2.83	Exist / Const	5.0	Bustang	5.0	5.00	Involved	3.0	None	0.0	1.50	Difficult	0.0	
I-25	NB	Plum Creek Pkwy	C-470	31	5.0	41	3.0	2.1	5.0	1.6	3.0	3.5	5.0	2.7	3.0	4.00	Exist / Const	5.0	Bustang	5.0	5.00	Involved	3.0	None	0.0	1.50	Involved	3.0	
I-25	SB	C-470	Plum Creek Pkwy	69	0.0	56	3.0	1	0.0	1.2	0.0	1	0.0	2.2	3.0	1.00	Exist / Const	5.0	Bustang	5.0	5.00	Involved	3.0	None	0.0	1.50	Involved	3.0	
I-25	NB	Academy Blvd	Monument	72	0.0	72	0.0	1	0.0	1	0.0	1	0.0	1	0.0	0.00	Exist / Const	5.0	Bustang	5.0	5.00	Difficult	0.0	None	0.0	0.00	Manageable	5.0	

Phase II Corridors

Selection of Corridors for Further Analysis

- ☐ **Congestion was #1 Consideration**
- ☐ **Red Corridors NOT selected** for Phase II
- ☐ **Blue Corridors** selected for **later study** outside of ELMP
- ☐ **Green Corridors selected** for Phase II
 - **Denver Metro Corridors**
 - **I-25** Loveland to Castle Rock
 - **I-25 Central Bi-directional Lanes**
 - **US 85 - Santa Fe**
 - **I-70 Mountain Corridor**
 - **Potential Direct Connections**



Design Configurations and Options to Fit Context



Express Lane Component	Options for Deployment
Location of Lanes	<ul style="list-style-type: none"> Converted general purpose or HOV lane New construction (widening) Permanent use of shoulder Temporary use of shoulder (dynamic lanes)
Lane Configuration	<ul style="list-style-type: none"> 1 lane in each direction 2 lanes in each direction 1 – 3 reversible lanes Contraflow (borrowed) lanes
Lane Separation	<ul style="list-style-type: none"> No separation Painted buffer Concrete barrier
Access to Lanes	<ul style="list-style-type: none"> Continuous access Limited access breaks Direct access ramps

Detailed Analysis of Phase II Corridors

Traffic & Revenue Estimates

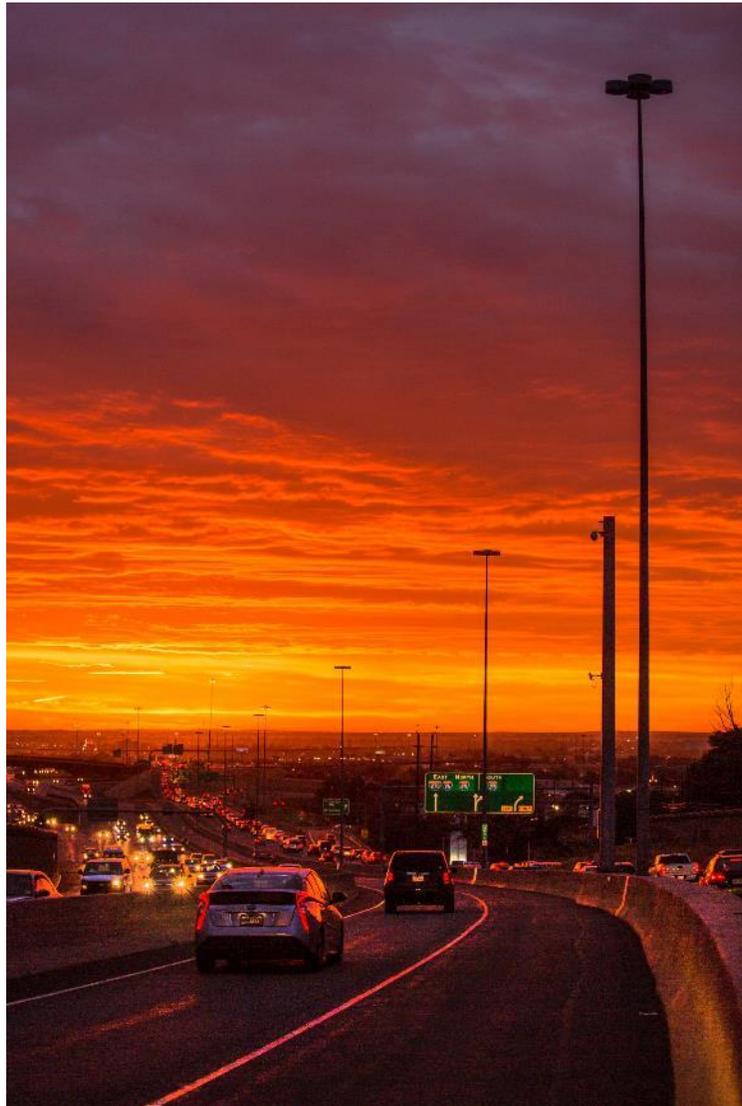
- Analyze Express Lane and General Purpose conditions for potential projects
- Evaluate various pricing & toll policy scenarios

Financial Feasibility

- Estimate potential net revenues and long-term project viability
- Develop financing program strategy for high-performing Express Lane corridors

Express Lane Network Recommendations

- Workshop #3 to review stakeholder input and technical analysis
- Prioritized List of Express Lane Corridors & Connections



How You Can Help

Help direct questions and concerns about Express Lanes to HPTE
dot_hpte@state.co.us

To learn more about Express Lanes visit
expresslanes.codot.gov

Be a sounding board and provide input on local corridor needs, including reviewing the results of the Express Lanes Master Plan



ATTACH C

ATTACHMENT C

To: Chair and Members of the Transportation Advisory Committee

From: Robert Spotts, Planning Supervisor, Air Quality and Mobility Analytics
303 480-5626 or rspotts@drcog.org

Meeting Date	Agenda Category	Agenda Item #
October 28, 2018	Informational	5

SUBJECT

The Regional Air Quality Council (RAQC) recap of the 2019 ozone season and the regulatory requirements of the Denver Metro/North Front Range ozone nonattainment area being reclassified from Moderate to Serious.

PROPOSED ACTION/RECOMMENDATIONS

No action requested. This item is for information only.

ACTION BY OTHERS

N/A

SUMMARY

The RAQC is the lead air quality planning agency for the Denver Metro area and the North Front Range area. The RAQC tracks the region's ozone levels, evaluates and recommends emission control measures to the Colorado Air Quality Control Commission (AQCC), and implements a variety of strategies designed to increase public awareness of strategies to reduce ozone pollution. The RAQC works closely with the Colorado Air Pollution Control Division (APCD). They are also responsible for developing the Denver Metro/North Front Range (DM/NFR) region's air quality attainment plans. Creating an ozone State Implementation Plan (SIP) involves developing emission inventories, evaluating and modeling emission control strategies, and adopting enforceable regulations and control measures. A SIP must be approved by the AQCC and the U.S. Environmental Protection Agency (EPA), with review by the Colorado state legislature.

At ground level, ozone is a health hazard, especially for the young and elderly and people with pre-existing respiratory conditions, such as asthma and Chronic Obstructive Pulmonary Disease (COPD). Those who are active and exercise outdoors may also experience breathing difficulties and eye irritation, and prolonged exposure may result in reduced resistance to lung infections and colds.

Ground-level ozone is formed when emissions of volatile organic compounds (VOCs and nitrogen oxides (NOx) from everyday items and industrial sources combine and "cook" in the heat and sunlight. Common sources of these ozone forming emissions include gasoline and diesel-powered vehicles and lawn equipment, local industry, power plants, oil and gas production, and paints, stains, and solvents.

In 2007, under the 1997 National Ambient Air Quality Standard (NAAQS), the 9-county DM/NFR region was designated as Marginal nonattainment for exceeding the ozone standard of 80 parts per billion (ppb). In 2008, the ozone standard was tightened to 75 ppb by the EPA to be more protective of human health. In 2012, the DM/NFR region was designated as Marginal nonattainment under the newer standard, with the 1997 standard

eventually being revoked, and in 2016, the region was reclassified to a Moderate nonattainment area for failing to attain by the Clean Air Act mandated deadline. At the conclusion of the 2018 ozone season, the DM/NFR region continued to fail to meet the ozone standard, which resulted in the region being reclassified to Serious nonattainment area in late 2019.

Meanwhile, in 2015, the ozone standard was further tightened by the EPA from 75 ppb to 70 ppb and the region was designated as a Marginal nonattainment area in July 2018 for the 2015 ozone standard. Due to a recent lawsuit, the newly established 2015 ozone standard does not revoke planning requirements associated with the 2008 standard. As a result, the RAQC and the Colorado APCD will be required to develop a Serious nonattainment area SIP for the 2008 standard at the same time as they begin modeling and planning for the 2015 standard.

The RAQC will present a summary of the 2019 ozone season and the regulatory requirements of being nonattainment for multiple ozone standards.

PREVIOUS DISCUSSIONS/ACTIONS

N/A

PROPOSED MOTION

N/A

ATTACHMENTS

1. RAQC presentation

ADDITIONAL INFORMATION

If you need additional information please contact Robert Spotts, Planning Supervisor, Transportation Planning and Operations, at 303 480-5626 or rspotts@drcoq.org.

Air Quality Planning

Becoming a Serious Nonattainment Area

Denver Regional Council of Governments (DRCOG)
Transportation Advisory Committee (TAC)

October 28, 2019

Amanda Brimmer, E.I.T.
Technical Director

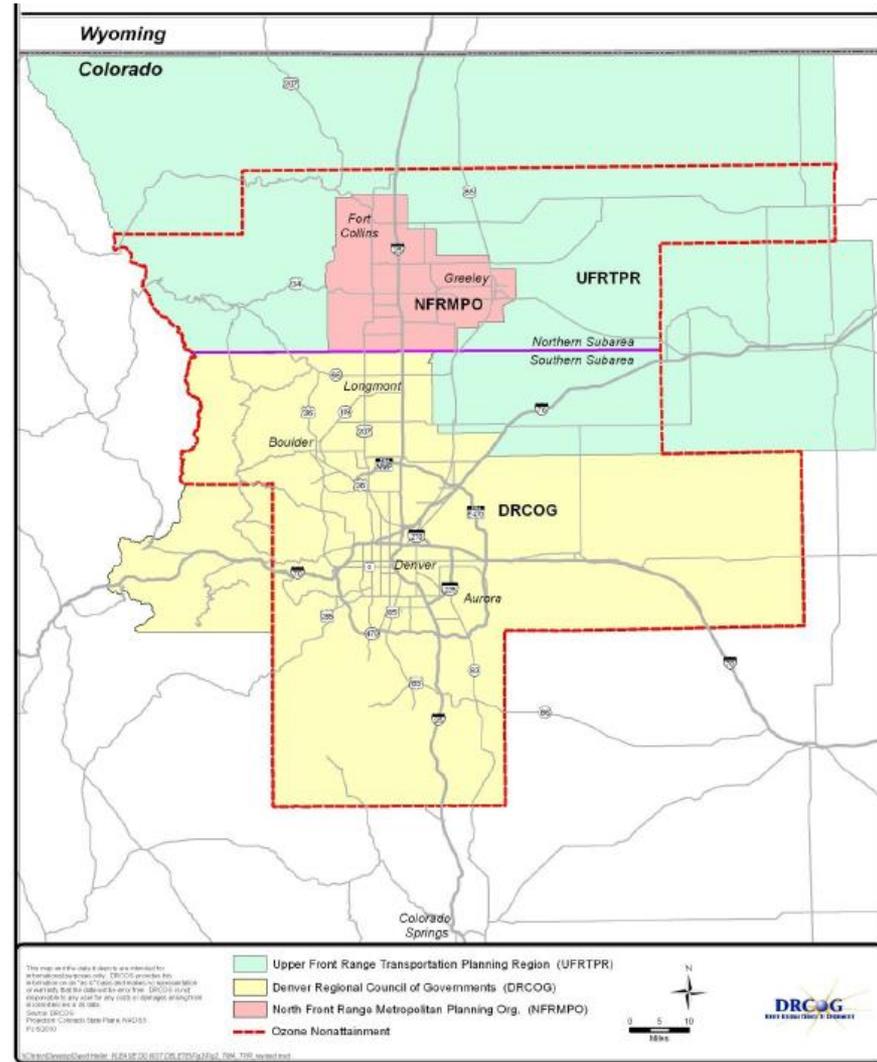


Lead air quality/ozone planning agency for the Denver Metro Area and North Front Range

29 Member Board Appointed by Governor via Executive Order

Primary Responsibilities

- Planning and State Implementation Plan (SIP) development to meet federal air quality standards
- Evaluating and recommending emissions reduction strategies
- Implementing public/private projects to reduce emissions and improve air quality
- Conducting programs of public education and awareness



Denver Metro/North Front Range AQ Status

Fine Particulates (PM_{2.5})

Attaining

Nitrogen Dioxide (NO₂)

Attaining

Sulfur Dioxide (SO₂)

Attaining

Lead (Pb)

Attaining

Carbon Monoxide (CO)

Attained in 1996 – Maintenance Area

Coarse Particulates (PM₁₀)

Attained in 1993 – Maintenance Area

Ozone (O₃)

1979 1-hour standard: 125 ppb

Attained 1987 (Standard Revoked)

1997 8-hour standard: 84 ppb

Attained in 2009 (Standard Revoked)

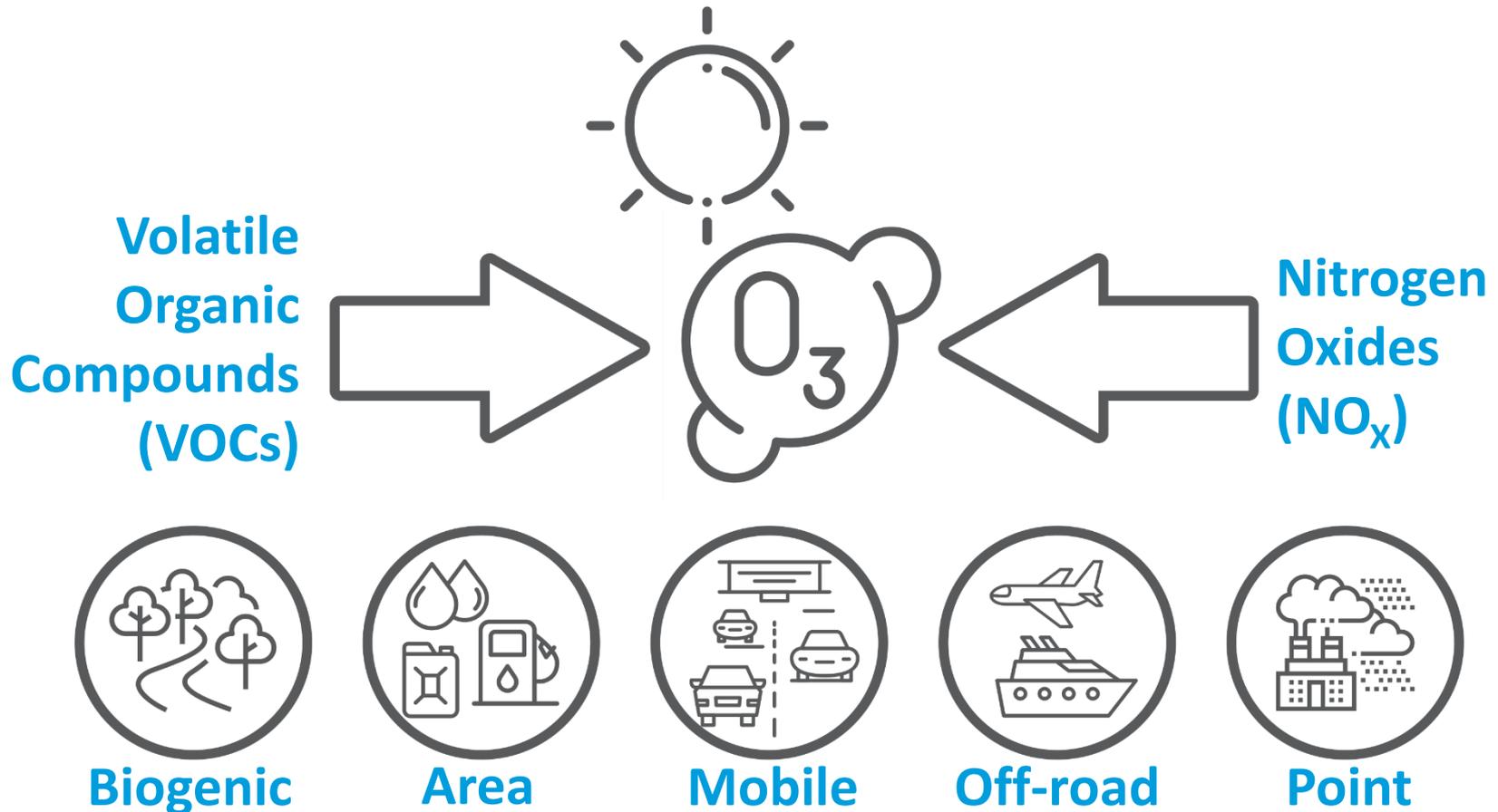
2008 8-hour standard: 75 ppb

Out of compliance

2015 8-hour standard: 70 ppb

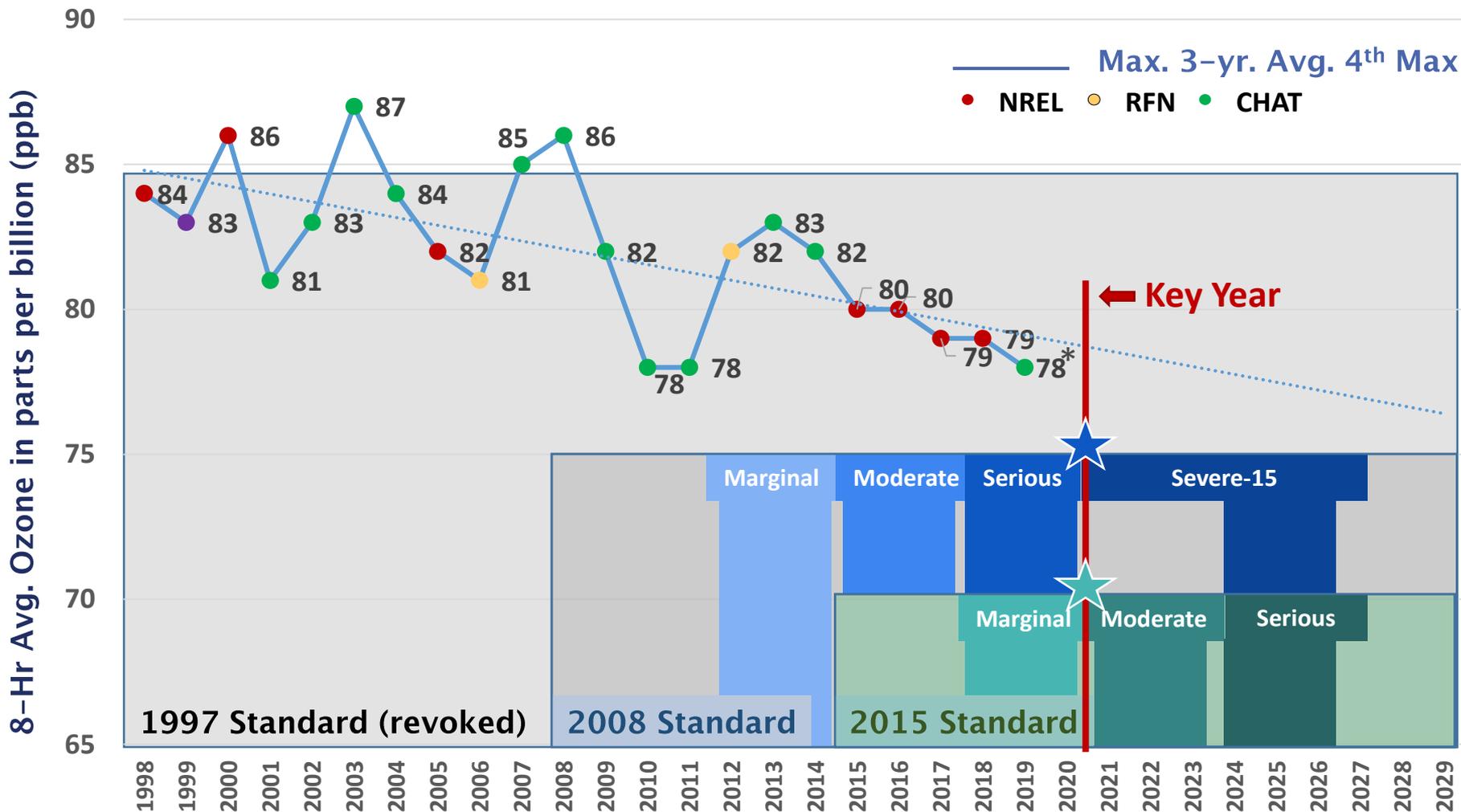
Out of compliance

How Ozone Is Formed



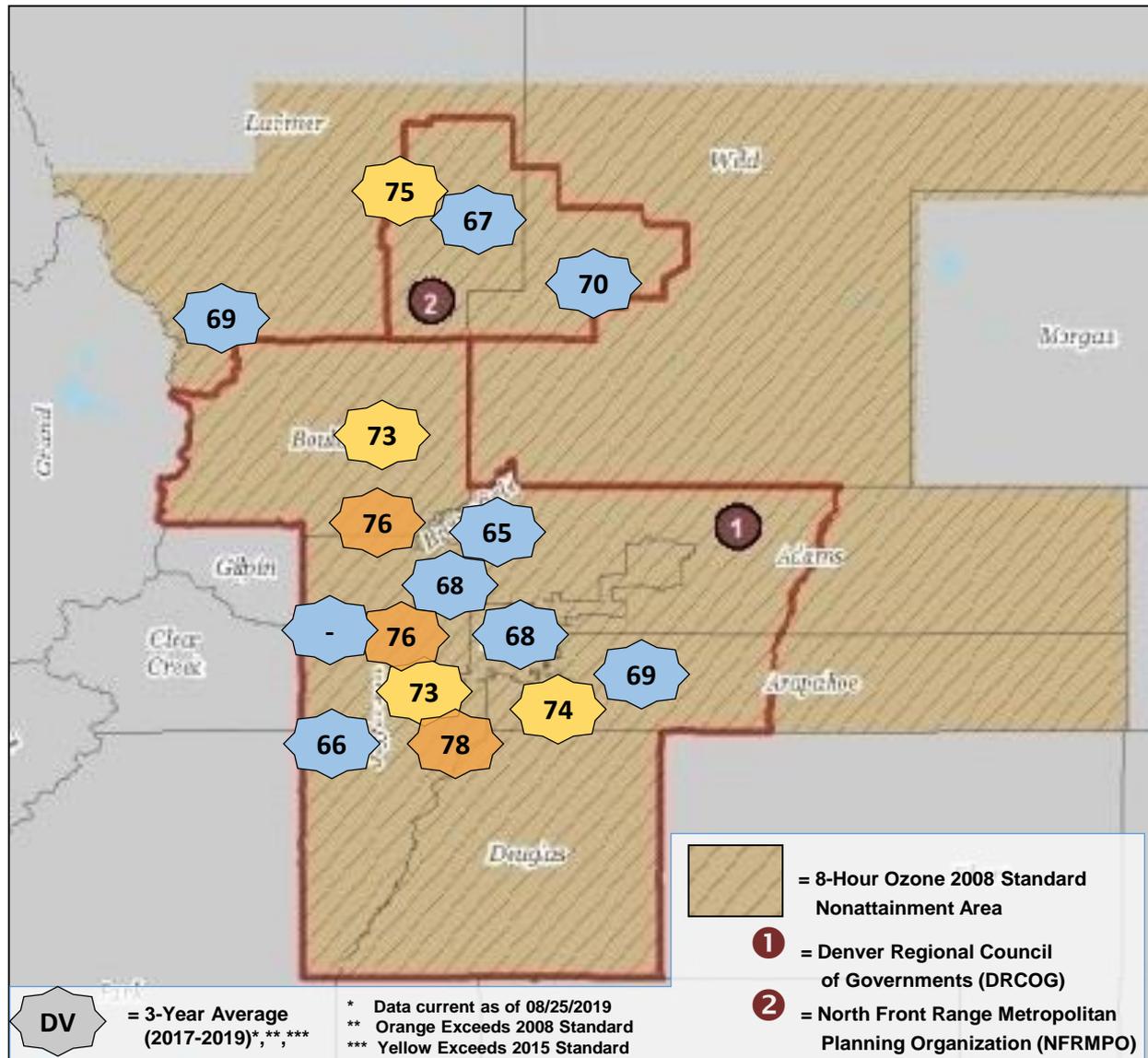
8-Hour Ozone Trends and Federal Standards

3-Year Design Values in the Denver Metro/North Front Range



8-Hour Ozone Standard: Based on a three-year average of the annual forth-highest daily 8-hour maximum ozone concentration.
 *Current as of 9/5/19.

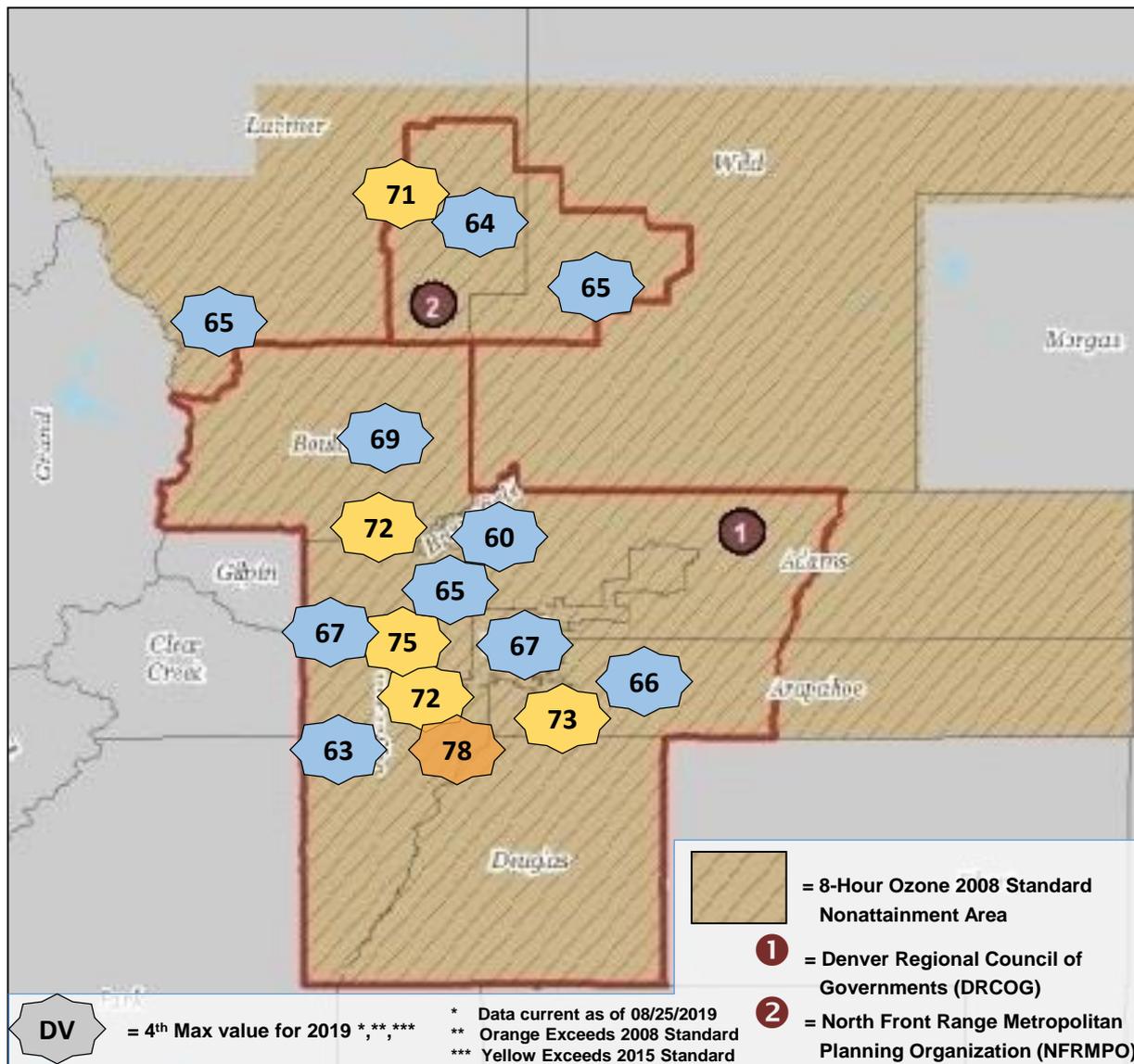
2017-2019 Three-Year Average of 4th Max



Monitor	Design Value (ppb)
Chatfield State Park	78
NREL	76
Rocky Flats	76
Fort Collins - West	75
Highland	74
Welch	73
Boulder Reservoir	73
Greeley - Weld Tower	70
Rocky Mtn. Nat'l Park	69
Aurora East	69
CAMP	68
La Casa	68
Fort Collins - CSU	67
Aspen Park	66
Welby	65
Blackhawk ¹	-

¹ Blackhawk monitor began operating July 3, 2019, 3 year average not available

2019 4th-Maximum 8-Hour Ozone Values



Monitor	2019 4 th Max (ppb)
Chatfield State Park	78
NREL	75
Highland	73
Welch	72
Rocky Flats	72
Fort Collins - West	71
Boulder Reservoir	69
CAMP	67
Blackhawk ¹	67
Aurora East	66
Greeley - Weld Tower	65
Rocky Mtn. Nat'l Park	65
La Casa	65
Fort Collins - CSU	64
Aspen Park	63
Welby	60

¹ Blackhawk monitor began operating July 3, 2019

Highest Allowable 4th Maximum in 2020

>75 ppb

71-75 ppb

<71 ppb

Monitor	2018	2019*
Chatfield State Park	83	78
Rocky Flats	81	72
Fort Collins - West	81	71
NREL	80	75
Highland	77	73
Welch	66	72
Boulder Reservoir	77	69
Rocky Mtn. Nat'l Park	74	65
Greeley - Weld Tower	73	65
Aurora East	72	66
CAMP	71	67
La Casa	72	65
Fort Collins - CSU	72	64
Aspen Park	71	63
Welby	69	60

Highest Allowable 4th Maximum in 2020	
(75 ppb)	(70 ppb)
66	51
74	59
75	60
72	57
77	62
89	74
81	66
88	73
89	74
89	74
89	74
90	75
91	76
93	78
98	83

Difficult

Possible

Likely

*as of 9/6/19

NAAQS Designations & Planning Process

EPA is required by the Clean Air Act to re-evaluate each NAAQS every 5 year and propose revisions if deemed necessary

Action	After NAAQS Promulgation
States submit area designation recommendations	1 year
EPA proposes nonattainment area rules/guidance	1 year
Final designations and classifications	2 years
States submit interstate and transport SIPs	3 years
States submit attainment plans	5-6 years
Nonattainment area attainment dates	5-24 years
Nonattainment Classification	Years to Attain
Marginal	3 years
Moderate	6 years
Serious	9 years
Severe (15 or 17)	15 or 17 years
Extreme	20 years

Air Quality Planning Process



Identify sources of emissions that contribute to ozone

Nitrogen Oxides (NO_x)

Volatile Organic Compounds (VOC)

Determine relative contributions

Field studies

Air quality modeling

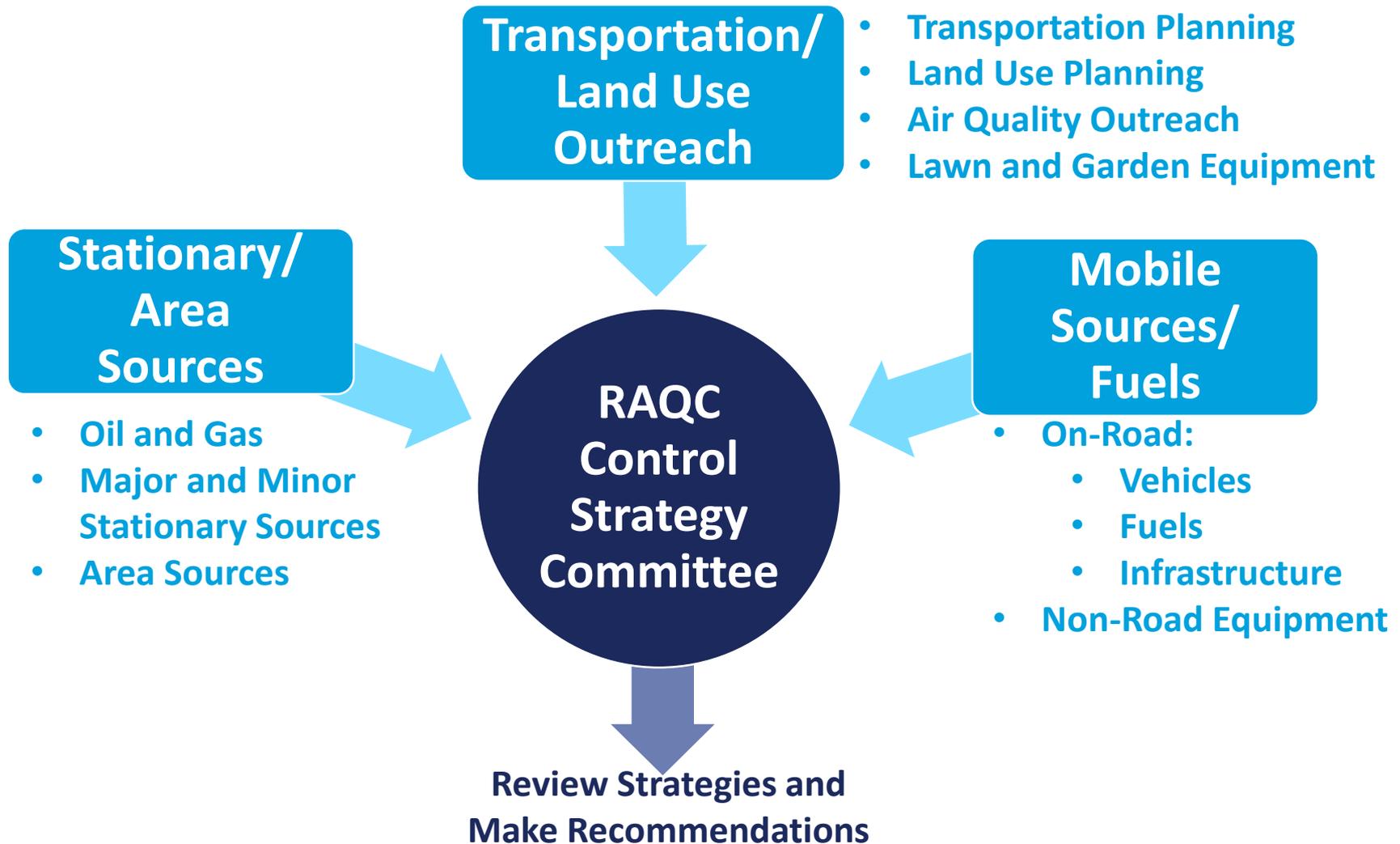
Identify strategies and determine effectiveness

Demonstration of future attainment

Air quality modeling and Weight of Evidence

Future tracking and enforcement

RAQC Control Strategy Committee

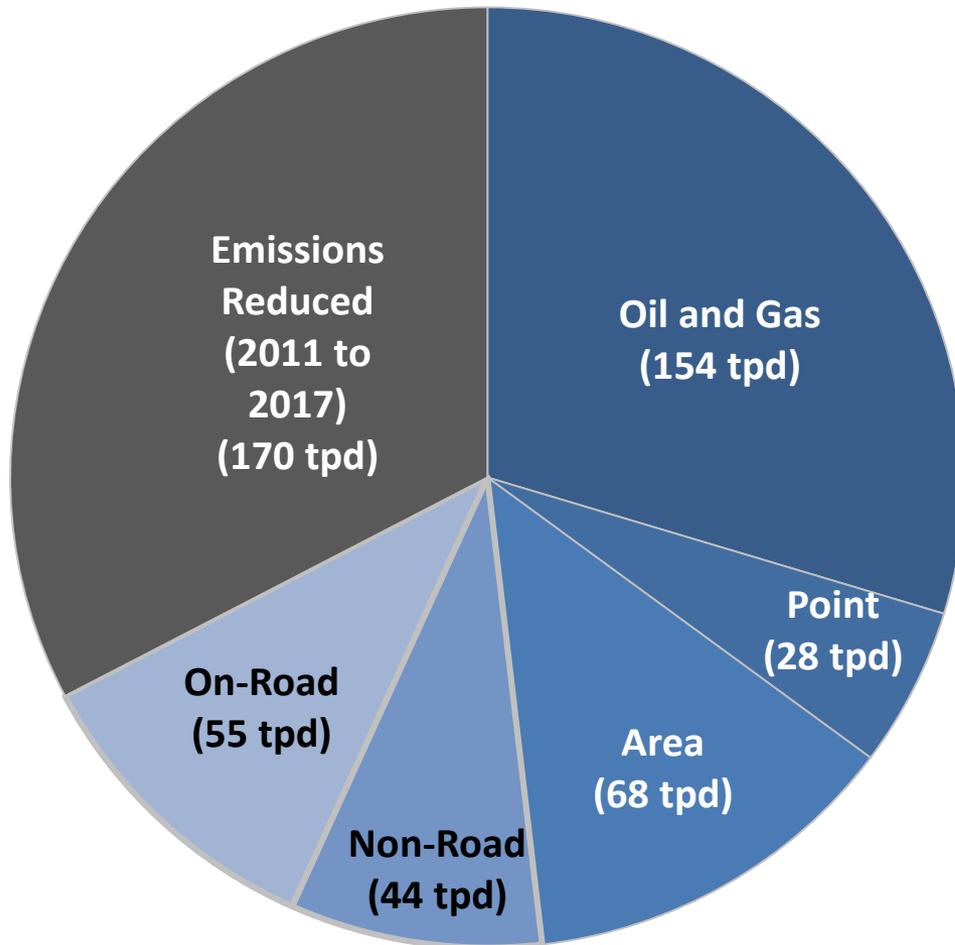


Meetings open to the public (3rd Wednesday of the Month)

Sign-up for notifications: raqc.org/email-signup/

Sources of VOC Emissions - What is Being Done?

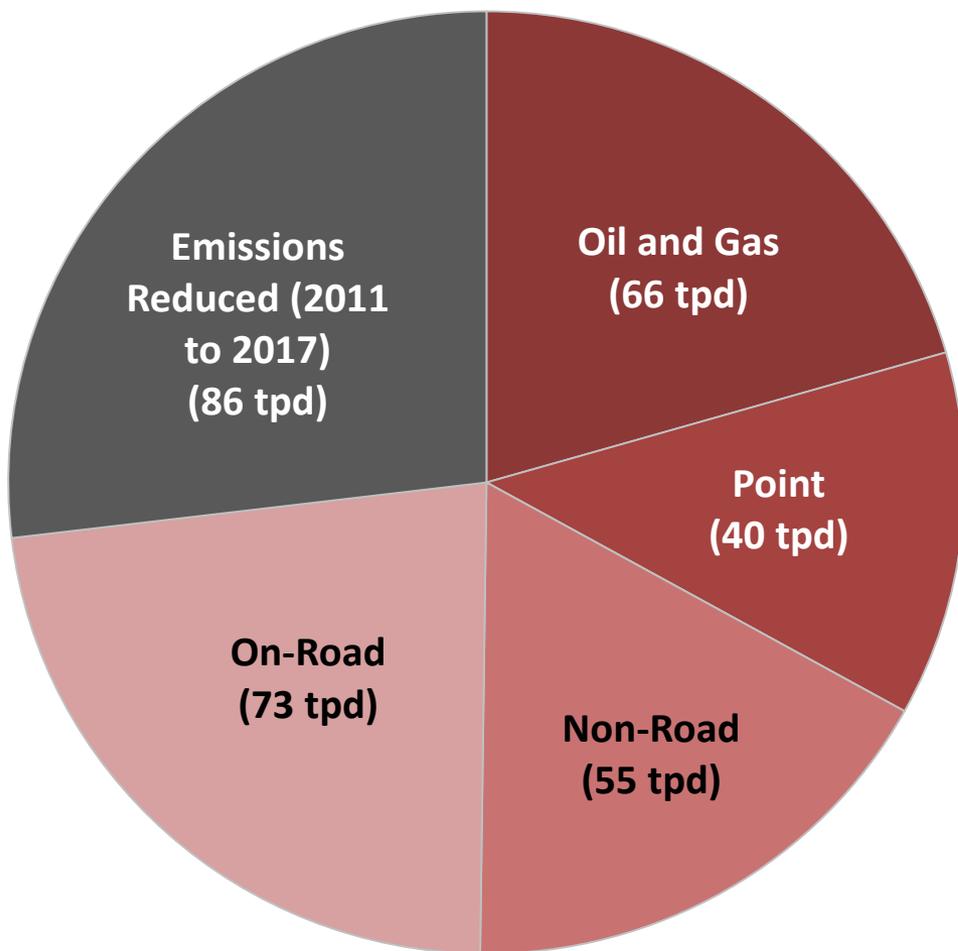
2017 VOC Sources (349 tpd)



- ✓ New car/truck standards
- ✓ Cleaner fuels/ Alternative fuels
- ✓ Inspection/maintenance programs
- ✓ New vehicle technologies
- ✓ Transportation/land use policies
- ✓ Travel reduction programs
- ✓ Oil and Gas (O&G)
 - *New regulations established by Air Quality Control Commission in Feb. 2014*
- ✓ Lawn and garden equipment change-out programs

Sources of NO_x Emissions - What is Being Done?

2017 NO_x Sources (234 tpd)



- ✓ New car/truck standards
- ✓ Cleaner fuels/ Alternative fuels
- ✓ Inspection/maintenance programs
- ✓ Diesel retrofits
- ✓ New vehicle technologies
- ✓ Transportation/land use policies
- ✓ Travel reduction programs
- ✓ Power Plants
 - *Clean Air Clean Jobs Act*
 - *Regional Haze program*
 - *Renewable energy/ energy efficiency programs*
- ✓ Small engine standards
- ✓ Non-road engine standards
- ✓ Locomotive engine standards
- ✓ Emissions Standards for Large Engines and Boilers

Moderate vs. Serious Area SIP Requirements

	Moderate	Serious
Photochemical Modeling	2017 Future Year	2020 Future Year
Reasonable Further Progress (RFP)	15% ↓ VOC 2012-2017	+9% ↓ VOC or NO _x 2018-2020
Reasonably Available Control Technology (RACT SIP)	Major Source = 100 tpy (NO _x or VOC)	Major Source = 50 tpy (NO _x or VOC)
Reasonably Available Control Measures	✓	✓
Inspection/Maintenance Program	Basic	Enhanced
New Source Review (NSR SIP) Emission offset ratio for VOC/NO _x	1.15:1	1.2:1
Contingency Measures 3% reduction in VOC and/or NO _x	✓	✓
Motor Vehicle Emissions Budgets	✓	✓
Clean Fuel-Vehicle Programs		✓
Transportation Control		✓

75 ppb Ozone NAAQS Nonattainment Areas

Marginal: Attaining			16 Areas
Allentown-Bethlehem, PA-NJ	Knoxville, TN	San Luis Obispo, CA	
Baton Rouge, LA	Lancaster, PA	Seaford, DE	
Charlotte-Concord, NC-SC	Memphis, TN	St. Louis, MO	
Cincinnati, OH	Pittsburgh, PA	Upper Green River Basin, WY	
Cleveland, OH	Reading, PA		
Columbus, OH	San Francisco-Oakland, CA		
Moderate: Attaining			3 Areas
Atlanta, GA	Baltimore, MD	Mariposa County, CA	
Marginal: Not Attaining/Incomplete Data			6 Areas
Calaveras County, CA	Philadelphia, PA	Washington-Arlington, DC-VA	
Dukes County, MA	Pechanga Band of Luiseno		
Jamestown, NY	Mission Indians, CA		
Moderate: Not Attaining - 1-Year Extension			1 Area
<i>Denver/North Front Range, CO</i>	Sheboygan, WI		
Moderate: Not Attaining - Bump-Up to Serious			10 Areas
Chicago, IL	Houston, TX	New York-New Jersey, NY-NJ	
Dallas-Fort Worth, TX	Imperial County (El Centro), CA	Phoenix, AZ	
Hartford, CT	Nevada County (Truckee), CA	San Diego, CA	
Serious and Above: Not Attaining			8 Areas
Kern County, CA	Morongo Band of Mission	Riverside-San Bernardino, CA	
Los Angeles-South Coast Basin, CA	Indians, CA	Ventura County, CA	
San Joaquin, CA	Los Angeles-San Bernardino, CA	Sacramento Metro, CA	



Serious Area SIP Timeline

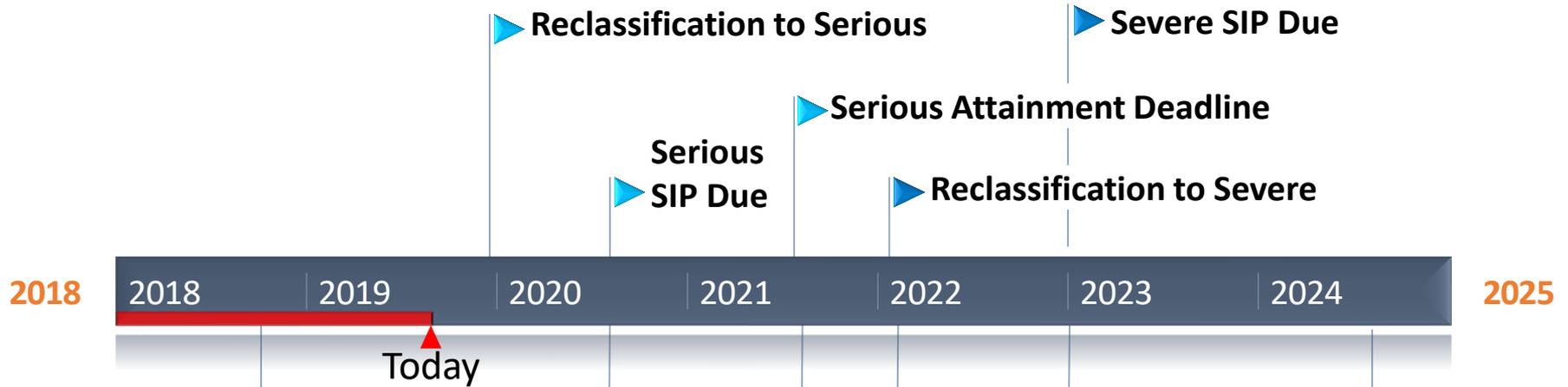
Action	Date
EPA Proposes Reclassification to Serious	Aug. 2019
EPA Public Hearing	Sept. 6, 2019
Public Comment Period Ends	Sept. 16, 2019
Final Rule	~Mid-Dec. 2019
Effective Date	30-Days After Final Publication
RAQC Review of SIP Elements	Dec. 2019 – Spring 2020
2020 Photochemical Modeling Results*	~April 2020
RAQC Endorsement	Late Spring/Summer 2020
Serious SIP Due	Aug. 2020
AQCC Public Hearing and Approval	Dec. 2020

*RAQC Modeling Protocol, finalized April 2019, outlined modeling efforts being contingent upon EPA's release of a 2016 National 12 km modeling platform (2016v1); now anticipated Sept. 2019.

Ozone Planning Timeline

75 ppb Standard

Attainment Years - Serious



70 ppb Standard



Attainment Years - Marginal

Attainment Years - Moderate

Simple Steps. Better Air. (SSBA)

Rebranded public education and outreach campaign in 2017



SSBA Communication Strategies

- Paid Media and Digital
 - Out of Home, Radio, Social Media, Website
- Stakeholder Partnerships
 - Community/Municipal Partners, TV Meteorologist Advisory Group
- Community Outreach & Sponsorships
- Digital tool kit/marketing catalog
 - Logos, graphics, stickers, tattoos, lollipops, hats, Kids Activity Book

Ozone Action Alerts

- Email Alerts
- CDOT Highway Signs
- Social Media (Facebook, Twitter)
- Digital and Mobile



Contact Information

Amanda Brimmer, E.I.T.

Technical Director

abrimmer@raqc.org

(303) 629-5450 x 240

www.raqc.org



ATTACH D

ATTACHMENT D

To: Chair and Members of the Transportation Advisory Committee

From: Robert Spotts, Planning Supervisor, Air Quality and Mobility Analytics
303-480-5626 or rspotts@drcog.org

Meeting Date	Agenda Category	Agenda Item #
October 28, 2019	Informational	6

SUBJECT

Congestion Management Process and preliminary results of the 2018 Annual Report.

PROPOSED ACTION/RECOMMENDATIONS

N/A

ACTION BY OTHERS

N/A

SUMMARY

DRCOG maintains a federally-required congestion management process (CMP). One component of the process is the calculation of congestion measurements for roadways in the DRCOG region, and presentation within an annual report on traffic congestion. The annual reports have been prepared since 2006.

Staff will present to the TAC a draft version of the *2018 Annual Report on Roadway Traffic Congestion in the Denver Region*, including topics such as vehicle miles traveled in the region, mobility related trends of the past five years, and the importance of incident management to safety and traffic congestion.

PREVIOUS DISCUSSIONS/ACTIONS

N/A

PROPOSED MOTION

N/A

ATTACHMENT

1. Draft *2018 Annual Report on Roadway Traffic Congestion in the Denver Region*
2. Staff presentation

ADDITIONAL INFORMATION

If you need additional information, please contact Robert Spotts, Planning Supervisor, at 303-480-5626 or rspotts@drcog.org.



2018 ANNUAL REPORT ON ROADWAY TRAFFIC CONGESTION IN THE DENVER REGION

October 2019

1. Introduction

Quality of life in the Denver region depends on mobility, the ease with which people and goods move from place to place. The region's residents and visitors frequently cite the importance of reliable access to jobs, services, education and recreation via a variety of travel options.

Each year, the Denver Regional Council of Governments publishes a report on congestion in the Denver metro area. This year's report includes information on a range of mobility subjects beyond roadway traffic congestion. Federal law requires DRCOG to implement a congestion management process, but DRCOG's staff and member

governments are also concerned with other aspects of mobility that affect, or are affected by, car and truck traffic. Please consult previous congestion reports that address specific subjects related to traffic congestion.

Topics addressed in this report include:

- annual monitoring of vehicle miles traveled
- five-year trends in demographic, mobility and travel characteristics
- traffic congestion measures
- incident management and safety
- recent and ongoing transportation projects



2. Travel and vehicle miles traveled on a typical weekday

Rapid household and economic growth pose a challenge to providing adequate mobility.

Every year, DRCOG staff estimates the annual change in total vehicle miles traveled (VMT) per day. VMT demonstrates how much people are traveling on roadways across the region. VMT influences traffic congestion, pollutant emissions, petroleum fuel use and traffic safety, and informs transportation professionals about transportation needs. Staff consolidates data from Federal Highway Administration annual reports, automated traffic recorders, the Colorado Department of Transportation's Highway Performance Monitoring System and local agency and toll highway traffic counts.

"Figure 1: Average daily VMT in the Denver region (2000-2018)" on page 3 depicts average weekday VMT by all types of motor vehicles for the Denver region.

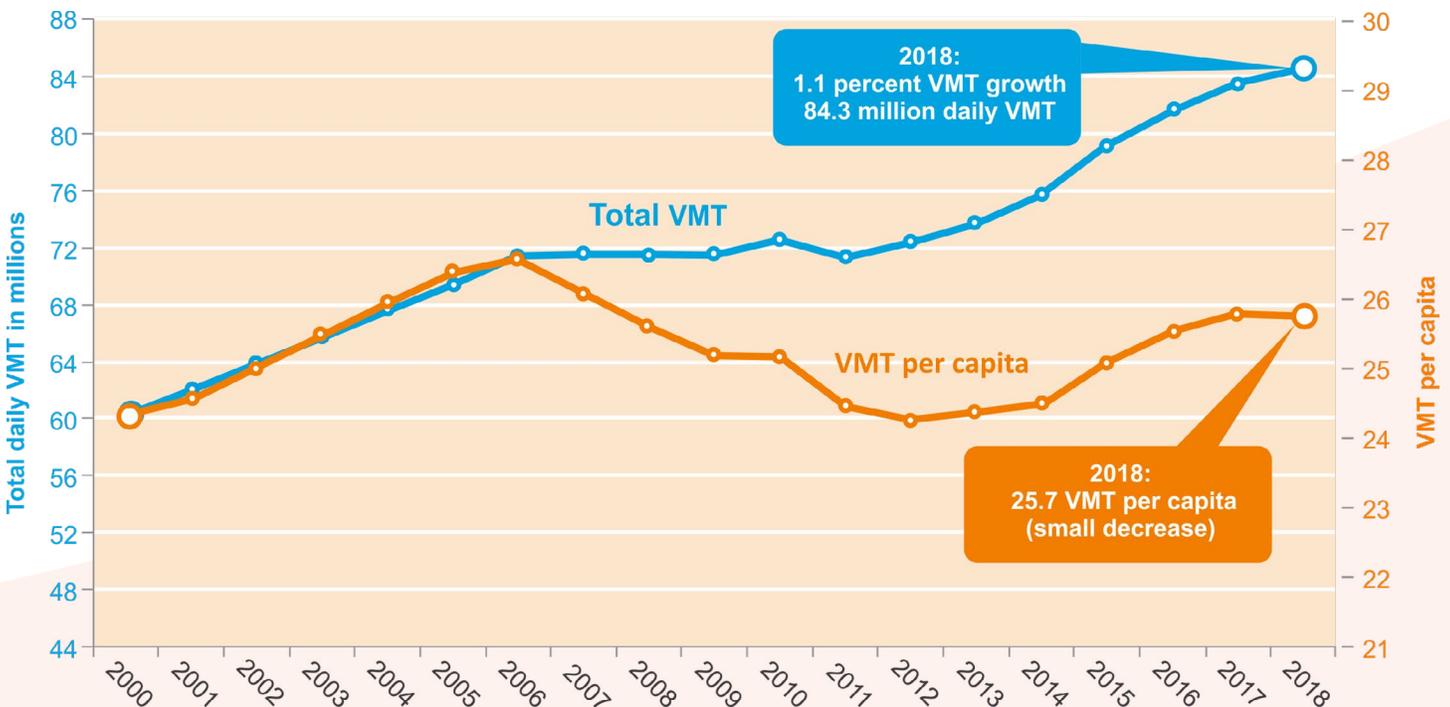
In 2018 the DRCOG region experienced a slowdown in VMT growth and a small decrease in VMT per capita. VMT increased by an estimated 1.1%, slower than

population growth of 1.4%. Before 2007, VMT and VMT per capita grew at a relatively stable and predictable rate. From 2007 through 2011 VMT was mostly flat, but with noticeable declines in the per capita value. A resurgence in VMT growth occurred through 2017. Is 2018's slower VMT growth the start of a new trend?

As the region looks toward its future, many unpredictable factors will influence transportation and mobility, such as fuel prices and availability, personal habits, alternative fuels, connected vehicle technologies and driverless (automated) vehicles. Technology is rapidly evolving and could have many unknown implications.

The Mobility Choice Blueprint (final report published in February 2019) initiative is a regional effort to plan and prepare for technological and service innovations affecting mobility. The blueprint suggests a set of 34 tactical actions led by an agency designated as the responsible initiator (champion) to help define the Denver region's mobility future. The first of the recommended tactical actions is to establish an Advanced Mobility Partnership committee to provide guidance on Mobility Choice Blueprint implementation activities.

Figure 1: Average daily VMT in the Denver region (2000-2018)



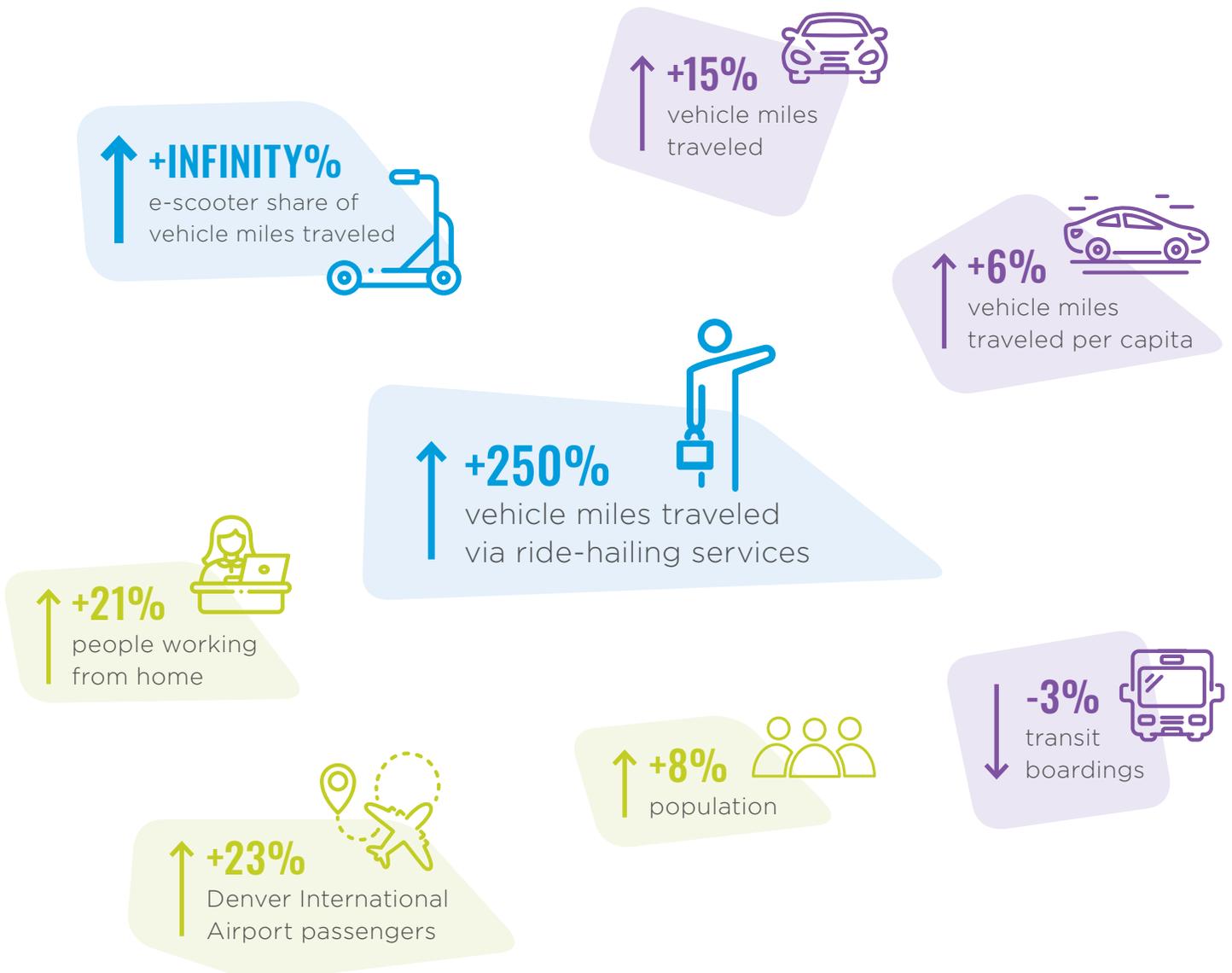
3. Mobility-related trends for the past five years and the foreseeable future

During the past five years, the Denver region has experienced significant growth in population and travel, new options and challenges from emerging transportation service technologies, and new transportation infrastructure. Since 2013, the Denver region has consistently ranked as one of the fastest-growing areas in the nation. Population and VMT have grown faster than the transportation system's capacity, resulting in more congestion and decreased travel time

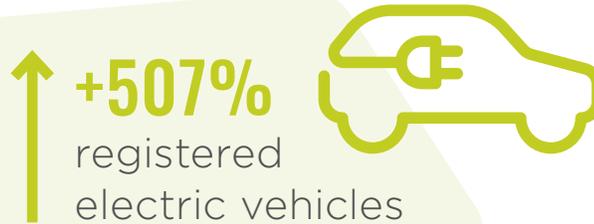
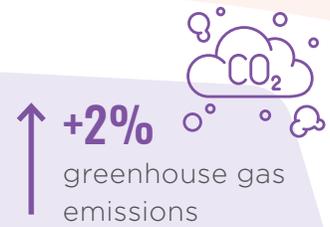
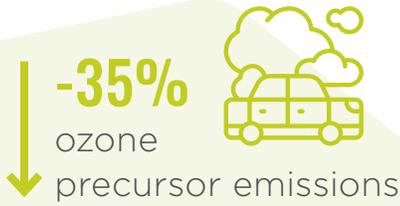
reliability. Meanwhile, technology and cultural forces have enabled large increases in teleworking, e-commerce, micromobility and on-demand ride-hailing.

Just five years ago Union Station wasn't open, our region had 40 fewer miles of passenger rail lines, and bus rapid transit was not yet serving the U.S. Route 36 and I-25 north corridors. I-225 was four lanes wide and construction had not yet begun on managed lane projects on Central I-70, South I-25 and C-470. The following infographic summarizes five-year trends influencing transportation.

FIVE-YEAR TRAVEL TRENDS



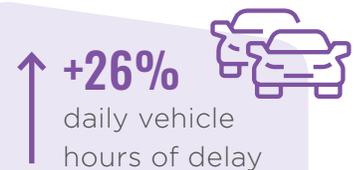
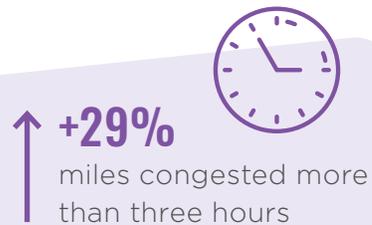
FIVE-YEAR MOTOR VEHICLE EMISSION TRENDS



FIVE-YEAR FREIGHT TRENDS



FIVE-YEAR CRASH AND CONGESTION TRENDS



4. Traffic congestion on major roadways

Per Federal Highway Administration rules, DRCOG maintains a database to monitor traffic congestion and performance measures for the 2,400-mile designated Regional Roadway System (“Figure 2: Key congested locations in 2018 and 2040” on page 8). The Regional Roadway System includes major streets, highways, freeways and tollways. It does not represent the entire roadway system. The congestion database identifies key attributes associated with roadway capacity, traffic volume and person volume (number of individuals) for each segment of the system.

“Table 1: Current and future congestion measures on Denver regional freeways and major roads” on page 7 displays several measures for the Regional Roadway System, with 2040 estimates based on forecasts from the DRCOG regional travel demand model. The model assumes an additional 1 million people will live in the Denver region by 2040. The model incorporates the population’s future demographic makeup and future transportation facilities, transit lines and employment concentrations. However, it does not include speculative factors for emerging technologies related to vehicles, roadways, fixed guideways and mobility services.



Photo courtesy of the Colorado Department of Transportation.

Table 1: Current and future congestion measures on Denver regional freeways and major roads

	2018		2040 (RTP)		Percent change between 2018 and 2040
	Average weekday	Annual total estimate (1)	Average weekday	Annual total estimate (1)	
Vehicle measures:					
Vehicle miles of travel	65,110,000	22,007,167,000	93,360,000	31,555,829,000	43%
Vehicle hours of travel	1,449,000	489,671,000	2,239,000	756,803,000	55%
Vehicle hours of delay	229,000	77,359,000	531,000	179,387,000	132%
Travel delay per driven registered vehicle (2)	7 minutes	40 hours	12 minutes	70 hours	74%
Travel delay per household	11 minutes	60 hours	17 minutes	97 hours	63%
Person measures:					
Person miles of travel	89,450,000	30,234,071,000	130,817,000	44,216,212,000	46%
Person hours of travel	2,029,000	685,901,000	3,165,000	1,069,898,000	56%
Person hours of delay	316,000	106,741,000	729,000	246,295,000	131%
Travel delay per resident	5.8 minutes	33 hours	10 minutes	56 hours	72%
Other:					
Percent of travel time in delayed conditions	16%	N/A	23%	N/A	48%
Travel time variation (peak vs. off peak)	1.22	N/A	1.37	N/A	13%
Lane miles of roads congested for three-plus hours	1,489	N/A	2,819	N/A	89%
(percent of total lane miles)	21%	N/A	36%	N/A	N/A
Economic travel delay costs:					
Commercial vehicles (3)	\$1,600,000	\$527,600,000	\$3,100,000	\$1,031,100,000	95%
Passenger vehicle persons (3)	\$3,200,000	\$1,067,900,000	\$5,800,000	\$1,945,600,000	82%
Total cost of delay	\$4,700,000	\$1,595,500,000	\$8,800,000	\$2,976,600,000	87%
Transit and other regionwide measures:					
Total RTD transit boardings	325,000	N/A	641,000	N/A	97%
Rail transit boardings	110,300	N/A	250,000	N/A	126%
"RTD Park-n-Ride parking space use (out of 31,225 spaces)"	65%	N/A	N/A	N/A	N/A
Modeled bicycle and pedestrian trips	1,088,000	N/A	1,532,000	N/A	41%
Population	3,278,000	N/A	4,373,000	N/A	33%
Employment	1,793,000	N/A	2,387,665	N/A	33%
Traffic crashes (2017)	217	73,366	N/A	N/A	N/A

Sources: DRCOG Congestion Management Program database, RTD ridership statistics, 2040 Regional Transportation Plan

Technical notes:

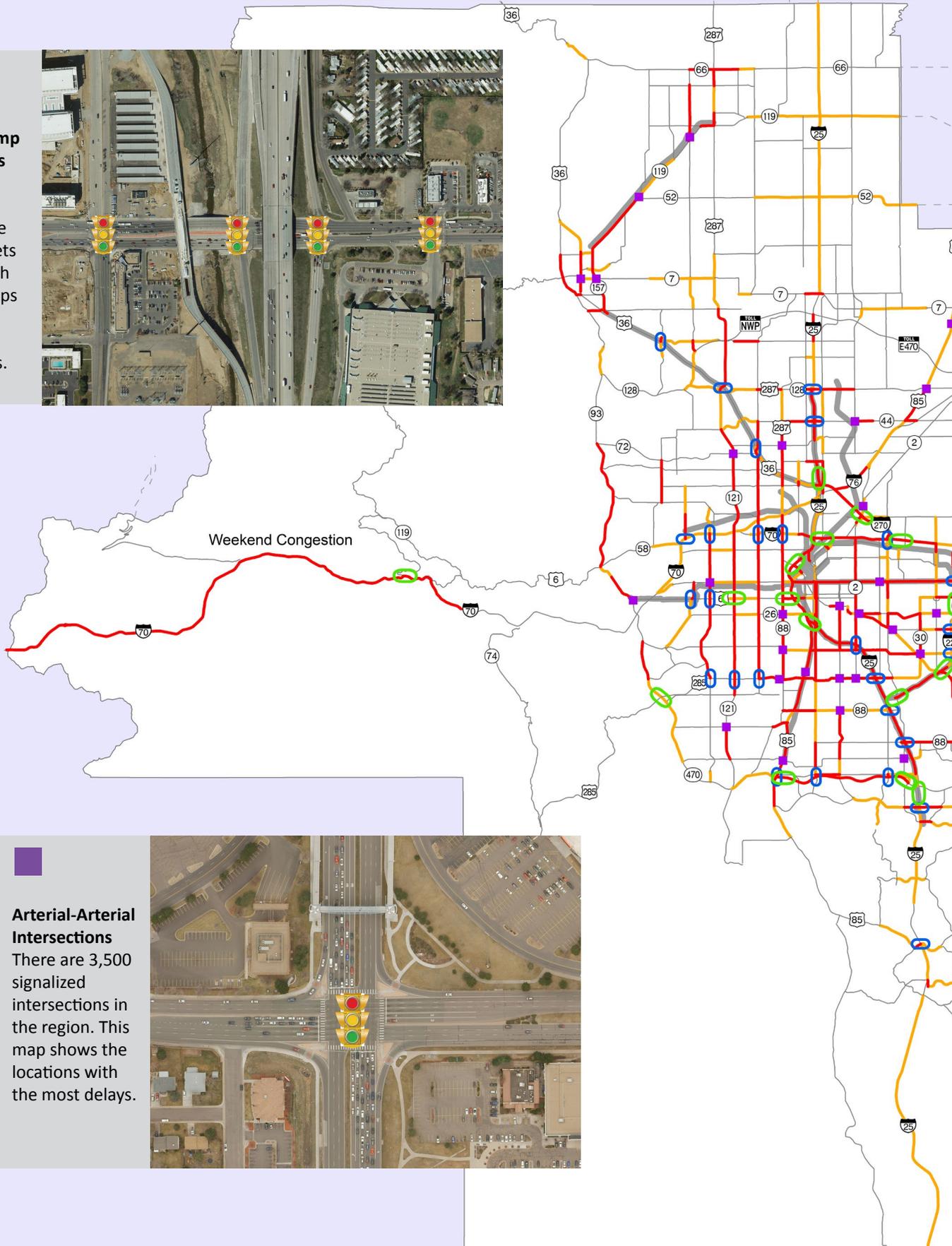
(1) Annual total estimate is "Average weekday" total multiplied by 338

(2) Assumption of 1,922,270 driven registered vehicles in 2018 and 2,564,710 in 2040

(3) Cost calculations incorporate \$12 per hour per adult in car, \$48.30 per hour per light commercial vehicle operator and \$71 per hour for heavy commercial.

Arterial-Freeway Ramp Intersections

Extensive congestion occurs where arterial streets intersect with freeway ramps in a series of signalized intersections.



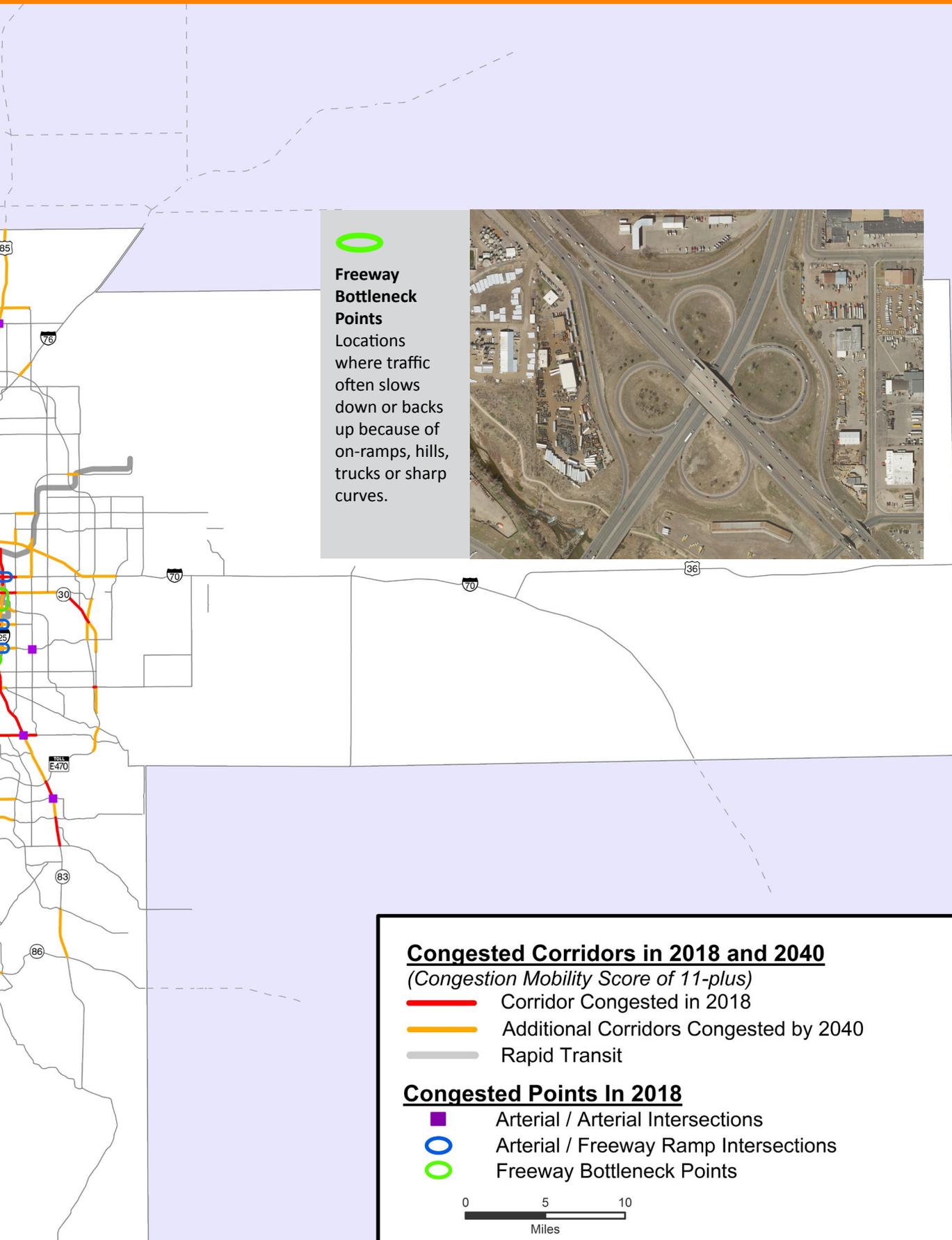
Arterial-Arterial Intersections

There are 3,500 signalized intersections in the region. This map shows the locations with the most delays.



Locations in 2018 and 2040

Mobility Score of 11 or higher



5. Incident management

Open a traffic app on your mobile phone. You'll likely see crash or incident locations on the map. Incidents create both additional travel delays beyond routine traffic congestion, and conditions that increase the chance of secondary crashes. On an average day in the Denver region, authorities receive more than 200 crash reports. Even more minor incidents or breakdowns are never reported. Though increased travel delays inconvenience other roadway users, the most critical factor is the **safety** of people involved in crashes, individuals along the roadside and first responders.

A) Incidents, traffic congestion and unreliability

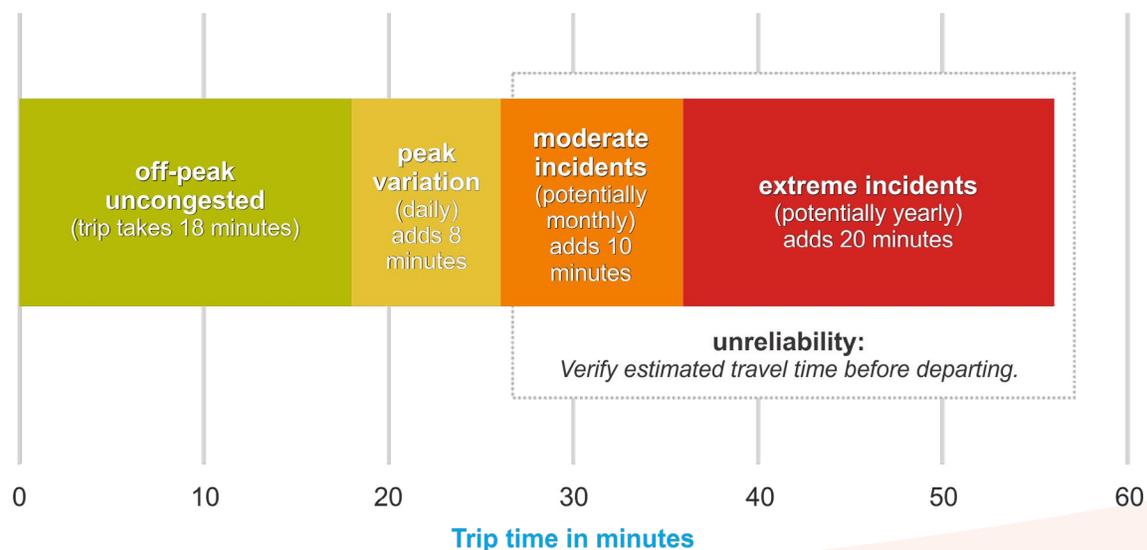
Incidents along highways or streets disrupt the roadway capacity by physically blocking lanes or stimulating vehicle slowdowns that are justified (for safety) or not (rubberneckers on opposite side of highway). Incidents may also divert traffic from the scene and overload nearby routes. For example, vehicles may detour onto other roadways.

Congested traffic conditions with extra delay for travelers occur every day. Daily peak period morning and afternoon rush hours cause routine travel time variations for most

drivers. Typically, a person traveling by car or truck during rush hour may plan for a 20% to 30% increase in travel time over off-peak times. Peak hour delay is predictable. "Figure 3: Sample 18-minute off-peak trip" on page 10 below displays the types of travel delay potentially associated with a trip. Routine congestion during rush hour may add 8 minutes to the trip when compared to off-peak travel time. If a moderate incident occurs along the travel route, the trip may include an additional 10 minutes of delay. Extreme incidents occur less frequently, but might add another 20 minutes or more to the trip. Such moderate and extreme incidents cause unreliability in predicted travel time, as well as close to half of all delay encountered by travelers. Motorists and passengers should check traffic apps, the Colorado Department of Transportation's cotrip.org or other sources for incidents prior to starting a trip. If possible, they can then choose to either:

- adjust their departure time
- travel via a different mode (contact Way to Go, waytogo.org)
- take a different route, or
- cancel the trip

Figure 3: Sample 18-minute off-peak trip



Southbound I-25 completely reopened after semitrailer spills sheet metal on highway

Thornton police advise commuters use alternative routes to avoid crash at 84th Avenue

B) Planned incidents: Prepare prior to a specific event.

Planned incidents at specific locations, such as construction, are generally scheduled ahead of time or reasonably expected. Anticipated incidents, such as snowstorms, can affect the entire region. Roadway operations staff, event organizers and law enforcement agencies can plan ahead for specific times and sites. The media and traffic app providers can be notified beforehand. Roadway operations staff can be ready to mobilize personnel, equipment and logistical elements for things such as:

- construction and utility work zones
- scheduled events (such as sporting events, festivals, runs and parades)
- forecast bad weather (However, unpredicted weather may catch travelers and road crews by surprise.)

C) Unplanned incidents: response and management

Unplanned incidents occur more frequently and cause a greater and less predictable level of traffic congestion. They happen at unforeseen times and locations. Critical roadway locations such as bridges or tunnels (for example, the Eisenhower-Johnson Memorial Tunnel on I-70) may have preplanned logistics and equipment set up for when sudden incidents occur. The types of incidents that occur along roadways include:

- crashes (reported)
- crashes (unreported)

- vehicle breakdowns
- rockfalls, landslides and avalanches (precautionary actions may be done at known locations)
- fallen debris on roadways
- emergency road repairs
- crime scenes or public disturbances

In the aftermath of major incidents, first responders and support staff review procedures and actions that went well or can be improved. They may use data from monitoring sources (such as INRIX or Google Maps) to measure congestion effects including roadway and incident clearance times, vehicle queue backups and dispersion time, and secondary crashes. The new DR 3447 Colorado Crash Report form includes a section in which to identify whether a crash was secondary to a previously occurring crash or related to a construction zone.

Many smaller incidents and vehicle breakdowns also require quick detection and response, even when not as many resources are deployed as in the example “[After a crash occurs](#)” on page 12. For example, the Colorado Department of Transportation State Farm Safety Patrol monitors freeways in the Denver area during peak periods and weekends, assisting about 30,000 motorists annually (approximately 80 each day).



After a crash occurs

- If they did not sustain an injury in the crash, people involved or on the scene may call 911 and conduct initial efforts to assist people or clear debris. Colorado Department of Transportation State Farm Safety Patrol drivers may come upon the scene.
- Roadside cameras (closed-circuit TV), automated incident detection systems or crowd-sourced apps (such as Waze) may pick up the crash. Road operations personnel, such as in the Colorado Department of Transportation's transportation management center in Golden, may see the incident on a monitor or receive an automated notification. Roadway operations personnel:
 - post alerts or information on variable message signs and websites
 - notify applicable local government traffic staff and public information officers, media, traffic apps and the public through 511 alerts and email or text notifications
- Relevant agencies identify, dispatch and deploy the appropriate type and scale of response.
 - First responders arrive. They establish incident command and communications protocols, mobilize to assess the safety and security of scene, and follow established incident management protocols.
 - Incident command coordinates the efforts of fire, law enforcement officers, the state highway patrol, ambulance crews, emergency medical technicians, standard tow trucks, heavy tow and lift equipment, debris and hazardous material removers, and clean-up crews.
 - Responders refer to an incident management plan for the corridor, if applicable.
- Relevant agencies set up detour routes, guidance signs and equipment. They may also direct responsive traffic signal system management efforts.
- Law enforcement and traffic management centers monitor vehicle queue backups and other off-site effects of the incident. For example, they may position a police cruiser ahead of the backup.
- Relevant agencies complete crash investigations and clear of all remnants of the scene.



Photo courtesy of the Colorado Department of Transportation.

U.S. 36 stretch collapses, forcing closure of eastbound lanes and CDOT blitz to re-build bridge approach that's 45 feet above ground

"It's too soon" to estimate how long eastbound U.S. 36 will be closed, CDOT director Shoshana Lew said

D) Emerging technologies

DRCOG and its partners are closely monitoring in-vehicle technologies and implementing roadside technologies (known as intelligent transportation systems) which will further improve incident management efforts and reduce the likelihood of their occurrence. Most newer vehicles are equipped with features such as lane-departure warning, blind spot monitoring, adaptive headlights and automated braking.

In the near future, the majority of vehicles (and mobile phones) on the road will be connected and communicate with other vehicles, roadside equipment and the wireless network. Vehicles will provide real-time advance alerts to drivers for conditions or incidents along their route such as:

- icy roadways or fog
- stopped vehicles along the road
- whether vehicles ahead have deployed air bags, used fog lights, or turned on windshield wipers
- whether drivers ahead have pumped the brakes at a certain rate or for longer than a specific duration
- pedestrians crossing the road
- stop signs or sharp curves
- traffic signal lights malfunctioning

More vehicles with connected vehicle technology operating on the region's roadways have the potential to significantly reduce crashes. All types of roadway users should benefit.



Road collapse

A section of U.S. 36 near Church Ranch Boulevard between Broomfield and Westminster collapsed after a large crack turned into a sinkhole.



E) Supporting incident management efforts in the Denver region and Colorado

Partners within the region have formed several standing groups and formalized efforts for involvement with incident management, including:

Regional Transportation Operations Working

Group: DRCOG has convened this group of boots-on-the-ground operators from local governments, the Colorado Department of Transportation and the Regional Transportation District for 25 years. It frequently discusses and makes recommendations on roadway system technologies which improve incident management activities.

The Governor’s Task Force on Responder Safety:

Led by the Colorado State Patrol, this group is charged with executing the recommendations of the 2017 Task Force Report: (colorado.gov/pacific/sites/default/files/Responder%20Safety%20Task%20Force%20Report%20June%202017.pdf)

Standing program management teams: These geographic area forums meet to discuss specific traffic

incident management plans and procedures including outcomes, needs, implementation and best practices.

Traffic incident management training – The Federal Highway Administration, National Highway Traffic Safety Administration and the Colorado Department of Transportation routinely coordinate and conduct trainings for first responders and other participants. Trainings are held in classrooms, in the field and or at the new Liniger Emergency Vehicle Operations Center located in Douglas County.

6. Projects recently completed or underway

Several congestion relief projects were completed by local governments, the Colorado Department of Transportation and the Regional Transportation District in 2018 or are underway, as show in “[Table 2: Example transportation projects addressing congestion and mobility](#)” on page 15. Transit and bicycle/pedestrian projects expand and enhance non-roadway facilities that encourage people to use alternative modes, avoiding congestion and reducing traffic.



Table 2: Example transportation projects addressing congestion and mobility

Interchange and roadway projects:	Status
Tower Road at Peña Boulevard: new on-ramp	completed
E-470 from Parker Road to Quincy Avenue: widening	completed
I-25 from 120th Avenue to State Highway 7: new managed lanes	underway
C-470 from Kipling Parkway to I-25: new managed lanes	underway
I-25 from Castle Rock to El Paso county line: new managed lanes	underway
Central 70 from I-25 to Chambers Road: new managed lanes	underway
Rapid transit projects:	Status
1 G Line (Ward Road station to Denver Union Station) commuter rail	completed
Southeast Rail Extension (Lincoln to RidgeGate Parkway stations) light rail	completed
North Metro Rail Line (Denver Union Station to Eastlake-124th Station) commuter rail	underway
Bicycle/pedestrian projects:	Status
U.S. Route 6 shared use path: Colfax to Johnson Road	completed
North Metro Rail bicycle/pedestrian access to FasTrack stations	completed
Nine Mile Station: bicycle/pedestrian access improvements	completed
23rd Ave bicycle/pedestrian path at Fitzsimons Station	completed
28th Street/U.S. Route 36 multiuse bicycle/pedestrian path: Iris Avenue to Yarmouth Street	completed
2 Wonderland Creek underpass and path connection: Foothills Parkway to Diagonal Highway	completed
C-470 multiuse trail: grade separation at Yosemite Street	underway
Superior Trail: McCaslin bus rapid transit station to Davidson Mesa underpass	underway
Westerly Creek Trail to Toll Gate Trail Connector	underway
Boulder Slough multiuse path: 30th Street to Pearl Street	underway



Visit DRCOG's partner agency websites for more information:

Colorado Department of Transportation
(codot.gov)

Regional Transportation District
(rtd-denver.com)

Colorado Department of Transportation Traveler Information (cotrip.org)

For ways to avoid or adapt to congestion, visit Way to Go (waytogo.org).

Preparation of this report has been financed in part through grants from the U.S. Department of Transportation, Federal Highway Administration and Federal Transit Administration. This report and others are available at DRCOG's congestion mitigation webpage (drcog.org/congestion).

Contact Robert Spotts, planning supervisor, at rspots@drcog.org for additional information regarding DRCOG's congestion mitigation program.



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2018 Annual Report on Traffic Congestion in the Denver Region

Presented by:

**Robert Spotts and
Steve Cook**

RTC October 15, 2019



Topics

Congestion Management Program and VMT growth



5-year trends in demographic, mobility, and travel characteristics



Traffic congestion measures



Incident management and safety

CONGESTION MANAGEMENT PROGRAM AND VMT GROWTH

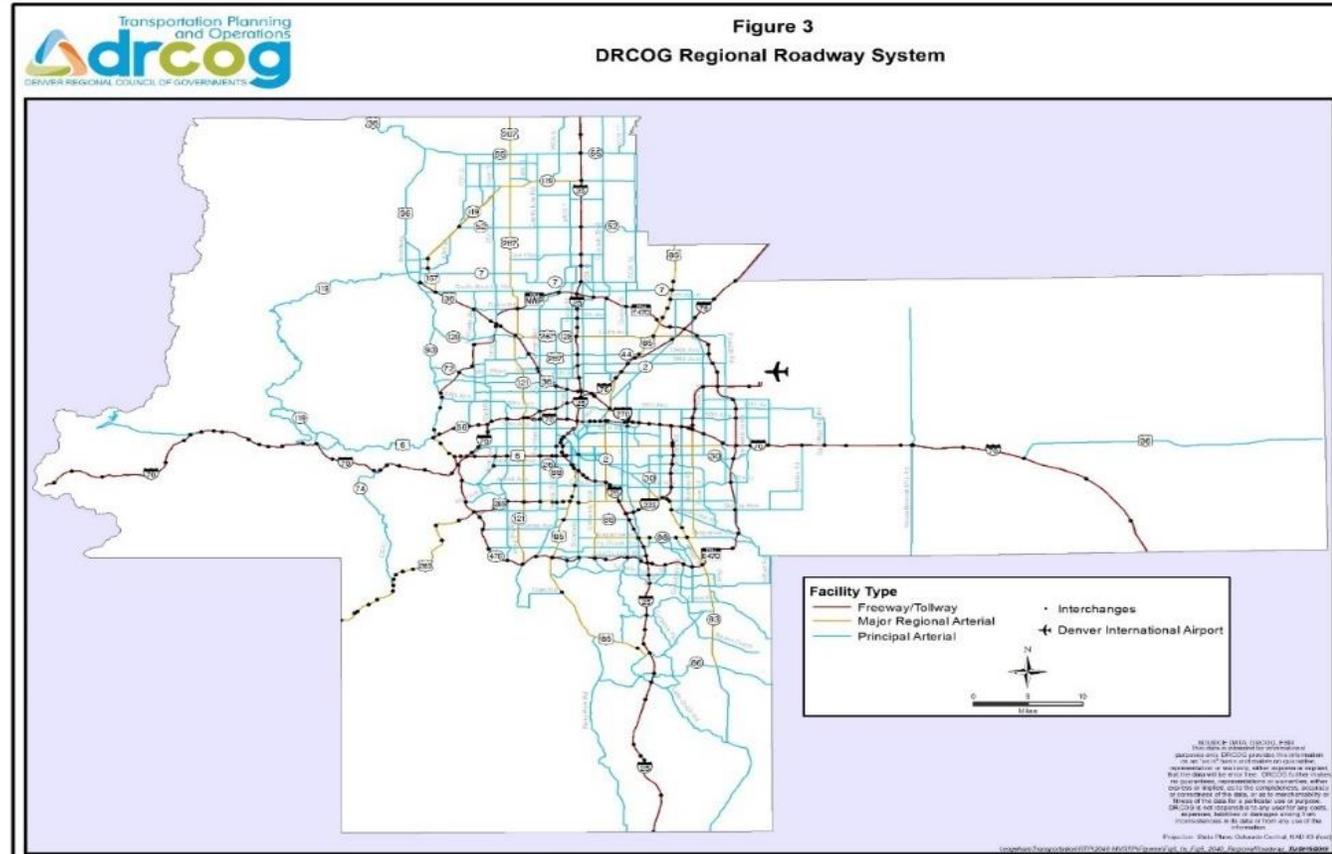
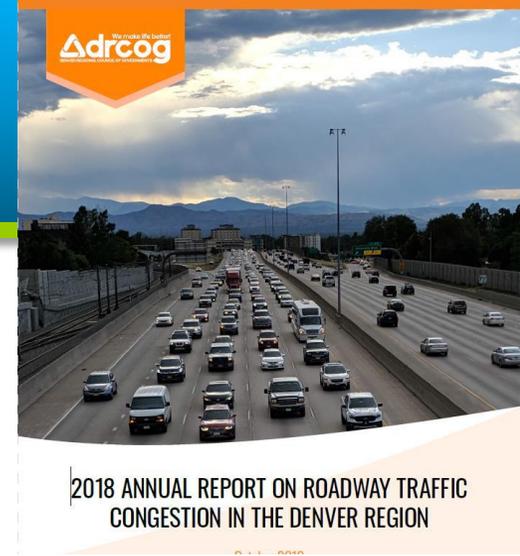


DRCOG Congestion Management Process

MPOs are federally required to monitor congestion.

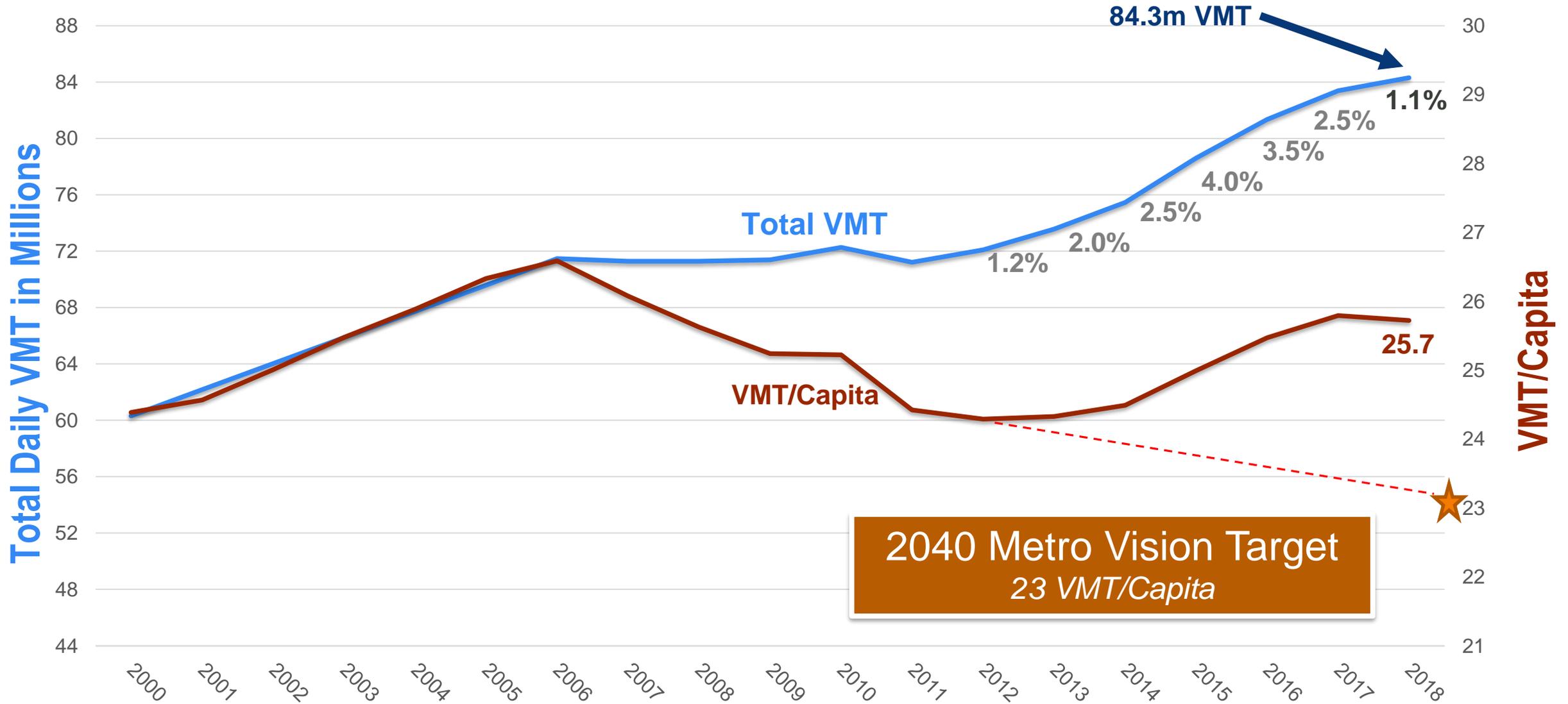
Annual Reports on Congestion since 2006

- Regional vehicle (VMT) and person (PMT) miles traveled
- Roadway networks: physical traits, traffic volumes, transit routes
- Used for TIP and RTP planning and project evaluation



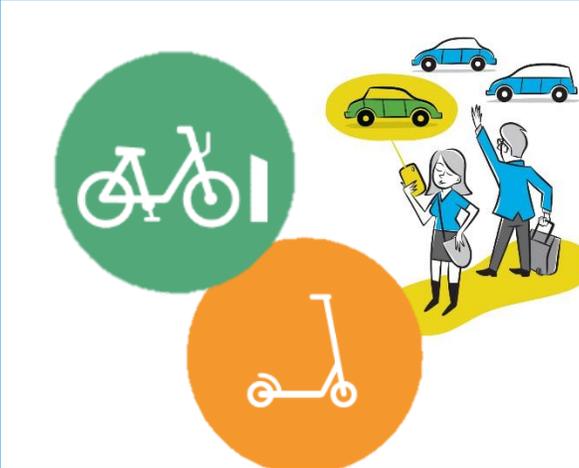
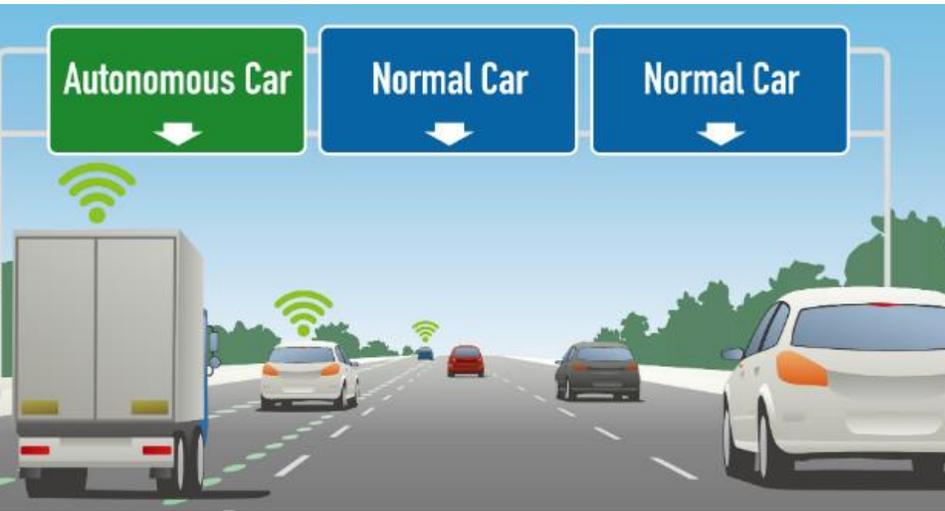


Average Daily VMT in the Denver Region (2000 – 2018)



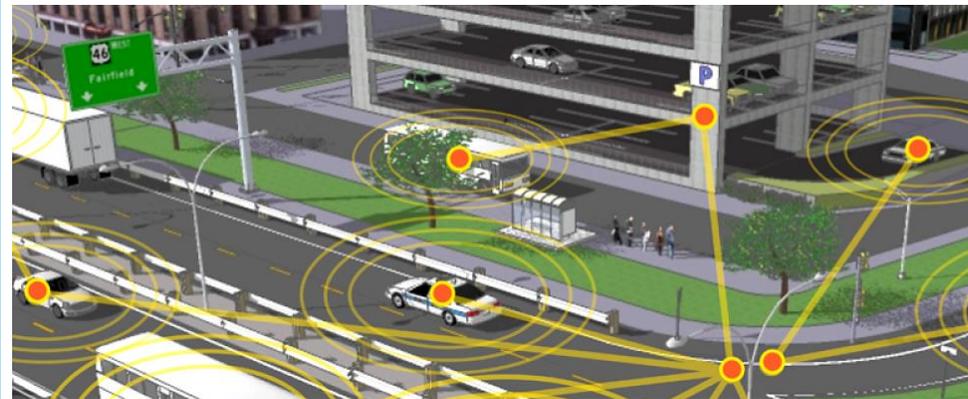


Emerging factors impacting VMT



- Unknown and unpredictable mobility factors

- Personal habits and preferences
- Mobility services, transit evolution, TNCs, micromobility
- Alternative fueled vehicles
- Connected vehicles
- Automated vehicles



- Mobility Choice Blueprint

- Prepare for rapid technological and other innovations affecting mobility



**MOBILITY RELATED TRENDS-
PAST FIVE YEARS & FORESEEABLE**



Transportation Infrastructure Changes Since 2013

Over 40 Miles of
passenger rail lines



US-36 Bus Rapid Transit
and HOT



I-225 Widening

Union Station





Five-Year Travel Trends

↑ **+8%**
population



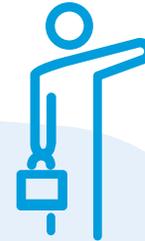
↑ **+23%**
Denver International
Airport passengers



↑ **+21%**
working from
home



↑ **+250%**
vehicle miles traveled
via ride-hailing services



↑ **+INFINITY%**
e-scooter share of
vehicle miles traveled





Five-Year Travel Trends



-3%

transit
boardings



+15%

vehicle miles
traveled



+6%

vehicle miles
traveled per capita





Five-Year Motor Vehicle Emission Trends



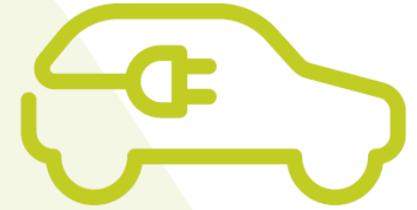
-35%

ozone precursor emissions



+507%

registered electric vehicles



+2%

greenhouse gas emissions





Five-Year Crash and Congestion Trends



+56%

annual
fatalities



+29%

miles congested more
than three hours



+26%

daily vehicle
hours of delay





Five-Year Freight Trends

↑ **+12%**

Denver International
Airport air cargo



↑ **+50%**
package
deliveries



↑ **+80%**
e-commerce
retail sales



TRAFFIC CONGESTION ON MAJOR ROADWAYS



Congestion Mobility Score

severity:

- How bad does congestion get on the roadway during rush hour?

duration:

- How many hours per day is the roadway congested?

magnitude:

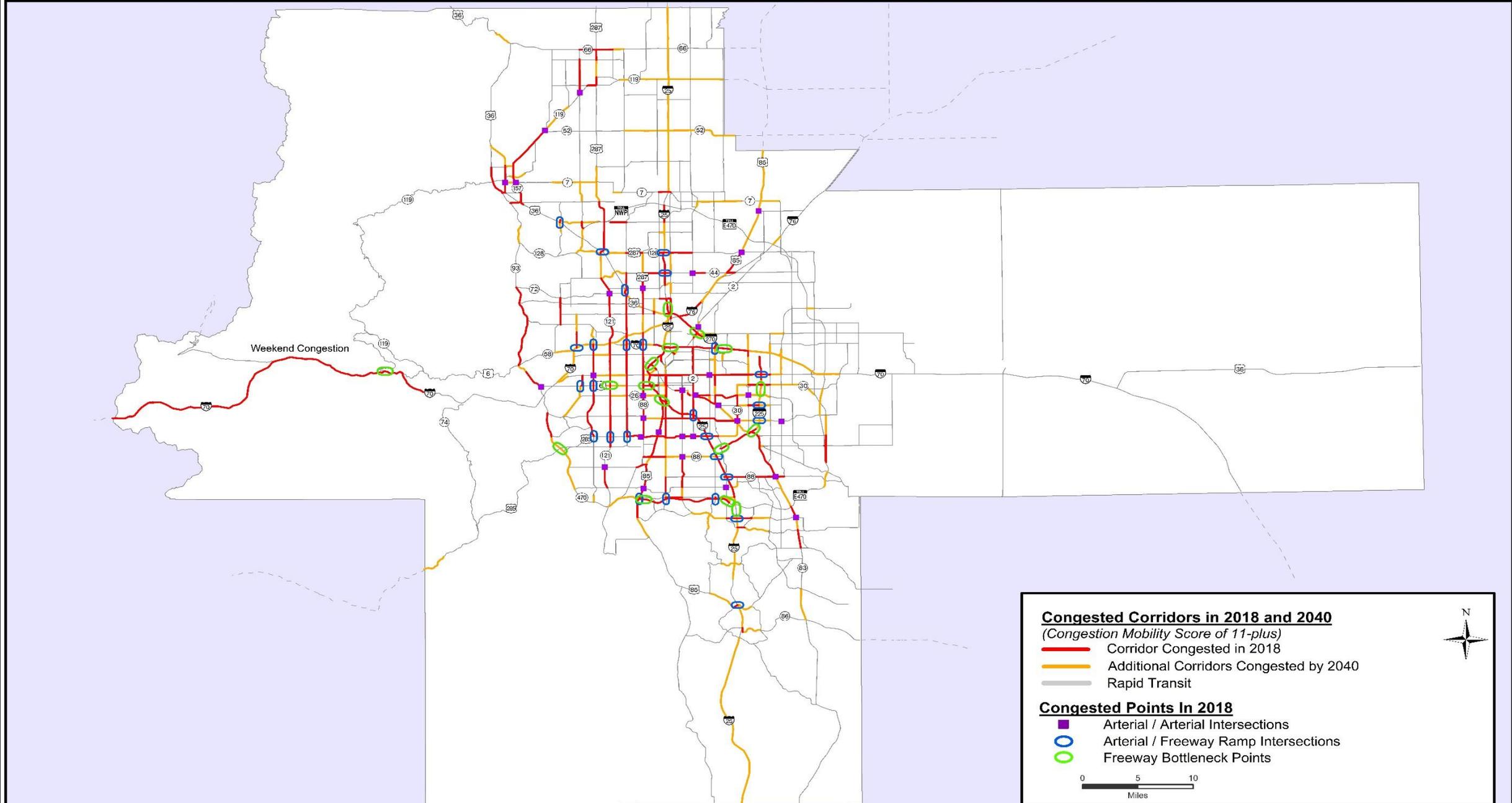
- How many people (traffic volume) are impacted by congestion on the roadway?

reliability:

- How often do crashes or incidents occur on the roadway?

Figure 3: Key Congested Locations in 2018 and 2040

Segments with a Congestion Mobility Score 11 or higher



Congested Corridors in 2018 and 2040

(Congestion Mobility Score of 11-plus)

- Corridor Congested in 2018
- Additional Corridors Congested by 2040
- Rapid Transit

Congested Points In 2018

- Arterial / Arterial Intersections
- Arterial / Freeway Ramp Intersections
- Freeway Bottleneck Points





Projects Recently Completed or Underway

Interchange and roadway projects:	Status
Tower Road at Peña Boulevard: new on-ramp	completed
E-470 from Parker Road to Quincy Avenue: widening	completed
I-25 from 120th Avenue to State Highway 7: new managed lanes	underway
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Wonderland Creek underpass and path connection: Foothills Parkway to Diagonal Highway	completed
C-470 multiuse trail: grade separation at Yosemite Street	underway
Superior Trail: McCaslin bus rapid transit to Davidson Mesa underpass	underway
Westerly Creek Trail to Toll Gate Trail Connector	underway
Boulder Slough multiuse path: 30th Street to Pearl Street	underway





Mitigating Congestion



How to Mitigate Congestion



Avoid it

Real-Time Information
Extra Night in Mountains
Flexible Work Hours
Telework

Adapt to it

Mobility Choices:
- *Alternative modes*
- *Transit, Walk, Bicycle*
- *Car/Vanpool*
Real-Time Information
Efficient Land Use Designs

Alleviate it

Add Lanes / Capacity
Improve Operations:
- *Traffic Signals*
- *Signing and Striping*
- *Access Management*
- *Incident Management*
Expand Transit Facilities

INCIDENT MANAGEMENT



Incident Management



200+ reported crashes every day in Denver region
Many more minor incidents and breakdowns



#1 Concern: Safety of persons at the scene or coming upon the scene



Increased travel delays for people and freight in cars, buses, and trucks



BREAKING NEWS
DEADLY FOUR-CAR CRASH IN ENGLEWOOD
SANTA FE DRIVE AND DARTMOUTH



Incidents and Traffic Congestion and Unreliability

Incidents affect roadway carrying capacity

- Blocking lanes
- Rubber necking
- Snow on pavement

Incidents cause traffic diversions

- Heavy traffic on side streets

Get the information out!

- Alerts and messages
- People can adjust plans
 - Depart at a different time or cancel trip
 - Use a different travel route or mode of travel



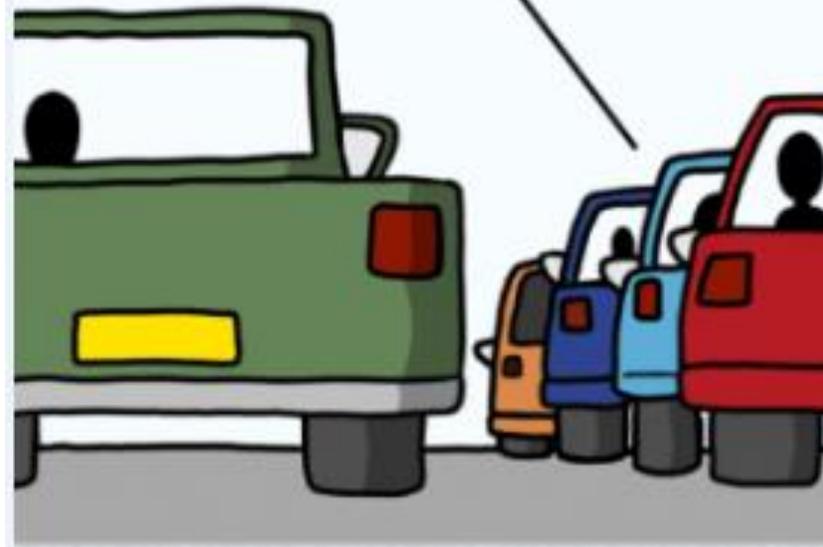


Don't do this!!!

OH COME ON, PEOPLE! YOU'VE ALL SEEN AN ACCIDENT BEFORE. STOP RUBBERNECKING!



ALRIGHT, ALMOST THROUGH IT.. FINALLY!

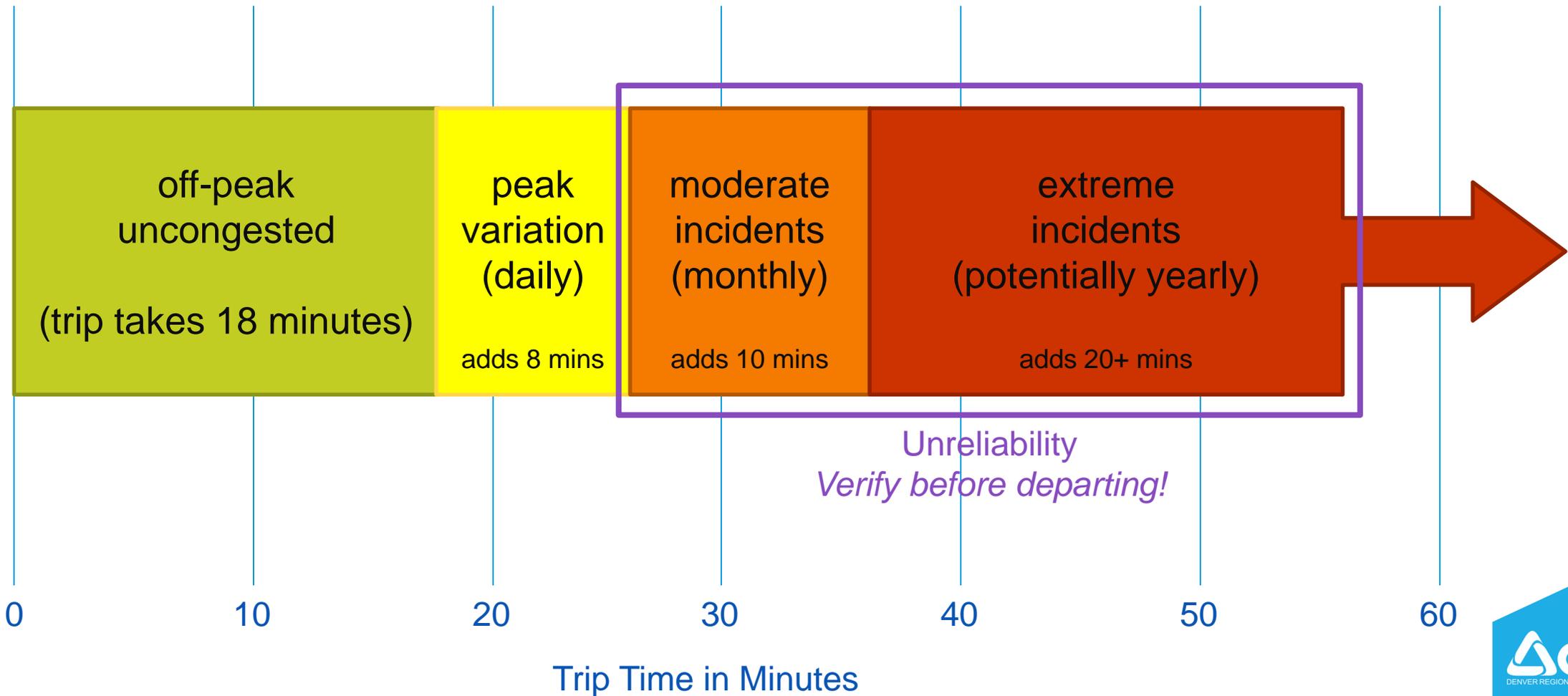


NOW LET'S SEE WHAT EVERYONE FOUND SO INTERESTING..





Sample 18-Minute Off-Peak Trip





“Planned” or Forecasted Incidents

Areawide forecasted incidents, such as snowstorms

Specific locations scheduled ahead of time

- Construction and utility work zones
- Scheduled events (sporting events, festivals, runs, parades, etc.)

Roadway operation staff, event organizers, and law enforcement agencies can plan ahead

Media and traffic app providers can be notified beforehand





Unplanned Incidents

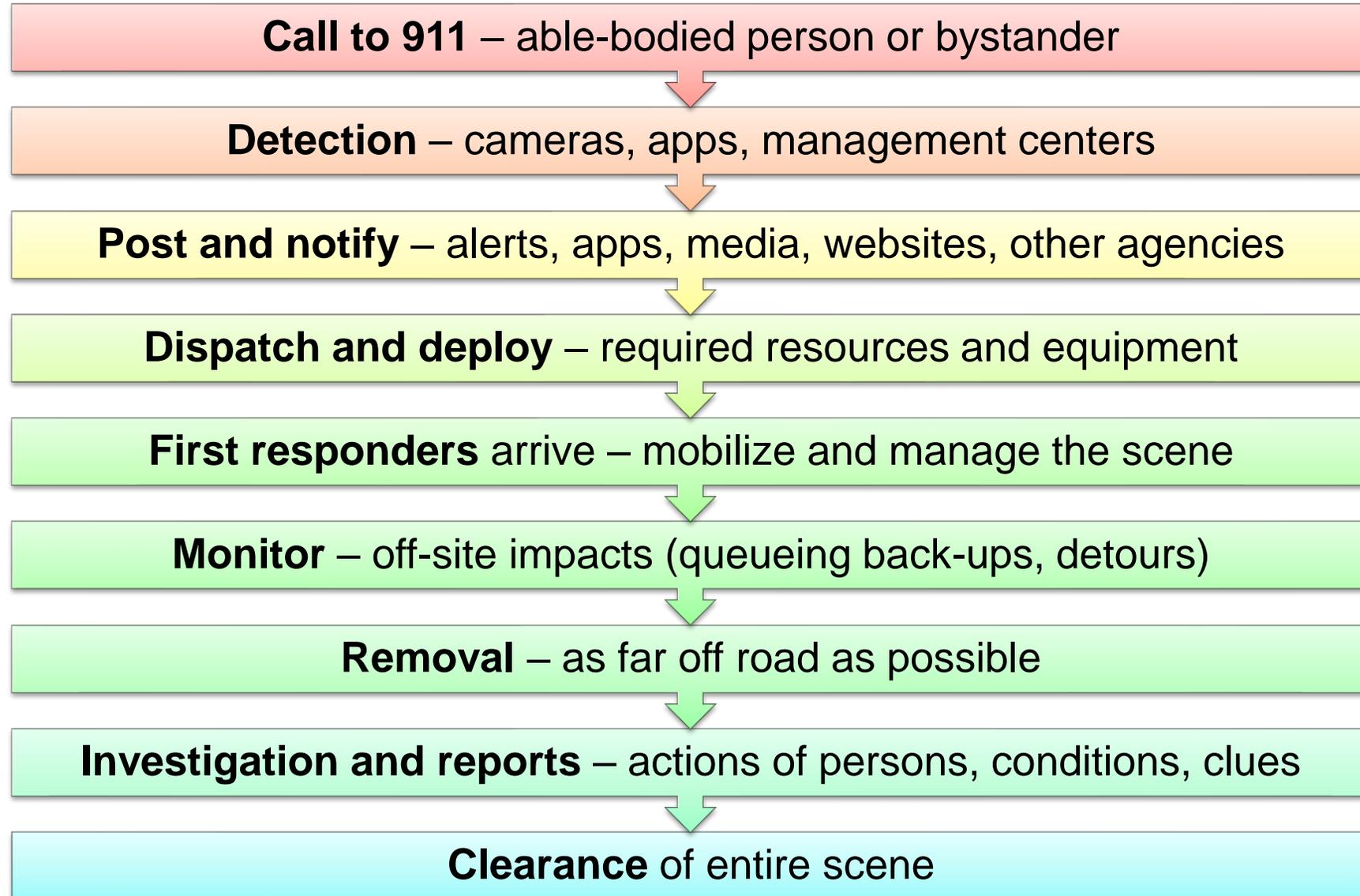
Occur frequently and cause unreliable travel times:

- Crashes (reported)
- Crashes (not reported)
- Rockfalls, landslides, and avalanches
- Fallen debris on roadways
- Emergency road repairs
- Crime scenes or public disturbances
- Vehicle break-downs
 - CDOT State Farm Safety Patrol





Example Sequence of Events for a Major Incident





Emerging Technologies

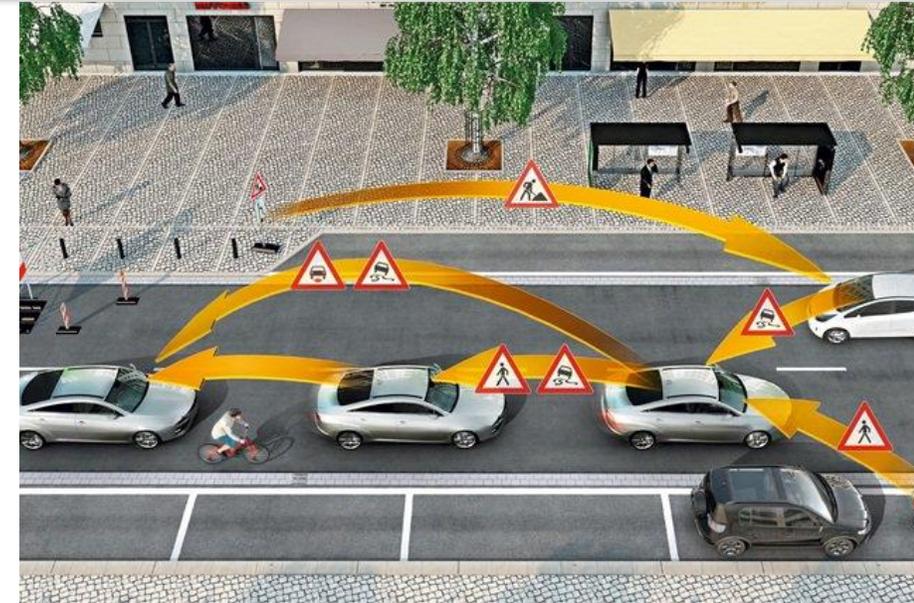
Connected vehicles and infrastructure

Driver assistance - immediate

- Lane departure, blind spots, automated braking, adaptive headlights

Information alerts – What's ahead of you?

- Pedestrian in road
- Weather and pavement conditions
- Actions by drivers ahead – turn on fog lights or wipers, brakes engaged
- Events – air bag deployed, traffic lights malfunctioning
- Stop sign or caution signs (e.g. sharp curve, steep grade)





Supporting Efforts



DRCOG Regional Transportation Operations Working Group

Governor's Task Force on Responder Safety

Standing Program Management Teams

Traffic Incident Management (TIM) Training

Legislation: I-70 Mountain Corridor traction and chain laws





QUESTIONS?

ATTACHE

ATTACHMENT E

To: Chair and Members of the Transportation Advisory Committee

From: Jacob Riger, Manager, Long Range Transportation Planning
303-480-6751 or jriger@drcoq.org

Meeting Date	Agenda Category	Agenda Item #
October 28, 2019	Informational	7

SUBJECT

Introduction to scenario planning analysis activities for the 2050 Metro Vision Regional Transportation Plan (2050 MVRTP).

PROPOSED ACTION/RECOMMENDATIONS

N/A

ACTION BY OTHERS

N/A

SUMMARY

As DRCOG completes phase I (visioning and education) of the [2050 MVRTP](#) planning process, staff is initiating phase II, which involves conducting a robust scenario planning analysis. The primary objective of the scenario planning analysis is to test the ability of conceptual transportation and urban form approaches to address Metro Vision Plan [outcomes](#) through 2050. It is an exploratory exercise to test [regional](#) relationships between urban form, travel behavior, and transportation investments.

It is important to understand regional scenario planning:

- Explores “what if” alternative futures at the regional level
- Includes relative comparisons between scenarios and baseline
- Does not dictate or usurp local land use decision-making
- Will provide guidance and direction to develop the 2050 Fiscally Constrained Regional Transportation Plan

Based on the public input received in phase I, existing urban form guidance in DRCOG’s [Metro Vision Plan](#), the capabilities of DRCOG’s land use and travel demand model tools, staff time and resources, and the 2050 MVRTP adoption schedule, DRCOG staff is proposing some initial potential land use and transportation concepts to test (shown in Attachment 1).

Staff will provide an overview of the scenario planning analysis process and solicit input at the October TAC meeting.

PREVIOUS DISCUSSIONS/ACTIONS

TAC – [March 25, 2019](#)
[June 24, 2019](#)
[September 23, 2019](#)

PROPOSED MOTION

N/A

ATTACHMENTS

1. Staff presentation

ADDITIONAL INFORMATION

If you need additional information, please contact Jacob Riger, Manager, Long Range Transportation Planning, at 303-480-6751 or jriger@drcog.org



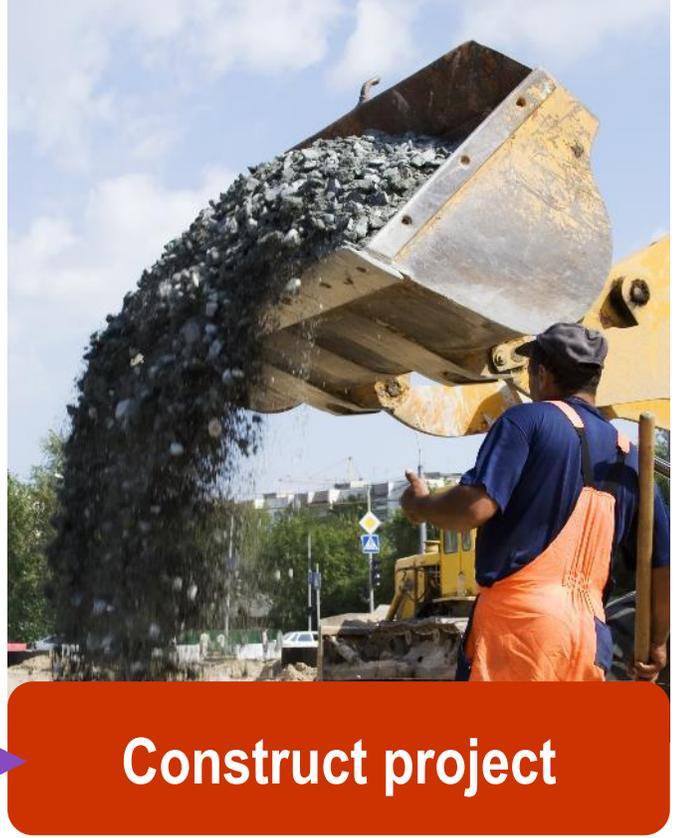
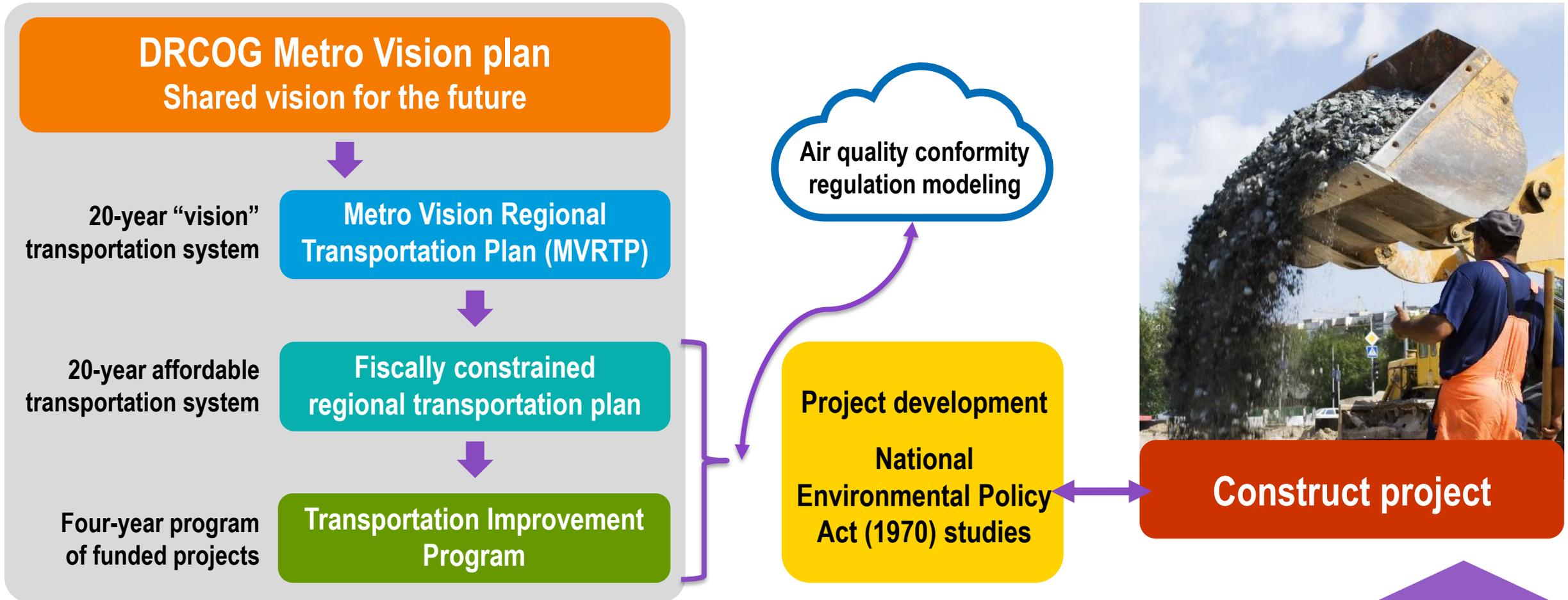
2050 Metro Vision Regional Transportation Plan – Scenario Analysis Introduction

Transportation Advisory Committee
October 28, 2019

Presented by:
Jacob Riger, AICP



Metro Vision Plan and MVRTP overview





2050 MVRTP major milestones & timeline





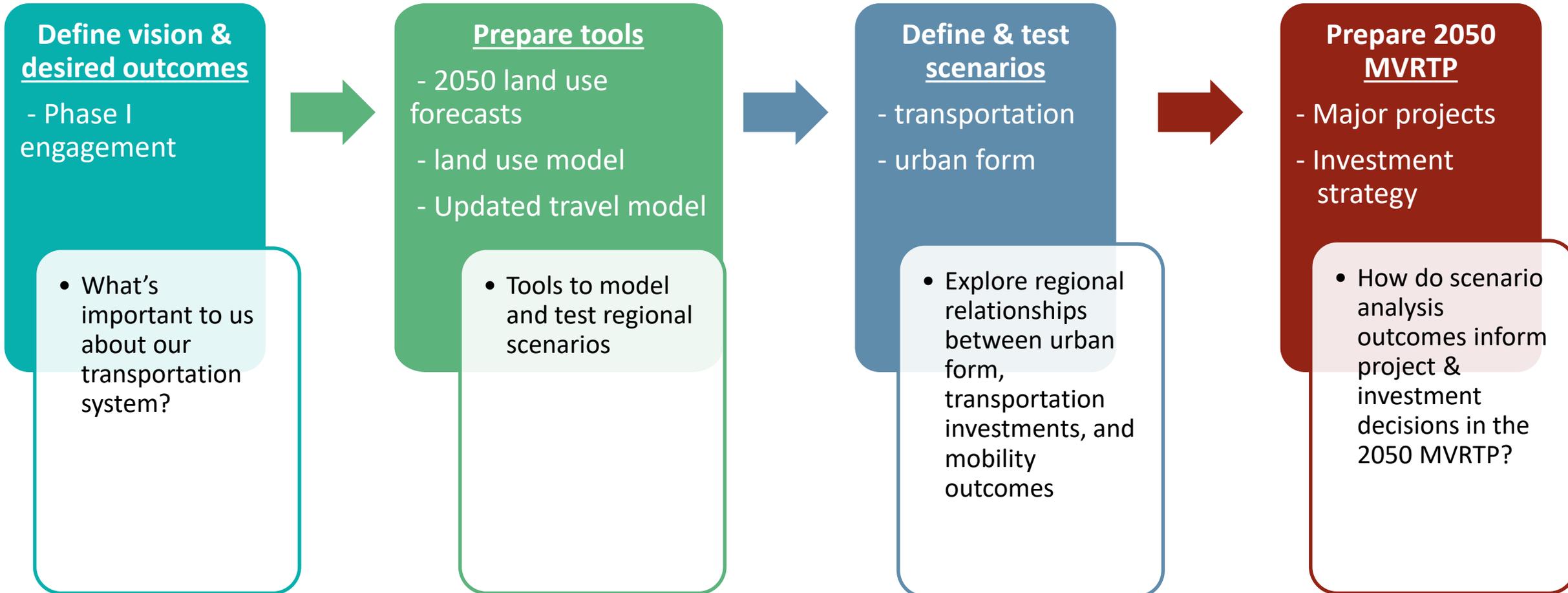
Scenario analysis tentative schedule

		Oct.	Nov.	Dec.	Jan.	Feb.	March	April
Scenario Planning Tasks	Define & Test Scenario Component Sensitivities (internal)							
	Define Scenario Packages to Test							
	Committees/Board Role in Scenario Planning	TAC conceptual input	Forums conceptual input	BWS, RTC confirm input			TAC reviews scenario results	RTC, Board review results
	Model/Test/Analyze Scenarios			start after RTC			end mid-month	



2050 MVRTP & scenario planning process framework

What mix of investments in the 2050 MVRTP will best achieve Metro Vision's performance outcomes?



Phase I Results - Transportation

DEFINE VISION AND DESIRED OUTCOMES



Public outreach event results

How would you use money for transportation?

615

542

442

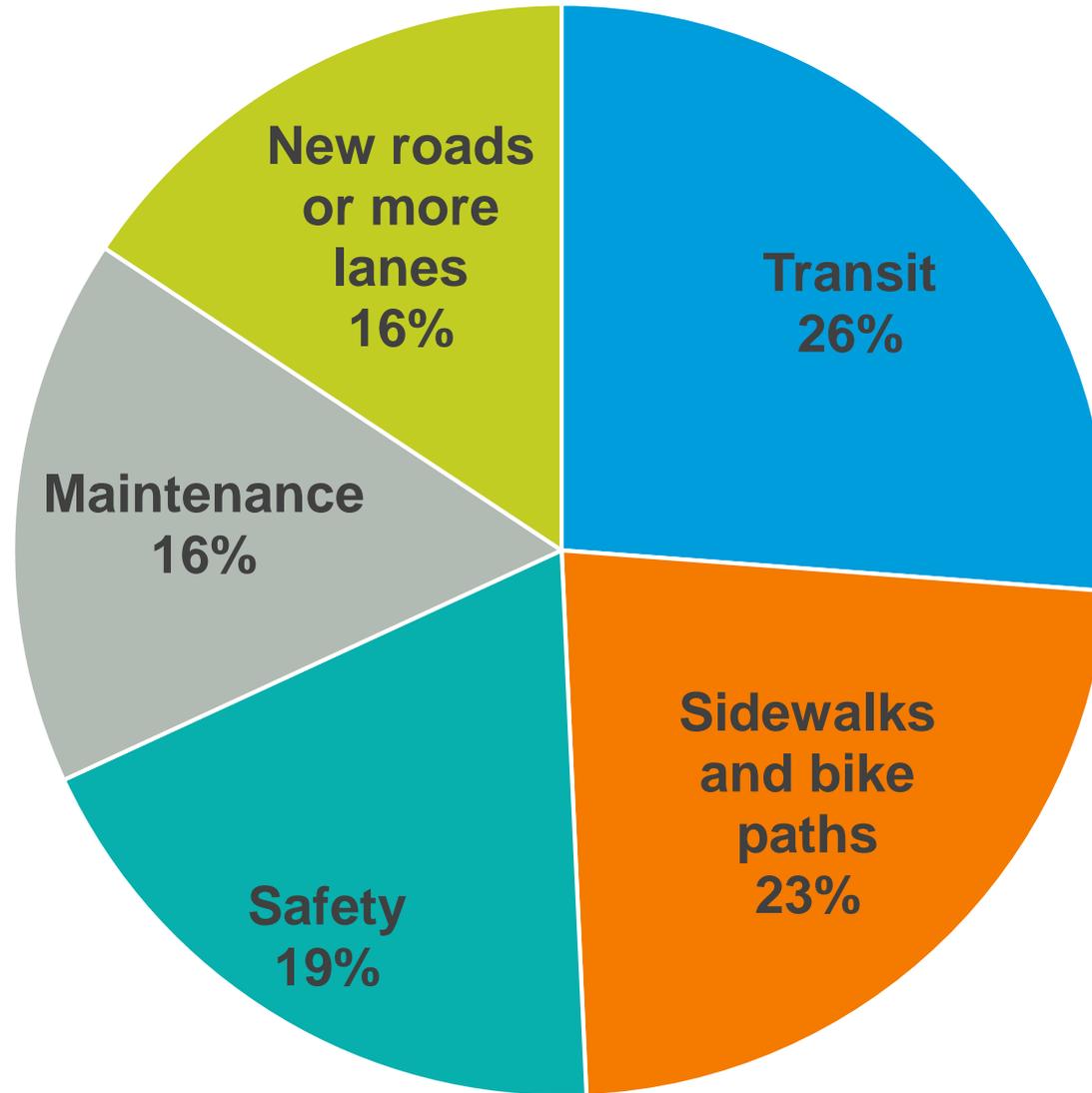
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368





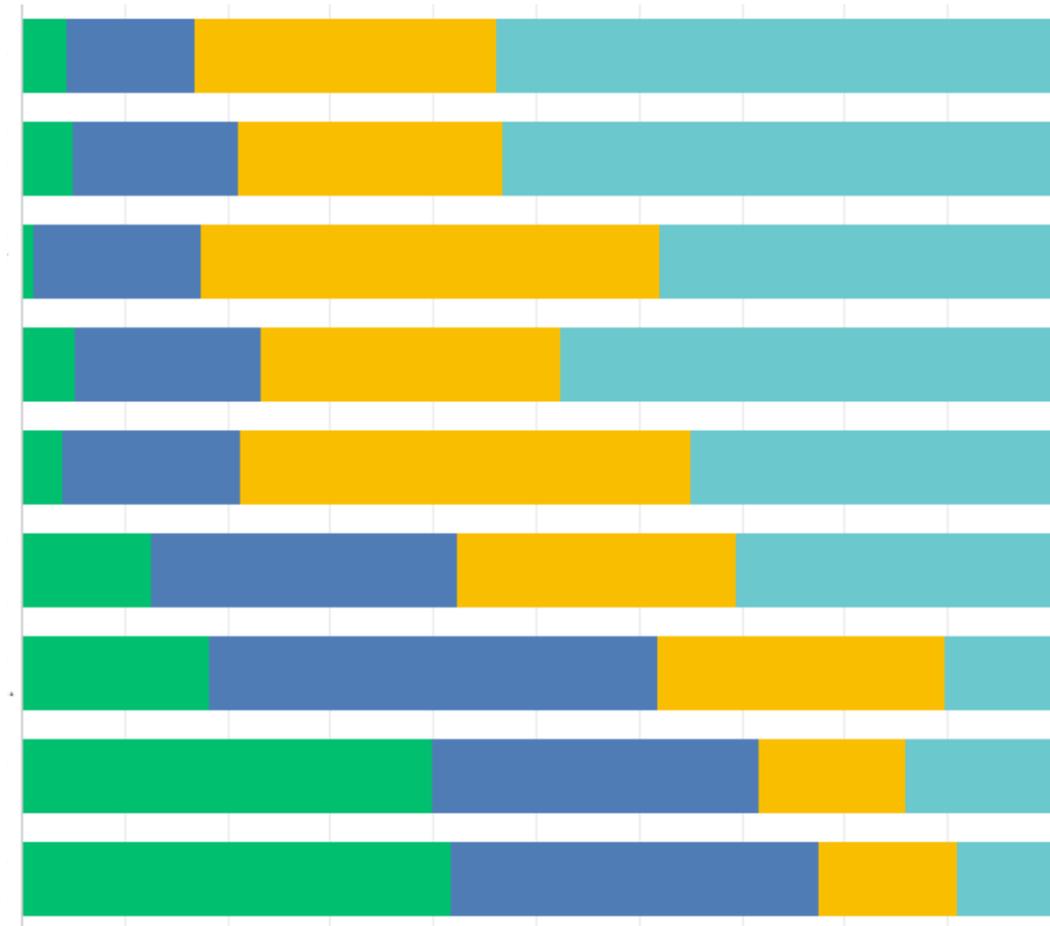
Public outreach event results





Survey results: high, medium, low, or no funding?

- 3.33 **Expand or create new bus routes and rail lines**
- 3.27 **Add more sidewalks and bicycle paths/lanes**
- 3.19 **Maintenance of existing roads, highways, and bridges**
- 3.19 **Increase frequency of existing transit service**
- 3.10 **Use latest technology to manage existing system**
- 2.75 **Remove roadway bottlenecks**
- 2.30 **Add more carpool/HOV lanes**
- 2.02 **Add more general use lanes (not HOV or toll lanes)**
- 1.90 **Build new roads**



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

n=589

No Funding Low Priority Medium Priority High Priority



Survey results: how important should these factors be to policymakers developing transportation policies and plans?

4.38 **Improves safety for all users of the system**

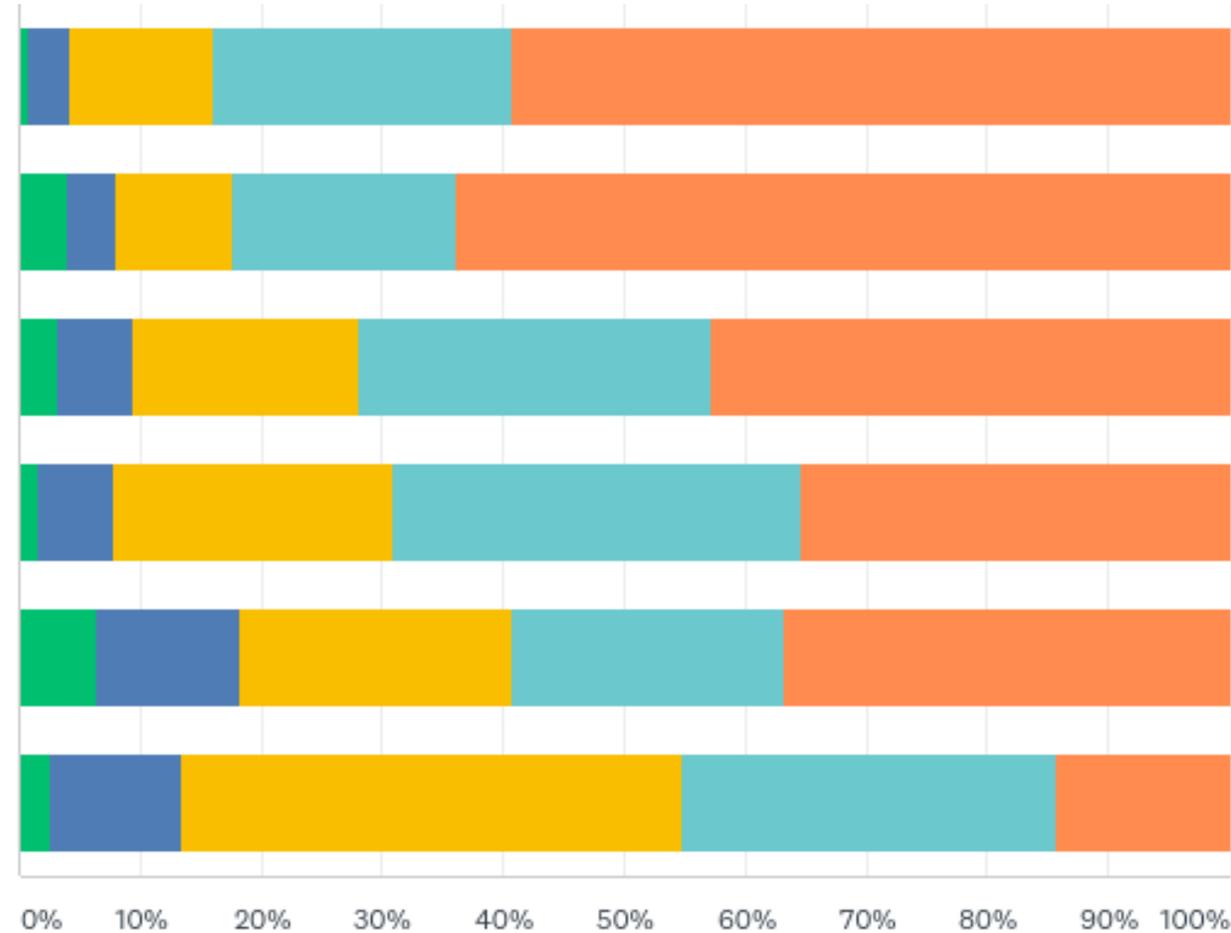
4.34 **Provides convenient and useful travel choices besides driving alone**

4.02 **Reduces negative impacts on natural or built environment**

3.95 **Makes travel times more reliable**

3.71 **Reduces traffic congestion**

3.43 **Supports economy and freight movement**



n=590

1 Not at All Important 2 3 4 5 Very Important



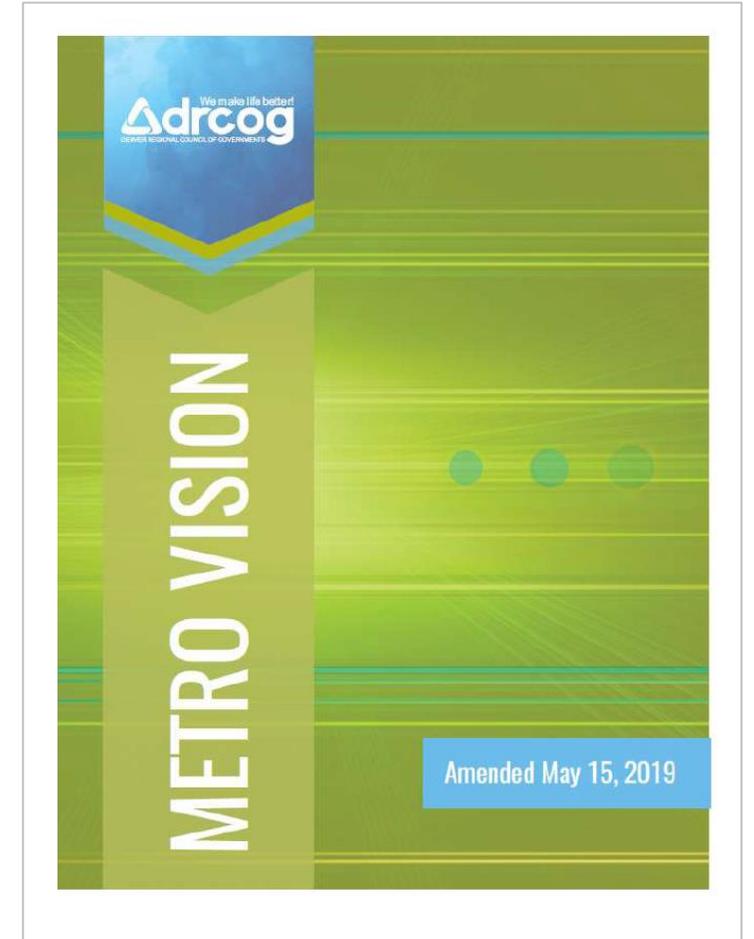
Urban form guidance from *Metro Vision* outcomes

“...investment/reinvestment **in existing communities...**”

“...**orderly and compact** pattern...”

“Connected **urban centers** and **multimodal corridors...**”

“...range of **housing options...**in or **near major employment centers...**”





TAC input – part 1

- Reactions to the transportation public input? Is this consistent with what you're hearing in your community?
- Reactions to Metro Vision urban form guidance?
- How should we incorporate the public input to frame scenarios?

DEFINE & TEST SCENARIOS

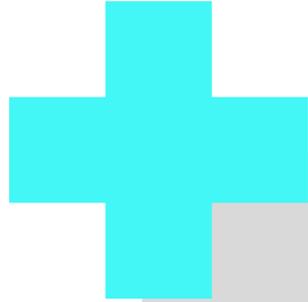


Regional scenario planning context

- Explores “**what if**” alternative futures
- A mix of **urban form** and **major transportation investment** options
- Tests ability of transportation and urban form approaches **to address** Metro Vision outcomes
- **Relative** comparisons between scenarios and baseline
- Provide **guidance and direction** for transportation investments in the 2050 MVRTP



Regional scenario planning summary



Achieve

Understand travel behavior and urban form relationships at the regional scale through 2050

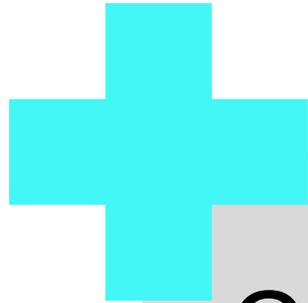


Avoid

Dictating or usurping local land use decision-making



Opportunities & limitations



Opportunities

- Robust land use & travel model tools
- Data-rich environment
- Explore & test vision



Limitations

- 2050 MVRTP adoption schedule
- Time & resource allocation
- Not everything can be modeled



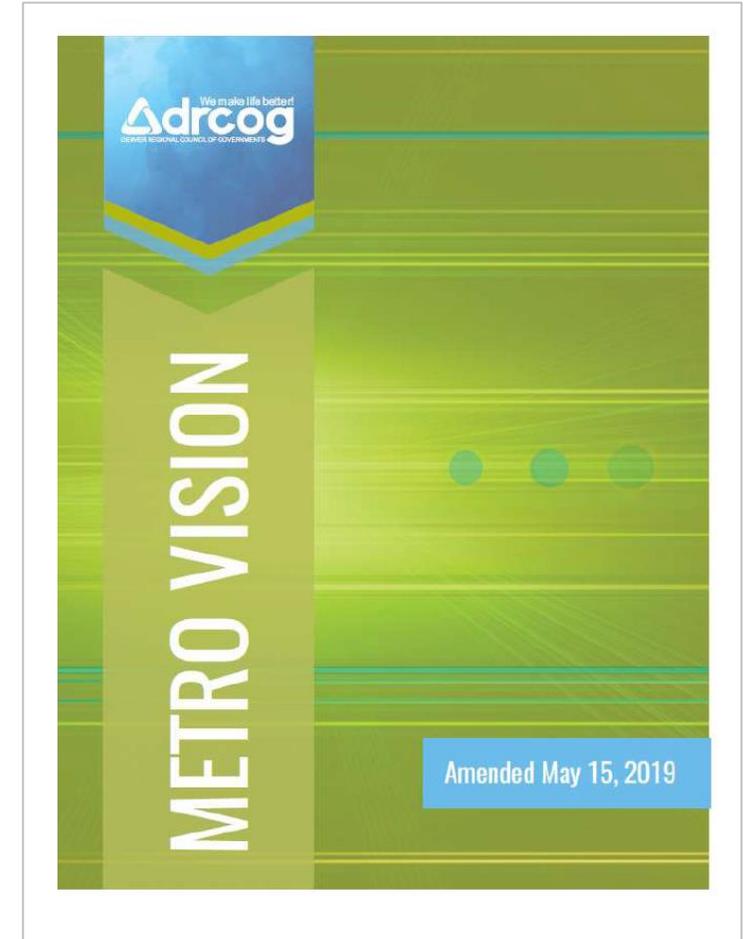
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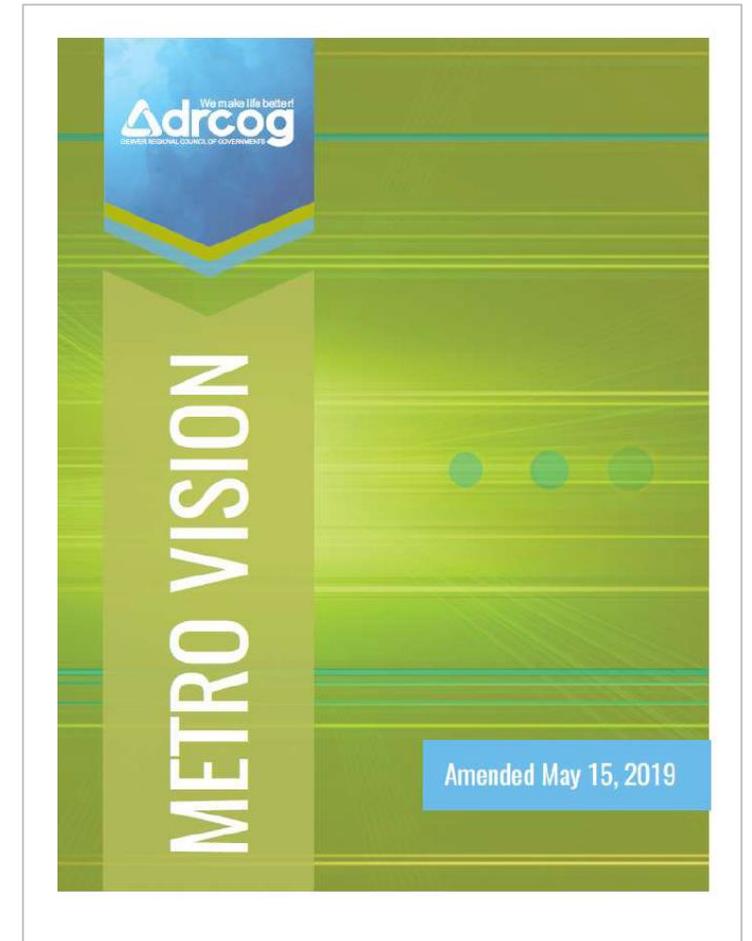
“...range of **housing options**...in or **near major employment centers**...”





Potential land use concepts to test

- Urban centers capacity for growth
- Transit corridors capacity for growth
- Rapid transit station areas capacity for growth
- Increase housing growth near employment centers





Example transportation concepts to test

Transit

- Free transit
- Increase transit frequency
- Regional BRT system
- Transit expansion & attractiveness

Non-motorized

- Complete regional high comfort/low stress network
- Expanded availability of shared mobility devices

Roadways

- Complete streets emphasis on urban arterials (e.g. lower speed limits)
- Mitigate off-peak congestion on the freeway system
- AV implications



TAC input – part 2

- Reactions to potential land use and transportation concepts to test?
- Other thematic concepts to explore?

NEXT STEPS



Next steps

- Today: provide thematic input to define scenarios
- November: input from county transportation forums
- December: confirm direction with DRCOG Board
- January-March: conduct scenario analysis
- March: initial scenario results at TAC

THANK YOU!

ATTACH F

ATTACHMENT F

To: Chair and Members of the Transportation Advisory Committee

From: Matthew Helfant, Senior Transportation Planner
303-480-6731 or mhelfant@drcog.org

Meeting Date	Agenda Category	Agenda Item #
October 28, 2019	Informational	8

SUBJECT

Briefing on Environmental Justice Analysis for the 2050 Metro Vision Regional Transportation Plan (2050 MVRTP).

PROPOSED ACTION/RECOMMENDATIONS

N/A

ACTION BY OTHERS

N/A

SUMMARY

One of DRCOG's most important responsibilities as the federally designated transportation planning agency for the Denver region is to develop the Metro Vision Regional Transportation Plan (MVRTP). A key element of the MVRTP is Environmental Justice (EJ) analysis. It is a federal requirement to evaluate the benefits and consider the impacts of DRCOG's transportation plans and programs, including the MVRTP, on minority and low-income populations. This stems from an executive order linked to Title VI of the Civil Rights Act of 1964.

There is no prescribed procedure for MPOs to use in defining EJ concentration areas except to focus on at least minority and low-income populations. DRCOG has generally used transportation analysis zones (TAZs) as the geographic basis for defining EJ areas. Using TAZs enables measures to be calculated based on outputs from the regional travel model (e.g., transit travel time and accessibility). DRCOG has identified EJ areas as TAZs above the regional average for either minority or poverty status. For the entire DRCOG region, the percent of minority population is 32%, and the percent of households in federally-defined poverty status is 11%. Using these thresholds, almost half (49%) of the region's population reside in EJ TAZs.

While the current approach meets federal requirements and the information is useful, the analysis that stems from it is limited. It shows where there are communities that include significant concentrations of minority and/or low-income, but those communities also include residents that do not fit into either of those categories. The opposite is also true: there are people from those categories who reside in places without concentrations significant enough to be identified based on the thresholds.

Recently, DRCOG was selected by the Federal Transit Administration among a handful of MPOs to receive technical assistance in exploring innovative practices that go above and beyond federal requirements related to EJ. As a result, DRCOG staff worked with ICF Consulting to learn more about an innovative technique to analyze EJ to complement the current method. This method is known as a population-based approach that focuses on

individuals from EJ communities (minority and low-income) and other vulnerable populations, such as older adults and individuals with disabilities, and how well their transportation needs are met currently and in the future. This practice is currently used by the Mid-Ohio Regional Planning Commission (MORPC). After learning about this technique, DRCOG staff tested the feasibility of conducting this analysis. This testing confirmed the feasibility and DRCOG staff proposes to use this complementary technique for the 2050 MVRTP in addition to current methods.

Staff will provide an overview of both EJ analysis methods at the October TAC meeting.

PREVIOUS DISCUSSIONS/ACTIONS

N/A

PROPOSED MOTION

N/A

ATTACHMENTS

1. Staff presentation

ADDITIONAL INFORMATION

For additional information, please Matthew Helfant, Senior Planner, Long Range Transportation Planning, at 303-480-6731 or mhelfant@drcog.org or Dorothy Friday, GIS Specialist, Regional Planning and Development at 303-480-6797 or dfriday@drcog.org.



Environmental Justice for the 2050 MVRTP

Transportation Advisory Committee

Presented by:

Matthew Helfant

October 28, 2019



ENVIRONMENTAL JUSTICE BACKGROUND & CURRENT PRACTICE



What is Environmental Justice?

- Executive Order – Environmental Actions to Address Environmental Justice in Minority and Low-Income Populations, signed in 1994
- Reinforces requirements of Title VI of the Civil Rights Act of 1964
- No prescribed methodology for setting thresholds
- All agencies receiving federal funds must comply



MPO EJ Responsibilities

Transportation plans and programs:

- must provide a fully inclusive public outreach program
- should not disproportionately impact minority and low-income communities
- must ensure the receipt of benefits by minority and low-income populations.

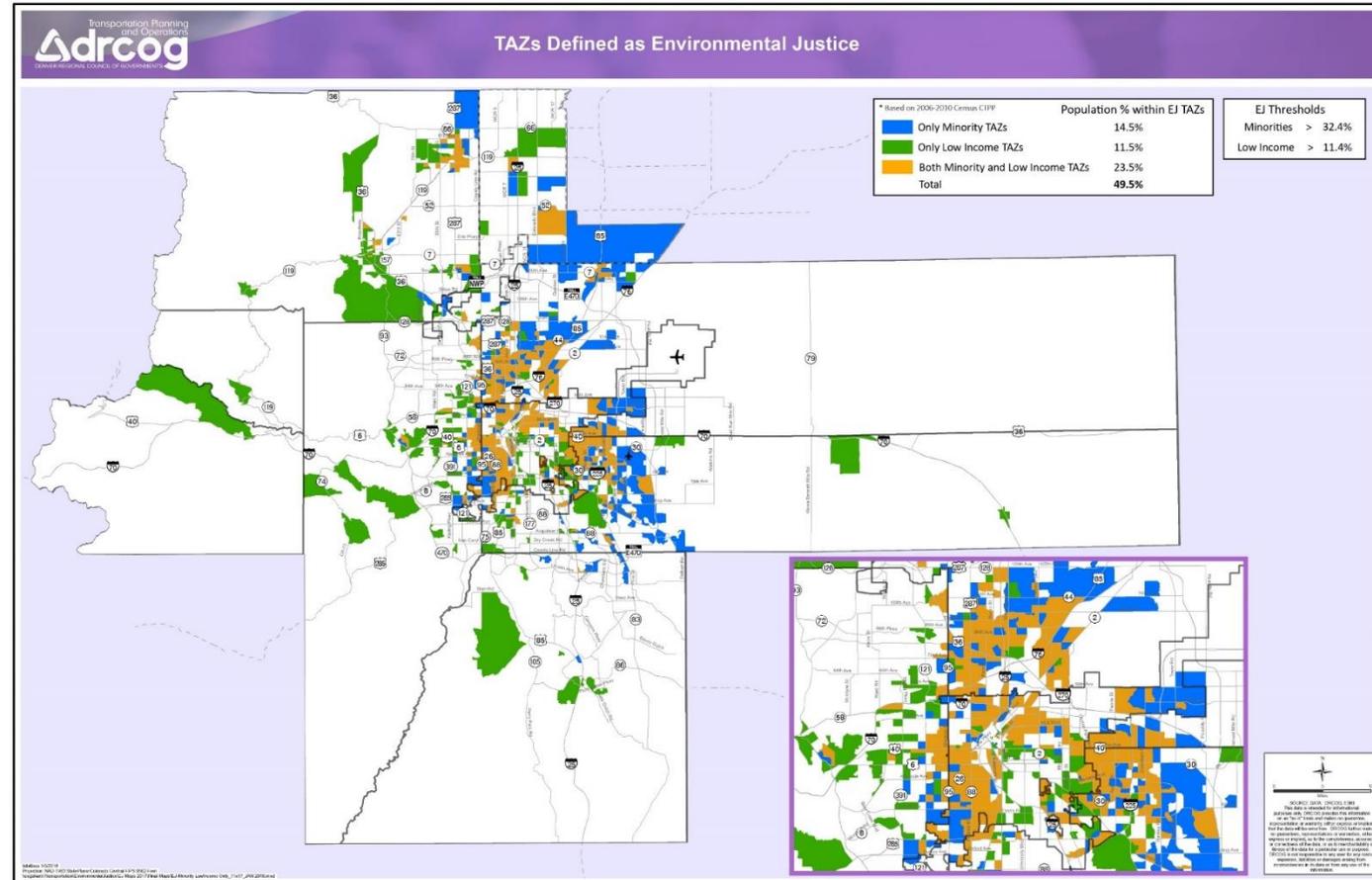


DRCOG EJ Activities

- Include EJ analysis in MVRTP and TIP
- “Status and Impacts of DRCOG Transportation Planning and Programming with Environmental Justice” Report
- Project scoring criteria in recent TIPs



Current EJ TAZ Geography





“POPULATION BASED” APPROACH FOR ANALYSIS



Worked with ICF Consulting on Population Based Approach

- Learned about population based approach that focuses on individuals from EJ communities and other vulnerable populations and how well their transportation needs are being met (currently and in the future)
- Connected w/ Mid-Ohio Regional Planning Commission (MORPC) to learn more about this approach
- Tested feasibility of conducting this analysis



Population Based EJ Data

	<u>Observed ACS 2010-2015</u>	<u>Percent of Total</u>	<u>Projected 2040</u>
Population	3,151,567	100.0%	4,334,641
Households	1,252,241	100.0%	1,826,345
Disabled Population	279,651	8.9%	384,630
Households with no Vehicle	72,563	5.8%	105,830
Households in Poverty*	127,399	10.2%	185,806
Minority Population	1,044,617	33.1%	1,436,759
Over 65 Population	358,090	11.4%	492,515
Hispanic Population	505,168	16.0%	694,804

*2016 Poverty Thresholds, United States Census Bureau



Example: 2015 vs 2050 Travel Times to Destinations

- Modes
 - Peak vs Off-peak Automobile
 - Peak vs Off-peak Transit
- Examples of Destinations
 - Central Business District
 - Urban Centers
 - Employment
 - And more...



Example of Population-Based Approach

Accessibility Performance Measures			
Share of total population with good transit-job accessibility (100,000+ jobs within a 45-minute transit trip)	44%	53%	
Share of population in low-income or minority areas with good transit-job accessibility (1)	62%	77%	

THANK YOU!

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