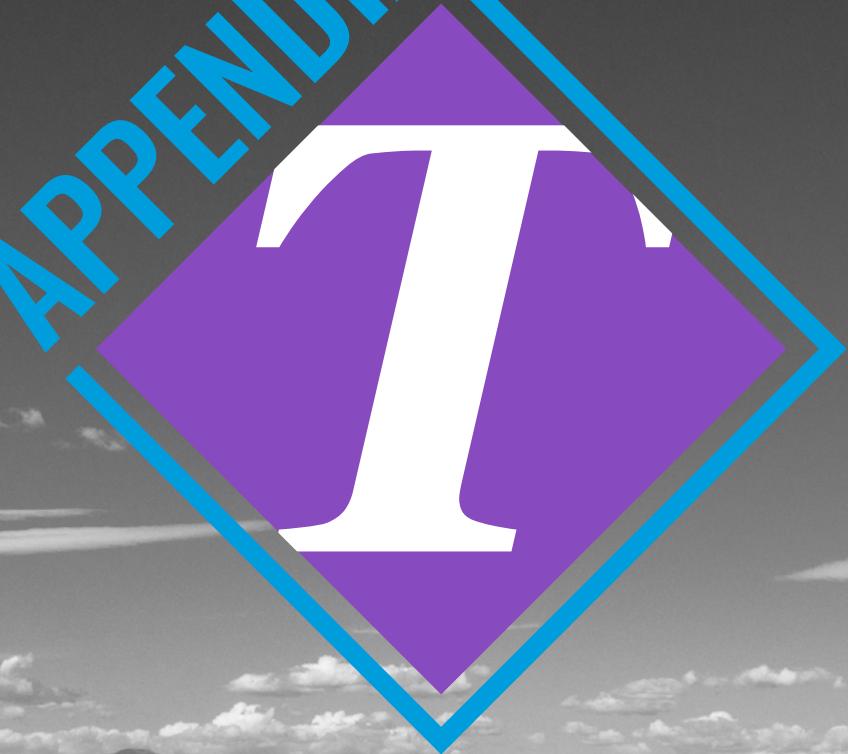


APPENDIX



Transportation Greenhouse Gas Report

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Summary

The Colorado Department of Transportation's Regulation Governing Statewide Transportation Planning Process and Transportation Planning Regions (2 CCR 601-22, known as the Greenhouse Gas Transportation Planning Standard), adopted in December 2021, requires the Denver region to reduce surface transportation greenhouse gas emissions through the transportation planning process. Through impactful changes to the 2050 Metro Vision Regional Transportation Plan (2050 RTP) and a commitment to further action through a Mitigation Action Plan, the DRCOG region meets the rule's greenhouse gas emission reduction requirements for all staging years defined by the rule.

The regulation (2 CCR 601-22, Section 8.02.6) establishes greenhouse gas emission reduction levels from an established baseline for four analysis years: 2025, 2030, 2040 and 2050. For the Denver region, baseline greenhouse gas values are established based on the defined transportation investments and planning assumptions identified in the 2050 RTP adopted in April 2021. The target greenhouse gas emissions are determined by subtracting the rule's greenhouse gas emission reduction levels from the total baseline emissions for each analysis year.

DRCOG meets the state greenhouse gas rule emission reduction levels through a combination of several strategies and concepts, summarized as follows:

Programmatic investment evaluation

- The adopted 2050 RTP includes over \$1.34 billion in transportation investments associated with greenhouse gas emission reduction benefits not previously reflected in the travel model. The model has been updated to reflect these important investments.

Project and program investment changes

- Reinvest funds from select roadway capacity projects to focus on multimodal elements and reduce the amount of increased roadway capacity;
- Accelerate multiple bus rapid transit projects; and
- Reallocate \$900 million within the 2050 RTP's financial plan towards additional and accelerated regional complete streets and other multimodal programmatic investments.

Updates based on observed data

- Minor geographic adjustments to the household growth forecasts based on observed residential construction occurring at higher densities than originally forecast; and
- Updated work-from-home rates to reflect changes in behavior due to technological advancements, transportation demand management efforts, and the effects of the COVID-19 pandemic.

Mitigation Action Plan

- A Mitigation Action Plan (Appendix A) has been developed using the methods and processes in the Colorado Transportation Commission's Policy Directive 1610 (PD1610). The Mitigation Action Plan includes project types from Table 1 of PD1610 focused on parking management and rezoning in specific geographies (e.g., around rapid transit stations, vacant and underutilized land), as well as local adoption of complete streets ordinances and project implementation, and local adoption of multimodal design criteria/standards.

As shown in Table 1, DRCOG meets or exceeds the required greenhouse gas reduction levels in each staging year through these actions, demonstrating compliance with the greenhouse gas planning standard.

Table 1. Greenhouse gas emission reduction results, million metric tons per year

	2025	2030	2040	2050
2050 RTP update modeling (Network updates, programmatic funding and observed data)	0.68	0.68	0.57	0.35
Additional programmatic transportation investments (Active transportation, complete street retrofits, signal timing and CDOT Bustang)	N/A	0.07	0.05	0.03
Mitigation Action Plan (Commitment to further action in Appendix A)	N/A	0.10	0.12	0.08
Total greenhouse gas reductions	0.68	0.85	0.74	0.46
Reduction level requirement from Table 1 of the greenhouse gas rule (2 CCR 601-22, Section 8.02.6)	0.27	0.82	0.63	0.37
Reduction level achieved	Yes	Yes	Yes	Yes

Purpose

The purpose of this report is to document DRCOG's process for complying with Colorado's transportation greenhouse gas rule. The 2050 RTP was amended Sept. 21, 2022, to meet the Oct. 1, 2022 deadline specified in Colorado Revised Statutes §43-4-1103 and the Code of Colorado Regulations (2 CCR 601-22, Section 8.02.5.1)¹. The analysis documented in this report demonstrates that the amended 2050 RTP complies with the regulation's requirements.

The demonstration is based on analysis conducted using the DRCOG's UrbanSim land use model and Focus travel demand model, and the Environmental Protection Agency's MOtor Vehicle Emission Simulator (MOVES) air quality model. Greenhouse gas reductions that could not be sufficiently modeled, such as signal timing and additional multimodal corridor enhancements, were calculated off-model using methodologies defined by the Colorado Transportation Commission's Policy Directive 1610. Additionally, the DRCOG Board has adopted a Mitigation Action Plan (Appendix A) to meet the reduction levels of the regulation.

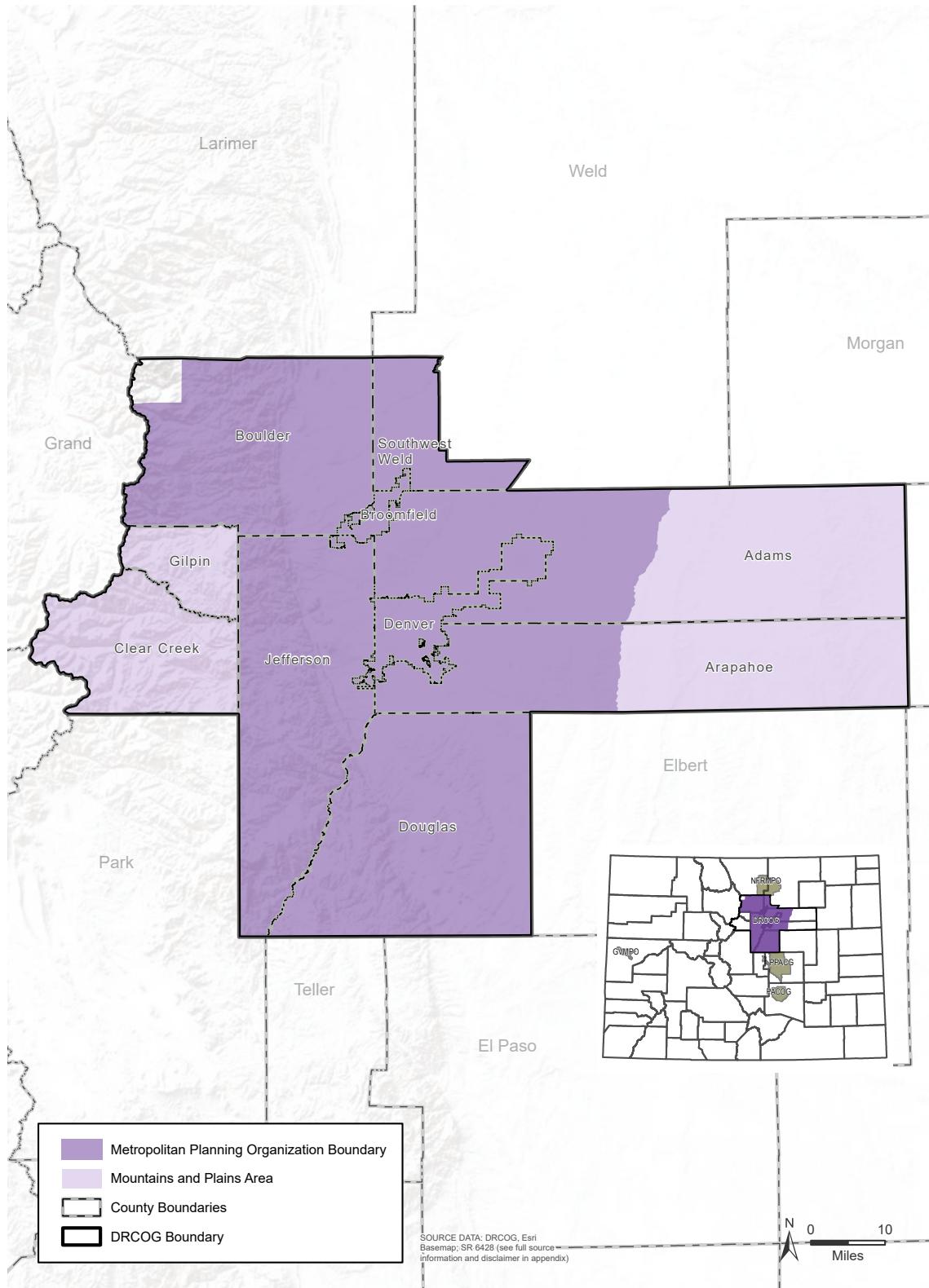
¹ Colorado Department of Transportation, "Rules Governing Statewide Transportation Planning Process and Transportation Planning Regions: 2 CCR 601-22", Accessed on 6/14/2022 from https://www.codot.gov/programs/environmental/greenhousegas/assets/5-2-ccr-601-22_final_clean.pdf.

Background

Colorado SB21-260 (“Sustainability of the Transportation System”) was enacted in June 2021. The bill directed the Colorado Department of Transportation to develop rules for the state and Colorado’s five metropolitan planning organizations to reduce surface transportation greenhouse gas emissions through transportation planning processes. Emission reductions due to vehicle technology, such as fuel efficiency and zero emission vehicles, are regulated in a separate process.

CDOT Regulation Governing Statewide Transportation Planning Process and Transportation Planning Regions (2 CCR 601-22), adopted December 2021, established reduction levels of annual greenhouse gas in million metric tons for four future analysis years: 2025, 2030, 2040 and 2050. The rule applies to the metropolitan planning organization area within DRCOG which includes all, or portions of, eight counties as shown in Figure 1. This report presents the modeled total greenhouse gas emissions of future surface transportation associated with the 2022 Updated 2050 RTP within the MPO area of DRCOG.

Figure 1: The DRCOG region



DRCOG's role

DRCOG is a planning organization where local governments collaborate to establish guidelines, set policy and allocate funding in the areas of transportation and personal mobility, growth and development and aging and disability resources. The Denver area is a dynamic region of 3.4 million people and 58 communities anchoring Colorado's Front Range. Consistently rated one of the best places to live in the country, the region will add a million more people and half a million more jobs by 2050.

The DRCOG region includes Adams, Arapahoe, Boulder, Clear Creek, Douglas, Gilpin and Jefferson counties, the City and County of Denver, the City and County of Broomfield and southwest Weld County. DRCOG is also the federally designated MPO for the Denver region, meaning DRCOG leads multimodal transportation planning activities in cooperation with CDOT, the Regional Transportation District and other stakeholders.

For over 25 years, DRCOG has been actively involved in efforts to reduce the amount of motor fuel burned, vehicle miles traveled and associated greenhouse gas emissions. This task is challenging due to the region's growth. However, DRCOG remains strongly committed to efforts to reduce greenhouse gas emissions and has invested significant funding towards those efforts for many years.

DRCOG's planning documents

DRCOG, in conjunction with its direct MPO partners CDOT and RTD, prepares and routinely updates three key planning documents:

Metro Vision

In addition to its role as an MPO, DRCOG serves as a regional planning commission under Colorado statutes. Metro Vision fulfills DRCOG's duty as an RPC to make and adopt a plan for the physical development of the region. As such, it reflects the long-range vision for the Denver region, establishing a set of shared outcomes and objectives that provide guidance and a framework for regional and local planning priorities, including the region's shared multimodal transportation planning priorities. While providing guidance and numerous example initiatives for regional and local implementation, Metro Vision acknowledges the unique characteristics and contributions of the region's 58 local governments.

To monitor progress towards Metro Vision outcomes the DRCOG incorporated vehicle miles traveled and greenhouse gas reduction targets, along with several other performance measures, into the plan – first in 2011 and again in the 2017 update. DRCOG continues to monitor and make progress towards these targets with strategic initiatives to achieve the shared outcome.

2050 Metro Vision Regional Transportation Plan

The 2050 RTP helps DRCOG and its many partners implement the shared aspirational vision of Metro Vision by identifying specific project and program investment priorities for the region's multimodal transportation system and its operations. It identifies six priorities: multimodal mobility, safety, air quality, regional transit, freight and active transportation. The RTP also identifies investments and regionally significant projects to be funded with "reasonably expected" future revenues over the next 30 years. The 2050 RTP balances planning for an additional million residents in the region while also maintaining the current transportation system and expanding travel options.

In particular, the RTP's project and program investment priorities include:

- Creating a safety program to increase the region's investments in projects to eliminate transportation fatalities and serious injuries.
- Continuing to invest in programs for community mobility planning and implementation, regional transportation operations and technology, regional air quality, commute options, and human service transportation through DRCOG's Transportation Improvement Program.
- Investing in a regional bus rapid transit system of corridors that can leverage federal funding opportunities, attract high volumes of ridership, are ready for implementation and reflect regional geographic equity considerations.

- Continuing to implement the DRCOG Active Transportation Plan through a program to further develop the region's high-comfort active transportation corridors, eliminate gaps and invest in the 2050 RTP's pedestrian focus areas and short-trip opportunity zones.

DRCOG staff used these priorities, along with the agency's Regional Complete Streets Toolkit, as the foundation for the greenhouse gas emission reduction strategies described in this report.

Transportation Improvement Program

The TIP is a four-year program of specific state and federally funded projects and programs to be implemented by CDOT, RTD, local governments, DRCOG and other partner agencies. The process to evaluate projects selected to receive DRCOG-

administered funds has always included criteria associated with the reduction of vehicle miles traveled and greenhouse gas emissions. This includes application questions on air quality reduction, improving multimodal mobility and connectivity, expanding transit, increasing safety and reducing congestion delays.

Historically, DRCOG allocations have gone towards the following project types that work towards reducing vehicle miles traveled and greenhouse gas emissions:

- Active transportation projects, new and upgraded facilities.
- Transit funding, including capital purchases, new and expanded service operations, bus rapid transit infrastructure and passenger facilities.
- Grants for station area, transit-oriented development and urban center planning.
- Direct funding to support air quality improvement programs through the Regional Air Quality Council.

- Congestion management initiatives, including:
 - DRCOG's Way to Go Program.
 - Transportation demand management partnerships and non-infrastructure projects.
 - Transportation operations, traffic signal system upgrades, signal corridor retiming, intelligent transportation systems infrastructure.
 - Carpool, vanpool and school pool programs
 - One of the nation's largest Bike to Work Day programs.
- Roadway operational improvement projects.

It should be noted DRCOG administers a small percentage of total transportation funds within the region used to build, operate and maintain the region's transportation system. Over 95% of funding is administered by CDOT, RTD, toll authorities, and local governments.

Modeling greenhouse gas emissions

UrbanSim model

To understand how demands on the transportation system will change between now and 2050, DRCOG must forecast how growth and development will affect the distribution of households and jobs throughout the region. The State Demography Office in the Colorado Department of Local Affairs forecasts future population, household and job levels at the state and county-level. DRCOG uses the county-level growth forecast from the state demographer and applies a predictive model, the UrbanSim block model, to simulate household and employment location choices with real estate market dynamics and within natural and regulatory constraints.

DRCOG relies on extensive feedback from local partners on preliminary model results to improve model inputs before finalizing household and employment forecasts across 2,804 transportation analysis zones within the Denver region. With forecasts available for each transportation analysis zone, DRCOG and its partners can model future travel demand between zones to anticipate the effects on the transportation network and vehicle emissions, as well as mobility and accessibility for people and freight. More details about the UrbanSim Model can be found in Appendix C.

Regional travel demand model

DRCOG's activity-based travel demand model, Focus, uses socioeconomic outputs from the UrbanSim model along with numerous travel, demographic, and human decision-making factors to represent an average weekday of travel within the Denver region. The Focus model is calibrated to data obtained from regional and national travel surveys, along with several other data sources, to replicate the 15.3 million person-trips made every weekday on the regional transportation system. The model replicates the planned transportation system and land use attributes to generate trips across travel modes and assigns applicable trips to the roadway and transit network. The Focus model is calibrated to match real world observations of traffic volumes, transit boardings and numerous other travel, demographic and trip mode data metrics.

The key use of the Focus model is to forecast future travel metrics based on changes to the Denver region's population, employment and transportation system. Appendix C shows some of the key travel model outputs for both the baseline and compliance model runs. Appendix D provides more detailed information about the Focus model.

MOVES emissions model

The Focus model does not calculate greenhouse gas emissions. The U.S. Environmental Protection Agency created the MOVES model to estimate transportation emissions for various pollutants from surface transportation, including greenhouse gas. To calculate greenhouse gas emissions for the Denver MPO area, region-specific inputs to the MOVES model are developed and maintained by the Colorado Department of Public Health.

Key inputs to the MOVES model to calculate greenhouse gas emissions include:

- Traffic volumes and speeds by time of day from the Focus travel model.
- Number, type and age of vehicles in the regional vehicle fleet.
- Vehicle fleet mix by roadway type.
- Meteorological conditions.
- Fuel economy of vehicles (miles per gallon).
- Increase of electric and other non-internal combustion engine motor vehicles.

Further documentation of the MOVES model is provided in Appendix E.

Greenhouse gas emissions analysis process and results

Setting the baseline

To establish the greenhouse gas emission baseline, DRCOG followed the guidance found in 2 CCR 601-22, Section 1.04 which defines the baseline as: “For each MPO area and for the Non-MPO areas of the state, for each of the model years 2025, 2030, 2040, and 2050: the greenhouse gas emissions, in million metric tons (MMT), produced by the most recently adopted model for that area... as of the effective date of this rule.”

For DRCOG, the “most recently adopted model” is the 2050 RTP adopted in April 2021. As adopted, the 2050 RTP identifies the regionally significant transportation investments through the year 2050 along with other planning assumptions, such as demographic data, land use information, travel costs and travel time changes. The final baseline values, shown in Table 2, were derived from running the most current version of the UrbanSim, Focus and MOVES models, with the network and land use planning assumptions as adopted in April 2021 for the 2050 RTP.

Table 2. DRCOG greenhouse gas baseline by analysis year in million metric tons

	2025	2030	2040	2050
Greenhouse gas baseline (2050 RTP adopted April 2021)	10.50	9.23	6.22	3.70
Reduction requirement from Table 1 of greenhouse gas rule	0.27	0.82	0.63	0.37

The large decrease in baseline greenhouse gas emissions over time is due to the CDOT’s estimates for large increases in the share of electric vehicles into the overall fleet.

Modeling the 2022 Updated 2050 RTP

To comply with the greenhouse gas rule and reduce future surface transportation greenhouse gas emissions, DRCOG committed to meaningful changes to planned regionally-significant transportation projects, analyzed the effects of programmatic investments and reevaluated land use and travel parameters in light of more recent observed data. Through this process, DRCOG engaged the public and stakeholders to determine the changes.

Project and program investment changes

DRCOG, CDOT and other project stakeholders have proposed modifications to select 2050 RTP projects (CDOT-directed funds and DRCOG-directed funds) to accomplish the following:

- Freeway managed lane projects: Modify C-470 and central I-25 projects to focus on safety, operational, transit and other multimodal aspects and associated greenhouse gas benefits; redirect/finance CDOT funds to advance bus rapid transit corridors and fund additional regional multimodal programmatic investments as shown in Table 3.
- DRCOG-directed funded roadway projects: Modify the scope of several projects to remove “six laning” components and re-focus those projects on multimodal, safety and complete streets investments as shown in Table 3.
- Bus rapid transit network: Advance four bus rapid transit corridors and complete five bus rapid

transit corridors by 2030. These include East Colfax Avenue, East Colfax Avenue extension, State Highway 119, Federal Avenue and Colorado Boulevard; advance Broadway Avenue/Lincoln Avenue bus rapid transit corridor from 2040-2050 to 2030-2039 as listed in Table 3.

- Additional multimodal programmatic investments: allocate and finance \$900 million made available through the specified project changes to fund additional multimodal programmatic investments (\$500 million by 2030, \$200 million more by 2040 \$200 million more by 2050). A summary of the program investment changes is shown in Table 4.

These changes also incorporate sponsor-requested project-based amendments as part of DRCOG's routine call for amendments to the 2050 RTP.

Table 3. Proposed project modifications, cycle amendments and greenhouse gas analysis

Project Name/ Corridor	Location/Limits	Current 2050 RTP Project Description
I-70 Floyd Hill Eastbound	Floyd Hill to Veterans Memorial Tunnel	Eastbound interchange improvements with frontage road extension from Hidden Valley interchange to US 6 interchange
I-70 Floyd Hill Westbound	Floyd Hill to Veterans Memorial Tunnel	Addition of a new express travel lane from the top of Floyd Hill to Veterans Memorial Tunnels, and eastbound auxiliary lane from the bottom to top of Floyd Hill
I-270	I-25/US 36 to I-70	New managed lanes
C-470	Wadsworth to I-70	New managed lanes
	U.S. Route 285/Morrison/Quincy	Interchange complex reconstruction
I-25 Central Buildout	Colfax Ave. to 20th St.	Ultimate buildout of corridor improvements
I-25 Valley Highway/ Burnham Yard	Santa Fe Blvd. to Colfax Ave.	Managed lanes, includes right-of-way, Burnham Yard, Central Main Line relocation
Broncos Pkwy./ Easter/Dry Creek Corridor	Parker Rd. to Havana	Widening to 6 lanes, bridge widening and intersection improvements
Gun Club Rd.	State Hwy. 30 to 6th Ave.	Widen from 2 to 4/6 lanes, includes stream crossing upgrade at Coal Creek
Gun Club Rd.	Quincy to Aurora Pkwy.	Widen from 2 to 6 lanes
Smoky Hill Rd.	Buckley Rd. to Picadilly St.	Widen from 4 to 6 lanes
State Hwy. 30	Airport Blvd. to Quincy Ave.	Widen from 2 to 6 lanes
Lincoln Ave.	Oswego to Keystone	Widen 4 to 6 lanes
SH-66	Lyons to Longmont	Widen from 2 to 4 lanes (Hover St. to Main St.) and operational/safety improvements from Lyons to Longmont in alignment with PEL
South Platte River Trail		Complete missing links and upgrade trail section
Broadway/Lincoln BRT	Colfax to Highlands Ranch Pkwy.	Bus rapid transit service and supporting safety/multimodal improvements
Federal Blvd. BRT	120th to Santa Fe/Dartmouth	Bus rapid transit service and supporting safety/multimodal improvements
State Hwy. 119 BRT	Downtown Boulder to downtown Longmont	Bus rapid transit service and supporting safety/multimodal improvements
Colfax Ave. Ext. BRT	I-225 to E-470	Bus rapid transit service and supporting safety/multimodal improvements

Proposed Project Change/Description

Process requested amendment. Move from 2030-2039 stage to 2020-2029 stage

Process requested amendment. Move from 2030-2039 stage to 2020-2029 stage

Process requested amendment. Move from 2030-2039 stage to 2020-2029 stage

Remove managed lanes component; complete interchange complex reconstruction as planned

Remove managed lanes component

Widen to 4 lanes; bridge, multimodal corridor and intersection improvements

Widen from 2 to 4 lanes, includes stream crossing upgrade at Coal Creek, multimodal corridor improvements; advance stage period

Widen from 2 to 4 lanes, multimodal corridor improvements

Multimodal corridor improvements [Note: corridor remains at 4 lanes]; Advance stage period

Widen from 2 to 4 lanes, multimodal corridor improvements

Multimodal corridor improvements [Note: corridor remains at 4 lanes]; Advance stage period

Process requested amendment. Split project between the 2020-2029 (Hover to Main) and 2030-2039 (Lyons to Hover) stage periods

Process requested amendment. Split project cost between the 2020-2029 and 2030-2039 stage periods

Advance BRT implementation from 2040-2050 stage period to 2030-2039 stage period

Process requested amendment. Advance BRT implementation from 2030-2039 stage period to 2020-2029 stage period

Process requested amendment. Advance BRT implementation from 2030-2039 stage period to 2020-2029 stage period

Advance BRT implementation from 2040-2050 stage period to 2020-2029 stage period

Representation of adopted 2050 RTP programmatic funding

As adopted in April 2021, DRCOG's fiscally constrained 2050 RTP contains over \$15 billion in regional programmatic funding. These investments are shown as lump sums across various programs and individual projects are not yet identified in these programs. Programmatic funding categories include transit investments, active transportation, safety/Vision Zero, transportation demand management and intelligent transportation investments, all of which are key strategic investments to improve the region's multimodal transportation system, improve air quality and reduce greenhouse gas emissions.

DRCOG staff evaluated the programmatic 2050 RTP funding, which was not yet reflected in the travel model, and determined there were approximately \$1.34 billion of investment associated with greenhouse gas emission reductions. Based on this information and in coordination with CDOT and North Front Range MPO travel modelers, DRCOG staff developed a method to reflect these investments in the travel model. Appendix D provides more detailed information about the 2050 RTP funding and the modeling process for greenhouse gas emissions analysis, including the research and CDOT guidance that supports these changes.

Updates reflecting new observed data

DRCOG compiles point-level housing data from a variety of local and proprietary sources. When the 2050 RTP was adopted in 2021, the most recent observation available was 2018. This was the same for point-level employment data licensed from the Colorado Department of Labor and Employment and subject to additional processing and cleaning at DRCOG. DRCOG staff use this data as a supplementary UrbanSim model input applied during the scheduled development step. DRCOG was able to incorporate housing and employment data through 2020, along with preliminary data from proprietary housing datasets to update those observations into 2022. DRCOG staff also incorporated insights from these same proprietary housing datasets to include anticipated housing construction through 2028. To accommodate these observations of more multifamily housing in more dense locations and counties, DRCOG staff had to make several adjustments to the previous county forecasts.

Additionally, factors influencing work-from-home rates were updated to reflect observed changes in behavior due to technological advancements, transportation demand management efforts from DRCOG and DRCOG's partners, and the effects of the COVID-19 pandemic. Further description of the model updates can be found in Appendix D.

Emission results

Table 4 shows the modeling results for the 2022 Amendments to the 2050 RTP with the greenhouse gas emission reductions from the baseline. Only in 2025 do the modeling results meet the greenhouse gas reduction levels on their own. Because the modeling of the 2022 Updated 2050 RTP did not achieve the rule's reduction levels, DRCOG incorporated additional transportation investments that were evaluated using "off model" calculations to achieve further emission reductions.

Table 4. Greenhouse gas emission results in million metric tons per year

	2025	2030	2040	2050
Greenhouse gas baseline (2050 RTP, adopted April 2021)	10.50	9.23	6.22	3.70
2022 Updated 2050 RTP	9.82	8.55	5.65	3.35
Greenhouse gas reduction from 2022 Updated 2050 RTP modeling:	0.68	0.68	0.57	0.35

Additional programmatic investment

In addition to modeling the greenhouse gas reductions associated with the programmatic (non-project specific) investments in the 2050 RTP as adopted, DRCOG also worked with CDOT to re-allocate \$900 million in the 2050 RTP's fiscally constrained financial plan towards additional programmatic investments to help meet the greenhouse gas reduction levels for each analysis year, especially for 2030. Additionally, \$190 million in 2050 RTP-adopted programmatic funding remained from the representation of programmatic funding in the Focus model described above and was also included in this analysis, for a total of \$1.09 billion.

Because the greenhouse gas technical analysis indicated particular difficulty with attaining the 2030 reduction levels, the \$1.09 billion in programmatic funding was allocated as follows:

- 2030: \$605,000,000
- 2040: \$242,000,000
- 2050: \$242,000,000

The first step was to compare the programmatic categories in Table 3.1 of the adopted 2050 RTP with the mitigation measures in Policy Directive 1610 since the greenhouse gas reduction calculations for each type of programmatic investment used Policy Directive 1610's scoring and calculation methodologies. Based on this comparison, the following Policy Directive 1610 measures were used to represent the additional programmatic investment:

- Signal timing.
- CDOT Bustang expansion within the DRCOG area.
- Bicycle/pedestrian facility (primarily urban and suburban).
- Sidewalk/pedestrian facility (urban and suburban).
- Shared-use path (urban, suburban and rural).
- Complete streets retrofits (urban and suburban).

Each programmatic investment category is described below.

Additional signal timing

Since 1989, DRCOG has been working with CDOT and local governments to coordinate traffic signals across jurisdictional boundaries on major roadways in the region. DRCOG has a proven record and the resources to continue to reduce traffic congestion and improve air quality through signal timing coordination plan development support.

The 2022 Updated 2050 RTP increases investments in the Regional Traffic Operations Program above this baseline to retime and optimize an additional 50 signals per year beginning in 2025. Calculations for greenhouse gas emission reductions associated with this effort were made using the method described in Policy Directive 1610. Greenhouse gas emission reductions are calculated per 10,000 average annual daily traffic per signal optimized within five years prior to evaluation year. The emission reduction value declines over time due to increasing electric vehicles in the fleet and the calculations include an induced demand factor.

Table 5 shows the calculated greenhouse gas emission reduction for 2030, 2040, and 2050 based on 250 signals (50 per year) optimized during the five years preceding the analysis year and with an average annual daily traffic per signal of 45,000.

Table 5. Greenhouse gas emission results, in million metric tons per year

	2025	2030	2040	2050
Greenhouse gas emission reductions from additional signal timing	N/A	0.05	0.03	0.02

CDOT Bustang expansion within DRCOG area

CDOT indicated to DRCOG that as part of its own greenhouse gas rule compliance, it intends to expand Bustang service over time, including within the DRCOG MPO area. According to CDOT, its approach apportions the daily bus vehicle revenue miles of the Bustang expansion within each MPO boundary, as well as by route, since different patterns of weekday and weekend service for the routes will require different annualization factors. The West Line and the Outrider Routes have the same schedule seven days a week — suggesting that 365 is a reasonable annualization factor. The South Line to Denver's Union Station and North Line have one-third the number of round trips on weekends compared to week days (52 weeks * 5 weekdays = 260 days, plus 1/3 weighing to 52 weekends -> 104/3 - 34.67, so 260+34.67 = 204.67 as an annualization factor). The Colorado Springs to Denver Tech Center route only operates on weekdays, so a 260 annualization factor is most appropriate.

Table 6. Greenhouse gas emission results, in million metric tons per year

	2025	2030	2040	2050
Greenhouse gas emission reductions from increased Bustang service within DRCOG area	N/A	0.003	0.001	0.001

Bicycle and pedestrian facilities and Complete Streets retrofits

DRCOG staff analyzed its Regional Active Transportation Plan in terms of the plan's envisioned regional network buildout, such as for the Regional Active Transportation Network as well as proposed on-street facilities. DRCOG staff also reviewed its Complete Streets Toolkit and deployed its Complete Streets geographic information system prioritization tool developed under guidance from the federal Bipartisan Infrastructure Law to estimate the potential for complete street retrofits throughout the region for each analysis year. Using Policy Directive 1610's methodology, the mileage associated with each investment is multiplied by a point factor ranging from 1.0 to 3.5 to estimate the total points for each category. Each point equals one metric ton of greenhouse gas reduction.

Table 7. Greenhouse gas emission results, in million metric tons per year

	2025	2030	2040	2050
Bicycle/pedestrian facilities, Complete Street retrofits	N/A	0.02	0.02	0.01

Considering all the additional programmatic investments together, Table 8 shows the total estimated greenhouse gas reductions for each analysis year in million metric tons per year. While the total reduction amounts are modest, they are an important component of the overall framework to demonstrate compliance with the greenhouse gas rule. Perhaps even more importantly, they represent important needed investment in the region's multimodal transportation network.

Total emission reductions from off-model calculations

Table 8. Greenhouse gas emission results, in million metric tons per year

	2025	2030	2040	2050
Greenhouse gas emission reductions from additional signal timing	N/A	0.05	0.03	0.02
Greenhouse gas emission reductions from increased Bustang service within DRCOG area	N/A	0.003	0.001	0.001
Pedestrian facilities, Complete Street retrofits	N/A	0.02	0.02	0.01
Total additional programmatic investment greenhouse gas reduction calculations:	N/A	0.07	0.05	0.03

Mitigation Action Plan

To achieve additional emission reductions and meet the reduction requirements defined in the rule, DRCOG is pursuing a Mitigation Action Plan. The Mitigation Action Plan is detailed in Appendix A. DRCOG staff's commitment is to report annually on the progress of the measures listed in the Mitigation Action Plan, which include further commitments to land use planning efforts, complete streets standards and other strategies to reduce greenhouse gas emissions from on-road transportation sources. A summary of the greenhouse gas reductions by staging period and strategy can be found in Table 9.

Table 9. Greenhouse gas emissions reductions from Mitigation Action Plan strategies

Measure	Greenhouse gas reduction in metric tons		
	2030	2040	2050
Increase residential density from <10 units/acre to at least 15 to 25 units/acre	13,548	16,011	10,557
Increase job density from <0.5 floor area ratio to at least 1.0 floor area ratio	2,309	2,822	1,833
Mixed-use transit-oriented development higher intensity: Area rezoned for mixed-use transit-oriented development at least 25 units/acre and 150 jobs/acre	8,588	9,814	6,510
Mixed-use transit-oriented development moderate intensity: Area rezoned for mixed-use transit-oriented development at least 15 units/acre and 100 jobs/acre	18,397	21,157	14,455
Reduce or eliminate minimum parking requirements and set low maximum levels (residential)	37,750	43,795	29,573
Reduce or eliminate minimum parking requirements and set moderate maximum levels (residential)	18,332	21,281	14,347
Reduce or eliminate minimum parking requirements and set maximum levels (commercial)	4,373	3,940	3,511
Adopt local Complete Streets standards	369	243	44
Grand total	103,666	119,063	80,829

Table 10. Reduction through Mitigation Action Plan by staging year, in million metric tons per year

	2025	2030	2040	2050
Greenhouse gas reductions from Mitigation Action Plan (commitment to further action in Appendix A)	N/A	0.10	0.12	0.08

Summary

DRCOG complies with the requirements of the rule for all staging periods through the revising the 2050 RTP and pursuing a Mitigation Action Plan. DRCOG will monitor changes in the region that would require a re-baselining in future years as well as the effectiveness of strategies. DRCOG will continue to demonstrate compliance with the rule in every 2050 RTP amendment cycle.

Table 11. Greenhouse gas emission reduction results, in million metric tons per year

	2025	2030	2040	2050
Greenhouse gas reduction from 2022 Updated 2050 RTP modeling (network updates, programmatic funding and observed data)	0.68	0.68	0.57	0.35
Off-model greenhouse gas reduction calculations (active transportation funds, signal timing and Bustang)	N/A	0.07	0.05	0.03
Greenhouse gas reductions from Mitigation Action Plan (commitment to further action in Appendix A)	N/A	0.10	0.12	0.08
Total greenhouse gas reductions:	0.68	0.85	0.74	0.46
Reduction requirement from Table 1 of the greenhouse gas rule (2 CCR 601-22, Section 8.02.6)	0.27	0.82	0.63	0.37
Reduction requirement achieved	Yes	Yes	Yes	Yes

Public engagement

DRCOG conducted a 31-day public review period and held a public hearing on the amended 2050 RTP and accompanying air quality and greenhouse gas documents. Additionally, staff engaged with the Civic Advisory Group and held five virtual open houses during the public comment period. For a full overview of the public and stakeholder engagement conducted during the 2022 Update process, see Appendix B of this report.

Appendix A: Mitigation Action Plan

Introduction and definition

DRCOG has prepared this Mitigation Action Plan to comply with the requirements of the Greenhouse Gas Transportation Planning Standard (known as the greenhouse gas rule) adopted by the Colorado Transportation Commission in December 2021. The greenhouse gas rule defines the Mitigation Action Plan as “an element of the GHG Transportation Report that specifies which GHG Mitigation Measures shall be implemented that help achieve the GHG Reduction Levels.” While the greenhouse gas rule defined general content requirements for a Mitigation Action Plan, the Colorado Department of Transportation’s Policy Directive 1610 specifies the following information to be included in a Mitigation Action Plan. An excerpt:

- a. GHG Emissions Reductions: Summary of emissions analysis from GHG Transportation Report, including the estimated gap to achieve the GHG Reduction Levels specified for each horizon year.
- b. GHG Mitigation Measure Summary/Description: Each measure shall include the following details as listed in Table 2 [of Policy Directive 1610].

(Source: Policy Directive 1610)

Both requirements are addressed below.

Greenhouse gas emissions reductions

As described in the Greenhouse Gas Transportation Report, DRCOG staff developed a framework of strategies to meet the greenhouse gas emission reduction levels for each analysis year as required by the greenhouse gas rule. Collectively, these strategies demonstrate meaningful progress toward achieving the reduction levels (and do so for the 2025 analysis year). However, there is a remaining gap for the 2030, 2040 and 2050 analysis years, demonstrating the need for mitigation measures and a Mitigation Action Plan. The analysis is shown in Table 1 of the Greenhouse Gas Transportation Report.

The analysis includes significant additional investments in the transportation projects and programs that result in estimated reductions in regional greenhouse gas emissions from the baseline as documented in the Greenhouse Gas Transportation Report. To address the remaining gap between these emission levels and the required reduction levels for each analysis year, DRCOG staff evaluated mitigation measure concepts and strategies included in Policy Directive 1610 for their feasibility and applicability within the DRCOG metro planning organization region. In doing so, DRCOG staff evaluated potential measures that are not already part of either the 2050 RTP or the Focus travel model. In other words, many of the measures included in Policy Directive 1610 are already directly included in the 2050 RTP or could be modeled or addressed within the Focus model. Therefore, DRCOG staff narrowed its focus to policy-oriented measures, such as land use, parking and other “non-project investment” measures.

Mitigation measures analysis

Land use and parking management measures

DRCOG staff analyzed vacant and redevelopable land parcels for various geographies where land use and parking strategies have the most potential for successful implementation and greenhouse gas reduction results. The specific geographies analyzed, shown in Figure 1, are areas within:

- A half-mile of an existing rail station.
- A quarter-mile of existing or planned bus rapid transit stations
- Existing urban centers as identified by local governments and then regionally designated in Metro Vision.
- Pedestrian focus areas identified in DRCOG's Active Transportation Plan.

DRCOG staff also created an interactive web map to illustrate the analyzed geographies.

DRCOG staff does not intend that the geographies it analyzed be considered "required" for implementing the mitigation measures. Rather, they are reasonable estimates of where (and to what extent) the measures could apply for calculating their greenhouse gas reduction potential.

DRCOG staff identified vacant and redevelopable parcels within each geography as those parcels where the ratio of improvement value to land value was less than or equal to 2.0. The areas were exclusive — in other words, a parcel was not counted in more than one of the following four geographies (in order of evaluation):

- Rail station areas.
- Bus rapid transit station areas outside of rail station areas.
- Urban centers outside the station areas.
- Pedestrian focus areas outside of station areas and urban centers.

No parcel was included that had 10 or more households in 2020 nor that is currently estimated to have 15 households or more in 2050, as this indicates pre-existing zoning not eligible for rezoning as required of the mitigation measures described in Policy Directive 1610. Additionally, to avoid counting property that could be difficult to assemble and reach required densities, no parcel smaller than a half-acre was included.

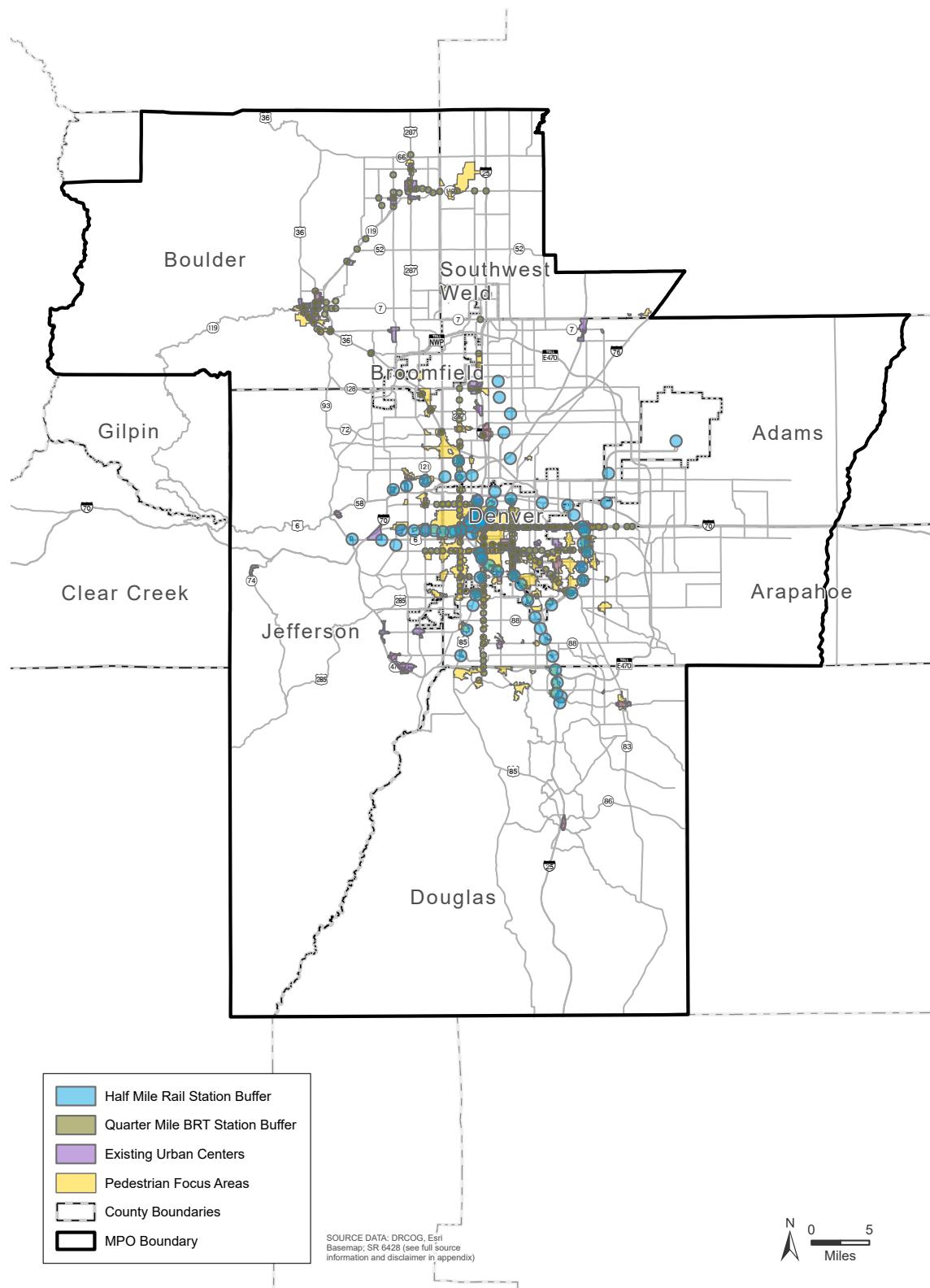
For the greenhouse gas reduction estimates associated with each mitigation measure, the vacant and redevelopable parcels were grouped into Station/Bus Rapid Transit Areas and Urban Center/Pedestrian Focus Areas since the nature of those groups of geographies have different levels of opportunity. The results of the analysis are summarized in Table 1.

Table 1: Vacant and redevelopable parcels by geography

Improvement to land value ratio	Category	Within a half-mile of rail station	Within a quarter-mile of bus rapid transit (non-rail station area)	Total Station/Bus Rapid Transit Areas	Within existing urban center (non-Station/Bus Rapid Transit Areas)	Within pedestrian focus area (non-Station/Bus Rapid Transit/urban center areas)	Total Urban Center/Pedestrian Focus Areas	Total of all areas
0	Vacant	3,463	1,135	4,598	697	2,056	2,753	7,351
greater than 0-1	redevelopable	3,483	2,388	5,871	1,019	1,337	2,356	8,227
greater than 1-2		2,132	1,232	3,364	755	1,205	1,960	5,324
Subtotal vacant or redevelopable		9,078	4,755	13,833	2,471	4,598	7,069	20,902
greater than 2-3	developed	1,446	921	2,367	569	1,174	1,743	4,110
greater than 3		12,863	7,614	20,477	7,683	19,411	27,094	47,571

Note: Includes parcels in areas of fewer than 10 households per acre in 2020; excludes parcels in areas of 15 households or more per acre in 2050.

Figure 1: Mitigation measures analysis geographies



For each land use and parking measure, DRCOG staff made an assessment about the:

- Total available acres of the two geography combinations to which to apply the measure.
- Amount of the available acres that is likely to be developed or redeveloped by 2050.
- Amount of the potentially developed or redeveloped area that is subject to either being rezoned or parking management standards.

Overall, the analysis identified approximately 20% of all vacant and redevelopable acres as eligible to be rezoned or have parking standards adjusted to produce sufficient additional greenhouse gas emission reductions to reach the greenhouse gas emission reduction levels for 2030, 2040 and 2050. Table 2 summarizes the cumulative analysis of the mitigation measures.

Table 2: Greenhouse gas emission reduction summary

Measure	Greenhouse gas reduction in metric tons		
	2030	2040	2050
Increase residential density from fewer than 10 units per acre to at least 15- 25 units per acre	13,548	16,011	10,557
Increase job density from less than 0.5 floor area ratio to at least 1.0 floor area ratio	2,309	2,822	1,833
Mixed-use transit-oriented development-higher intensity: Area rezoned for mixed-use transit-oriented-development of at least 25 units per acre and 150 jobs per acre	8,588	9,814	6,510
Mixed-use transit-oriented development-moderate intensity: Area rezoned for mixed-use transit-oriented development of at least 15 units per acre and 100 jobs per acre	18,397	21,157	14,455
Reduce or eliminate minimum parking requirements and set low maximum levels (residential)	37,750	43,795	29,573
Reduce or eliminate minimum parking requirements and set moderate maximum levels (residential)	18,332	21,281	14,347
Reduce or eliminate minimum parking requirements and set maximum levels (commercial)	4,373	3,940	3,511
Adopt local complete streets standards	369	243	44
Grand total	103,666	119,063	80,829

The greenhouse gas emission reductions for each mitigation measure use the calculations as adopted in Policy Directive 1610. Detailed information on the calculated emission reductions is included in the next section.

Greenhouse gas mitigation measure summary

Land use strategies

Increase residential density. Increase residential density from fewer than 10 units per acre to at least 15-25 units per acre.

The analysis assumes that 1,759 acres in Urban Center/Pedestrian Focus Areas (43.4%) and Station/Bus Rapid Transit Areas (56.6%) will be rezoned from fewer than 10 residential units per acre to allow at least 15 units per acre. This represents 763 acres of vacant or redevelopable land in Urban Center/Pedestrian Focus Areas (10.8% of the region total) and 996 acres of vacant and redevelopable land in Station/Bus Rapid Transit Areas (7.2% of the region total). According to the Policy Directive 1610 evaluation, increasing residential density as described reduces vehicle miles traveled per residential unit by 4,321 per year, resulting in 21.9 fewer tons of greenhouse gas emissions per rezoned acre in 2030, 12.7 tons per rezoned acre in 2040, and 6.0 tons per rezoned acre in 2050.

DRCOG staff estimates that 35% of the opportunity land areas would be rezoned by 2030, 35% by 2040, and 30% by 2050.

Assumptions:

Amount of total Station/Bus Rapid Transit Areas included in measure	40%	5,533 acres
Amount of total Urban Center/Pedestrian Focus Areas included in measure	60%	4,241 acres
Amount of area that will be developed or redeveloped over 30 years	30%	2,932 acres
Amount subject to rezoning	60%	1,759 acres

Greenhouse gas reduction calculations

Greenhouse gas tons per acre rezoned	2025		2030		2040		2050	
	Reduction per acre		Reduction per acre		Reduction per acre		Reduction per acre	
	27		22		13		6	
Greenhouse gas tons reduced	2025		2030		2040		2050	
	Acres rezoned	Reduction	Acres rezoned	Reduction	Acres rezoned	Reduction	Acres rezoned	Reduction
	-	-	616	13,548	616	8,005	528	3,167
Amount rezoned per period	0%		35%		35%		30%	
Carryover	-	-	-	-	616	8,005	1,232	7,390
Total reduction			13,548			16,011		

Increase job density. Increase job density from less than 0.5 floor area ratio to at least 1.0 floor area ratio.

The analysis assumes that 367 acres in Urban Center/Pedestrian Focus Areas (43.3%) and Station/Bus Rapid Transit Areas (56.7%) will be rezoned from a floor area ratio of less than 0.5 to allow a floor area ratio of at least 1.0. This represents 159 acres of vacant or redevelopable land in Urban Center/Pedestrian Focus Areas (2.2% of the region total) and 208 acres of vacant and redevelopable land in Station/Bus Rapid Transit Areas (1.5% of the region total). According to the Policy Directive 1610 evaluation, increasing job density as described reduces vehicle miles traveled per employee by 445 per year, resulting in 18 fewer tons of greenhouse gas emissions per rezoned acre in 2030, 10.5 tons per rezoned acre in 2040, and 5 tons per rezoned acre in 2050.

DRCOG staff estimates that 35% of the opportunity land areas would be rezoned by 2030, 35% by 2040 and 30% by 2050.

Assumptions:

Amount of total Station/Bus Rapid Transit areas Included in measure	10%	1,383 acres
Amount of total Urban Center/Pedestrian Focus Areas included in measure	15%	1,060 acres
Amount of area that will be developed or redeveloped over 30 years	25%	611 acres
Amount subject to rezoning	60%	367 acres

Greenhouse gas reduction calculations

Greenhouse gas tons per acre rezoned	2025		2030		2040		2050	
	Reduction per acre		Reduction per acre		Reduction per acre		Reduction per acre	
	22		18		11		5	
Greenhouse gas tons reduced	2025		2030		2040		2050	
	Acres rezoned	Reduction	Acres rezoned	Reduction	Acres rezoned	Reduction	Acres rezoned	Reduction
	-	-	128	2,309	128	1,411	110	550
Amount rezoned per period	0%		35%		35%		30%	
Carryover	-	-	-	-	128	1,411	257	1,283
Total reduction				2,309		2,822		1,833

Mixed-use transit-oriented development (moderate intensity). Rezone areas for mixed-use transit-oriented development accommodating at least 15 residential units per acre and 100 jobs per acre within a half-mile of a high-frequency bus transit or fixed-guideway station.

The analysis assumes that 1,314 acres in Urban Center/Pedestrian Focus Areas (24.2%) and Station/Bus Rapid Transit Areas (75.8%) will be rezoned to allow mixed-use transit-oriented development accommodating at least 15 residential units/acre and 100 jobs/acre. This represents 318 acres of vacant/redevelopable land in Urban Center/Pedestrian Focus Areas (4.5% of the region total) and 996 acres of vacant and redevelopable land in Station/Bus Rapid Transit Areas (7.2% of the region total). According to the Policy Directive 1610 evaluation, increasing mixed-use transit-oriented development areas with moderate residential and job density as described reduces vehicle miles traveled per acre by 109,269 per year, resulting in 40 fewer tons of greenhouse gas emissions per rezoned acre in 2030, 23.2 tons per rezoned acre in 2040, and 11 tons per rezoned acre in 2050.

DRCOG staff estimates that 35% of the opportunity land areas would be rezoned by 2030, 35% by 2040, and 30% by 2050.

Assumptions:

Amount of total Station/Bus Rapid Transit areas Included in measure	40%	5,533 acres
Amount of total Urban Center/Pedestrian Focus Areas included in measure	25%	1,767 acres
Amount of area that will be developed or redeveloped over 30 years	30%	2,190 acres
Amount subject to rezoning	60%	1,314 acres

Greenhouse gas reduction calculations

Greenhouse gas tons per acre rezoned	2025		2030		2040		2050	
	Reduction per acre		Reduction per acre		Reduction per acre		Reduction per acre	
	49		40		23		11	
Greenhouse gas tons reduced	2025		2030		2040		2050	
	Acres rezoned	Reduction	Acres rezoned	Reduction	Acres rezoned	Reduction	Acres rezoned	Reduction
	-	-	460	18,397	460	10,578	394	4,336
Amount rezoned per period	0%		35%		35%		30%	
Carryover	-	-	-	-	460	10,578	920	10,118
Total reduction				18,397		21,157		14,455

Mixed-use transit-oriented development (higher intensity). Rezone areas for mixed-use transit-oriented development accommodating at least 25 residential units per acre and 150 jobs per acre within a half-mile of fixed-guideway transit stations.

The analysis assumes that 501 acres in Urban Center/Pedestrian Focus Areas (25.3%) and Station/Bus Rapid Transit Areas (74.7%) will be rezoned to allow mixed-use transit-oriented development accommodating at least 25 residential units per acre and 150 jobs per acre. This represents 127 acres of vacant or redevelopable land in Urban Center/Pedestrian Focus Areas (1.8% of the region total) and 374 acres of vacant and redevelopable land in Station/Bus Rapid Transit Areas (2.7% of the region total). According to the Policy Directive 1610 evaluation, increasing mixed-use transit-oriented development areas with higher residential and job density as described reduces vehicle miles traveled per acre by 174,706 per year, resulting in 49.1 fewer tons of greenhouse gas emissions per rezoned acre in 2030, 28.5 tons per rezoned acre in 2040, and 13.5 tons per rezoned acre in 2050.

DRCOG staff estimates that 35% of the opportunity land areas would be rezoned by 2030, 35% by 2040, and 30% by 2050.

Assumptions:

Amount of total Station/Bus Rapid Transit areas Included in measure	15%	2,075 acres
Amount of total Urban Center/Pedestrian Focus Areas included in measure	10%	707 acres
Amount of area that will be developed or redeveloped over 30 years	30%	835 acres
Amount subject to rezoning	60%	501 acres

Greenhouse gas reduction calculations

Greenhouse gas tons per acre rezoned	2025		2030		2040		2050	
	Reduction per acre		Reduction per acre		Reduction per acre		Reduction per acre	
	60		49		28		13	
Greenhouse gas tons reduced	2025		2030		2040		2050	
	Acres rezoned	Reduction	Acres rezoned	Reduction	Acres rezoned	Reduction	Acres rezoned	Reduction
	-	-	175	8,588	175	4,907	150	1,953
Amount rezoned per period	-	-	-	-	175	4,907	351	4,557
Carryover	-	-	-	-	175	4,907	351	4,557
Total reduction	-		8,588		9,814		6,510	

Parking strategies

Eliminate minimum and set low maximum parking levels (residential). Adopt development code standards that do not require a minimum number of general-purpose parking spaces and set a low maximum number of general-purpose passenger vehicle parking spaces for new multifamily development (three-quarters of a parking space per one-bedroom, studio and efficiency unit; one space per two-bedroom unit; and one-and-a-quarter spaces per three-bedroom and larger unit). Required disabled spaces, accessible spaces and loading zone spaces do not count toward maximum parking limits.

The analysis assumes that 1,718 acres in Urban Center/Pedestrian Focus Areas (15.4%) and Station/Bus Rapid Transit Areas (84.5%) will be subject to the parking standards described earlier. This represents 265 acres of vacant or redevelopable land in Urban Center/Pedestrian Focus Areas (3.7% of the region total) and 1,452 acres of vacant and redevelopable land in Station/BRT Areas (10.5% of the region total). According to the Policy Directive 1610 evaluation, adopting parking standards as described reduces annual vehicle miles traveled per dwelling unit by 4,500 in an urban core area, 4,700 in an urban area, and 5,400 in a suburban area.

Assumptions:

Amount of total Station/Bus Rapid Transit areas Included in measure	70%	9,683 acres
Amount of total Urban Center/Pedestrian Focus Areas included in measure	25%	1,767 acres
Amount of area that will be developed or redeveloped over 30 years	30%	3,435 acres
Amount subject to rezoning	50%	1,718 acres

Area		Dwelling units			
		2025	2030	2040	2050
Percent urban core	30%				
Average residential density	75	-	13,526	13,526	11,593
Percent urban	45%				
Average residential density	45	-	12,173	12,173	10,434
Percent suburban	25%				
Average residential density	20	-	3,006	3,006	2,576

Greenhouse gas reduction calculations

Greenhouse gas tons per 1,000 dwelling units	2025		2030		2040		2050	
	Reduction per 1,000 dwelling units		Reduction per 1,000 dwelling units		Reduction per 1,000 dwelling units		Reduction per 1,000 dwelling units	
Urban core	1,535		1,265		734		347	
Urban	1,603		1,321		766		362	
Suburban	1,841		1,517		880		416	
Greenhouse gas tons reduced	2025		2030		2040		2050	
	1,000 dwelling units	Reduction	1,000 dwelling units	Reduction	1,000 dwelling units	Reduction	1,000 dwelling units	Reduction
Urban core	-	-	13.526	17,110	13.526	9,928	11.593	4,023
Urban	-	-	12.173	16,081	12.173	9,325	10.434	3,777
Suburban	-	-	3.006	4,560	3.006	2,645	2.576	1,072
Urban core carryover	-	-	-	-	13.526	9,928	27.051	9,387
Urban carryover	-	-	-	-	12.173	9,325	24.346	8,813
Suburban carryover	-	-	-	-	3.006	2,645	6.011	2,501
Total urban core	-	-	13.526	17,110	27.051	19,856	38.645	13,410
Total urban	-	-	12.173	16,081	24.346	18,649	34.780	12,591
Total suburban	-	-	3.006	4,560	6.011	5,290	8.588	3,573
Total tons of greenhouse gas reduction			37,750		43,795		29,573	

Eliminate minimum and set moderate maximum parking levels (residential). Adopt development code standards that do not require a minimum number of general-purpose parking spaces and sets a moderate maximum number of general-purpose passenger vehicle parking spaces (1.0 space per 1 bedroom, studio, and efficiency unit; 1.5 space per 2 bedroom unit; and 1.75 spaces per 3+ bedroom unit) for new multifamily development. Required disabled/accessible and loading zone spaces do not count toward maximum parking limits.

This analysis assumes that 2,481 acres in Urban Center/Pedestrian Focus Areas (56.1%) and Station/BRT Areas (43.9%) will be subject to these parking standards. This represents 1,392 acres of vacant/redevelopable land in Urban Center/Pedestrian Focus Areas (19.7% of the region total) and 1,089 acres of vacant and redevelopable land in Station/BRT Areas (7.9% of the region total). According to the Policy Directive 1610 evaluation, adopting parking standards as described reduces annual VMT per dwelling unit by 2,250 in an urban core area, 2,350 in an urban area, and 2,700 in a suburban area.

Assumptions:

Amount of total Station/Bus Rapid Transit Areas included in measure	30%	4,150 acres
Amount of total Urban Center/Pedestrian Focus Areas included in measure	75%	5,302 acres
Amount of area that will be developed or redeveloped over 30 years	35%	3,308 acres
Amount subject to parking standards	75%	2,481 acres

Area	Dwelling units			
	2025	2030	2040	2050
Percent urban core	30%			
Average residential density	65	-	16,933	16,933
Percent urban	45%			
Average residential density	20	-	7,815	7,815
Percent suburban	25%			
Average residential density	15	-	3,256	3,256

Greenhouse gas reduction calculations

Greenhouse gas tons per 1,000 dwelling units	2025		2030		2040		2050	
	Reduction per 1,000 dwelling units		Reduction per 1,000 dwelling units		Reduction per 1,000 dwelling units		Reduction per 1,000 dwelling units	
Urban core	767		632		367		173	
Urban	801		660		383		181	
Suburban	921		759		440		208	
Greenhouse gas tons reduced	2025		2030		2040		2050	
	1,000 dwelling units	Reduction	1,000 dwelling units	Reduction	1,000 dwelling units	Reduction	1,000 dwelling units	Reduction
Urban core	-	-	16.933	10,702	16.933	6,214	14.514	2,511
Urban	-	-	7.815	5,158	7.815	2,993	6.699	1,212
Suburban	-	-	3.256	2,472	3.256	1,433	2.791	581
Urban core carryover	-	-	-	-	16.933	6,214	33.866	5,859
Urban carryover	-	-	-	-	7.815	2,993	15.631	2,829
Suburban carryover	-	-	-	-	3.256	1,433	6.513	1,355
Total urban core	-	-	16.933	10,702	33.866	12,429	48.381	8,370
Total urban	-	-	7.815	5,158	15.631	5,987	22.330	4,042
Total suburban	-	-	3.256	2,472	6.513	2,866	9.304	1,935
Total tons of greenhouse gas reduction	-		18,332		21,281		14,347	

Reduce or eliminate minimum and set maximum parking levels (commercial). Adopt development code standards that reduce or do not require a minimum number of general-purpose parking spaces and set a maximum number of general-purpose passenger vehicle parking spaces for new commercial development. Required disabled spaces, accessible spaces and loading zone spaces do not count toward maximum parking limits.

The analysis assumes that 217 acres in Urban Center/Pedestrian Focus Areas (20%) and Station/Bus Rapid Transit Areas (80%) will be subject to the parking standards described earlier. This represents 44 acres of vacant or redevelopable land in Urban Center/Pedestrian Focus Areas (0.6% of the region total) and 173 acres of vacant and redevelopable land in Station/Bus Rapid Transit Areas (1.3% of the region total). According to the Policy Directive 1610 evaluation, adopting parking standards as described reduces annual vehicle miles traveled per 10,000 square feet by 8,960 in an urban core area, 23,893 in an urban area, and 29,867 in a suburban area.

Assumptions:

Amount of total Station/Bus Rapid Transit Areas included in measure	10.0%	1,383 acres
Amount of total Urban Center/Pedestrian Focus Areas included in measure	5.0%	353 acres
Amount of area that will be developed or redeveloped over 30 years	25%	434 acres
Amount subject to parking standards	50%	217 acres

Area	10,000 square feet				
	2025	2030	2040	2050	
Percent non-central business district, maximum two-and-a-half spaces per 1,000 square feet	60%				
Average floor area ratio	3	-	613	545	545
Percent non-central business district, maximum two spaces per 1,000 square feet	30%				
Average floor area ratio	3	-	70	63	63
Percent central business district, maximum one-and-a-half spaces per 1,000 square feet	5%				
Average floor area ratio	10	-	170	151	151
Percent central business district, maximum one space per 1,000 square feet	5%				
Average floor area ratio	10	-	170	151	151

Greenhouse gas reduction calculations

	2025
Greenhouse gas tons per 1,000 dwelling units	Reduction per 10,000 square feet
Non-central business district, two-and-a-half parking spaces	6
Non-central business district, two parking spaces	8
Central business district, one-and-a-half parking spaces	5
Central business district, one parking space	9
	2025
Greenhouse gas tons reduced	10,000 square feet
Non-central business district, two-and-a-half parking spaces	-
Non-central business district, two parking spaces	-
Central business district, one-and-a-half parking spaces	-
Central business district, one parking space	-
Non-central business district, two-and-a-half parking spaces carryover	-
Non-central business district, two parking spaces carryover	-
Central business district, one-and-a-half parking spaces carryover	-
Central business district, one parking space carryover	-
Total non-central business district, two-and-a-half parking spaces	-
Total non-central business district, two parking spaces	-
Total central business district, one-and-a-half parking spaces	-
Total central business district, one parking space	-
Total tons of greenhouse gas reduction	-

Projected Reductions by Building Type					
2030		2040		2050	
Reduction per 10,000 square feet		Reduction per 10,000 square feet		Reduction per 10,000 square feet	
3		1		1	
7		4		2	
4		2		1	
8		5		2	
2030		2040		2050	
10,000 square feet	Reduction	10,000 square feet	Reduction	10,000 square feet	Reduction
612.8	1,838	544.7	545	544.7	545
70.3	492	62.5	250	62.5	125
170.2	681	151.3	303	151.3	151
170.2	1,362	151.3	757	151.3	303
-	-	612.8	613	1,157.5	1,157
-	-	70.3	281	132.9	266
-	-	170.2	340	321.5	322
-	-	170.2	851	321.5	643
612.8	1,838	1,157.5	1,157	1,702.2	1,702
70.3	492	132.9	531	195.4	391
170.2	681	321.5	643	472.8	473
170.2	1,362	321.5	1,608	472.8	946
	4,373		3,940		3,511

Adopt local complete street standards. Local jurisdictions adopt Complete Streets standards into their public works standards and apply those standards to locally funded arterial roadway improvements in the 2050 Metro Vision Regional Transportation Plan.

The analysis is based on the miles of locally funded arterial roadway projects that are four (or fewer) lanes wide and which are specifically listed in the adopted fiscally constrained portion of the 2050 Metro Vision Regional Transportation Plan. There are approximately 164 miles of such projects in the plan and DRCOG staff analyzed the projects within the plan staging year in which the project is programmed. DRCOG staff estimates that about 64% of the projects in the 2020-2029 staging period, 75% of the projects in the 2030-2039 staging period, and 80% of the projects in the 2040-2050 staging period will be constructed as Complete Streets.

Assumptions:	2025	2030	2040	2050
Miles of locally funded arterial roadway projects of four lanes or fewer	20	50	69	25
Percent constructed as Complete Streets	50%	70%	75%	80%
Miles of locally funded Complete Streets	10	35	52	20
Percent urban core	0%	-	-	-
Percent urban	30%	3	14	16
Percent suburban	70%	7	32	36

Greenhouse gas reduction calculations								
Greenhouse gas tons per mile	2025		2030		2040		2050	
	Reduction per mile		Reduction per mile		Reduction per mile		Reduction per mile	
Urban core	54		44		26		12	
Urban	22		18		11		5	
Suburban	5		4		2		1	
Greenhouse gas tons reduced	2025		2030		2040		2050	
	Miles	Reduction	Miles	Reduction	Miles	Reduction	Miles	Reduction
Urban core	-	-	-	-	-	-	-	-
Urban	-	-	13.5	243	15.5	171	6.0	30
Suburban	-	-	31.5	126	36.2	72	14.0	14
Total tons of greenhouse gas reduction			369		243		44	

Co-Benefits

One of the Policy Directive 1610 required elements is to quantify, where possible, specific co-benefits of the mitigation measures for each relevant compliance year in the project's lifetime, including:

- Reduction of co-pollutants (such as nitrogen oxides and particulate matter with diameters of 2.5 micrometers and smaller)
- Travel impacts (such as changes to vehicle miles traveled, pedestrian activity, bike use, transit ridership, as applicable).

As discussed in the introduction, DRCOG staff specifically selected policy-oriented mitigation measures outside of both the 2050 Metro Vision Regional Transportation Plan and Focus travel model for inclusion in this Mitigation Action Plan. As such, the selected measures cannot be modeled, and co-benefits cannot be estimated from a quantitative perspective. However, an important theme of DRCOG's work to comply with the Greenhouse Gas Transportation Planning Standard is not just compliance but to encourage continued meaningful multimodal transportation planning within the region. The mitigation measures, as implemented over time, are intended to encourage and support multimodal travel options and the co-benefits that come with thoughtfully integrated land use and transportation planning that provide more people with more travel choices.

As the Denver region continues to grow (with another million residents forecast to live in the region by 2050), the proposed mitigation measures are intended to help accommodate some of that growth in strategic areas to reduce the frequency and length of auto trips. The proposed measures also will help maximize the region's current and planned investment in rail, bus rapid transit and other multimodal travel options.

Vehicle emissions from internal combustion engines are chiefly related to the number of vehicle trips, the length of vehicle trips, and the operating conditions (such as speeds and idling) for those trips along with vehicle fuel efficiency. While the proposed mitigation measures probably will not have a significant regional impact on air quality and reducing co-pollutants (because they are voluntary and targeted to small, specific areas), they will result in policies and planning that are beneficial for air quality.

Benefits to disproportionately impacted communities

Policy Directive 1610 defines a disproportionately impacted community as “a community that is in a census block group...where the proportion of households that are low income is greater than 40%, the proportion of households that identify as minority is greater than 40%, or the proportion of households that are housing cost-burdened is greater than 40%.”

Because the proposed mitigation measures are policy-based and not project-based — and not directly location-based — it is difficult to draw specific conclusions regarding disproportionately impacted community benefits or dollars spent. However, in analyzing and evaluating the proposed mitigation measures, DRCOG staff identified the conceptual geographies (discussed previously and shown in Figure 1). While the mitigation measures in this appendix are not constrained to these geographies, they provide a reasonable mechanism to spatially compare with disproportionately impacted community geographies.

To conduct this analysis, DRCOG staff first mapped the disproportionately impacted community geographies within the DRCOG metropolitan planning organization area (Figure 2). Then, staff used geographic information systems to compare the spatial overlaps between the conceptual mitigation measure analysis geographies (Figure 1) with the disproportionately impacted community geographies (Figure 2) to illustrate where both geographies overlap (Figure 3).

As shown, there is meaningful overlap between the two geographies. Because the mitigation measure analysis geographies are anchored around rail stations, future bus rapid transit corridors, urban centers, and pedestrian focus areas, the policy changes associated with the land use and parking mitigation measures can provide disproportionately impacted community benefits not just at specific locations — such as adjacent to a rail station — but through access to the rail network across the region. For example, increased residential densities in transit-efficient locations can lead to reduced total housing and transportation costs. Similarly, increased job densities in transit-efficient locations can increase accessible job opportunities for people with less access to private vehicles. In these ways, encouraging integrated land use and transportation planning through the mitigation measures provides potential disproportionately impacted community benefits at both the specific location level and the network or system level.

Of course, some policy changes associated with land use and parking mitigation may lead to displacement of current residents and existing market-rate affordable housing units. Additionally, because the mitigation measures are voluntary and not location-constrained, there is also flexibility to implement them over time where and when they are most effective and needed, including to maximize disproportionately impacted community benefits.

Figure 2: Disproportionally impacted communities geographies

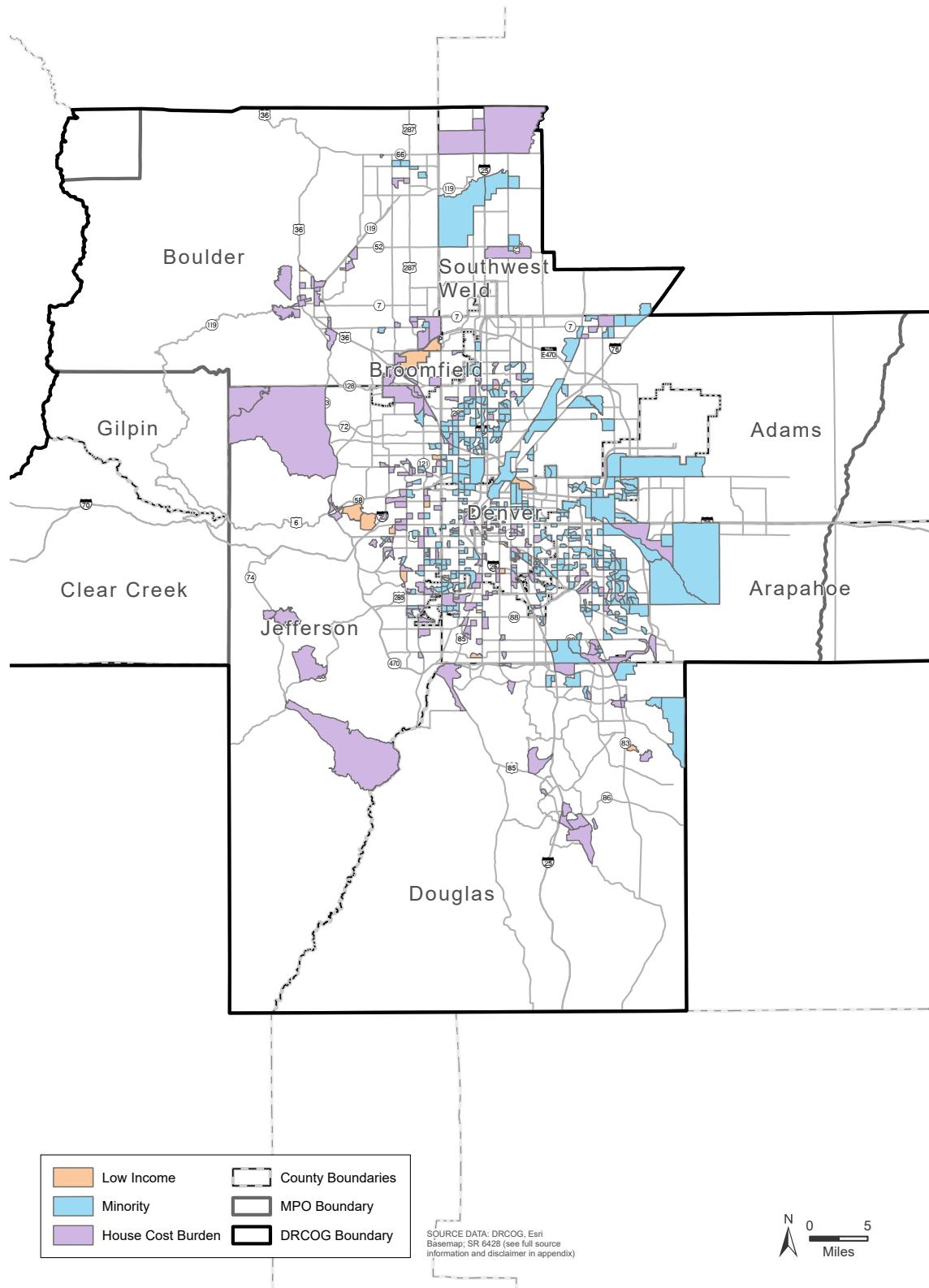
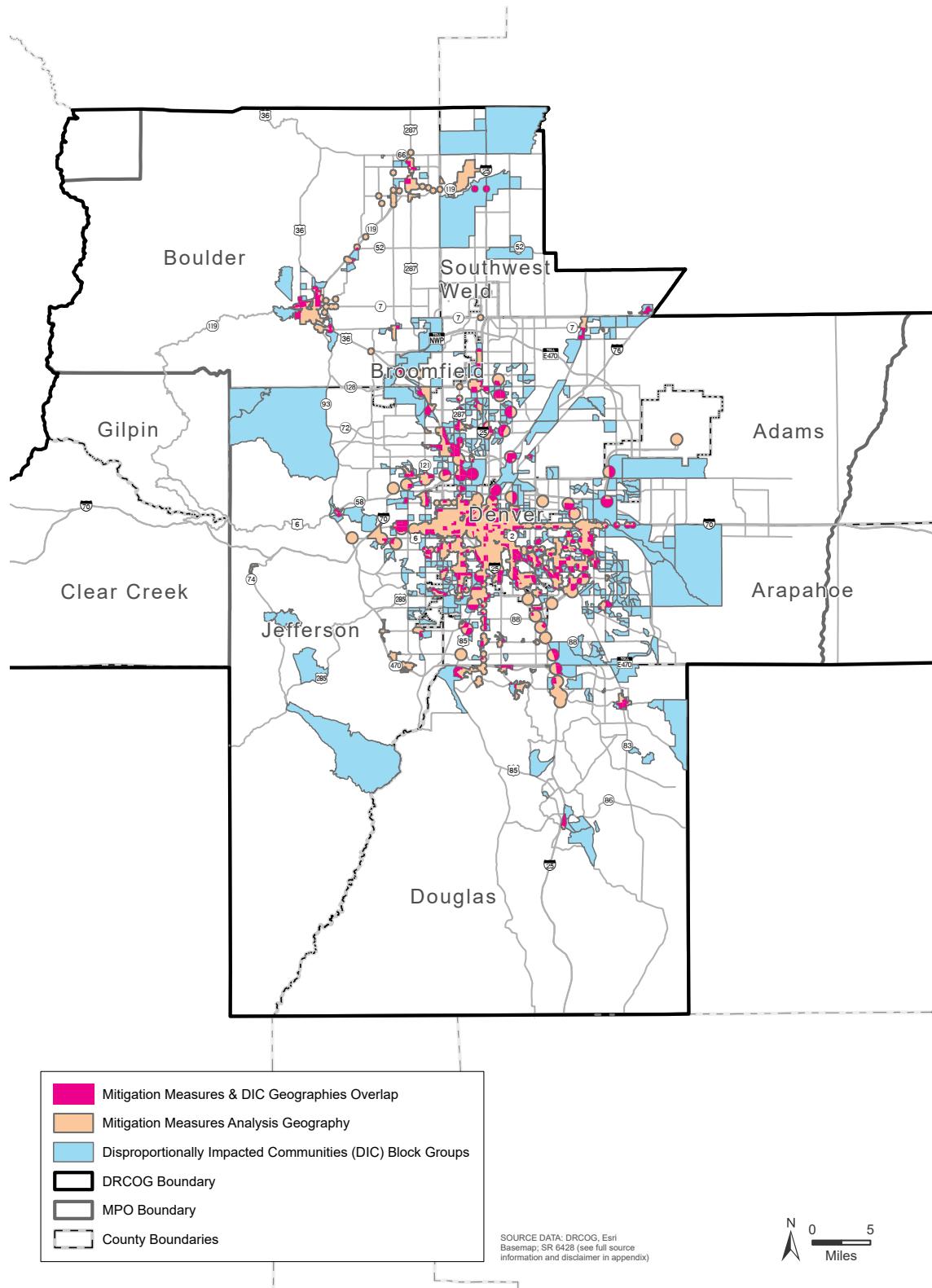


Figure 3: Mitigation measures and disproportionately impacted communities geographies overlay



Measure origin and history

While the mitigation measure profiles describe their general origin and how they are “additive” (going beyond what the region is already doing), Policy Directive 1610 also requires information about the role of the metropolitan planning organization or Colorado Department of Transportation in the proposed mitigation measures. As indicated throughout this report, DRCOG staff selected mitigation measures to expand the region’s existing efforts related to integrated land use and transportation planning in applicable areas, particularly around rail stations, urban centers, and in strategic development and redevelopment areas. Similarly, many jurisdictions (as well as DRCOG) have adopted Complete Streets standards or toolkits. These activities are primarily undertaken and led by local governments within the region, with support from DRCOG.

The analysis geographies draw on DRCOG’s planning framework. For example, urban centers are identified by local governments and then regionally designated through DRCOG’s Metro Vision plan. Similarly, the pedestrian focus areas are a geography defined in DRCOG’s Regional Active Transportation Plan. And the bus rapid transit network is an implementation priority of DRCOG’s 2050 Metro Vision Regional Transportation Plan. The geographies selected for analyzing the mitigation measures were chosen because they closely relate to the concepts embodied in the mitigation measures.

Going forward, DRCOG will work with local jurisdictions to develop tracking and support mechanisms related to required annual reporting associated with the Mitigation Action Plan.

Funding, resources and partnerships

For this section, Policy Directive 1610 specifies describing confirmed funding sources, partnerships, or in-kind or other matching funds associated with the proposed mitigation measures. Given the policy-oriented nature of the mitigation measures as noted in previous sections, there is not dedicated funding to implement the measures. That said, DRCOG has a legacy of funding the types of planning activities encompassed by the mitigation measures. For example, DRCOG has allocated funding for several cycles through its Transportation Improvement Program Community Mobility Planning and Implementation Set-Aside to encourage visioning, planning and implementation around transit stations and other applicable areas. Through the 2024-2027 Transportation Improvement Program, DRCOG will implement the Community Mobility Planning and Innovation Set-Aside, which will dedicate \$12 million for transportation corridor planning, community mobility planning and innovative mobility. There is the potential within these eligible activities for local governments to apply for funding to support the planning and policy development activities underpinning several of the mitigation measures.

In addition to potential funding, partnerships will play a pivotal role in implementing the Mitigation Action Plan. One primary example, discussed in the previous section, will be DRCOG staff developing tracking and support mechanisms for the required annual reporting associated with the plan. As part of that work, DRCOG has offered its local governments the availability of its staff and resources to help explore the feasibility and implementation of specific mitigation measures at the time, location and purview of each interested local government. Examples of DRCOG staff and resource support could include developing and making available to local jurisdictions model code language, best practices, training, research, data and analysis as needed to help their staff establish and implement the mitigation measures most applicable for that jurisdiction.

Appendix B: Public and stakeholder engagement

Introduction

During the 2050 Metro Vision Regional Transportation Plan technical analysis and update process (approximately December 2021 through July 2022), Denver Regional Council of Governments staff focused on providing frequent updates on the fast-paced technical analysis process to DRCOG's committees, Board, county transportation forums and other stakeholders. DRCOG staff also reconvened the Civic Advisory Group to provide input throughout the plan update process.

This appendix summarizes the outreach and engagement efforts undertaken during the plan update process including the engagement activities conducted during the review period and the comments received during that period and at the public hearing.

General methods of public and stakeholder engagement used included:

- Notices and promotion.
- Civic Advisory Group.
- Online engagement site (Social Pinpoint).
- Stakeholder presentations.
- DRCOG committee and Board briefings.
- Partner agency review (Colorado Department of Transportation, Transportation Commission and Colorado Department of Public Health and Environment).
- Website and social media posts.

Committees, Board, forums and stakeholder outreach

DRCOG staff provided an average of five to 10 updates a month throughout the technical plan update process to DRCOG's committees, Board, county transportation forums and other stakeholders, including:

- DRCOG Transportation Advisory Committee (regular meetings and June work session).
- DRCOG Regional Transportation Committee.
- DRCOG Board (regular meetings and work sessions).
- County transportation forums (Adams County, Arapahoe County, Boulder County, City and County of Broomfield, City and County of Denver, Douglas County, Jefferson County and southwest Weld County).

For all briefings, the focus was on informing and seeking input on each step of the multifaceted and fast-paced technical analysis to respond to the requirements of the Greenhouse Gas Transportation Planning Standard. Because the technical analysis was so complex (as documented in Appendix T), there was new technical information to present and use for subsequent decision-making on a regular basis.

DRCOG staff also participated in CDOT's "4P" outreach process in spring 2022. While not specifically oriented toward this plan update process, it was still an valuable mechanism for both agencies to collaborate with and receive input from local governments regarding the planning process for DRCOG's 2050 RTP and CDOT's 10-Year Plan.

Finally, DRCOG staff also had regular dialogue with Board directors, local government staff, stakeholder groups and others who had questions or requested information about the technical analysis process to comply with the greenhouse gas rule.

Civic Advisory Group

To assist in determining the best strategies for complying with the greenhouse gas rule, DRCOG staff prioritized community engagement and input. DRCOG staff reinstated and met with the Civic Advisory Group four times throughout the greenhouse gas analysis process. The Civic Advisory Group was able to provide input at various stages of the analysis and assist DRCOG in determining the most meaningful mitigation strategies from a community lens. During the four meetings the Civic Advisory Group was able to:

- Discuss transportation investment preferences based on perceived greenhouse gas reduction benefits and community/personal benefits.
- Determine priorities surrounding greenhouse gas reduction strategies.
- Perform a “strengths, weaknesses, opportunities and challenges” analysis on various greenhouse gas mitigation measures.
- Comment on the final proposed amendment.

The Civic Advisory Group’s exercises and discussions highlighted its members’ preference for mitigation and reduction strategies that prioritize accessibility and personal choices. For instance, when asked what types of transportation investments they believed to be most beneficial to reducing greenhouse gases the group mentioned investments such as:

- Focusing on the integration of various transportation systems to allow for succinct trips for all users.
- Free and flexible rapid transit.
- More frequent transit.
- Better education of our transportation systems and travel etiquette.

Similarly, during the greenhouse gas reduction priority exercise the group prioritized reduction strategies that prioritized access to transit, bike and pedestrian options. The strategies provided in the exercise were operational capacity improvements, transportation demand management, transit enhancements, bicycle and pedestrian infrastructure and Complete Streets corridor projects. Group facilitators provided the Civic Advisory Group 10 votes and asked members to allocate them to the projects they considered to be of the highest priority. Facilitators held two voting sessions, the first was purely based on group members’ personal priorities for themselves and their communities. Before the second round of voting the group was given more context about each reduction strategy and its effects. Members were asked to spend no more than two votes on operational capacity improvements and transportation demand management. See exercise results below.

When given the chance to reflect on their choices, group members noted their unwavering support for transit, bike and pedestrian improvements and the need for balance between greenhouse gas impact and community benefit. The group felt that although the transit, bike and pedestrian-focused strategies did not create as significant of an impact in greenhouse gas emissions, such strategies prioritized people.

Figure 1. Voting session one result



Figure 1. Voting session two results





DRCOG Home



2050 METRO VISION REGIONAL TRANSPORTATION PLAN 2022 UPDATE

Welcome to our on-demand virtual open house! This site was created to help you explore the 2022 update to the 2050 Regional Transportation Plan (2050 RTP) and provide your comments! DRCOG, in coordination with local and regional partners, is updating the 2050 RTP to meet greenhouse gas emissions reduction levels set for the region by the state's adopted Greenhouse Gas Planning Standard. Review the draft of the 2022 update to the 2050 RTP and learn how to provide feedback.

Public comment period outreach activities and comments received

DRCOG held a 31-day public comment review period from Aug. 7 through Sept. 6 to solicit review, engagement and input on the draft 2050 RTP documents. To do so, DRCOG staff updated the 2050 RTP Social Pinpoint project website to house the draft plan documents, announce public meetings and provide opportunities for feedback and discussion. DRCOG gave the public the option of sharing general comments and engaging in discussion through the site's idea wall and providing more specific comments on markable

PDFs of the plan documents. Several eblasts and social media posts were made during the public review period to publicize the Social Pinpoint site and the virtual public meetings.

Public notice

DRCOG staff published a legal notice in the Sunday, Aug. 7, edition of The Denver Post officially announcing the public review period.



Denver Regional Council of Governments

4d ·

Today! Join the 4 p.m. public hearing on Zoom for the 2050 Metro Vision Regional Transportation Plan and the #greenhousegas updates! Live Spanish and American Sign Language interpretation will be provided. Find details in the #DRCOG event calendar: <https://drcog.org/node/988942>

Audiencia pública: 4 p.m. Miércoles, 7 de septiembre
Reunión virtual únicamente
Con interpretación en vivo en español y lenguaje de señas americano
Para unirse a la reunión, haga clic en el e... See more



Denver Regional Council of Governments

6d ·

Online feedback ends at 5 p.m. today, Sept. 6, on the new greenhouse gas emissions levels in the 2050 Metro Vision Regional Transport... See more



Virtual public meetings

During the public review period, DRCOG staff held five virtual public meetings to present the draft 2050 RTP, with a focus on the proposed updates to comply with the state Greenhouse Gas Planning Standard. Simultaneous Spanish interpretation was provided for two of the meetings. Each meeting included an introduction to DRCOG, an introduction to the Greenhouse Gas Planning Standard, an overview of DRCOG's proposed greenhouse gas compliance strategy, an explanation of overall changes to the 2050 RTP and information on how to participate in the process further. Over the five public meetings, there were 11 attendees.

Civic Advisory Group

DRCOG staff met twice with the Civic Advisory Group during the public comment review period. The first was a formal virtual meeting to provide an overview of the draft 2050 RTP, like the virtual public meetings described above. The second meeting was an informal in-person meeting to reflect on the group's work during this 2022 update process and to begin to look ahead toward potential future Civic Advisory Group topics, roles and structure.

Other presentations

DRCOG staff also made other presentations and updates during and after the public comment review period. These included presentations to the Colorado Communities for Climate Action, Denver South, Denver Inter-Neighborhood Cooperation, several county transportation forums, DRCOG committees and the state Transportation Commission.



drcog.org

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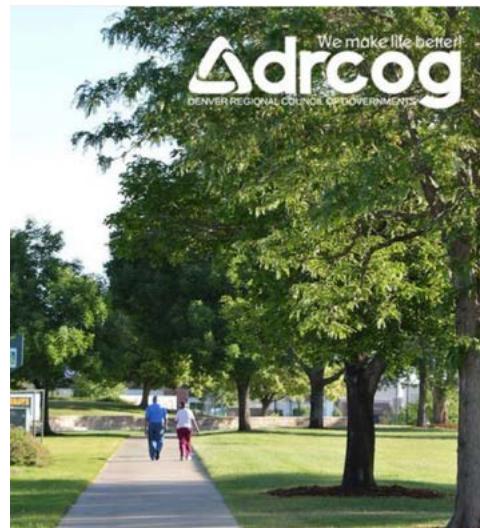
Liked by mobilemesacounty and others

drcog.org Online feedback ends at 5 p.m. today, Sept. 6, on the new greenhouse gas emissions levels in the 2050 Metro Vision Regional Transportation... [more](#)

- Support for the proposed 2050 RTP updates to comply with the state Greenhouse Gas Planning Standard.
- Support for the proposed 2050 RTP updates, but with a desire to shift investment further from roadways and highways to transit and other multimodal travel options.
- Opposition to the proposed 2050 RTP updates and opposition to the Greenhouse Gas Planning Standard, with a preference for additional roadway- and highway-oriented investment.
- Neutral or technical comments that were not opinion-based.

Comments received

DRCOG received almost 350 comments from the general public and stakeholders during the public comment period. The majority of comments were received through the Social Pinpoint idea wall. Although previous invitations for public comment provided the capacity for participants to interact with each other's posts, the 2050 RTP represented the first time they took advantage of the opportunity. Comments were also received through marked-up PDF documents and via email. Comments generally fell into one of the following categories:



Liked by mobilemesacounty

drcog.org Te invitamos a asistir a una sesión virtual de preguntas y respuestas con el personal del Consejo Regional de Gobiernos de Denver para preguntar sobre las nuevas normas de emisiones de gases de efecto invernadero para el Plan de Transporte Regional Metro Vision 2050. ¡Tu opinión es importante! Haz clic en el enlace que aparece en nuestra biografía para ver el calendario de reuniones, revisar las actualizaciones del plan y compartir tus comentarios en línea. ¿Preguntas? Llama a la asesora de participación pública Kellsie

Public hearing

DRCOG held a virtual public hearing on Sept. 7 as part of a special DRCOG Board meeting. For the first time, the public hearing and Board meeting included both simultaneous Spanish interpretation and American Sign Language interpretation using the Zoom platform. Eleven people testified during the public hearing, with comments generally in support of the proposed 2050 RTP updates and urging the DRCOG Board to adopt the updated plan. Commenters generally urged even greater investment in multimodal travel options and less in roadways and highways.

Comments matrix

On the following pages, all written comments that were received on the draft updated 2050 RTP during the public comment review period are listed in a matrix, noting both the comment and a response by DRCOG staff.

Document revisions based on public comment

DRCOG staff made the following revisions to plan documents after the public comment review period and public hearing:

- 2050 RTP document, Table 3.1: added references to transit to the project description and table for Arapahoe County projects as requested by county staff.
- Greenhouse Gas Transportation Report: corrected Table 1 to remove references to greenhouse gas reductions from mitigation measures for the 2025 analysis year (staff published an errata sheet on this issue during the public comment period).
- Greenhouse Gas Transportation Report: corrected a copy-editing error on page 11 (Additional Programmatic Investments section).
- Greenhouse Gas Transportation Report, Appendix C (Model Outputs): corrected a formula error in the table.



...



Liked by mobilemesacounty

drcogorg Final call to attend the last two public meetings for the 2050 #MetroVision Regional Transportation Plan #greenhousegas updates! #DRCOG staff will be on Zoom answering questions and fielding comments. The Thursday, Sept. 1 session from 3 to 4:30 p.m. includes live Spanish translation, and the Friday, Sept. 2 session will be held from 10 to 11:30 a.m. Click the link in our bio for more information and to register for the Q&As. Questions? Call Public Engagement Planner Kellsie Forfar-Jones at 303-480-5658. #2050MVRTP #OzoneAware #Transportation

i
About

≡
About you

 socialpinpoint

 Your comments | 6 days ago

Like +1 Dislike 

As someone who's been commuting in Denver for 15 years, I was so happy to see that the plan was updated to include more bus rapid transit (BRT) and no expansions to I-25! We know that adding lanes only induces more traffic. Just look at Houston, Vegas and LA. Adding lanes just doesn't work. Let's do BRT and do it right. If you want to spend money on highways, get rid of toll roads and improve the loop around the city. Instead of expanding a horrific freeway through the heart of the city!

 Start a discussion

 Your comments | 6 days ago

Like +16 Dislike 

Improve our roads... thus improving the quality of

We should not be widening I-270 as long as the region is in severe ozone non-attainment status. This will only make the problem worse. Redirect those funds to transit and bicycle infrastructure.

 Start a discussion

 Your comments | 6 days ago

Like +5 Dislike 

Please continue to invest in highway capacity improvements. The safe and efficient movement of people and goods on roads through metro Denver is critical to the quality of life for Denver residents. Also, moving traffic is much better for air quality.

 Start a discussion

 Your comments | 6 days ago

Like +1 Dislike 

Page	Date	Comment type	Name
2050 Metro Vision Regional Transportation Plan			
	15-Aug	Discussion board	
	15-Aug	Discussion board	
	15-Aug	Discussion board	Christian Oggel
	15-Aug	Discussion board	

Comment	Response
<p>"DRCOG's new plan for I-25 between Santa Fe Drive and downtown Denver would eliminate planned new toll lanes and instead prioritize improvements to transit, pedestrian and bicycle connectivity, and safety. "Yes!</p> <p>Please move money away from road expansion and invest in trains, pedestrian, and biking connectivity and safety.</p> <p>We know wider roads just lead to more cars, accidents, pollution, and they cut through communities.</p> <p>We deserve to move away from prioritizing cars over people."</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Urban highways are a failed experiment. It's time not only to see the end of expansion but also start to see those highways in urban areas returned to the communities.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>As a Physician Assistant working in a local Emergency Department, I agree with all efforts to build better bicycle and bus infrastructure. Expanding roads and highways has only made life more dangerous and unhealthy in this area. We see too many pedestrians and cyclists suffer devastating injuries from cars on streets that maximize car speed. We see too much lung and heart disease from transportation pollution. People need infrastructure to safely choose to bike and walk for healthy lives.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>It is beyond time to put an end to road expansion and the misguided idea that faster car movement equals 'quality of life'. Too much of our valuable real estate has already been gobbled up by cars and car infrastructure. Everywhere you look, concrete and asphalt dominate our urban landscapes, creating an environment that is not compatible with human life. Heat island effects, noise pollution (so much noise!), increasing risk of flooding are causing far more harm than good.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

Page	Date	Comment type	Name
	15-Aug	Discussion board	
	15-Aug	Discussion board	Austin
	15-Aug	Discussion board - reaction	
	15-Aug	Discussion board	

Comment	Response
<p>Very pleased to see the steps away from road expansion and towards multimodal solutions. In my global travels, vehicles have choked cities everywhere, and the most livable ones are where public transport investments have created widespread use. Couple that with the climate impact and the inversion of the Ft. Range, and this makes tons of sense.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I'm glad to see a focus on emissions reduction. With that said, express lanes should be allowed to be constructed as they can reduce dwell times, create sustainable funding sources for improvements, and can be used for EV/Autonomous lanes in the future. Maybe make new express lanes free for EVs to incentivize adoption and reduce ghg, while not slowing important road safety projects?</p>	<p>Thank you for your review of the 2050 RTP and providing comments. The use of express lanes is the purview of the Colorado Department of Transportation in accordance with state and federal requirements.</p>
<p>More lanes beget more cars, and more cars are not a sustainable solution.</p>	<p>Thank you for participating in the discussion.</p>
<p>I absolutely love this rethinking of our transportation infrastructure. It's about time a state in America embraced greener, cheaper and more efficient modes of transportation that the rest of the world has been using for decades.</p> <p>Even if you're against public transportation every study has shown that widening highways actually increases traffic. This is the right path forward.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

Page	Date	Comment type	Name
	15-Aug	Discussion board	

Comment	Response
<p>Many of the reasons to prioritize good, usable safe bike infrastructure are self and many of them are self evident, here are some studies too:</p> <p>Bikeways make places more valuable. (http://bit.ly/15EICCM)</p> <p>Bikeways help companies attract talent. (http://usa.streetsblog.org/2012/04/05/u-s-pirg-report-young-americans-dump-cars-for-bikes-buses/)</p> <p>Bike commuters are healthier and more productive. (http://1.usa.gov/1bRYaKd)</p> <p>Bike facilities increase retail stores' sales http://bit.ly/1aD65Gx</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I agree with the plan to shift budget from expanding interstates and highways/arterials into transit and bike + pedestrian infrastructure, I would only like to see that happen on a wider basis and with a larger percentage of funds. This shift to funding transit, bike and walking spaces over highways not only improves our collective future from a climate perspective, but also is a positive for air quality and safer streets for non-drivers. Please continue this trend.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>So glad to see we are moving away from car centric infrastructure. Any money that can be diverted from car infrastructure, to PROTECTED bike lanes will help tremendously. Please continue this shift to provide quality high-comfort bikeways for Coloradans, with an emphasis on safety and separation for riders. Paint on the road, and sharrows are not enough to effectively get people out of their car and onto bikes- we need truly protected bike lanes.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I support any plan that fast tracks the creation of Rapid Bus Transit lines down Colfax and down Colorado Blvd. As a resident of the Mayfair/Hale neighborhood both services would great increase my and my neighbors access to efficient public transportation options. I would also like to see an increased amount of funding for protected bike lines to increase safety</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

Page	Date	Comment type	Name
	15-Aug	Discussion board	
	15-Aug	Discussion board	
	15-Aug	Discussion board - reaction	
	15-Aug	Discussion board - reaction	
	25-Aug	Discussion board - reaction	

Comment	Response
<p>Excellent shift in emphasis. Colorado and Denver are still growing and have time to shape a more-efficient transportation system to grow into rather than repeating the expensive sprawl mistakes of the past. The Bus Rapid Transit corridors using existing highway lanes are a fine idea to increase the productivity of infrastructure already in place. Bus corridors not blocked by cars are great for business, by making it easier for more people to move around at lower cost.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>We need more road capacity for vehicles in metro Denver. Not expanding I25 and C470 because of climate change concerns is insane. Electric vehicles will be using those lanes also. I urge the consideration of highway expansion that will meet the needs of our growing population.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. The plan provides for investment in multimodal travel modes to meet the needs of the region's current and future population.</p>
<p>With more people on safer bike trails and more public transportation infrastructure there will be less traffic on the roads. Highway expansion is shown to only encourage more car use, thus clogging up our roadways even more. For safer roads and better air to breathe we need to invest in alternative routes of transportation than just cars, this will in turn make our city more resilient and robust.</p>	<p>Thank you for participating in the discussion.</p>
<p>EVs still have many of the problems of internal combustion engine vehicles. They take up space, they still get caught in traffic, they are heavier and more dangerous for pedestrians, and they still shed PM 2.5 particles like tire and brake particles. Adding more lanes is climate suicide. Each new lane still requires GHG heavy construction and maintenance. And electric vehicles still mean bad land use even if they don't have a tail pipe.</p> <p>We need alternatives not more of the same.</p>	<p>Thank you for participating in the discussion.</p>
<p>People won't use the bike lanes, and those of us with jobs need to get to work. Only by expanding highways can Colorado function properly.</p>	<p>Thank you for participating in the discussion.</p>

Page	Date	Comment type	Name
	30-Aug	Discussion board - reaction	
	30-Aug	Discussion board - reaction	
	15-Aug	Discussion board	
	15-Aug	Discussion board	Max
	15-Aug	Discussion board	Alex Strouthopoulos

Comment	Response
<p>https://bit.ly/CapacityExpansionsInduceTravel A new tool from NRDC, RMI and Smart Growth America called SHIFT gives practitioners a way to estimate how much new driving and pollution new highway lanes will cause. By understanding these predictable consequences, we can avoid investing billions in new highways that fail to deliver congestion relief and or alleviate our dirty air.</p>	<p>Thank you for participating in the discussion.</p>
<p>https://bit.ly/CapacityExpansionsInduceTravel By understanding these predictable consequences, we can avoid investing billions in new highways that fail to deliver congestion relief and or alleviate our dirty air.</p>	<p>Thank you for participating in the discussion.</p>
<p>It's a good idea, but with RTD unable to provide the current level of service that is on their schedules how do you expect them to be reliable enough for people with cars to change transportation?</p> <p>I was considering an electric bike because government programs forbid recipients from saving enough money to buy a car, but the increasing fatalities from hit and run drivers has made it clear that it's not safe.</p> <p>Any plans to provide public transportation to public land in the mountains?</p>	<p>Thank you for your review of the 2050 RTP and providing comments. Several transit operators provide service to mountain recreation areas, including the Regional Transportation District, Via Mobility and CDOT's Bustang/Pegasus services. DRCOG also just held an idea exchange on this topic: https://drcog.org/node/989699</p>
<p>Thank you! As a Native Coloradoan who grew up using a bike for my personal transportation I want to see more and better infrastructure. Not for me, but for everyone else in the city who want to try something different and sees biking as too dangerous. Please continue to expand our safe network of bike infrastructure.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I agree with the plan to increase the spend on non-auto related infrastructure. With the great weather we have and a safe easier to use path network I know many people will be able to shift away from cars to alternate transportation. Protected bike lanes are one of the biggest opportunities to get people out of cars. We still need highway infrastructure for longer distance driving but in-town trips for many people can be replaced with alternatives.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

Page	Date	Comment type	Name
	15-Aug	Discussion board	
	15-Aug	Discussion board	
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	15-Aug	Discussion board	Jody Robins

Comment	Response
<p>I am all for focusing on public transit, pedestrian, and bike infrastructure rather than endlessly expanding our highways. As Colorado's population continues to grow, the best way to keep our air safe for breathing (and our planet inhabitable for future generations) while accommodating new residents is to make our cities less car dependent. This will require major investments in bike/pedestrian/transit. Especially important is bike and pedestrian safety.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>More mass transit, pedestrian-centric. Less car-centric. Cars = emissions/greenhouse gases, money for a car payment/insurance/maintenance/inequity, and stress/traffic. More car lanes = more cars.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>More car lanes and space also has been shown to lead to faster and crazier driving in multiple places.</p>	<p>Thank you for participating in the discussion.</p>
<p>At 73 I thought I would never see really climate change proposals. Thank you, I have tears in my eyes.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>The climate change hoax is a con to separate you from your money. Please think of the kids who will suffer for your decisions.</p>	<p>Thank you for participating in the discussion.</p>
<p>Love to see more consideration for cycling. As eBikes continue to grow in popularity dedicated bike paths to and from downtown (that don't go past waste treatment plants) are going to result in significant traffic reduction.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I fully support the change from expanding highways to focusing on other types of transit. Not only do we need to address climate change, but it is obvious that we cannot build our way out of traffic and must provide alternative ways to travel around the metro area. We need a massive increase in PROTECTED bike lanes and paths and more bus transit in Denver.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

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	15-Aug	Discussion board	
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Comment	Response
<p>So, the DRCOG is proposing to cut spending on roads in favor of buses, trains, and bike paths. This is supposed to discourage drivers from using the roads and reduce pollution.</p> <p>Considering that these are Interstate highways this makes it difficult for those drives to pull semis with their bikes.</p> <p>This when government is basically mandating the use of electric vehicles which of course do not pollute. Isn't the planet saved even when all the EVs are stacked up on I25 in traffic?</p> <p>See Page Two</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Page Two</p> <p>However, there is no plan for charging stations. Taxpayers did not fund gas stations why should we fund charging stations? Why should we rely on China for all the raw materials for EV's?</p> <p>Then we should expand the use of public transportation which has seen substantial declines in ridership, except for game day, partially due to its total inconvenience and the crime one can expect. Again, when we are forced to go EV, public transportation won't save a single flower on the planet.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Private vehicles already have the majority of space. Allowing for choice of movement is a good thing.</p> <p>Private vehicles will still be a part of our transportation system but maybe we will finally make it viable for some to choose another way.</p> <p>I'm all for this since the other methods have been pushed to the margins for so long.</p>	<p>Thank you for participating in the discussion.</p>

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	15-Aug	Discussion board	
	15-Aug	Discussion board	James W Rogers
	15-Aug	Discussion board	
	15-Aug	Discussion board	Mona Thornton

Comment	Response
<p>I support a plan for more funding of multi-modal opportunities. We need more and safer infrastructure for cyclists, pedestrians and transit. I ask that separated pedestrian and cyclist facilities be assessed along certain corridors (mostly corridors where cyclists are or could be commuting longer distances). Often pedestrians and cyclists are lumped together, but they have very different needs and uses. Please look at areas where separated facilities make sense.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>More money for transit and bike lanes. Enough already for expanded highways!</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I fully support the move away from road expansion to encouraging more transit, walking and biking. Currently our system is built to favor vehicles and make life inconvenient for anyone not driving. Not only is this a handout to auto manufacturers it is strangling our cities, dividing communities, and making us all worse off.</p> <p>The more people taking transit or riding bikes means those that have to drive can do so, while those that can choose a different way may finally be able to do so safely.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I can't wait to see some forward thinking green mass transit options for Denver and north to Fort Collins. Please hurry we have waited long enough. No matter how many lane you build it will always be at or over capacity it's time to think differently and beyond single use cars. There's a reason why the most livable cities were all in Europe and Canada where they value walkable and bike-able communities.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

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	15-Aug	Discussion board	
	16-Aug	Discussion board - reaction	
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Comment	Response
<p>Great, more bike lanes that won't be used. More money for RTD (reason to drive) that won't be ridden. Isn't it about time you give up this pipe dream of a car free society and realize that the war on cars has already been won ... by cars! The DRCOG is really a completely pointless organization and should be disbanded for coming up with nonsense like this. It's time the concept of a grid was embraced, and instead of making bikes and cars share the same space, they are safely separated.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Good idea! I propose that we ban cars from 50% of the roads, so that bikes can safely use the other 50%. Since they can't seem to keep out of the bike lanes, even the "protected" ones. Deal?</p>	<p>Thank you for participating in the discussion.</p>
<p>Random, disconnected and unprotected bikeways may not be used. Roads are connected, a regional bike/multiuse path network needs to be built - connected, protected, safe, comfortable, accessible to people of all ages and abilities.</p>	<p>Thank you for participating in the discussion.</p>
<p>Thank you. As a single car household (fam of 4) and someone who was car-free for over 15 years in my adult life, I'm filled with hope that my mode preferences and choices will one day have sufficient infrastructure. I appreciate this positive step very much.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

Page	Date	Comment type	Name
	15-Aug	Discussion board	
	15-Aug	Discussion board	Pete
	15-Aug	Discussion board	

Comment	Response
<p>Yes! Please spend more on bike, pedestrian and public transit infrastructure.</p> <p>Spending money on car-centric infrastructure is bad for society on a number of levels.</p> <ul style="list-style-type: none"> • pollution • injuries and deaths caused by car crashes • noise • heat islands and ugly, inhospitable landscapes created by car-centric infrastructure • forcing people, especially lower income folks to purchase huge, expensive vehicles that are only going to depreciate over time • obesity because no one can walk anywhere 	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I fully support greatly increasing our funding for public transit and other alternatives to cars. Regarding public transit, I think it's most important to keep the costs low while expanding the service hours and increasing the frequency of the rides. This will make it so that it's actually a viable alternative for many people. For example the Boulder airport bus only runs once an hour and not very early or late. Flight times are often very early or late, and with delays can be unpredictable.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I encourage the use of alternate forms of transportation, and I commend DRCOG for reviewing plans going forward. HOWEVER, not completing C-470 expansion would be a mistake. C-470 is a beltway. The purpose of beltways is to keep congestion out of the "inner city". Current congestion is forcing traffic to other roads. Previously authorized development will add thousands more vehicles. Developers should pay for the roads to support their developments, as they do with utilities!</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

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	15-Aug	Discussion board	
	15-Aug	Discussion board	
	15-Aug	Discussion board	Yuliya Fedasenka
	15-Aug	Discussion board - reaction	

Comment	Response
<p>Please invest more in public transit! I think the biggest issue that the RTD has is that it's slow (compared to personal vehicles) and the time tables are not reliable; investing to fix these issues would encourage others to leave the cars for trips and emergencies, and to use the RTD for daily use. The more people that use it, the quicker we can focus on the long-term projects that RTD has in store, like expanding rail service to Boulder or building express lines for the bus lines.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Making the Denver area more walkable, bikeable, and public transit friendly would be a huge step in the right direction when it comes to improving the metropolitan area. Adding rapid bus transit on congested streets like Colorado Avenue and East Colfax would help with reducing car dependency. I think expanded public transit needs to come with decisions like increased security of the light rail and more frequent service on buses. But overall I'm pleased with this proposed plan.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>The idea is great but hear me out. I'm from Europe where everyone uses public transit. It's reliable, clean, it connects to everything, and it's affordable. Here it's slow, unreliable, inconvenient, dirty, and there is zero infrastructure connected. Some brand new road crossing bridges look like animal cages - built without consideration for aesthetics or convenience. Please think of how to make public transit MORE ATTRACTIVE than driving. Focus on 2-3 routes and make them amazing.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Agree 100%. Until we get past that, this is just a nice idea. Make it safe, clean, convenient, reliable. Eliminate the horn noise for road crossings by building overpasses or quiet zones to give relief to the residents currently living by trains and the envisioned additions. A lot of work and money if you really want this to happen...</p>	<p>Thank you for participating in the discussion.</p>

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	15-Aug	Discussion board	
	15-Aug	Discussion board	BJ Davenport
	16-Aug	Discussion board - reaction	
	19-Aug	Discussion board - reaction	

Comment	Response
<p>Really glad to see this shift in focus! Adding "one more lane" over and over just creates additional lanes choked with traffic. The only way to solve traffic is to give potential drivers other options (walk, bike, transit) that are pleasant, safe, and reliable. This *also* benefits those who still choose to drive by relieving congestion. There is no "War on Cars" as one of the other commenters asserted. We're realizing that forcing everyone into cars many decades ago was mistake that has failed.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I would like the creation of more EV charging stations - the federal government's plan for & the Public's embrace of EVs to be considered as well. If we all switch to EVs, the demand for decent, improved & expanded roads will likely Still Be needed.</p> <p>There has to be a multi-pronged and all encompassing look at this. At times a private vehicle is the only practical way to travel; although I do believe in public transportation (air, train, trolley and buses)</p> <p>Wide-long view not shortsighted 1</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>EVs still cause harm to the environment when they are built. We should be trying to build less vehicles and a bus or train can carry dozens of people compared to 1-5 in a ev</p>	<p>Thank you for participating in the discussion.</p>
<p>While EVs don't create local tailpipe emissions, they still create particulate pollution from tire wear. More than that, their heavier weight cause immense roadway damage. Double the weight of a vehicle, you cause 16 times the damage to the road. The Ford 150 EV weighs 30% MORE than the ICE version. The cost of maintaining roadways if everyone is driving EVs is simply not sustainable. Not to mention the inconvenience.</p>	<p>Thank you for participating in the discussion.</p>

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	15-Aug	Discussion board	
	15-Aug	Discussion board	Bob Walker
	15-Aug	Discussion board - reaction	
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Comment	Response
<p>This is good news! Finally, private vehicle travel, at any cost, may have to take a back seat to those of us who choose to utilize mass transit, bicycle or walk to our destinations. In the late 70s, I worked at Cherokee Ranch in Douglas County. While working in the residence, I used to watch with dismay as the "Brown Cloud" moved slowly from I-70/Denver, south along the front range to Castle Rock. It was dis-heartening. Forty years later, it is time for a change!</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Please give us lanes and areas where we can safely walk and bike. I do not currently feel safe riding my bike in the city.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Yes, please! I used to ride my bike to work when I was in my 20s. Now that young-male hubris has subsided, I can't imagine still sharing lanes with traffic while on my bike. The number of times I was threatened because I was in a bike lane is too numerous to count.</p>	<p>Thank you for participating in the discussion.</p>
<p>I still get threatened regularly, but in my early 40's, I have even less sh*tts to give. I carry pepper spray (I recommend POM brand), and I'm not hesitant to use it. Aggressive drivers get a *single* warning if they're so bold as to step out of their vehicle (although few do). And if they roll down their window to shout at me, I keep a close eye on their hands.</p>	<p>Thank you for participating in the discussion.</p>
<p>I am all for reducing the brown cloud of Denver. But at this point RTD is a weak public transit option. I challenge anyone who wants to reduce traffic lane expansion without taking on the problems of RTD as it currently is, to use the bus for their travels and not use their car for a month. There are other problems that affect these ideas such as homelessness, staffing problems at RTD, budgets, making public transit as attractive of an option as getting into your car to go somewhere.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

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	15-Aug	Discussion board	Brian Duckett
	16-Aug	Discussion board	
	16-Aug	Discussion board	

Comment	Response
<p>This is good news. Focus on supporting the #1 selling EV vehicle of 2021 - the electric bicycle! Adding real physical protection (that would actually stop a car) to bike lanes and car diverters to the existing on-street "bike routes" would go a long way in encouraging ridership. I bought an ebike last year and have been replacing car trip errands with it often. As a bonus, I'm more likely to shop locally instead of a big box store so I don't have to navigate their often unsafe locations.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>so force people to bike year-round in a temperate climate like Colorado? What a well-thought out idea.</p>	<p>Thank you for participating in the discussion.</p>
<p>I'm all in favor of any transportation options except cars. I'm so over cars and one person in them. I love Colorado so much - except when I'm in traffic. Nothing ruins a weekend in the mountains like sitting in traffic to get there or sitting in traffic on the way back. I want - I need - more transportation options beyond passenger vehicles. Bring on the bus rapid transit, the bike lanes, trails, connected transportation nodes, dense cities that encourage walking. Whatever. Just not cars.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Thank you for doing the right thing. More spending on sustainable healthy transportation, and less spending on suburban sprawl automobile modes. Local businesses surrounded by higher densities with safe protected pedestrian and cycling infrastructure is the only future that makes sense. Save electric cars for longer trips. Get rid of fissile fuel cars and tools! Lawnmowers, blowers, motorcycles, all must be converted to electricity too.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Hello,</p> <p>I wish to express my support for the proposed changes which will help move money to fund transit and BRT infrastructure.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

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	16-Aug	Discussion board	Emily
	16-Aug	Discussion board	
	16-Aug	Discussion board - reaction	

Comment	Response
<p>I support the proposed changes to invest in sustainable modes of transportation like BRT and safe biking and finally stop expanding highways and roads. Thank you for all the hard work that goes into this.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Yes! Our tarnished air quality and urban transportation need a strong shift away from prioritizing cars. I want to feel safe walking or biking to work, grocery, recreation; and I want to know that if I go to the bus stop the scheduled bus will actually appear and get me where I need to go.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Love this but would also love an expansion of public transportation routes. It's extremely inefficient for those of us living in the north and west suburbs (Arvada, Westminster, Thornton, Louisville) to use Public transportation to navigate around this area. I do appreciate the train from Arvada to Union station, but I would also take a train or bus to work if it didn't take 2 hours to get from Arvada to Louisville.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Perhaps more folks would ride the buses and ride the trains if they were cleaner. Make them more inviting. I have seen several times with the train system people just jump on, no ticket and no regard for others. It's actually scary. I for one will not ride the trains anymore for that reason.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>The absence of security at RTD is dangerous. Groups of people are taking over and trashing the facilities, smoking crack and meth in the light rail stations, elevators and on buses. There's also the perverts that can't keep their penises in their pants on public transportation.</p>	<p>Thank you for participating in the discussion.</p>

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	19-Aug	Discussion board - reaction	
	16-Aug	Discussion board	
	16-Aug	Discussion board	Nick Kroncke
	16-Aug	Discussion board	Mike Smith
	16-Aug	Discussion board	Nick Bither
	16-Aug	Discussion board - reaction	
	17-Aug	Discussion board - reaction	

Comment	Response
<p>The underlying issue is the stifled housing development in this city — compounded over decades, creating an escalating crisis of homelessness. That, and a nationwide opioid epidemic, which will only be exacerbated by the recent fentanyl felonization bill here in Colorado. These are issues that are beyond RTD's ability to do more than "manage".</p>	<p>Thank you for participating in the discussion.</p>
<p>Expand Light Rail to Children's Hospital in Highlands Ranch and create more parking at that location as well as create leveled (more) parking at the Light Rail station at Aspen Grove.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Full support of 100% investment in multi-modal forms of travel. Divest from widenings. Emphasize separated bicycle facilities.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>More density via increased public transit, better bike infrastructure, and changes to zoning are important for keeping Denver growth manageable.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Hello! I am resident of Denver who walks, bikes, and drives a car for transportation. I feel there is already far too much infrastructure dedicated to my convenience as a driver, and an absolutely massive lack of support as a pedestrian and cyclist. While Denver is certainly not alone in this problem, it could stand out as one of the first cities to truly begin remedying the problem through a re-allocation of focus and resources. Thank you!</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I completely agree! Denver could become the model that proves to other cities that this can be done</p>	<p>Thank you for participating in the discussion.</p>
<p>There is no pedestrian traffic in the winter, nor bike traffic. This is not SoCal</p>	<p>Thank you for participating in the discussion.</p>

Page	Date	Comment type	Name
	16-Aug	Discussion board	Rosalie Winn
	16-Aug	Discussion board	
	16-Aug	Discussion board	Andy Pendl
	16-Aug	Discussion board	

Comment	Response
<p>As a Denver resident, I support funding multi-modal infrastructure and shifting away from a focus on widening roads for additional vehicular traffic.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I fully support the funding of Bus Rapid Transit through Denver and an end to highway widenings that will just create more impermeable roadway material through our city, leading to heat & drainage problems. Mass transit is a much more financially responsible & geometrically feasible use of public money in a densely populated and growing area. Please also cancel the I-25 Broadway Interchange project, which will knock down residents' homes, and replace that project with Broadway/Lincoln BRT.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. Your suggestions related to this project have been passed along to the project sponsor and City and County of Denver Department of Transportation and Infrastructure staff.</p>
<p>Please please please make this happen. Denver needs a truly multi-modal transportation system. Expand the Light-Rail with more connections (not just the hub/spoke system that basically exists now). Expand BRT. Expand bike lanes and make them connected and protected. I'd love to be able to bike to the grocery store, or my kids school, without feeling like I might die on the roads. Fund RTD for the staffing it needs to operate more frequently, and clean up the buses and trains.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I fully support any and all efforts to move the region away from private motor vehicles to transit, biking, and walking. The proposed plan is a small but welcome start. I hope that even stronger plans, with a greater proportion of funds moved away from highway and road expansion towards transit and a protected, connected bike network can be achieved in the future.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

Page	Date	Comment type	Name
	16-Aug	Discussion board	
	16-Aug	Discussion board	Malorie Torrey
	16-Aug	Discussion board	Nick C.

Comment	Response
<p>Until such time as most vehicles are electric, any time spent idling or crawling in traffic means that poisonous and greenhouse gasses are being emitted with no benefit. It is important to remember that some people have to travel many miles, often with relatively heavy loads; public transportation and bicycles will only solve a small part of the problem. We must make our streets more efficient AND change over to electric vehicles AND produce our electricity by renewable means.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I am a student at DU and use transit a few times a month. I have to drive to work though on I-25 from university to Speer. If the train/bus ride wasn't 2 hours I would use transit. I think your plan is a step in the right direction and cannot wait to use BRT once it's built!</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I would love to bike and take public transport more if it were more readily available and faster. I'd love to go from downtown Denver to the tech center via public transport and avoid I-25 and sitting in a car. I've lived in Europe and investing in these types of things increases lifestyle immensely!</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Less funding for roads, more funding for basically everything else you can fund. Everything else has been underfunded for decades.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Please fund BRT and protected bike lanes, and make existing bus and train transit more frequent and reliable. Currently for me it takes 10 minutes to drive to my office and 40 minutes to take the bus, if it arrives in time. I would like to see the Broadway/25 interchange project scrapped, please do not tear down housing in a housing crisis to add an accessory to the interstate. Transportation is for moving people, not moving cars!</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Journalists and activists blasting this survey link on their social media so most of the responses echo the same views isn't the greatest system for true public comment/involvement.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

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Comment	Response
Or maybe people just want a change in the status quo of car-dependent infrastructure that will eventually just lead to gridlock everywhere in the city.	Thank you for participating in the discussion.
Oh please, Denver is 20 years behind in having decent roadway facilities. (suppressed demand). I'm all for building efficient transit options for the urban corridor that the Front Range is becoming, but the roads have already been neglected and underfunded for so long that even buses will have a hard time operating on them. It's hilarious how all the transplants just want cars gone and road construction to stop even though the population has boomed.	Thank you for participating in the discussion.
I didn't hear about this from social media or journalists or activists. I'm a lifelong metro area resident.	Thank you for participating in the discussion.
I would like to see funding moved from highway expansions to safety and public transit improvements. Federal needs work and investment badly.	Thank you for your review of the 2050 RTP and providing comments. The updated plan reallocates \$900 million to multimodal investments, including accelerating the Federal Boulevard Bus Rapid Transit project.
Agreed. Federal is in complete disrepair and needs work. Making improvements to pedestrian safety along this road is important, too.	Thank you for participating in the discussion.
<p>I was informed that drcog was not interested in transportation.</p> <p>I tried to find out if they are doing anything for the elderly and disabled residents without cars to have access to the mountain parks, was told to contact RTD.</p> <p>As the area agency on aging and disability, drcog has no interest in helping elderly and disabled people have access to public land and are unwilling to acknowledge that fresh air and time in nature is important to all residents, not just people with more resources.</p>	Thank you for your review of the 2050 RTP and providing comments.

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	16-Aug	Discussion board	KC Anderson
	16-Aug	Discussion board	Brittany Spinner
	16-Aug	Discussion board - reaction	
	2-Sep	Discussion board - reaction	
	16-Aug	Discussion board	Drew Nesmith

Comment	Response
<p>I strongly support these changes to the Regional Transportation Plan. Please divert funds from car infrastructure into public transit and biking/walking improvements. Denver will be a better place to live if these commitments are put into action.</p> <p>I live in West Washington Park, and I hope the plans for the I-25/Broadway interchange are canceled. Bulldozing my neighbors' homes to rebuild an unnecessary on-ramp is misguided and will harm my community. Let's prioritize walking/biking.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>The I-25/ Broadway interchange project goes against all city goals and initiatives including its own goals in the EA. We ask DRCOG to not approve Phase 2, segment 4 (northbound on-ramp) and divert funds towards the redesign of the phase 2 segment 3 to incorporate BRT lanes on Lincoln and convert it to a true multi modal connection with pedestrian oriented infrastructure. We have one chance to make it right otherwise we'll feel the negative affects for decades.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Absolutely. The interchange project is a travesty. Harmful, and a waste of money at *any* price.</p>	<p>Thank you for participating in the discussion.</p>
<p>Agree 100%. Can't believe they want to spend money to go in the wrong direction. That project is absolutely terrible and should only go forward if they start over and redesign the whole thing. Currently it's just a highway interchange expansion project. Agree, getting it wrong will lock us into to an unwalkable car dependent hellscape for decades. I own a home here and I want to see the area get better, not worse. I want to see people walking through here and supporting walkable shops.</p>	<p>Thank you for participating in the discussion.</p>
<p>This is a start. Please continue to divert funding away from road and highway expansions, all funding for vehicles should be towards road maintenance. Sustainable infrastructure should be prioritized strictly for larger funding priorities.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

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	16-Aug	Discussion board	Peter Taylor
	17-Aug	Discussion board - reaction	
	2-Sep	Discussion board - reaction	
	2-Sep	Discussion board - reaction	
	16-Aug	Discussion board	

Comment	Response
<p>It is idiotic in a city where for four months of the year it is too cold to bike and for four months of the year it is too hot to even think about expanding bike lanes and biking infrastructure when the highway system needs major overhaul. While 2per cent of Denverites bike to work, the rest are in cars, on trains and on buses. So... improve the chaotic I25, 470 and improve the lot of the majority of Denver's population who do not wear Spandex.</p> <p>Peter</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>2% of the population commutes via bike because of poor infrastructure. If you build it, they will come.</p>	<p>Thank you for participating in the discussion.</p>
<p>Have you actually read the plan, table 3.1 that lists the funded projects? Bike infrastructure is getting pennies compared to car/highway infrastructure (and that's not a good thing). BTW, I bike commute every week, all seasons, year round. I get groceries by bike. The people biking for transportation do not wear Spandex; they wear normal clothes. Denver is ideal because it's mostly flat, good weather, low humidity, mild winter temperatures, and little snow compared to other places.</p>	<p>Thank you for participating in the discussion.</p>
<p>Four months of the year it is too cold to bike, really? Denver winters are very mild! And biking in colder temperatures is not hard! You just need to wear more clothes (coat, pants, hat) in the winter, same as you would if you went for a walk. You don't need special gear. Plus, because you are using your legs, your body warms up very quickly. In fact, you need fewer layers than if you were going for a walk. Can't tell you how many times I've had to take off my coat while biking in winter!</p>	<p>Thank you for participating in the discussion.</p>
<p>If it's a highway: defund it. Don't build it, don't expand it, don't "improve" it, and if it's in disrepair, take the opportunity to reduce it. And if it's running through a community, RIP IT OUT (I'm looking at you, I-70, from Wadsworth to Quebec).</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

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Comment	Response
<p>No ""stroads"" in our cities. When we say ""Twenty is Plenty"", we really *mean* that twenty miles per hour is plenty fast enough. And for BRT with proper routing and signal priority, it's *still* fast enough, particularly when you stop prioritizing personal motor vehicles, and build a connected network of truly separated and protected bikeways.</p> <p>We MUST reduce VMTs, yes, including from EVs. We must make driving the least-preferred option, inferior to all others. The last alternative.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Not everyone can ride a bike or walk. You're effectively limiting those who can't, and making their already difficult life even harder.</p>	<p>Thank you for participating in the discussion.</p>
<p>Very *few* people are unable to bike or walk. And when we invest in transit, where buses have dedicated lanes and signal priority, this becomes highly efficient. And yes, streets for personal motor vehicles will *still* exist, for those that require them.</p> <p>There are far more elderly and disabled people who are *unable* to drive who would be served by prioritizing transit, biking, and pedestrian access, than those who might experience a minor inconvenience by slightly slower drive times.</p>	<p>Thank you for participating in the discussion.</p>
<p>As a cycling family, we rely on public officials to create a safe environment for my children to go to school. I am disheartened at the blatant misappropriation of funds meant for improving our city's connectivity going towards the destruction of homes and expansion of community-killing highway infrastructure. Please put a stop to this madness, now. Our lives are literally depending on your ability to see reason.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>you can't require others to live like you and bike everywhere in Colorado's temperate climate. LOL</p>	<p>Thank you for participating in the discussion.</p>

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Comment	Response
<p>To the other commenter: Kids who bike are not all from families who don't drive. Do we want to continue making it so impossible or unsafe to get around except when surrounded by steel, in a car? Even then, crashes are a top killer.</p>	<p>Thank you for participating in the discussion.</p>
<p>The marginal return on investment for expanding auto infrastructure is really poor at this point.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>The proposed Broadway I-25 interchange phase 2 segment 4 shouldn't be advanced as it doesn't comply with city plans and the creation of a pedestrian oriented intersection. We need a redesign of phase 2, segment 3 to be in compliance.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. Your suggestions related to this project have been passed along to the project sponsor and City and County of Denver Department of Transportation and Infrastructure staff.</p>
<p>Please do NOT fund this proposal. We need a redesign amendment to phase 2 and segment 3 so that it complies with city plans and, importantly, to create a pedestrian oriented intersection with BRT.</p>	<p>Thank you for participating in the discussion.</p>
<p>Before any more driving lanes or widenings we need the full, missing networks for everyone else - all of us of all ages walking, taking transit, bicycling, etc. My son was hit on his way to school at a gap in a protected path. My elderly parents can't ride a bike on our arterials for speeding cars. https://bit.ly/CapacityExpansionsInduceTravel and https://bit.ly/SafeAccessMobility4AI</p>	<p>Thank you for participating in the discussion.</p>
<p>I agree! The final example cross sections of the Broadway project have at least three lanes for cars on either side with a tiny slice for pedestrians and bikes to share. Please redesign. We can't afford to design like this in a climate crisis. Denver can do better.</p>	<p>Thank you for participating in the discussion.</p>

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Comment	Response
<p>Also writing to respectfully request a pause and reconsideration of the I-25 and Broadway onramp project.</p> <p>Simply put, the proposed design does not provide an adequate safe pedestrian connection between the adjacent existing neighborhood and Broadway Station. Even the closest neighbors to the station will have to cross at SIX busy intersections to access the station in the proposed condition, creating further barriers for residents to use transit and disconnecting neighborhoods.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I support the shift in infrastructure priorities away from private vehicles to public transit and other means of mobility. This will really help with the air quality issues we experience, free up for space for other uses (housing), and increase the rate of decarbonizing our economy.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>If you think people giving up their cars would achieve this goal, we have an organization to recycle vehicles. I'd be happy to send you a donation slip so you can be the first to forward your cause!</p>	<p>Thank you for participating in the discussion.</p>
<p>I too would like to suggest pausing the i-25 and Broadway interchange in favor of building the BRT more quickly and fixing sidewalks.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. Your suggestions related to this project have been passed along to the project sponsor and City and County of Denver Department of Transportation and Infrastructure staff.</p>

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Comment	Response
<p>So you are pushing everyone to get electric cars, but, you don't want to expand I25 and E470 for all of those electric cars? This makes no sense at all with all of the people moving to the Denver metro area. You will need to find ways to accommodate all modes of transportation. Most people own multiple vehicles and drive them daily. If they substitute ev's for gas powered, that's fine. But, they will still need space on the freeways. You will only cause more traffic nightmares down the road.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Investing in public transportation infrastructure will lead to less people driving on these roads. Expanding the roads does the opposite by drawing more car traffic. As someone who grew up in the Philly suburbs where cars were the only way to get around, I understand it's hard for people to accept other alternatives, but we know this is necessary if we want to have any chance at fighting climate change. EV's will not be enough</p>	<p>Thank you for participating in the discussion.</p>
<p>Historically, highway expansions trigger induced demand, meaning that any capacity expansions yield diminishing returns of initial reductions to congestion. Alternatively, the region should implement measures to increase capacity of our current roadways, while investing in transit, bike, and pedestrian infrastructure, while increasing stock of affordable and dense housing. EVs still require capacity.</p>	<p>Thank you for participating in the discussion.</p>
<p>Special interests are reaping the funds while everyday drivers in Denver suffer. The government doesn't care about your needs, only their political benefactors.</p>	<p>Thank you for participating in the discussion.</p>
<p>Let's enable all people to get around, not just those in cars.</p>	<p>Thank you for participating in the discussion.</p>

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	17-Aug	Discussion board	Ralph
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	17-Aug	Discussion board	Rusty

Comment	Response
<p>I won't be using mass transit ever in Denver Metro. There is no safety or security in mass transit in this area, unless I carry concealed. Even then, unless the homeless problem in Denver Metro is addressed, I won't deal with Denver. I can't walk several miles to get to places in Denver Metro carrying purchases. Denver metro is effectively telling the rest of the state not to come to enjoy restaurants, shopping, unless you're 25 and able to walk/bike.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I would encourage people to try riding RTD or one of our other transit systems, which should feel safe, have increased coverage, operate at higher frequencies, and be competitive with travel times by car. Concealed carry just introduces another variable that could exacerbate safety concerns and perceptions. Concurrently, the region needs to address the root causes of people experiencing homelessness, especially the lack of affordable housing, which could increase safety, real and perceived.</p>	<p>Thank you for participating in the discussion.</p>
<p>Concealed carry on mass transit is *illegal*. Carry pepper spray, like a reasonable person (I recommend POM brand).</p> <p>Yes, homelessness is a severe problem in Denver, due to decades of inadequate housing development. I hope the next election will usher in new leadership for this city, but it will take a long time to reverse course.</p>	<p>Thank you for participating in the discussion.</p>
<p>Please continue to push Denver towards multi-modal transportation and away from a car dominated model. The best cities in the world are walkable and supported by robust public transportation system. Prioritizing expanding public transit and other forms of transit that don't require cars will help Denver.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

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	18-Aug	Discussion board	Ariel Schnee

Comment	Response
<p>I would like to see increased investment in public transit, and a move away from the car dominated planning model, especially in dense areas of the city. High speed rail should also be a consideration among heavy traffic corridors such as I-70, I25, and US36. High speed rail should be significantly faster than the highway speed limit.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Thank you for considering expansions to bike, pedestrian and transit infrastructure. There is a significant demand and people will use these resources! Providing safe places to lock bicycles is also an important piece of the puzzle, since bike theft is another deterrent when it comes to exchanging car trips for bicycle trips.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Yes, I'm reluctant to leave my e-bike anywhere. Need safe places to lock up.</p>	<p>Thank you for participating in the discussion.</p>
<p>Thank you for the thoughtfulness put into this plan so far. It is my belief that to make headway in Denver, we need to push even further into prioritizing pedestrian, micro-mobility, and transit options far and above individual vehicles. I recognize that this has implications across many facets of the city, however, in order to continue to advocate for the livability and sustainability of our city, we must consider the headways made globally by focusing on non-motor-vehicle strategies.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I'm happy about the integration of climate-minded transportation planning within Denver but concerned that easing regional travel to and through Denver isn't more of a priority. Getting to Denver in order to get to the city or even to the airport is a nightmare. In addition to local travel, we need to think about the economic consequences of making regional travel so time intensive and unpleasant, and how to resolve this through a multi modal transit system that considers the whole region.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

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	18-Aug	Discussion board	James levy
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Comment	Response
<p>With regard to I-25 northbound widening, taking advantage of the real estate in Burnham yards, I am in favor of this initiative. Between the time wasted, and the emissions from motor vehicles waiting in traffic, I feel the widening between Alameda to north of 6th avenue is warranted.</p> <p>I do bicycle this corridor often, though when needing to drive in my car get very frustrated with the congestion in this area. I recognize it early constraints when redesigning the I-25 corridor through this area,</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Widening I-25 would make the problem worse. When the interstate gets crowded, some may choose different options to get where they are going and some may not choose to go at all. Widening the interstate would initially reduce traffic, but it would only serve to draw more cars in and start the problem again. Why does LA have massive freeways and yet they still have traffic issues?</p>	<p>Thank you for participating in the discussion.</p>
<p>So CDOT wants to put their money into making areas easier for RTD to serve, while RTD already can't serve the areas they have access to?</p> <p>It costs me more money and more time to get from my home in Centennial to DIA via RTD, then it does to drive.</p> <p>Same with downtown.</p> <p>Or north of Denver.</p> <p>Once again CDOT proves they only care about Denver proper and RTD.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Denver isn't just a playground for you to drive in and out of at your convenience. If you're going to visit, you need to do so in a way that isn't harmful to the people who *live* here.</p>	<p>Thank you for participating in the discussion.</p>

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	18-Aug	Discussion board	Abby Novinska-Lois
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Comment	Response
<p>Hi, I live in Denver and can't get anywhere in a reasonable amount of time. The roads are so bogged down from the population increase that we either have to make cars illegal immediately and instantly have a massive rapid transit system, or else you all are just fringe activists with nothing real to add to the discussion.</p>	<p>Thank you for participating in the discussion.</p>
<p>CDOT hasn't been supporting or funding RTD but they should. Enable more people to get around this way. Make it fast, frequent, and free. Add bus rapid transit to Colfax, Broadway, CO Blvd, and the major corridors west of downtown too.</p>	<p>Thank you for participating in the discussion.</p>
<p>As a health professional, I strongly support these changes to the Regional Transportation Plan. We have decades of research showing the negative health impacts of vehicle pollution, which includes premature death, asthma, and cardiovascular disease. Moving funds from highways into biking, walking, and public transportation infrastructure will save lives. Car oriented planning fuels the climate crisis and our communities deserve healthier alternatives.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>https://bit.ly/NoSafeLevel of pollutants from fossil fuel combustion https://bit.ly/AirPollutionDamagesEveryCell http://bit.ly/govtresponsibility http://bit.ly/AQheadlines - research highlights and links from last decade</p>	<p>Thank you for participating in the discussion.</p>
<p>Yes! https://bit.ly/NoSafeLevel of pollutants from fossil fuel combustion http://bit.ly/AQheadlines research highlights and links https://bit.ly/AirPollutionDamagesEveryCell http://bit.ly/govtresponsibility</p>	<p>Thank you for participating in the discussion.</p>

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	18-Aug	Discussion board	Cait
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Comment	Response
<p>I'm a NW Denver resident who walks, runs, bikes and drives around the city. I'd bike from A to B more if I felt it was safer. In the Netherlands they have dedicated bicycle highways, which Denver should explore. I'm all for investing in non-auto infrastructure; it's more sustainable and better for overall health. Also, lower residential speed limits! There are just too many aggressive, hot-headed drivers in this city, and expanding the roadways isn't going to completely fix the root cause.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Exactly. We need bike-only infrastructure. Fully separate routes. And 20 really IS plenty.</p>	<p>Thank you for participating in the discussion.</p>
<p>I'd like to agree with everything here and add that please accompany lower speed limits with traffic calming infrastructure! Wide roads in residential areas with one too many lanes are conducive to driving above the posted speed limit, not matter what it is</p>	<p>Thank you for participating in the discussion.</p>
<p>OMG - yes! Have literally been assaulted by those using their vehicles to do so.</p>	<p>Thank you for participating in the discussion.</p>
<p>Buses are fine. Except that because of traffic and weather they're more likely to be delayed. And that doesn't address the fumes or the lurching that happens in buses.</p> <p>For the love of all that is good, how do we not have light rail that goes from Fort Collins to Pueblo? How do we not have it running down Speer and Colfax? How do we have nothing to the Highlands?</p> <p>We need to be spending this money on long-term solutions, not just more buses.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

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	6-Sep	Discussion board - reaction	

Comment	Response
<p>You should listen to ""Ghost Train"", about the history of the Light Rail, and how RTD put it where it was ""easy"", but not really ""useful"".</p> <p>As for traffic, that's why we need transit-only lanes. A for fumes? Electrification. RTD will be placing 13 battery-electric buses in service early next year to gather operation data about future deployments as they develop a developing a zero-emission bus strategy. Not sure about lurching!</p> <p>https://www.rtd-denver.com/projects/battery-electric-bus-fleet</p>	<p>Thank you for participating in the discussion.</p>
<p>You should listen to Ghost Train, about how RTD put the light rail where it was ""easy""", but not particularly ""useful"".</p> <p>https://www.cpr.org/podcast/ghost-train/</p> <p>Transit-only bus lanes mean no delays! That's what we want!</p> <p>RTD will be placing 13 40-foot battery-electric buses in service early next year to replace diesel buses to gather operational data about their use as they make decisions about future electric bus deployment.</p> <p>https://www.rtd-denver.com/projects/battery-electric-bus-fleet</p>	<p>Thank you for participating in the discussion.</p>
<p>You also need people to drive the buses, which to this point has eluded Denver. If you're not collecting adequate fares we can't support current infrastructure let alone driver growth and/or paying drivers decent wages.</p>	<p>Thank you for participating in the discussion.</p>

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	21-Aug	Discussion board	Ric Edwards
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Comment	Response
<p>Any plans that depend on the increased use of EVs in their calculations when estimating GHG reductions are fundamentally flawed, as they are based on assumptions regarding future conditions beyond CDOT's control. The automotive industry, the consumer market, the renewable energy market, etc. This also doesn't take into consideration the sustained concern of particulate pollution from EVs, or the increased roadway damage from heavier vehicles. The primary goal should be to *reduce* VMTs.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Only a small minority of us is going to buy into an immediate transition into your ideas. Our cars and trucks are too important to us. Turning your backs on us and our freedoms is not going to fly.</p> <p>Throwing money at your personal pipe dreams will not persuade us to agree with you. Use our money to improve our highways. Keep our cars and trucks from idling in traffic jams!</p> <p>Look into the valuable effects to our air that sunflowers provide. They've been proven to lessen carbon dioxide.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>You're going to need to give up your cars and trucks, sorry. It's like my father used to say about the vegetables I didn't enjoy: "You don't have to like it, you just have to eat it."</p>	<p>Thank you for participating in the discussion.</p>
<p>Just like solar and windmills, coal powered vehicles are an inefficient fix for a problem that doesn't exist. Build more highway lanes that benefit tax payers, and stop pandering to special interests.</p>	<p>Thank you for participating in the discussion.</p>

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	21-Aug	Discussion board	Terry Wadsworth
	22-Aug	Discussion board - reaction	

Comment	Response
<p>Some may love their truck or car more than much else. I speak for a lot of moms as well as daughters of aging parents who don't love driving and are heavily impacted and have to do a ton of extra driving over years because we've yet to invest in transportation for ALL. Infrastructure for individual trucks and cars have been getting nearly all the \$\$ for years and only pay 40% of their way, after gas taxes and registration fees.</p>	<p>Thank you for participating in the discussion.</p>
<p>https://bit.ly/CapacityExpansionsInduceTravel https://bit.ly/TravelSpeedValueIsNotWhatWeThought</p>	<p>Thank you for participating in the discussion.</p>
<p>How is it legal for this government to spend Federal and State tax money on anything other than our road repairs? Every time a bill is passed to increase what we pay in taxes, we are told it's for the repair of our crumbling infrastructure - but the money never goes there, does it? Where are the studies showing that we can even PRODUCE enough energy to power all of these EVs? Indeed - where is any scientific study backing any of these things up? Colorado is being killed by stupidity.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. The RTP is multimodal in its scope and covers all the ways people and goods travel.</p>
<p>We need to update and modernize our highways and roads. We do not need to pour good money after bad into Fasttracks, buses and light rail that do not work for the majority of the populace. Look at the buses and light rail — rolling mostly empty. You cannot 'will' the public into your idea of the way it 'should be'. Reality is that we are not western Europe, nor the east coast where the population density can naturally support real mass transit — that is the way they grew up. Here we did not.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>The light rail was poorly conceived — RTD put it where it was easy, not where it was needed. And it was largely designed to move people back and forth between the suburbs and downtown, and suburbs are subsidized sprawl that needs to be left to die on the vine. The same with our buses — we must stop catering to far-flung suburbs that cannot support transit, and focus on urban density that can. If the suburbs build density, then and only then can they have transit.</p>	<p>Thank you for participating in the discussion.</p>

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Comment	Response
<p>You should focus on widening and improving our highways and freeways so that the populace can freely move about rather than trying to force us onto buses and unused bike lanes.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I agree...when something is a good idea, there is no need to force its use.</p>	<p>Thank you for participating in the discussion.</p>
<p>The current system forces people into buying and driving cars. They don't have a choice, and people who can't afford a car or can't drive due to age or disability are screwed over. How is that fair? Car would still be an option, but with funding directed to transit/bikes instead of expanding highways, it would be more of a level playing field; people would actually be able to choose. Nobody should be forced into driving.</p>	<p>Thank you for participating in the discussion.</p>
<p>What a waste of our tax dollars. We sit in traffic, creating the pollution you want to decrease, because the roads are either too small or in need of repair. Forcing people on to bikes, buses and light rail only works in the confines of Denver proper where all live blocks from available services and their jobs. Electric cars are nice but where does that electricity come from? Who all can afford a new electric car? Not the people I know.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>The RTP plan is urban centric that thinks everyone lives in cities. The state government then taxes rural communities to pay for Denver's environmental agenda. Stop Denver's tyranny on rural towns and our state's economy that relies on agriculture and energy production.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Sorry, but the Front Range (Denver more than all the rest), is subsidizing the rest of the state. Rural communities paying for Denver's environmental agenda? Absurd. You wouldn't even have a gravel road to drive on if Denver and the other Front Range cities weren't paying your way.</p>	<p>Thank you for participating in the discussion.</p>

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Comment	Response
<p>I'm sorry, but the ag industry, O&G industry, and tourism industry are all in rural Colorado. All of the new transplants in Denver have serious delusions if they don't see that our entire transportation is built for a population much smaller than what Colorado has today.</p>	<p>Thank you for participating in the discussion.</p>
<p>I'm from a farm family on one side. I've grown up and still live on the peripheries. Denver isn't tyrannizing. All our families need clean air and a livable CO where farming and being outdoors is viable. Making highways wider and wider in and to Denver is not the place to spend more money though. Maybe we can focus and agree on that.</p>	<p>Thank you for participating in the discussion.</p>
<p>The toll lanes that are set for the gap project do not solve any of our traffic flow problems. Just look at the current toll lanes that are in use around the Denver area. Highway 36 from I-25 rarely gets used leading to traffic jams on the free lanes. This happens day in and day out. The new toll lane on W-470 rarely gets used. Where in the world can an item rarely get used and people call it successful. Only in government can this happen. Let me first in line to tell you I told you so.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I guess people only want to drive on the highway if it's free. That's why we say that expanding highways creates ""induced demand"". If you build more highways, you create more traffic.</p> <p>I say, convert the free lanes to toll lanes. This will reduce traffic. People will find that they really didn't need to drive after all. De-induce the demand.</p>	<p>Thank you for participating in the discussion.</p>
<p>More lanes mean more capacity, and the metro area highway system has not expanded with the population growth.</p>	<p>Thank you for participating in the discussion.</p>

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Comment	Response
<p>Please stop trying to force your vision of California public mass "GREEN" transportation that a LOT of us Native Coloradan's don't want. Use our tax dollars on actual infrastructure improvements...as your mission statement proclaims.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Congratulations on having your mother's womb located in this state when they pushed you out of their uterus, but I don't see how that's relevant to the transportation plan for Colorado. As for actual infrastructure improvements, those would be the kind that reduces personal automotive vehicle dependency, reduce ozone in the air all Coloradans breathe, and make our state a more livable place for everyone, regardless of where our mother's wombs were located at the time of our birth.</p>	<p>Thank you for participating in the discussion.</p>
<p>Colorado residents want more lanes, not wasted tax resources. Build more highway lanes that are desperately overdue!</p>	<p>Thank you for participating in the discussion.</p>
<p>Isn't southern California famous for being completely car dependent and having some of the country's worst traffic congestion as a result? Pretty sure not many Coloradans want that either.</p>	<p>Thank you for participating in the discussion.</p>
<p>Please keep roads and cars (affordable cars like the gas powered one I own) in the mix. I am older, would love to bike/walk but my body not so; buses are not convenient, or safe imo. I also live with my son who has intellectual disability, and medical issues. He does not drive or bike. As such it's important he be driven where he needs to go; the buses are not an option for safety, many other reasons. Don't forget about older and disabled citizens in your transportation plan.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

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	22-Aug	Discussion board	

Comment	Response
<p>I agree we should be making public transit more convenient and safe. This can only be done by investing in these services. If you prefer to drive or feel that is your only option, you can still do so. The roads are already extremely car centric and will continue to be so even if some of these changes are made. The point of this is to give everyone a choice in how they travel, not to take away yours</p>	<p>Thank you for participating in the discussion.</p>
<p>Roads will not be going away any time soon. We could eliminate 50% of the roads, and you would still be able to get where you need to go by driving.</p>	<p>Thank you for participating in the discussion.</p>
<p>There are bus services that will pick up the elderly and disabled at their homes. Why is this not publicized more frequently????</p>	<p>Thank you for participating in the discussion.</p>
<p>Am an older folks, have a disability/hard to drive and parents would like to bike/can't drive - let's not give up on a protected bike network. We all need it. Our kids need it. Just because we don't have it and it's not practical or easy to get around, actively, without it doesn't mean its not missing and needed by so very many. It's way past time to focus on delivering systems that serve people of all ages and abilities, not just drivers and the decades, billions, trillions gone to that.</p>	<p>Thank you for participating in the discussion.</p>
<p>You have provided a 2050 population estimate. By geographic area, work backwards to what infrastructure is required to handle the growing traffic volumes. Design roads/highway systems to accommodate these needs. Then schedule permitting/construction/funding to meet these goals. CDOT is always playing Catch Up, that's why we have the problems we do. Before spending money on bike paths and regional transportation, you need to run a cost/benefit analysis - the per unit cost will be shocking.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

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	22-Aug	Discussion board - reaction	
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	5-Sep	Discussion board - reaction	
	22-Aug	Discussion board	Steven
	22-Aug	Discussion board - reaction	
	6-Sep	Discussion board - reaction	

Comment	Response
<p>We need to design transit and bike infrastructure to accommodate the needs of our 2050 population. We cannot accommodate more motor vehicles. We must *reduce* VMTs, not allow for *more*. Traffic volumes must not be permitted to grow. It simply is not acceptable.</p>	<p>Thank you for participating in the discussion.</p>
<p>Having a complete good/safe/protected bike REGIONAL NETWORK has enormous benefits. If we had a few intermittent roads that weren't near our homes or didn't go where we need, that wouldn't be practical either. It's time to deliver this affordable, practical, MISSING infrastructure. Everyone deserves to be safe and served by transportation dollars, not only those who have been the focus these past 7 decades.</p>	<p>Thank you for participating in the discussion.</p>
<p>People can't take other options until the systems and complete networks are there to allow them (or their family members whom they are driving now) to get where they need to go, and safely.</p>	<p>Thank you for participating in the discussion.</p>
<p>Commit more funding to highway and roadway maintenance and expansion</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>This is sarcasm, right?</p>	<p>Thank you for participating in the discussion.</p>
<p>Support maintenance but NOT expansion</p>	<p>Thank you for participating in the discussion.</p>

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	22-Aug	Discussion board	
	25-Aug	Discussion board - reaction	
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	23-Aug	Discussion board	Karen Malan

Comment	Response
<p>Building out our public transportation infrastructure should be a top priority as Colorado continues to grow. Everyone knows that even our large highways are congested much of the time, and greater availability of buses, trains, and bike lanes will help take cars off the road and reduce traffic. If we continue to spend money on widening highways and roads, people will continue to be forced to drive and we'll have the same problems again in a few years, forcing the State to always play catch-up.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>This is going to destroy our quality of life. Can't wait to see cars jammed in at a stand still while a trolley whizzes by with 1 person on it. If you demand cars be EV by whatever year. And you demand electricity comes from "green sources"... what do care if those cars are on the road?! Hypocrites. Living in a dream world. You've worked to destroy denver for quite some time, and this step will certainly accelerate that.</p>	<p>Thank you for participating in the discussion.</p>
<p>Amen! More people taking easy, affordable/free, fast, frequent, reliable transportation on BRT gets people off roads and to have more options daily or in emergencies. Plus it's the only thing/way available for many.</p>	<p>Thank you for participating in the discussion.</p>
<p>We all breathe and need cleaner air. It's not a green thing. It's life.</p>	<p>Thank you for participating in the discussion.</p>
<p>+1 to more non-car options. Connect bike lanes and paths to give more coverage. More trains running on routes that people use. Bring back the FF1</p>	<p>Thank you for participating in the discussion.</p>
<p>The state will always need well maintain highways for delivery of needed products. If we have poorly maintained highways, it will be difficult to received needed goods. Damage highways for a state are similar to ill circulation in the human body.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

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	30-Aug	Discussion board - reaction	

Comment	Response
<p>I applaud the decision to not expand highways and the cuts to certain arterial expansions, and I encourage you to continue doing this more. Folks who comment that we rely on roads, therefore we must build more roads, are only perpetuating a cycle of danger, pollution, and car-dependent design. By prioritizing other modes of transit, we foster a network of connectivity and accessibility that will keep Colorado an amazing place to live and work.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Highway construction and maintenance can't be abandoned but have not been and will never be able to keep up with population growth and demand especially when we need to lower carbon emissions for cleaner air.</p> <p>More frequent busses, dedicated bus lanes so they are faster than the average car, and protected bike lanes along with high speed regional trains are important investments for the future.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>More frequent buses and more overlapping routes would help tremendously.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Build more / better roads NOW!</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Yes to better roads! Adding designated bus lanes and protected bike lanes will go a long way to bettering our roads and bringing them up to the standards of the 21st century</p>	<p>Thank you for participating in the discussion.</p>
<p>Better roads means finally investing in sidewalks and protected bikeways in a full regional network, and for our major corridors (1 mile apart) having bus rapid transit (Colfax, Alameda, CO Blvd, Bway, Sheridan, Federal, Wads and more), making these the top priority the next 4-5 years.</p>	<p>Thank you for participating in the discussion.</p>

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	25-Aug	Discussion board - reaction	

Comment	Response
Agree, we should convert car travel and parking lanes to bus lanes and bike lanes to make our roads better! And our railroads should be improved!	Thank you for participating in the discussion.
I'd be willing to ditch my car and commute via bike/RTD if we had better safe infrastructure for people on bikes. More separated bike-only roads to protect us from car drivers, and more frequent buses would be required for me to do this.	Thank you for your review of the 2050 RTP and providing comments.
Absolutely! Couldn't have said it better!	Thank you for participating in the discussion.
These are essential — without it, who wants to send their 9 year old to school, or get out there oneself as a middle aged person, or encourage an aging and increasingly frail parent or neighbor to do so, especially after close calls? It's time to build this affordable and long-neglected and missing infrastructure that would make these options more realistic for everyone.	Thank you for participating in the discussion.
We need to update and modernize our highways and roads. We do not need to put more of our taxes into buses and light rail that do not work for the majority of the people. The buses and light rail are free for August and very few people park at a lot of the park n rides cause they are just driving to work.	Thank you for your review of the 2050 RTP and providing comments.
I'm confused. You start by pushing for modernization of our roads, but then suggest not increasing funding of public transit, which is the very thing needed to modernize our roads and general transportation. We already know the answers to these problems, we just need to fund and implement them. I suggest learning about city planning and public transit. There are YouTube channels that have short but very insightful info on these topics like "City Beautiful" and "Not Just Bikes"	Thank you for participating in the discussion.

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	25-Aug	Discussion board	
	30-Aug	Discussion board - reaction	
	25-Aug	Discussion board	Shirley

Comment	Response
<p>Good Morning, I'm beyond frustrated with the condition and capacity of the highways in the Denver metro area. The last project that has expanded capacity was the TRex, almost 20 years ago. As a bike commuter I appreciate the plethora of biking paths, but there has not been a corresponding increase in highway lanes. Please build out one additional, non-pay, highway lane from Castle Rock to Fort Collins on I25, in addition to another lane from Bennet to Golden on I70. Thanks!</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>The amount of money on highways compared to what it would cost to build out missing systems of connected regional multi-use paths is astronomical. It is time to put highway widenings/more lanes on hold this decade to finally deliver missing infrastructure that serves people of all ages and abilities, able to afford/drive a car or not. Roads come to our doorsteps but not safe ways to walk or bike, or practical, accessible, affordable transit. Cost of 1 mi of 4 lane hwy = regional bike network</p>	<p>Thank you for participating in the discussion.</p>
<p>It's overdue in time that we actually commit to working towards our climate goals. For the majority of the year denver/front range have some of the worst ozone and air pollution in the world. As a young mother, and someone who is thinking about our future generations I hope we can implement this plan to put our money towards investing in a cleaner air and safer, reliable public transportation for us all. This is step 1 in a larger cultural shift that needs to happen, but a great place to start.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

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	5-Sep	Discussion board - reaction	
	25-Aug	Discussion board	Mark M
	30-Aug	Discussion board - reaction	
	26-Aug	Discussion board	Brad Pierson
	30-Aug	Discussion board - reaction	

Comment	Response
<p>Yes, it's amazing how little progress and effort have gone into the public promise to Coloradans and metro residents made in the compromise legislation of 2019, HB 1261 that committed to reduce pollution 26% by 2025 and 50% by 2030. Instead, the bulk of the funding is still going to facilitate more cars, failing to prioritize and deliver construction and operation of a comprehensive system of options, transit and broadband for all, and safe/protected paths that go everywhere.</p>	<p>Thank you for participating in the discussion.</p>
<p>Just give me a sidewalk for the love of god</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Agreed - and they are needed on both sides of the street, separated from the road if possible, and with good crossings at large streets. How many of these engineers have pushed a stroller or a wheelchair around, for a distance? ALL of us, our kids, our elders, people of all ages and abilities need safe, comfortable places to walk - wider paths and sidewalks everywhere, and a complete off-street/protected network.</p>	<p>Thank you for participating in the discussion.</p>
<p>Sounds like you're going to ax desperately needed road expansions like that of Interstate-25 and C-470 and put the money to buses, trolleys and bike paths, which very few people can actually use. Your ignorance is showing! Stop being stupid.</p> <p>Every marginal transportation dollar should be used on what immediately reduces automobile traffic the most.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Public transportation investment is what reduces automobile traffic the most. Widening highways is a short-term solution to the long-term problem of population growth.</p>	<p>Thank you for participating in the discussion.</p>

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Comment	Response
<p>Agree with your last point about reducing automobile traffic: so lets invest in public transportation and bicycle infrastructure to get people out of cars! Widening highways only causes an increase in traffic and vehicle miles traveled. Also, the easiest, cheapest, most straightforward way to immediately reduce automobile traffic would be to toll the highways with dynamic prices.</p>	<p>Thank you for participating in the discussion.</p>
<p>You drive and might benefit but many others don't and have been waiting decades and never getting safe, connected, comprehensive systems of access — just more pollution and excuses that there is never the money. Get these systems for all built out FIRST before returning to more/unending highway needs and requests. Other people should count too. These are public funds and supposed to be for transportation of all, including people of all ages and abilities, with or without access to cars.</p>	<p>Thank you for participating in the discussion.</p>
<p>Climate change is a farce that only over-educated or simpletons believe. All these communist actions to destroy American energy production and pretending to think we can all buy and use \$60,000 electric vehicles is beyond stupid.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Sorry, but your computations are wrong. Electric car manufactures increased prices by \$8,000 now that the federal govt is giving \$8,000 in rebates from your federal tax dollars. The rest of your comment is spot on!</p>	<p>Thank you for participating in the discussion.</p>
<p>Put the money where the users are - roads. Funding for green bs is stupid. No more money for buses, trolleys, bikes, Public transportation is a crime spreader and nobody will ride it.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Thank you for your honest comment that reflects the opinion of 90% of the traveling public in the Denver area. Everyone wants more lanes, and less wasted money on virtue signaling bike lanes and public transportation.</p>	<p>Thank you for participating in the discussion.</p>

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	30-Aug	Discussion board - reaction	
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	5-Sep	Discussion board - reaction	

Comment	Response
<p>"Green BS" is adding little mitigation stuff to highway projects, such as 3 floors of stairs to a million+ pedestrian crossing structure when what we REALLY need is build out of the MISSING REGIONAL NETWORK of multi-use paths for people of all ages and abilities, to get bikes, scooters, wheelchairs, etc. out of the way of cars. We also need faster, more frequent transit on major corridors - free and easy for all who will take it and can use it.</p>	<p>Thank you for participating in the discussion.</p>
<p>I highly doubt that 90% of Denver residents want to turn our city into LA, where we have 8 lanes of highway traffic in each direction at a perpetual standstill because there is no other way to get around except for driving.</p>	<p>Thank you for participating in the discussion.</p>
<p>People aren't driving because they like it. They're doing it because there is no other option. We need to level the playing field by funding transit/bikes rather than cars to make them real options. Denver was historically a walking and transit (streetcar) city. That changed when the city/region began subsidizing the car and tearing down urban buildings for highways and parking, and fueling suburban sprawl with highways. Remove car subsidies, subsidize transit and bikes instead.</p>	<p>Thank you for participating in the discussion.</p>
<p>A problem is we have roads for cars that connect everywhere, access within seconds, but not remotely that access for any other way to get around, much less safely. Let's follow the lead of cities that are ensuring safe, protected/separated paths within a half mile or closer of 85% of businesses, destinations, and residences and more reliable and fare free transit year round, and good broadband for all that saves trips and ensures some equality of access.</p>	<p>Thank you for participating in the discussion.</p>

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	26-Aug	Discussion board	Richard jacques
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	27-Aug	Discussion board	Julianne Ard
	28-Aug	Discussion board - reaction	

Comment	Response
<p>Pretty pathetic it's impossible to get anywhere without a car and sure do hate driving. Everyone complains because the roads are congested. Simply too many people drive. Let's get some reliable, fast, functional public transport, so we can alleviate the congested roads.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I agree! The best way to reduce traffic is to offer people better public transportation so fewer people need to drive. It's really that simple.</p>	<p>Thank you for participating in the discussion.</p>
<p>Disagree, this is short sighted and pathetic thinking. I'm not riding a bus to Target to pick up groceries. I'm not riding an e-bike in January, and I'm not walking 20 miles when I need to be in the office. Stop the charades and build more highways!</p>	<p>Thank you for participating in the discussion.</p>
<p>Fast, frequent, reliable bus rapid transit is needed on our major corridors. 20-40% don't or can't drive in each community including many of our kids, parents, and neighbors. Some of those of us who drive find it painful to do so and wish we had real options with transit and a region-wide network of safe, protected bike infrastructure. These are emergency, safety issues that have been neglected for a long time — missing systems that are absolutely necessary.</p>	<p>Thank you for participating in the discussion.</p>
<p>I want my tax dollars spent repairing the existing roads and highways and to expand them and build more. It was insanity to spend all the time and money widening C470 only to make those improvements toll use only. The pollution generated as we sit in traffic everyday is unhealthy and unacceptable in a responsible society. The ever growing time spent commuting comes from time I could be spending with family. We don't need more bike paths and public transportation.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>i'm confused. widening the highway was bad but also bike pahts and transportation is bad? so what do you want? you know that actually good public transportation and bike paths improve road traffic right :)</p>	<p>Thank you for participating in the discussion.</p>

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	30-Aug	Discussion board - reaction	
	2-Sep	Discussion board - reaction	
	28-Aug	Discussion board	Dennis Haefele

Comment	Response
<p>It sounds like you do not believe in climate change. The more space we give SOV's, the more pollution increases. We all "love" our cars — it seems more than we love our health and what will happen to future generations! Vehicles that use diesel fuel also add benzene , which causes cancer, to the air. Central I-70 has placed a playground on top of the highway. Guess where the pollutions from the vehicles below go! — straight into the lungs of our young people!</p>	<p>Thank you for participating in the discussion.</p>
<p>Widening the highway with "free" lanes in a growing region would not solve congestion, due to induced traffic demand. The highway would fill right back up as people change their living and travel habits. More suburban sprawling homes would be built on bulldozed prairie, inducing new traffic. Making them toll lanes mitigates this somewhat but still induces traffic. The only way to "solve" congestion would be to make the entire highway a toll road with dynamic prices based on demand.</p>	<p>Thank you for participating in the discussion.</p>
<p>I make a living now and for the last 40+ years driving a truck delivering goods to the good people of Colorado. This s**tshow you have made of our highway system is a disaster. Don't fix it . put a " bump" sign on it. I -270 westbound . Southbound 225 has a patch that they used to fix a hole that is a bump that breaks trailers now. The Santa Fe merge with I 25 north was bad before they fixed it and millions of dollars later it's still bad or worse. Spend the money on the roads.... Bunch of dumb**s</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

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	28-Aug	Discussion board	
	30-Aug	Discussion board - reaction	
	30-Aug	Discussion board - reaction	
	30-Aug	Discussion board	Nick
	2-Sep	Discussion board - reaction	

Comment	Response
<p>I am a resident of the greater Denver metro area and I commend the decision to shift away from car centric infrastructure. I recently bought an ebike and have already ridden 100+ miles in the neighborhood — however frequent, non traffic calmed encounters with cars entering freeway traffic frankly make the experience unsafe. The shift towards multimodal transport and design and away from suburban sprawl will only be successful *if and only if* it is safe and convenient to the average resident.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>My kids are unable to ride to school and elderly parents are unsafe riding/getting to protected paths due to lack of prioritization on much faster implementation of a regionwide, safe, connected, protected bike network. A bookclub friend can no longer drive and relies on a trike. All of these folks (and appeal to middle age women such as myself, even those who formerly commuted by bicycle in 20s), really need this missing infrastructure for safer and more comfortable bicycling</p>	<p>Thank you for participating in the discussion.</p>
<p>Yes, I agree that we definitely need a shift away from car/vehicle infrastructure!</p>	<p>Thank you for participating in the discussion.</p>
<p>Although I don't advocate for large expansions, I hope that CDOT will still add short lane sections to alleviate the worst pain points around Denver. For example, the section of I-25 between US 6 and Santa Fe Ave should really have 2 auxiliary lanes in each direction instead of just one. Previously it was a matter of space — not enough room between the tracks and the river. Now that the track area is being ceded by the railroad, can we make this a reality?</p>	<p>Thank you for your review of the 2050 RTP and providing comments. The revised plan includes a revised project scope for this section of I-25 to focus on safety and operational improvements.</p>
<p>Is 10 lanes really not enough for you? Please, we cannot let I-25 get even wider. It's already a nightmare as is and produces so much noise and pollution for the surrounding neighborhoods. It's already such a massive barrier separating east and west Denver.</p>	<p>Thank you for participating in the discussion.</p>

Page	Date	Comment type	Name
	5-Sep	Discussion board - reaction	
	31-Aug	Discussion board	Sarah Clark
	1-Sep	Discussion board	
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Comment	Response
<p>It's time to stop doubling down on what is making our air quality, health, and lack of access by so many worse and worse, at great expense, then hearing endlessly that there isn't the money to build out missing safe, comprehensive transportation networks for all (transit, active, etc.).</p>	<p>Thank you for participating in the discussion.</p>
<p>CO Sierra Club supports the RCOG Regional Transportation Plan in its addressing of the Denver Metro area's severe air quality problem, its focus on environmental justice communities, and its increased options for multimodal transportation. We support an all-hands-on-deck approach to transportation, which includes reduction in emissions from cars while investing in walking, biking and bus rapid transit projects. We look forward to continuing to engage in this process, and we encourage</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>The changes are a step in the right direction. There's still too much widening of highways and not enough investment in transit. Moving up the implementation of BRT corridors is good. Even better would be to ensure that it's actual BRT, and not just increased bus service in shared traffic (which is also needed).</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>After seeing news of changes to redirect funding of highway expansion to transit, I thought perhaps DRCOG was finally on the right track. But after reading through the plan and its funded projects, that couldn't be farther from the truth. WAY too much funding for roadway and interchange widening and expansion. The changes go from 90/10% car/transit funding to 80/20, but car infrastructure still gets the vast majority of public money. When will planners learn?</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

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	5-Sep	Discussion board - reaction	
	2-Sep	Discussion board	
	2-Sep	Discussion board	
	4-Sep	Discussion board - reaction	

Comment	Response
<p>Couldn't have said it better. Doubling a part that is too small, and even then funding the MMOC at that level just for one year is grossly inadequate. This STIP and this decade, funds need to be entirely redirected to build out missing safe systems for access and safe travel or mobility for people of ALL ages and abilities, including the 20-40% who don't drive. Too many decades of emphasis on cars, and even then, serving certain communities and leaving others without good options.</p>	<p>Thank you for participating in the discussion.</p>
<p>Revise this plan to remove roadway expansions and redirect that money to bus rapid transit, front range passenger rail, and bicycle networks! Public transit should be receiving far more money than private cars. As long as it's backwards with car infrastructure getting all the money, DRCOG will never meet the goals listed in this plan. The proposed car projects directly contradict the 2050 plan's priorities for multimodal, transit, air quality, safety, and expanding options for vulnerable users.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>The I-25/Broadway project needs serious rework, you NEED to hault it until it can be revised. Phase 2 segment 4 must not be funded, as it proposes demolishing 8 homes next to a TRAIN STATION for a highway ramp! Phase 2 segment 3 must be redesigned to remove roadway expansion and only improve ped/bike/transit mobility. I live here and the current proposal will absolutely degrade the walkability of the area and the ridership potential of Broadway station. This does not match the plan's goal!</p>	<p>Thank you for your review of the 2050 RTP and providing comments. Your suggestions to this project have been passed along to the project sponsor and City and County of Denver Department of Transportation and Infrastructure staff.</p>
<p>The I-25 Broadway project is needed. As a driver, a cyclist, a pedestrian and Denver resident, it is important that CDOT and City and County of Denver advance this project. DRCOG needs to get on board or get out of the way, Lets get Colorado moving and move projects forward not backward.</p>	<p>Thank you for participating in the discussion. Your suggestions to this project have been passed along to the project sponsor and City and County of Denver Department of Transportation and Infrastructure staff.</p>

Page	Date	Comment type	Name
	2-Sep	Discussion board	
	4-Sep	Discussion board	
	6-Sep	Discussion board - reaction	
	4-Sep	Discussion board	

Comment	Response
<p>My spouse and I would sell our car and stop driving it if we had better, faster, more reliable public transit, safer bike infrastructure, and access to car sharing services for the occasional day hike or big home depot trip. We don't even like driving and getting in the car. It's a chore. But without better alternatives we will keep driving.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>I am so glad to see this move to invest additional funding and resources into public transportation, bicycle, and pedestrian infrastructure, and my only complaint is that it does not go far enough. A walkable community with good public transit benefits everyone - kids, seniors, people who otherwise can't drive - and improves air quality. More bus rapid transit and bicycle infrastructure please!</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>We have tried the communities you discuss in virtually every city in the country at some point in the 20th century. It yields the same results. When you don't have to leave your neighborhood, you don't. We create communities of haves and have nots, people who are prisoners of their upbringings, and a segregated city that has limited means for economic mobility. More Chinatowns and Little Italy's with underresourced community schools do not solve affordable housing or mobility.</p>	<p>Thank you for participating in the discussion.</p>
<p>DRCOG should rethink its vision and allow the road, bridge and highway expansion needed to keep up with population growth. Eliminating planned and needed road expansions and re-directing to transit is idiotic and fruitless. Hasn't DRCOG heard RTD cannot even staff the infrastructure already in place. The most popular route A-Train to DEN has had to cut back to service every hour instead of every half hour due to lack of staffing. And RTD eliminated the Bronco bus to Mile High Stadium.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

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	5-Sep	Discussion board - reaction	
	6-Sep	Discussion board - reaction	
	6-Sep	Discussion board - reaction	
	5-Sep	Discussion board	CM
	5-Sep	Discussion board	MW
	6-Sep	Discussion board - reaction	
	6-Sep	Discussion board	Jonathan Fowler

Comment	Response
<p>20-40% of the people in each community don't drive. Already roads are funded primarily by the general fund (all people) rather than gas tax and user fees from cars. Everyone needs to get around. Roads connect, but we have had missing safe systems for everyone else besides the drivers prioritized again and again for decades (richest, whitest, skiiers/those with 2nd homes or who can afford weekend rec trips, etc.). Our kids, elders, and us all need options, not more roads/widenings.</p>	<p>Thank you for participating in the discussion.</p>
<p>Do you know the concept of induced demand?</p>	<p>Thank you for participating in the discussion.</p>
<p>Glad to hear you support increased funding for public transportation, so RTD can raise wages and hire more staff!</p>	<p>Thank you for participating in the discussion.</p>
<p>Finish 470 between Broomfield and Golden.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. The Jefferson Parkway is a locally funded project within the plan.</p>
<p>RTD gets less than 1 percent of their operating budget from the state. The bulk of highway investments are from the general fund, not gas taxes or registration. Those who don't drive (kids, teens, many elders, disabled, plenty of parents) are 20-40% of the people in each community. We need more, good, and safe options — not just investments in faster driving.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>When people who can't transport themselves are forced to look to the community for options (community centers, churches, ngo's) they are more often picked up by vehicles than buses or trains. Vehicles are also the answer for those who can't afford personal vehicle ownership. Just ask Uber and Lyft.</p>	<p>Thank you for participating in the discussion.</p>
<p>Please continue to appropriately expand I25 and 470, as well as other critical arterials. We can do this and create more smart public transit, assuming the demand is there for it. Thank you.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

Page	Date	Comment type	Name
	6-Sep	Discussion board	
	6-Sep	Discussion board - reaction	
	6-Sep	Discussion board - reaction	
	6-Sep	Discussion board	

Comment	Response
<p>I NEED A CAR. I WILL ALWAYS HAVE A CAR. STOP THIS NONSENSE AND FIX OUR ROADS.</p> <p>How do bus/bike home from Boulder with my laptop/lunch bag wearing my slacks/dress shirt in inclement weather and get there in time to bus/bike my son to hitting practice in Arvada with his baseball gear and race back to north Broomfield to grab my daughter from cheer practice, etc, etc?!?!</p> <p>I NEED A CAR. I WILL ALWAYS HAVE A CAR. STOP THIS NONSENSE AND FIX OUR ROADS.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Wow. You need a car. Yep. But tons of other people don't. People who don't need or want to use a car can take the improved modes of transport proposed by this plan. Less cars on the road = less wear and tear & less traffic = an easier commute for you, someone who needs to use a car. Cheers.</p>	<p>Thank you for participating in the discussion.</p>
<p>Completely agree with your sentiments. Prior to kid duty I commuted by bike a lot more often. It just didn't work when I had kid pickup, followed by quick dinner, off to practices and recitals in 2 different places, run some shopping errands, followed by pickup and home. I can't be 40 minutes late for a flat bike tire. Same with non-reliable public transit. If your only obligation is trivia night at the local pub with friends you can be 40 minutes late with little impact.</p>	<p>Thank you for participating in the discussion.</p>
<p>Really.... dropping expansion of roads is not the answer. Where is the common sense? Congestion effects the quality of life for everyone and yet DRCOG ignores what is best for the people of Denver and Colorado. The economic impact of not expanding lanes will be detrimental to the local and state economy. FYI Denver has spent billions of dollars on rail transit. What part don't you get? People need and want to drive their vehicles. We all want clean air. Why handcuff the Denver Metro area ?</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

Page	Date	Comment type	Name
	6-Sep	Discussion board	Matt G.
	6-Sep	Discussion board	Josh
	6-Sep	Discussion board	
	6-Sep	Discussion board	

Comment	Response
<p>An all of the above method for transportation is great. But the construction of transit options should not come at the sacrifice of new vehicle based projects. With a population doubled in a decade, widening is essential for the operations and maintenance of our roads. The air quality is much worse when vehicles are sitting still on a highway than when they're moving. The notion that 20-30% of Coloradans will abandon their preferred method of travel to hop on a unpoliced bus or train is wild</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Improve alternative transit. Improving other forms of transportation will encourage people to take forms of transportation other than highways. Thus, decreasing highway congestion without having to expand highways. Not only that, but it also provides people who can't afford a car financially to have a means of transportation. The option and ability to have a valid means of transportation should be accessible to everyone.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Improve our roads... thus improving the quality of life for all. Congestion on our roads needs to be resolved now. It is time to take a hard look at immediate improvement. I am tired of the wants of the few outweighing the needs of the many. Expand lanes, improve our roads, less congestion means less pollution. Fluid movement on our roads is better than idle movement.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Please continue to invest in highway capacity improvements. The safe and efficient movement of people and goods on roads through metro Denver is critical to the quality of life for Denver residents. Also, moving traffic is much better for air quality.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

Page	Date	Comment type	Name
	6-Sep	Discussion board	
	6-Sep	Discussion board	
	6-Sep	Discussion board	

Comment	Response
<p>As someone who's been commuting in Denver for 15 years, I was so happy to see that the plan was updated to include more bus rapid transit (BRT) and no expansions to I-25!</p> <p>We know that adding lanes only induces more traffic. Just look at Houston, Vegas and LA. Adding lanes just doesn't work. Let's do BRT and do it right.</p> <p>If you want to spend money on highways, get rid of toll roads and improve the loop around the city. Instead of expanding a horrific freeway through the heart of the city!</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Leetsdale BRT should be prioritized for completion this decade especially since we have a plan that is ready to be implemented- https://www.denvergov.org/files/assets/public/dotl/documents/projects/go-speer-leetsdale/go-speer-leetsdale-study-report-2017.pdf</p>	<p>Thank you for your review of the 2050 RTP and providing comments. The updated plan proposes five bus rapid transit corridors be completed by 2030 based on coordination with project sponsors, project readiness, likely ability to obtain federal and other funding, and related factors. Project sponsors have the ability to request amendments to the 2050 RTP as priorities and needs change.</p>
<p>We should not be widening I-270 as long as the region is in severe ozone non-attainment status. This will only make the problem worse. Redirect those funds to transit and bicycle infrastructure.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

Page	Date	Comment type	Name
	6-Sep	Discussion board	

Comment	Response
<p>+1 to more non-car options.</p> <p>Connect bike lanes and paths to give more coverage.</p> <p>More trains running on routes that people use.</p> <p>Bring back the FF1 and have more bus routes running more often.</p> <p>NY has protected bike lines on most roads and buses that run predictably every 10 minutes. We should do at least that.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

Page	Date	Comment type	Name
	15-Aug	Email	Cory Gaines

Comment	Response
<p>To the DRCOG Metro Vision planning committee,</p> <p>My name is Cory Gaines. I am not a resident of any of your counties, but I do pass through them regularly and wanted to provide you some feedback on your plan. I will also go through and mark up my concerns on your documents.</p> <p>I have some concerns over both the scope and the implications of your plan. I also think that in your planning you are ignoring basics of human nature and will end up disappointed with your results while at the same time greatly frustrating those that live in your area or drive through it.</p> <p>First, with regard to the scope and implications of your plan, I would like to refer you to Appendix T, table 9. My goodness. When did it become the job of government to legislate and interfere so strongly in the lives of its citizens? When did it become the job of government to do the same to businesses?</p> <p>I realize that it has long been part of the scope of government rules and regulations to define boundaries on behavior, but in the past, those boundaries were minimized and defined by things that worked to keep us safe or ensure the steady flow of commerce. Your new set of rules, as outlined in your action plan, strike me as social engineering: an attempt to shoehorn people into a way of life that you on the DRCOG board feel is best regardless of the choices of others. If I have read right, and I hope I've misunderstood, the line items in your table indicate a desire to legislate things such as housing density, density at work, putting a cap on the number of parking spaces for people at home and at work, and rezoning to form communities according to how you'd have them. Why not let the market decide these things on its own (with the guardrails that were existing prior)? Surely you can try and meet CDOT's goals for greenhouse gases without being so intrusive. Surely you can do so without imposing what you think</p>	<p>Thank you for your review of the 2050 RTP and providing comments. Your comments have been forwarded to CDOT.</p>

Page	Date	Comment type	Name
	15-Aug	Email	Cory Gaines

Comment	Response
<p>(contd) is the best solution. If not, perhaps another sit down with CDOT to discuss what they ask is in order. I don't recall anyone getting to vote on CDOT after all.</p> <p>I am also concerned with where and how you are diverting our tax dollars. When I review the list of things that you intend to axe in the transportation plan, I'm astonished. Roadbuilding is a core function of government. It's one of the things that we all pay into with taxes because it touches on so many lives: it is how we get to work, it's how we move freight, it drives commerce. The idea that you would take our tax dollars and move it from road building and into other areas strikes me as thoughtless, and, as above, an example of you trying to make the world into what you think it should be rather than how the vast bulk of citizens have decided it should be....(contd) Transit already exists. Walkable areas already exist. When you ask people about taking the bus or the train, my guess is that many express an interest. Then they wake up the next morning and get in their single occupancy vehicles and go to work as always. What I'm trying to say is that no matter what people say, no matter what polls indicate, people have spoken louder with their actions. They have confirmed multiple times that they prefer to drive themselves to work (and yes, often from single family homes). If you need an example, I urge you to look at the bike lane usage in Denver. Have they not increased the capacity for bikes without seeing a concomitant increase in biking? Your planning should, but does not, acknowledge this basic fact and will, I believe, prove itself to be disappointing to you, frustrating to those driving, and a waste of everyone's money.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. Your comments have been forwarded to CDOT.</p>

Page	Date	Comment type	Name
	15-Aug	Email	Corey Gaines

Comment	Response
<p>(contd) Lastly, to drive the point home about the nonsensical nature of your plan, I want to call your attention to how utterly hapless RTD has been at providing transit solutions. If you are depending on them to take up the slack for thousands of new riders daily, I think again that you'll be disappointed. Why on earth should we give the organization MORE money when they cannot deliver on a simple rail line connecting Denver to Boulder? They've shown incredible ineptitude and yet you are intending to throw more business their way. That decision beggars logic.</p> <p>The solution to the problem of population growth and livable cities for all is out there and there is more than one way to achieve that solution. Your current proposal is one way to achieve that goal, but it does so at the cost of what is actually needed and desired by the citizens of this state. I urge you to revisit your plan in the light of doing what government in this country has traditionally done: allowing people to have freedom of choice while providing for the common good. There is nothing about the current problem that precludes a solution where you respect that.</p> <p>Thank you for your time. Cory</p>	<p>Thank you for your review of the 2050 RTP and providing comments. Your comments have been forwarded to CDOT.</p>

Page	Date	Comment type	Name
	21-Aug	Email	Jim Kewley

Comment	Response
<p>Rather than try to specifically comment on a 200 page document, please consider my comments which follow.</p>	
<p>I strongly oppose a plan that does not provide for adequate roads for transportation by cars and trucks, as do my friends and relatives. This is especially so since pollution-free electric cars and trucks are being introduced rapidly for our use (we currently own an electric hybrid).</p>	
<p>You can build a system of public buses, trains, and bike lanes but let's face it, they just don't get used because people like the freedom of their own vehicle and non-polluting cars accomplish the same goal.</p>	
<p>Unlike many Europeans, we don't live in high density city centers where mass transit works (My favorite international city is London where I can visit and do not need a car with the easy-to-use Underground to ride.) It will be way past my lifetime when mass transit will deliver a skier from my house in Colorado Springs to Steamboat Springs in a reasonable amount of time, if ever.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. The updated plan allocates funding for all major travel modes, including roadways and highways.</p>
<p>So, please plan on bigger and better roads to keep traffic moving. Don't waste precious transportation dollars on a mass transit system that no one will use.</p>	
<p>Thank you. Jim Kewley</p>	

Page	Date	Comment type	Name
	7-Sep	Email	Over 30 community organizations*

Comment	Response
<p>Dear DRCOG Board Members,</p> <p>Thank you in advance for listening to the wide range of regional residents, community members and leaders of all types, business owners, homeowners, and renters, people of all ages and abilities — including the 20-40% in each of our communities who don't drive and who have been underserved and over-impacted for so long.</p> <p>We urge you to continue dropping highway widenings from your plans (I-270 next) until our regional severe air quality is restored to a healthy zone. We urge you to redirect resources, both technical and financial. Our communities have suffered for years with worsening air quality and ozone and ongoing lack of comprehensive, connected, convenient, accessible and affordable transit and safe, protected paths for people of all ages and abilities to get around. These missing systems providing access for all are needed now and should receive the “big ticket” investment focus these next few years.</p> <ul style="list-style-type: none"> • Redirect funds and technical support now to design and build out missing systems on a fast track. • Support comprehensive, affordable, reliable transit in metro areas as well as ongoing Bustang expansion. Consider the rationale as explained in this briefing to MPOs and DOTs. Support ongoing operations as well as physical infrastructure: • Improve safe access and storage/parking, benches, info and shelters at stops. • Expand BRT on all recommended corridors https://bit.ly/RTD-BRT-now and initiate land acquisition now for high density housing. 	<p>Thank you for your review of the 2050 RTP and providing comments. The RTP is multimodal in its scope and covers all the ways people and goods travel. The vision outlined in the 2050 RTP is to create and maintain a multimodal and connected transportation network to serve the diverse Denver region.</p> <p>The updated plan balances the priorities of regional partners with the reduction levels required in the rule. Through changes to the plan's project and program investment mix, \$679 million is now allocated to bus rapid transit projects in the first 10 years. It also shifts \$900 million toward additional multimodal programmatic investments, with \$500 million in the first 10 years.</p>

Page	Date	Comment type	Name
	7-Sep	Email, cont.	Over 30 community organizations*

Comment	Response
<p>(contd)</p> <ul style="list-style-type: none"> • All people, “8-80s,” deserve to be able to get around safely, on a comprehensive network of protected paths. In some cities these are being built out to reach 80% of residents and jobs/businesses. Networks are only as strong as their weakest links. There are benefits to building out a complete network sooner. See: bit.ly/RapidBuildOutBikeNetworksBenefits, bit.ly/BikePedCrashExposureTool. Consider how past top projects top projects by decade (evaluated with input from community elders) have been inequitable. Some takeaways: • Past investment/focus primarily serving whiter, wealthier communities. • Inadequate support for metro transit even though 20-40% of the people in each community don’t or can’t drive (or shouldn’t and are driving because there is no other accessible or convenient option). See https://bit.ly/20-40percentDoNotDrive. Fees pay for less than half of the cost of roads, not to mention additional costs for provision of (free) parking. And importantly, bit.ly/ansitDesertsResultCauseEconSocInequalityInequality. • People have suffered in terms of their health, deaths, and lack of access, with impacts on ability to learn or have jobs and support families. Research shows that air pollution from cars and trucks has a big impact on physical, mental, and emotional health as well as learning and cognition. And commute distance and especially lack of access have a large effect on social mobility. Persistence with old solutions that over-impact and underserve the same communities again and again have marginalized people of color and people who are economically poorer. It has resulted in more pollution when research doctor’s are clear that there is https://bit.ly/NoSafeLevel of pollutants from fossil fuel combustion, that https://bit.ly/AirPollutionDamagesEveryCell, and you have responsibility http://bit.ly/govtresponsibility. See http://bit.ly/AQheadlines for highlights from the research this past decade. 	<p>Thank you for your review of the 2050 RTP and providing comments. The RTP is multimodal in its scope and covers all the ways people and goods travel. The vision outlined in the 2050 RTP is to create and maintain a multimodal and connected transportation network to serve the diverse Denver region.</p> <p>The updated plan balances the priorities of regional partners with the reduction levels required in the rule. Through changes to the plan’s project and program investment mix, \$679 million is now allocated to bus rapid transit projects in the first 10 years. It also shifts \$900 million toward additional multimodal programmatic investments, with \$500 million in the first 10 years.</p>

Page	Date	Comment type	Name
	7-Sep	Email, cont.	Over 30 community organizations*

Comment	Response
<p>(contd)</p> <p>High injury and deaths are off freeways. Nearly everyone walks and some of the boldest people bike or use micromobility - we want to deliver accessible paths and streets/spaces that make active transport safe for all people 8 to 80.</p> <ul style="list-style-type: none"> • Explain equity. Ethics, USDOT orders, and state law now require that long underserved and over-impacted people in our communities are now given access and transportation options. <p>Most of all there is a strong need to design and deliver missing networks for safe access for all in this STIP and this decade. We urge you to ShiftToEquityNow and serve all who have been underserved and over-impacted for so long. It's well past time and these systems help everyone. They result in cleaner air, better health, less disease, and improved cognition for each person. They enable fewer cars on roads and allow back-up options for people with cars. Most importantly, they allow access for everyone, people of all ages, abilities, and income levels, who haven't had it for so long. And they give people more time, ability to support their families, our state, and economy, so we all can thrive. Climate safety, responsibility, and accountability, and compliance with the law and promises made to Coloradans in the 2019 compromise legislation are additional benefits.</p> <p>Thank you for your work and getting this done,</p>	<p>Thank you for your review of the 2050 RTP and providing comments. The RTP is multimodal in its scope and covers all the ways people and goods travel. The vision outlined in the 2050 RTP is to create and maintain a multimodal and connected transportation network to serve the diverse Denver region.</p> <p>The updated plan balances the priorities of regional partners with the reduction levels required in the rule. Through changes to the plan's project and program investment mix, \$679 million is now allocated to bus rapid transit projects in the first 10 years. It also shifts \$900 million toward additional multimodal programmatic investments, with \$500 million in the first 10 years.</p>

Page	Date	Comment type	Name
1	7-Sep	Mark-up	Bryan Weimer
7	2-Sep	Mark-up	Ian Frasch
33	7-Sep	Mark-up	Bryan Weimer
36	7-Sep	Mark-up	Bryan Weimer

Comment	Response
<p>The updated plan for GHG reduction purposes relies heavily if not all on modeling assumptions and strategies are based around such. As with any model actual data is needed to calibrate the the result to very accuracy of the assumptions. As such, the region should invest in monitoring equipment to test carbon dioxide (a major contributor to GHG) to determine if the strategies presented are helpful in reducing GHG or if changes in approach are necessary. Without such information, we are assuming that if you implement the plan, GHG will be reduced.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. DRCOG staff evaluate model and forecast data with observed data. The Mitigation Action Plan will require annual reporting to assess the implementation of the mitigation strategies.</p>
<p>These priorities are nice, making it sound like you are going to focus on moving away from car-centric planning. But when you look at the actual projects proposed, where the money is actually going, there are far too many road widenings and interchange expansions. Most of the money is still going to cars and will fuel additional suburban sprawl, pollution, and traffic deaths, so it absolutely does not meet your own goals listed here, and we will not see an improvement to air quality. The actual projects need major revising to move money away from road/interchange widenings into transit and bike networks.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. The RTP is multimodal in its scope and covers all the ways people and goods travel. The vision outlined in the 2050 RTP is to create and maintain a multimodal and connected transportation network to serve the diverse Denver region.</p>
<p>I would be beneficial to compare VMT between the new version of the 2050 Plan vs the original version of the 2050 RTP. The GHG Rules measurements discusses VMT with an intention to reduce VMT tying that to GHG reduction.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. These comparisons are publicly available with the caveat that the modeling assumptions and parameters are different for the 2050 RTP 2022 update to comply with the Greenhouse Gas Transportation Planning Standard (greenhouse gas rule). Additionally, compliance with the greenhouse gas rule includes strategies and mitigation measures that do not directly involve vehicle miles traveled reductions. Particularly with the increased electrification of the motor vehicle fleet over time, the relationship between vehicle miles traveled and greenhouse gas reductions will continue to become more complex.</p>
<p>Can you please provide a comparison between data for these measurements between the revised RTP and the new RTP.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. These measurements are for an average weekday in 2019, so they did not change in the 2050 RTP 2022 update.</p>

Page	Date	Comment type	Name
37	7-Sep	Mark-up	Bryan Weimer
45	17-Aug	Mark-up	Bryn Grunwald
45	15-Aug	Mark-up	Lattina Adams
45	17-Aug	Mark-up	Zach O'Brien
47	1-Sep	Mark-up	Cherie W.
50	7-Sep	Mark-up	Bryan Weimer

Comment	Response
<p>VHT would be a better measurement to compare GHG benefits of a new 2050 RTP. Please provide that comparison between the original RTP and the revised based on GHG</p>	<p>Thank you for your review of the 2050 RTP and providing comments. Appendix C of the Transportation Greenhouse Gas Report includes comparisons of vehicle hours traveled between each of the baseline and updated scenarios, along with a plethora of other metrics.</p>
<p>Raised bike lanes, protected bike lanes or just making it hard to drive/park in the bike lane would be helpful to get people to feel safer biking!</p>	<p>Thank you for your review of the 2050 RTP and providing comments. For more information on how DRCOG is providing resources and guidance to project sponsors, please feel free to explore DRCOG's Regional Active Transportation Plan and Regional Complete Streets Toolkit.</p>
<p>Yes!</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Also not putting street signs in the middle of bike lanes, not dumping bikes onto the sidewalk when it's inconvenient to make a safe bike route (like at stop-lights and roundabouts), and separating bikes/scooters from pedestrians. Also making bike lanes in places that people want to go, not just where it's easy.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>You said it yourself. People only bike or walk if they feel comfortable or safe! Please consider holding the traffic design to the highest standard of safety — shared streets with cars should be a last stage development, only when it is so normalized to cycle and walk that cars actually behave like guests ! North America is not there yet. That's why we need a physically protected bike lane so that we get to that critical volume of people cycling and THEN maybe you can make the whole street a shared street.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. For more information on how DRCOG is providing resources and guidance to project sponsors, please feel free to explore the Regional Active Transportation Plan and Regional Complete Streets Toolkit.</p>
<p>Since one of the overall goals of the RTP is to change modes for commuting, what would be the predicted/estimated mode percentage if the plan is implemented by 2050?</p>	<p>Thank you for your review of the 2050 RTP and providing comments. This information is available in the revised Appendix E.</p>

Page	Date	Comment type	Name
66	7-Sep	Mark-up	Bryan Weimer
69	17-Aug	Mark-up	Zach O'Brien
71	6-Sep	Mark-up	Cherie W.
95	2-Sep	Mark-up	Ian Frasch

Comment	Response
<p>If electrification of vehicles on the road is a goal, there will still be VMT, congestion, etc., just w/ electric vehicles vs fossil fuel vehicles. How does the plan ultimately address those realities?</p>	<p>Thank you for your review of the 2050 RTP and providing comments. The 2050 RTP recognizes the complex and changing relationships in multimodal transportation planning over time between electrification, vehicle miles traveled, greenhouse gas reductions, mobility options and other variables. These issues are not mutually exclusive. For example, fleet electrification can help address air quality and greenhouse gas emissions, and other strategies and investments can address mobility options and vehicle miles traveled.</p>
<p>Not included in here is the active Transit Signal Priority (TSP) that will slightly adjust light timings to make sure busses don't have to wait. It looks like this was implemented along Colfax in 2018, but I haven't seen anything about expanding it to other routes.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. The fiscally constrained rapid transit network in Appendix J illustrates several bus rapid transit corridors. Transit signal priority is a necessary component of bus rapid transit deployment.</p>
<p>What specific measures will be taken to design and retrofit roadways? What manual of traffic design will be used? How will cars be physically slowed and separated from pedestrians and bikers? I'd like to see the actual budget and implementation of these measures because it sounds nice on paper but until an actual protected network of non-auto transport is built, we will continue to see deaths from fatal crashes. How many traffic deaths are we willing to accept so that cars can go fast?</p>	<p>Thank you for your review of the 2050 RTP and providing comments. For more information on how DRCOG is providing resources and guidance to project sponsors, please feel free to explore the Active Transportation Plan and Regional Complete Streets Toolkit.</p>
<p>I am not fooled by pretty pictures of happy people riding bikes. And including these pictures does not make you a champion of sustainable transport. Action matters way more than words and pictures. You are funneling the majority of money into car infrastructure. Stop expanding/widening roads, highways, and interchanges. If you did that you'd have nearly endless money to create an incredible and revolutionary bike and transit network.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. The RTP is multimodal in its scope and covers all the ways people and goods travel. For more information on how DRCOG is providing resources and guidance to project sponsors, please feel free to explore the Active Transportation Plan and Regional Complete Streets Toolkit.</p>

Page	Date	Comment type	Name
96	2-Sep	Mark-up	Ian Frasch
98	28-Aug	Mark-up	kdflynt
101	2-Sep	Mark-up	Ian Frasch
101	6-Sep	Mark-up	Cherie W.
101	2-Sep	Mark-up	Ian Frasch

Comment	Response
<p>None of these would indicate that the majority of money should go to road and interchange widenings. You need to completely revise the funded projects to align with these goals.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. The RTP is multimodal in its scope and covers all the ways people and goods travel.</p>
<p>This is too late for our climate goals. This date needs to move forward to help meet reduction targets.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. The 2050 RTP is the region's long-range transportation plan and covers a 30-year horizon. The proposed 2022 update shifts significant financial and project investment resources into earlier years of the plan to address greenhouse gas emissions.</p>
<p>This entire regional list has way too much money going to roadway expansion, including road widenings, interchange expansions, and even entirely new roads being constructed. Having the majority of the money going to road expansion for cars does not meet the goals of this plan.</p> <p>This roadway expansion will also result in significantly higher maintenance costs long term. Instead of expanding roads, focusing on maintaining the existing roads, and instead expanding and improving transit, bicycling, and walking infrastructure.</p>	<p>Of all the funding accounted for in the RTP, DRCOG administers only a small portion. The RTP is also required to include all roadway capacity and transit capacity projects anticipated to be implemented over the life of the plan, regardless of funding source.</p>
<p>How does this fit in with Denver's Vision Zero plan?</p>	<p>Through the 2022 update, the scope of the I-25 Central project is being refocused to safety, operational and transit improvements.</p>
<p>Why can't we convert existing lanes into managed lanes? The highway does not need to be expanded to get managed lanes. Converting an existing lane into a managed lane with dynamic toll prices would reduce VMT/pollution while providing a fast, reliable lane for bus transit. Please consider that for this project and others.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

Page	Date	Comment type	Name
101	2-Sep	Mark-up	Ian Frasch
101	2-Sep	Mark-up	Ian Frasch
101	2-Sep	Mark-up	Ian Frasch
101	2-Sep	Mark-up	Anonymous
101	2-Sep	Mark-up	Ian Frasch
101	2-Sep	Mark-up	Anonymous

Comment	Response
<p>I'm very happy to see the central I-25 widening removed from the list of projects. This not only stops some of the bleeding by not expanding an urban highway, but it also makes significant funds available to use towards sustainable transport like a BRT network. Thank you and I'd like to see more of these types of changes to the plan.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>The expansion of I-270 will have significant negative impacts on the Denver area in terms of ozone and greenhouse gas emissions from induced demand. This does not meet the goals of the plan.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Why can't we convert existing lanes into managed lanes? The highway does not need to be expanding to get managed lanes.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>How about double tracking the Amtrak line towards Ft. Morgan to increase speeds and reliability? Double tracking would also make it easier to add more service. It seems ridiculous that CDOT will spend billions in a flawed attempt to shave a minute off a drivers commute, but are more than happy to let Amtrak passengers be 10+ hours delayed.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. Your suggestions have been shared with project sponsors.</p>
<p>Agreed 100%</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>All the widening projects listed aren't going to reduce congestion in the long term because of induced demand. It would be better to either reduce the spending or spend that funding on walking, biking and transit.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. The RTP is multimodal in its scope and covers all the ways people and goods travel.</p>

Page	Date	Comment type	Name
101	2-Sep	Mark-up	Ian Frasch
102	2-Sep	Mark-up	Ian Frasch
102	17-Aug	Mark-up	Zach O'Brien
106	7-Sep	Mark-up	Bryan Weimer
107	2-Sep	Mark-up	Ian Frasch

Comment	Response
<p>Exactly. Roadway widenings fuel suburban sprawl and degrade other modes. This is like digging the hole deeper with an excavator. The handful of transit projects is like a single person with a tiny shovel attempting to fill it back in. If you want to solve the problems you need to first stop digging yourself a deeper hole.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Absolutely laughable that widening Federal is listed as containing Bicycle/Pedestrian, Safety, and Transit improvements. That road is now a insanely wide hellscape, harder to cross, higher speeds. Who do you think you are fooling?</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Why is adding a toll lane to I-25 marked as containing a Bicycle/pedestrian element?</p>	<p>Thank you for your review of the 2050 RTP and providing comments. The intent is that the RTP's projects are as multimodal as possible as they are designed and implemented over time, given specific project characteristics and context. Freeway managed lane projects can include parallel and/or connecting pedestrian/bicycle connections.</p>
<p>The July 26 letter requested Transit be added to the SH 30 and Gun Club Corridor, please add into the description and on the following table.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. Table 3.1 has been revised accordingly.</p>
<p>This entire list is all roadway widenings and interchange expansions. How does this align with the goals of the plan to focus on multimodal, transit, safety and air quality? Road widenings induce additional car-centric suburban sprawl and traffic/pollution, higher speeds meaning more dangerous roads, and lock in more car dependency rather than investing the money into transit. It takes away potential transit ridership as well.</p> <p>Think about what great things could be funded if this \$371 million was available instead for transit. This could be put towards Front Range passenger rail, bus rapid transit, and Bustang.</p>	<p>The RTP is multimodal in its scope and covers all the ways people and goods travel. The list of projects and funding included in the plan is also based on priorities from CDOT, RTD and local governments. The vision outlined in the 2050 RTP is to create and maintain a multimodal and connected transportation network.</p>

Page	Date	Comment type	Name
107	2-Sep	Mark-up	Ian Frasch
107	2-Sep	Mark-up	Ian Frasch

Comment	Response
<p>Please either remove the I-25/Broadway interchange expansion project and redirect the funds to Broadway BRT, or completely revise it to ONLY make improvements to bike/walk/transit mobility without widening the roads, straightening curves so drivers can speed faster, tearing down homes, and adding new highway ramps next to a transit station. I own a home here, pass through here on multiple modes regularly, and the proposed project would absolutely degrade walkability of the area. It has already demolished a business building that was a short walk from Broadway station!</p> <p>The project proposal would worsen the pedestrian experience with longer crossing distances, more required road crossings, a more pedestrian hostile environment. It also includes no bus lanes or transit signal priority to speed up bus service. This project does not meet the goals of the plan and would be a major blow to an urban area that has lots of potential to be pedestrian/transit oriented; instead locking it into car dependency for years to come.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. Your suggestions to this project have been passed along to the project sponsor and City and County of Denver Department of Transportation and Infrastructure staff.</p>
<p>To be more specific in my comments on the I-25/Broadway project:</p> <p>Please do not fund phase 2 segment 4 of the project which would displace and demolish 8 homes on Lincoln St for an expanded highway ramp. Tearing down housing near an urban transit station for a highway ramp absolutely does not meet the goals of this 2050 plan.</p> <p>Additionally, please allow a redesign/amendment to phase 2 segment 3 (roadway widening and straightening, new ramp, larger roadway footprint) to meet the goals of the 2050 plan as well as local city plans by focusing only on pedestrian/bike/transit improvements rather than vehicle movement, creating a pedestrian-oriented intersection with BRT. It's extremely important for this project to be revised significantly.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. Your suggestions to this project have been passed along to the project sponsor and City and County of Denver Department of Transportation and Infrastructure staff.</p>

Page	Date	Comment type	Name
107	2-Sep	Mark-up	Matthew Downey
107	2-Sep	Mark-up	Ian Frasch
107	7-Sep	Mark-up	Bryan Weimer
107	2-Sep	Mark-up	Ian Frasch
108	7-Sep	Mark-up	Bryan Weimer
109	2-Sep	Mark-up	Anonymous
109	2-Sep	Mark-up	Ian Frasch

Comment	Response
<p>Would love to see the I-25/Broadway interchange project de-prioritized (or removed altogether) because what is currently proposed is not going to improve multimodal safety/comfort at all - it's just focused on vehicular operations.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. Your suggestions to this project have been passed along to the project sponsor and City and County of Denver Department of Transportation and Infrastructure staff.</p>
<p>Agree 100%, it will not improve bike/walk/transit mobility. The current proposal will actually degrade it and degrade the ridership potential of Broadway light rail station.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>per the July 26 letter from Arapahoe County, Centennial, and Aurora, please add Transit for the Gun Club Corridor. This would include the two Gun Club Projects plus SH30.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. Table 3.1 has been revised accordingly.</p>
<p>Please remove this project from your plan or SIGNIFICANTLY revise it to remove all roadway/ramp expansions. This project involves tearing down buildings and even homes near a transit station to widen a highway ramp and expand the interchange footprint, so that drivers from the suburbs can save a couple seconds on a commute and drive faster through the neighborhood.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. Your suggestions to this project have been passed along to the project sponsor and City and County of Denver Department of Transportation and Infrastructure staff.</p>
<p>Thank you for including transit for SH30, but should also add for the Gun Club projects.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. Table 3.1 has been revised accordingly.</p>
<p>All these road widenings are just a waste of money; they aren't fixing congestion or improving safety. Fund transit instead.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Yes exactly. After reading the beginning of the plan I did not expect to see pages and pages of road widenings. Shameful.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

Page	Date	Comment type	Name
109	2-Sep	Mark-up	Ian Frasch
109	2-Sep	Mark-up	Ian Frasch
113	2-Sep	Mark-up	Ian Frasch
113	22-Aug	Mark-up	Anonymous
113	2-Sep	Mark-up	kdflynt
113	2-Sep	Mark-up	Ian Frasch

Comment	Response
<p>How does a roadway 2X widening count as a bicycle/pedestrian improvement? Unless the additional 2 lanes are bike lanes, it does not count. Even if you have a wider sidewalk, the effects of roadway widening cancel it out. Also, how does it help freight? Induced demand will fill it up with traffic. What freight needs is fewer everyday people driving clogging up the roads. That would be accomplished by investing in transit/bike infrastructure.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. The intent is that the RTP's projects are as multimodal as possible as they are designed and implemented over time, given specific project characteristics and context. Roadway widening projects can still have significant multimodal components as part of the overall project.</p>
<p>Again another roadway widening incorrectly listed as a bicycle/pedestrian improvement.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>These BRT projects are great, thank you! And they've been moved forward in time! However, the slice of the funding pie going to transit is still far too small. The majority is still going to car infrastructure like road/interchange expansions.</p> <p>This needs to be flipped; the majority should be going to transit and bike infrastructure, and the only money for car infrastructure should be spent maintaining existing roads or converting ""free"" lanes to managed lanes (even outright narrowing some roads to save money on long-term maintenance and/or increase safety).</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>How about all day service instead of just peak only?</p>	<p>Thank you for your review of the 2050 RTP and providing comments. RTD is currently conducting a study of this project toward implementing peak period service consistent with its future plans and financial constraints.</p>
<p>We should be working on installing these BRT first instead of funding additional road widening in order to see how much trip demand they can absorb, reducing the need for road widenings. We need to put our money where our stated values are.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Agreed!</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

Page	Date	Comment type	Name
115	2-Sep	Mark-up	Ian Frasch
117	6-Sep	Mark-up	Cherie W.
117	2-Sep	Mark-up	Jackie C. Anderson
117	2-Sep	Mark-up	Jackie C. Anderson

Comment	Response
<p>BRT projects are great to see! Please ensure this has transit signal priority at every intersection in addition to dedicated lanes. Please do not half-a** it. Colorado Blvd could be completely transformed if it had a well implemented, fast, reliable BRT. If done right we could see an incredible mode shift away from cars on Colorado Blvd.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>Thank you for dedicating this funding to Vision Zero. It's unacceptable to lose any lives just because of traffic design and I'm glad Denver is standing behind that ideal. Where can we read in more detail about what these actual improvements constitute? In the Vision Zero document, there are a few examples given such as a Rapid Flash Beacon added at 30th Avenue and Downing Street, as well as the raised median and curb bulb outs at 13th Avenue and Broadway. However I'd argue that targeting known "high-injury" locations does not go far enough to address the problem. There are many, many dangerous locations where an accident is just waiting to occur — I would implore Denver to not just redesign single streets but rather to reroute cars to the outside of the city center /have cars take a more circuitous route, and have a protected NETWORK for bikes and pedestrians elsewhere. This should include things such as raised crossing intersections, reduced lanes for cars, roundabouts etc. We need to physically make it impossible to speed, not just put warning signs and signals not to do so. Traffic safety impacts all of us. It could be your child, your parents, your siblings, your friends, or you tomorrow. Please please please. and Thank you.</p>	<p>"Thank you for your review of the 2050 RTP and providing comments.</p> <p>DRCOG has adopted Taking Action on Regional Vision Zero, for more information visit: https://drcog.org/planning-great-region/transportation-planning/traffic-safety/regional-vision-zero</p> <p>DRCOG has also adopted the Regional Complete Streets Toolkit, a resource for local governments to implement a connected regional complete streets network. For more information, visit: https://drcog.org/planning-great-region/transportation-planning/complete-streets</p>
<p>Where can I see the short-trip opportunity zones? I live 6 miles from work in Capitol Hill and live in East Virginia Vale. Would love to bike to work if it only it was safe to do so.</p>	<p>The short trip opportunity zones can be viewed/ downloaded on DRCOG's Regional Data Catalog at https://data.drcog.org/dataset/short-trip-opportunity-zones</p>
<p>Bike lanes needed with safeguards on Alameda, Speer and Lincoln to allow people to bike to work. Without safeguards, the bike lanes are extremley dangerous to riders.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

Page	Date	Comment type	Name
125	2-Sep	Mark-up	Ian Frasch
150	2-Sep	Mark-up	Ian Frasch
152	2-Sep	Mark-up	Ian Frasch
156	2-Sep	Mark-up	Ian Frasch

Comment	Response
<p>This is an awful list of massive road widenings and new road construction that will bring additional suburban sprawl, traffic, pollution, and traffic violence. Including additional traffic/pollution in Denver and other urban places. Can DRCOG control these projects to reduce the size of this list? Is DRCOG contributing funding to these projects? Even if it's a "local project" these will absolutely affect the region in a negative way.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. These are locally funded projects (not funded by DRCOG).</p>
<p>There is far too much suburban roadway expansion in this plan. Through induced demand this will cause higher GHG emissions and worsen air quality, which does not meet the goals of this plan. This will induce development of low-density car-dependent suburban sprawl on freshly bulldozed prairie, literally destroying the environment and native animal/plant habitat, adding many new car trips and VMT, and large energy-hungry houses which are locked into car dependency forever.</p> <p>By instead redirecting the funds to improving transit/bike/walk infrastructure in already developed urban and suburban areas, we could instead encourage dense, sustainable housing development in cities and town centers with little to no parking, which further increases walkability by placing things closer together and fuels increases to transit ridership like an upward spiral.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>West Colfax Ave should have fast, reliable BRT in addition to East Colfax. You should be able to travel without a transfer from West Colfax to East Colfax.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>A transit alignment to bypass the dense urban center of downtown Denver (union station) would be a disaster and would result in poor ridership. Such an investment needs to be connected to places that have the most potential for high ridership. Suburban highways with park-n-rides will not ever product long lasting ridership. Downtown Denver actually has the potential for people to make an entirely car-free trip (especially since people from surrounding neighborhoods and suburbs can connect to downtown on existing transit), and to support car-free living that reduces emissions.</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>

Page	Date	Comment type	Name
160	7-Sep	Mark-up	Bryan Weimer
Appendix T: Greenhouse Gas Transportation Report			
3	15-Aug	Mark-up	Cory Gaines
8	15-Aug	Mark-up	Cory Gaines
11	15-Aug	Mark-up	Cory Gaines
15	15-Aug	Mark-up	Cory Gaines

Comment	Response
<p>For all the performance measures referenced below, compare and show/share the differences between this plan and the original 2050 RTP.</p>	<p>Thank you for your review of the 2050 RTP and providing comments. Performance measures are largely a comparison of observed data trends toward a future goal, neither of which have changed in the updated 2050 RTP. Many of the performance measures and targets (especially the federally required ones) are short-term in nature.</p>
<p>Why are our tax dollars for transportation being put to use for this purpose? Do we not pay them so we have functional transportation networks? Why has DRCOG not pushed back on CDOT more?</p>	<p>The Greenhouse Gas Transportation Planning Standard is one of several transportation strategies identified in Colorado's Greenhouse Gas Pollution Reduction Roadmap and is a key requirement established in the 2021 state transportation funding bill passed by the Colorado General Assembly.</p>
<p>Has anyone at DRCOG looked at RTD's past record of achievement (well, lack thereof) and wondered whether or not they're a sound investment of our money?</p>	<p>Thank you for your review of the 2050 RTP and providing comments.</p>
<p>People have made it very clear by repeated choices to drive themselves that this is what they wish. Why then is it that DRCOG is taking our tax dollars and putting it to uses besides roads?</p>	<p>The RTP is multimodal in its scope and covers all the ways people and goods travel. The vision outlined in the 2050 RTP is to create and maintain a multimodal and connected transportation network. Additionally, multiple project types are eligible for federal funding.</p>
<p>This strikes me as a role not traditionally given to government. I.e. how is it that this is the proper role of government--to intrude so far into our lives for the purpose of what they deem as the right way to live?</p>	<p>DRCOG staff evaluated mitigation measure concepts and strategies included in Policy Directive 1610 for their feasibility and applicability within the DRCOG metropolitan planning organization area. Many of the measures included in Policy Directive 1610 are already directly included in the 2050 RTP or could be modeled or addressed within the travel model. Therefore, DRCOG staff narrowed its focus to policy-oriented measures, such as land use, parking and other "non-project investment" measures.</p>

Page	Date	Comment type	Name
18	6-Sep	Mark-up	Sarah Grant
18	6-Sep	Mark-up	Sarah Grant
18	6-Sep	Mark-up	Sarah Grant
18	6-Sep	Mark-up	Sarah Grant

Comment	Response
Should planned rail stations be included for rail lines in 2050 RTP, including planned Northwest Rail stations?	RTD is currently leading a study on Peak Period Service for Northwest Rail and the selected geographies are only intended to be a proxy for reasonable estimates of where (and to what extent) mitigation measures could apply for calculating greenhouse gas reduction potential.
Why quarter mile for BRT and half mile for rail? Consider 1/2 mile for US 36 BRT as it has a different operational and land use context than urbanized arterial BRT. Additionally, please consider stations for 2050 RTP Transit Planning Corridors such as CO 7, US 287, as well as, CDOT I-25 Mobility Hubs as station areas.	The selected geographies are only intended to be a proxy for reasonable estimates of where (and to what extent) mitigation measures could apply for calculating greenhouse gas reduction potential.
How are existing urban centers defined? Why are emerging urban centers not included? City & County of Broomfield has four emerging urban centers that are not shown on the map. It seems important that land use and parking strategies should be considered in all identified DRCOG Urban Centers.	The selected geographies are only intended to be a proxy for reasonable estimates of where (and to what extent) mitigation measures could apply. DRCOG staff focused on existing urban centers for the sake of reasonableness, especially when applied to the 2030 gap to be mitigated. Including emerging urban centers would have added significant amounts of vacant land that could not be expected to develop by 2030. Regardless of the reasonableness assumptions for this analysis DRCOG staff are ready to assist local governments in the implementation of strategies inside or outside these mapped areas to help the region reduce greenhouse gas emissions.
How are future growth areas being accounted for future pedestrian focus areas/short trip opportunity zones?	Pedestrian focus areas were identified using a variety of factors, including DRCOG urban centers that are both existing and emerging. Short trip opportunity zones were identified using DRCOG's travel demand model data for the base and horizon (2040 at the time) years. These geographies will be updated in the coming years to include updated data sources.

Page	Date	Comment type	Name
18	6-Sep	Mark-up	Sarah Grant

*Coalition letter signatories

Marie Venner, **Colorado Small Business Alliance** and Steve Douglas, as former city council members and planning commissioners

Jan Brown, **Citizens' Alliance for a Sustainable Englewood**

Juan Roberto Madrid, Transportation Director, **Colorado GreenLatinos**

J.D. Ruybal, **Colorado Community Rights Network**

Miah Ntepp, Policy Director, **Denver NAACP**

Kristi Douglas, Co-chair, **North Range Concerned Citizens**

Fran Aguirre, President, **Unite North Metro Denver**

Trupti Suthar, **Sunnyside United Neighbors, Inc**

Thomas Lundy, Co-Chair of the **CDP Energy and Environment Initiative**

Philip Beck and Elizabeth Stacishin, Co-founders, **Indivisible Ambassadors**

Dr. David Mintzer, Hospitalist, on the board of **Colorado Physicians for Social Responsibility**

Bridget Walsh, **Greater Park Hill Community**

Dr. Velma Campbell and Jamie Valdez, Colorado Lead, Mothers Out Front

Paddy McClelland, Co-Chair, **Wall of Women**

Emmett Hobley, Co-Chair, **Montbello Neighborhood Improvement Association**

Shannon Francis, Director, **Spirit of the Sun**

Maura Stephens, Coordinating Committee, **System Change Not Climate Change**

Jim Smith, President, Golden Realty, Co-Chair, **Colorado Businesses for a Livable Climate**

Moshe Kornfeld, Coordinator, **Colorado Jewish Climate Action**

Fred Kirsch, Director, **Community for Sustainable Energy**

Comment	Response
<p>Could a larger buffer around bus/rail stations be suggested for moderate intensity changes and smaller radii for high intensity? Can DRCOG map out where strategies can be potentially applied in emerging urban centers, where growth is anticipated and multimodal corridors in the planning stages? This map can be helpful to support implementing strategies where growth is anticipated.</p>	<p>While the selected geographies are only intended to be a proxy for reasonable estimates for calculating greenhouse gas reduction potential, DRCOG staff are ready to assist local governments in the implementation of strategies.</p>
<p>Stefanie Klass, Co-Chair, Colorado Call to Action and CatholicNetwork</p>	<p>Harmony Cummings, Co-Founder, Green House Connection Center</p>
<p>Debbie Thornburg James, Mayfair Park Neighborhood Association Board</p>	<p>Jeff Hart, former U.S. Environmental Protection Agency staff member and Co-Founder of Save EPA</p>
<p>Nic Venner, Metro State Student and Our Children's Trust Juliana Plaintiff</p>	<p>Rev. Mark Meeks, Pastor, Capitol Heights Presbyterian Church</p>
<p>Amy Petré Hill, Founder and Community Chaplain, Mental Health & Inclusion Ministries</p>	<p>Sr. Anna Koop, Sisters of Loretto</p>
<p>Alfonso Espino, Coordinator, University of Colorado Accelerated Nursing Program and Denver Globeville-Elyria-Swansea Coalition staff</p>	<p>Rabbi Eliot J Baskin, D.Min, with Together Colorado</p>
<p>Rachael Lehman, Healthy Communities Chair, I-70/Vasquez Boulevard Citizens Advisory Committee</p>	<p>Paolo C. Solorzano of the Transit Riders Alliance, TRUST and Colorado Cross Disabilities Coalition</p>
<p>Yadira Sanchez, mother and longtime Denver resident Elyria Swansea community</p>	<p>Anna Ramirez, Working for Racial Equity and Southwest Organization for Sustainability</p>
<p>Renée M. Chacon, Executive Director/Co-Founder, Womxn from the Mountain</p>	<p>Dennis Wilwerding, President, Wilwerding Consulting and Littleton Business Alliance</p>
<p>Karen Bueno, Leaders Team, Accelerate Neighborhood Climate Action</p>	<p>Patrick Santana, Chair, Vibrant Littleton</p>

Appendix C: Key model outputs

Table 1. Baseline and GHG Action Modeling Outputs for MPO Boundary

		2025	
		Base	Action
Socioeconomic Data			
Population	3,579,146	3,581,763	3,785,097
Households	1,447,137	1,449,760	1,558,474
Employment	2,285,194	2,285,283	2,427,438
Vehicle and Transit Data – Typical Weekday			
Vehicle Miles Traveled (VMT)	89,682,621	84,413,140	96,297,646
VMT per capita	25.05	23.56	25.44
Person Miles Traveled (PMT)	125,490,607	118,738,780	135,151,753
PMT per capita	35.05	33.14	35.71
Average vehicle speed (mph)	35.97	37.12	35.48
Average vehicle trip length (mi)	8.84	8.94	8.92
Vehicle Hours Traveled (VHT)	2,494,574	2,274,771	2,714,228
Vehicle Hours Delay (VHD)	400,157	317,733	465,460
Transit boardings	373,096	339,157	476,948
Trip Mode Share			
Single occupancy vehicle	7,794,512	7,234,971	8,348,266
Shared ride trip	5,982,668	5,559,432	6,405,984
School Bus	245,348	222,625	243,538
Bicycle	220,888	358,675	232,257
Walk	1,347,359	1,938,258	1,463,460
Transit	265,239	267,462	321,376
Total Daily Trips	15,856,014	15,581,423	17,014,881
Lane Miles by Roadway Type			
Interstate	1,890	1,894	1,929
Expressway	476	476	482
Principal Arterial	4,206	4,205	4,445
Minor Arterial	2,693	2,693	2,732
Collector/Other (CC included)	8,712	8,712	8,727
Total Lane Miles	17,978	17,979	18,315
VMT by Roadway Type			
Interstate	34,343,430	32,878,504	36,671,282
Expressway	5,147,926	4,874,994	5,469,704
Principal Arterial	27,133,787	25,412,101	29,363,218
Minor Arterial	9,045,034	8,294,271	9,700,858
Collector/Other (CC included)	14,012,444	12,953,272	15,092,583
Total Lane Miles	89,682,621	84,413,141	96,297,645

2030		2040		2050	
	Action	Base	Action	Base	Action
	3,776,311	4,159,729	4,140,898	4,382,191	4,348,527
	1,558,656	1,728,921	1,726,703	1,844,824	1,839,296
	2,427,554	2,687,310	2,687,621	2,948,570	2,948,769
	90,228,400	108,206,129	99,479,208	118,314,127	108,369,631
	23.89	26.01	24.02	27.00	24.92
	127,551,977	152,132,871	141,387,016	166,422,152	154,515,131
	33.78	36.57	34.14	37.98	35.53
	36.78	34.81	36.45	34.12	35.83
	9.02	9.08	9.27	9.25	9.48
	2,453,093	3,108,478	2,729,089	3,467,330	3,024,211
	363,327	587,159	435,540	721,146	535,862
	456,975	574,836	529,783	647,314	625,950
	7,717,264	9,259,523	8,331,155	10,009,451	8,947,200
	5,916,371	7,069,963	6,271,214	7,561,293	6,643,433
	219,276	260,698	222,228	258,313	217,532
	375,969	253,605	384,535	264,251	406,277
	2,115,709	1,635,726	2,857,802	1,708,534	3,060,170
	339,391	381,132	415,013	424,240	486,666
	16,683,980	18,860,647	18,481,947	20,226,082	19,761,278
	1,940	2,073	2,045	2,084	2,045
	482	488	488	488	488
	4,441	4,899	4,900	4,935	4,900
	2,730	2,853	2,863	2,863	2,863
	8,727	8,744	8,744	8,744	8,744
	18,320	19,057	19,040	19,114	19,040
	35,083,155	40,785,141	38,468,590	44,799,037	42,153,693
	5,173,921	5,966,243	5,590,389	6,420,522	6,077,067
	27,312,073	33,305,345	30,298,966	36,285,219	32,736,501
	8,817,582	10,882,437	9,633,254	11,949,964	10,501,653
	13,841,670	17,266,962	15,488,008	18,859,384	16,900,717
	90,228,401	108,206,128	99,479,207	118,314,126	108,369,631

Appendix D: Focus model documentation

Introduction

The Denver Regional Council of Governments maintains the Regional UrbanSim Socio-economic Model and the Focus regional travel demand modeling system. Outputs from the Focus Model are used in the MOtor Vehicle Emission Simulator model by the Colorado Department of Public Health and Environment to calculate emissions of several pollutants:

- Greenhouse gas CO₂
- Ozone precursors: Nitrogen oxides and volatile organic compounds
- Particulate matter 10 microns or less

The Focus Model simulates the millions of trips made throughout the region on a typical weekday. It considers virtually all the types decisions considered by people when making choices on where, when and how to travel, whether for a two-block walk to the store, or a cross-region drive to visit relatives. Currently, about 15 million trips made by individuals are made every weekday. The Focus Model sums all travel to forecast how many vehicles will be driven on major roads: travel speed and delay, how many people will walk, ride a bicycle or use transit to get to where they want to go. To realistically simulate each person's daily household travel, the Focus Model simulates the many choices each person makes through activity-based model components including:

- 1) Where to work.
- 2) Where to go to school.
- 3) How many automobiles are available in the person's household.
- 4) How many trips each person makes in a day, and for what purposes.
- 5) Which trips are chained together within home-to-home tours.
- 6) The location where each individual trip begins and ends.
- 7) The travel mode used for each trip.
- 8) Which roadways or bus routes were chosen to reach each destination.

In addition to the activity-based model components for household travel, the Focus model also incorporates three add-on gravity models for:

- Commercial vehicle trips by light, medium and heavy-duty vehicles. This model reflects non-household vehicles used for everything from the hauling of large goods, construction materials and small packages to the provision of business and household services (e.g., electrical, plumbing, health care, landscaping). An estimated 1.7 million commercial vehicle trips are made within the region every day.
- External station trips starting or ending outside the DRCOG modeling area. This model represents trips that pass through the region (such as on I-25 from Colorado Springs to Fort Collins) and trips between the inside of the Denver region and outside (such as between Denver and Summit County).

- Denver International Airport trips – for trips not fully captured by the activity-based model components. Denver International Airport is unique in terms of the types of trips and vehicles: drop-offs/pick-ups, rental cars, shuttle vehicles and employees.

An UrbanSim model is used to forecast household and employment levels by small-area transportation analysis zones. The Focus Model considers many characteristics of people, such as their age, gender, employment status and income, as well as how the region's demographics will change over time. It also considers characteristics of the built environment, such as transit stops and stations, household and employment density, bicycling facilities, shared-use paths, sidewalks and walkability. The Focus Model creates an origin and destination for each trip (15 million weekday trips in the 2020 base model). Specific groupings of origins and destinations were initially estimated based on detailed data from a 1998 survey called the Travel Behavior Inventory. In 2016, the Focus Model was recalibrated using more recent data sources including roadway counts, transit boardings, American Community Survey Census data and results from the following surveys:

- The 2010 Front Range Travel Counts Household Survey – a survey of over 12,000 households along the Colorado Front Range, including 7,000 in the Denver region, using a format similar to the 1998 Travel Behavior Inventory described above.

In 2020 and 2022, further refinements were made to the Focus Model based on additional results of the 2010 Front Range Travel Counts Survey, the 2016 Commercial Vehicle Survey and RTD's updated 2018 Regional On-Board Survey. (See the Calibration Report at <https://drcog.org/sites/default/files/resources/Focus%202.3.1%20Calibration%20Report.pdf>)

The final trip assignment outputs of Focus were validated against traffic counts, operating travel speed observations, and RTD ridership data to make sure the overall regional travel patterns being forecasted were reasonable. (See the Validation Report at <https://drcog.org/sites/default/files/resources/Focus%202.3.1%20Validation%20Report.pdf>.)

- The Regional Transportation District's 2008 Regional On-Board Transit Survey – a questionnaire handed out to light rail and bus travelers to understand transit travel patterns and choice factors. The survey contains information on almost 24,000 transit trips.

Regional socioeconomic forecasts

DRCOG staff uses county-level forecasts of population, households and employment produced by the Colorado State Demography Office as the basis for future growth reflected in the Focus Model. Table 1 shows the population, household and employment forecasts by model staging years for the DRCOG full region and the metropolitan planning organization area.

Table 1: Population, household, and employment forecasts

	Model Area	DRCOG	MPO
2025			
Population	3,655,852	3,609,906	3,583,810
Households	1,513,712	1,497,432	1,486,067
Employment	2,343,134	2,320,916	2,308,241
2030			
Population	3,855,518	3,805,523	3,776,311
Households	1,588,772	1,570,673	1,558,656
Employment	2,467,276	2,440,736	2,427,554
2040			
Population	4,232,276	4,174,425	4,140,898
Households	1,761,980	1,740,370	1,726,703
Employment	2,733,137	2,702,026	2,687,621
2050			
Population	4,456,092	4,386,631	4,348,527
Households	1,882,036	1,854,938	1,839,296
Employment	3,000,648	2,964,774	2,948,769

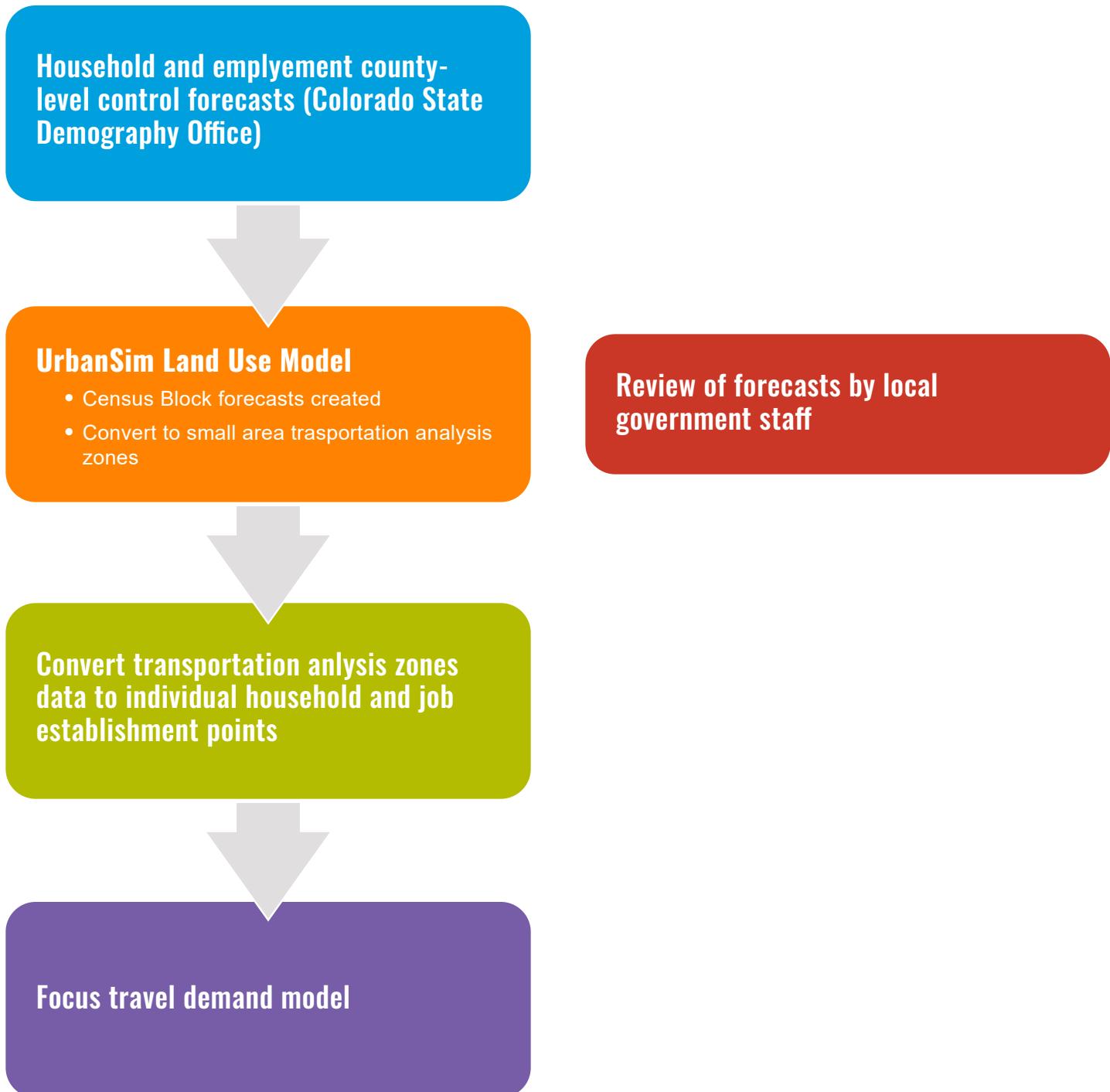
Small area development forecasts

To provide household and employment data at a level of detail necessary for the travel model, the regional socioeconomic forecasts are disaggregated into 2,800 transportation analysis zones, as shown in Figure 1. The allocation of households and employment to transportation analysis zones is carried out within the UrbanSim model based on the dynamics of urban land markets and the simulated decisions of land developers and residential and commercial land customers. The UrbanSim model considers questions such as:

- What parcels of land are profitable for development, and for what uses?
- What is the level of transportation accessibility?
- Where should a firm locate to conduct its business in accordance with zoning regulations, and with suitable transportation access to workers, supplies and finished product markets?
- Does a family's current residence continue to meet its needs and be convenient to jobs, schools and other activities, or should the family move to a "better" location?
- What size and types of residence does a family need based on the number and ages of its members and its household income?
- Where are designated open spaces, parks and other undevelopable lands located?

The UrbanSim model outputs are used in a population synthesizer that creates a descriptive database record for each household in the region (about 1.4 million records for 2020) and each person (about 3.4 million records in 2020). Figure 2 shows a flowchart for the process of socioeconomic forecasting in the Denver region.

Figure 2: Socioeconomic model elements and flow



Focus Model process overview

Figure 3 shows a simplified diagram of how the Focus Model components flow after the socioeconomic forecast has been completed.

First, travel time and cost information between zones are calculated by travel mode and time of day. Tours are the first travel elements to be created. Figure 4 shows a diagram depicting an example set of tours for a person in one day, including intermediate stops.

The model runs through a set of steps for each tour, including activity generation, location choice, mode choice and time of day choice model components. Then the model runs through a parallel set of model components for each trip within a tour.

A key use of the model is to estimate the travel patterns that result from before and after changes to model network facilities or inputs. Such changes can be made to population/employment, road/transit projects, cost of transportation fuels, fares, and services and many other model factors. The model is designed to estimate varying output values (e.g., traffic volume, delays and ridership) due to people in the model adjusting travel paths, travel modes, and travel demand due to the model changes mentioned above. This includes newly induced trips or trips to destinations further away. For a new transportation project(s) the model clearly depicts:

- Diversion of existing (assigned) trips between different roadway paths or transit routes.
- Mode shift of trips between driving, auto passenger, transit, walk and bicycle.
- Increase in traffic volume or transit ridership due to planned household and employment developments.
- Induced new trips or longer trips due to significant changes in travel time.
- Induced trips associated with changes in the location or timing of developments (new housing units or employment establishments), within the limits of state established demographic control totals.

Figure 3: Focus activity-based model elements

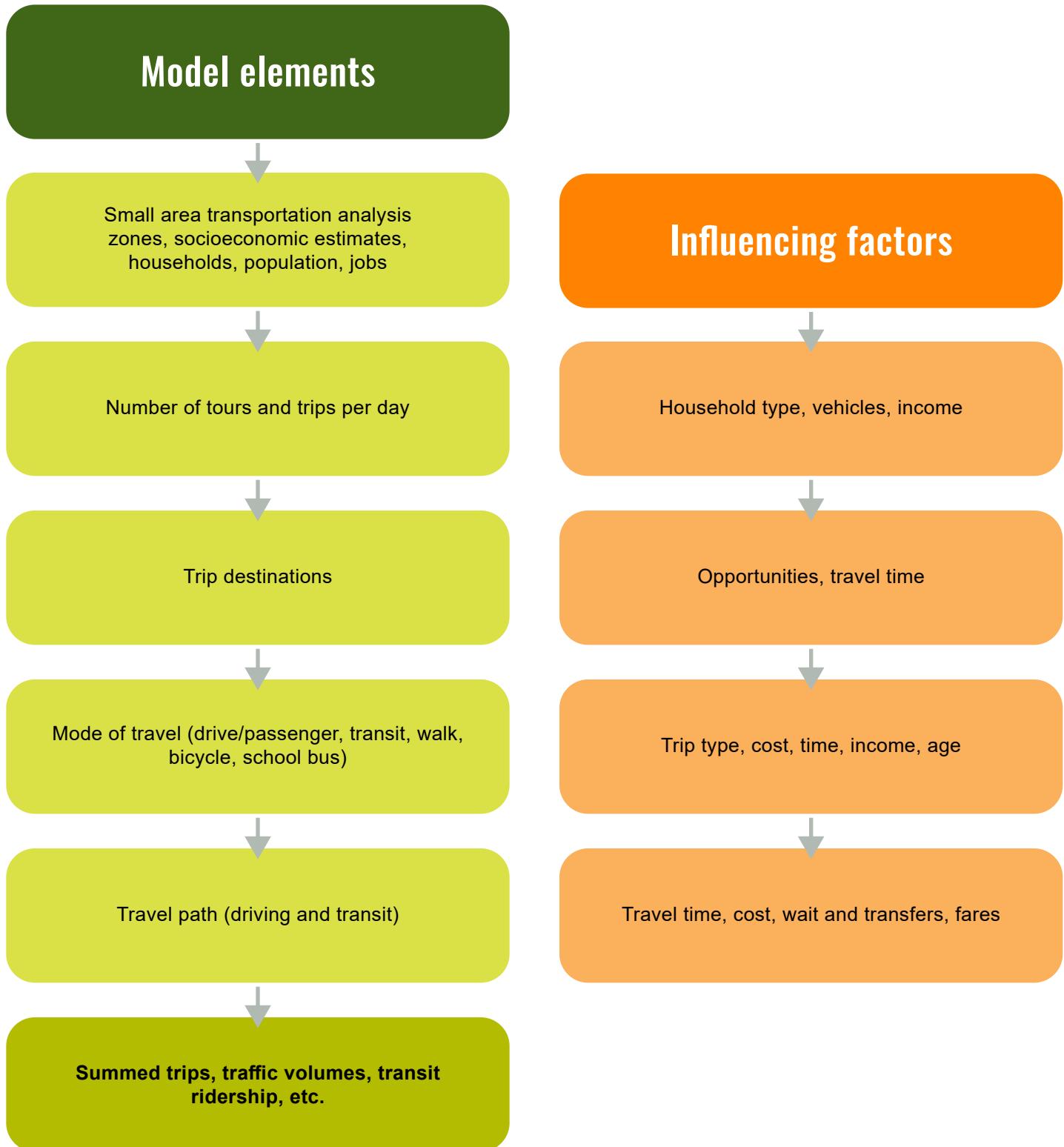
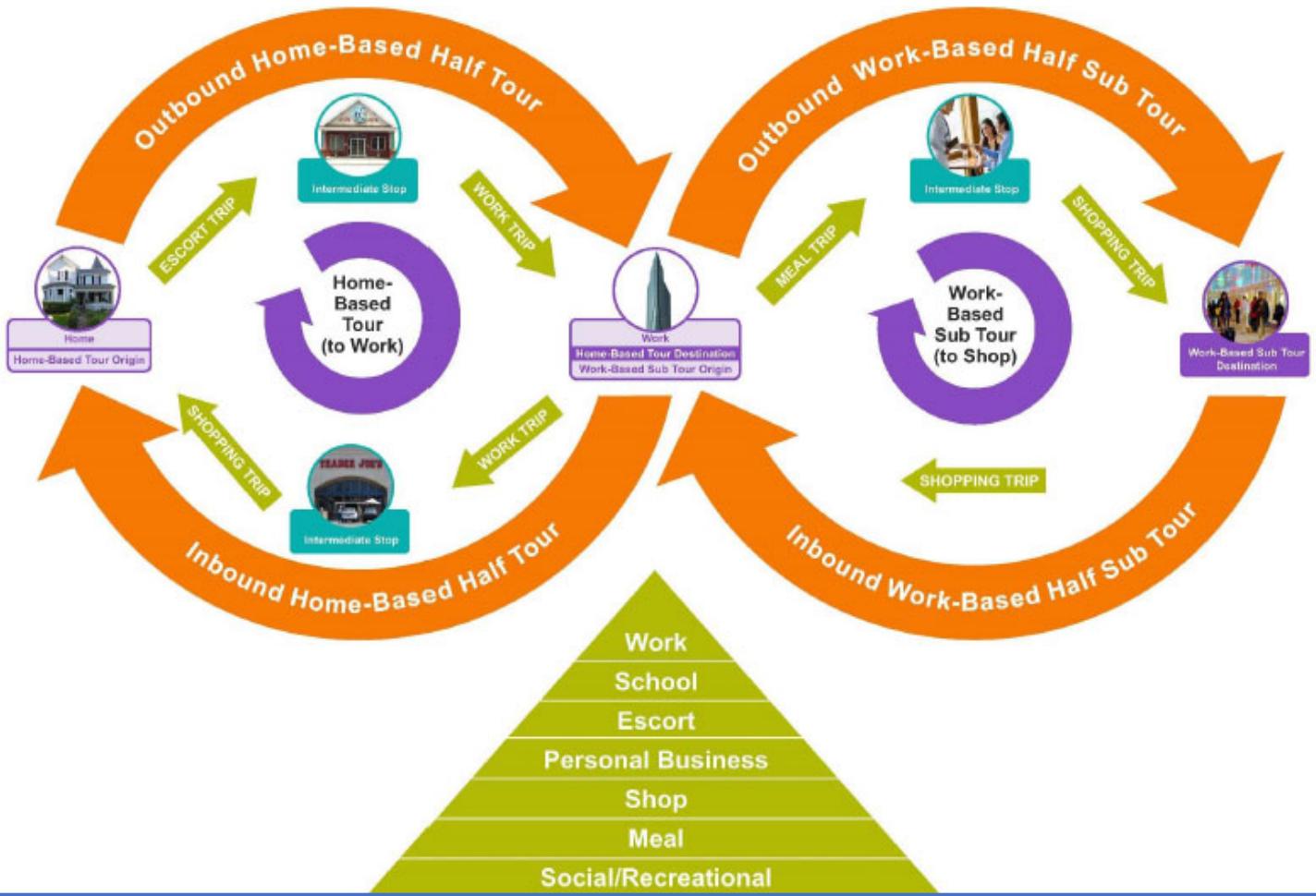


Figure 4: Sample tour diagram



Roadway and transit system

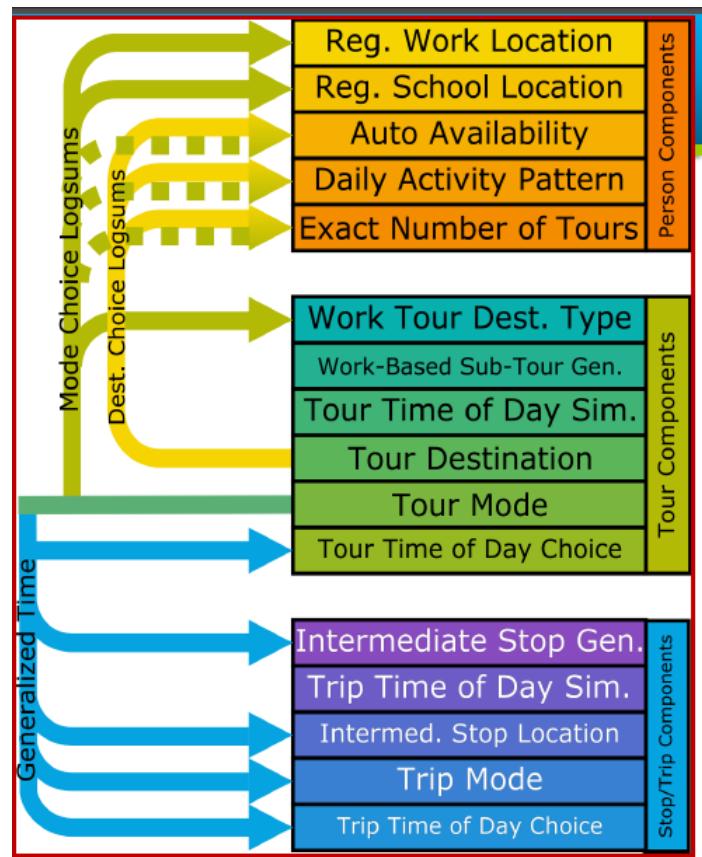
The most critical feature of the model is the representation of the transportation system. The roadway network is represented by over 25,000 directional road segments, described by location, length, number of lanes, functional classification and area type. High-occupancy vehicle and managed lanes also are represented as special links. Tollway links are assessed an additional cost impedance to reflect toll charges. The model also includes a fully detailed representation of transit facilities, including all bus and rapid transit lines, Park-n-Ride lots, bus stops, stations and walk access/egress routes. Bus routes follow the same roadway network as auto trips, and bus travel speeds are based on auto speeds. Bus rapid transit facilities use a formula to reflect less delay time than general purpose lane auto travel. Overall transit travel time also includes access, wait and transfer time. Rail speeds are developed based on transit schedule information. Capture areas for Park-n-Ride lots are quite broad, permitting trip-makers in the model to select the lot that produces the most convenient overall transit path to their destination. As part of the process of estimating roadway and transit use, minimum impedance travel paths are calculated using time, distance, fares, tolls and other operating costs.

Model components

The most important model components are briefly described in the sections below, and Figure 5 lists all model components. Most model components are multinomial logit or nested logit models, which are statistical models that have two or more discrete choice outcomes.

Figure 5: Key focus model components (Activity Based Model components in red italics)

- 1) TransCAD model software initialization
- 2) Size sum variable calculator
- 3) TransCAD trip generation
- 4) TransCAD skimming (path selection)
- 5) TransCAD airport, commercial vehicle, and external travel distribution and mode choice
- 6) *Regular workplace location*
- 7) *Regular school location*
- 8) *Auto availability*
- 9) *Aggregate destination choice log sum generation*
- 10) *Daily activity pattern*
- 11) *Exact number of tours*
- 12) *Work tour destination type*
- 13) *Work-based subtour generation*
- 14) *Tour time of day simulation*
- 15) *Tour primary destination choice*
- 16) *Tour priority assignment*
- 17) *Tour main mode choice*
- 18) *Tour time of day choice*
- 19) *Intermediate stop generation choice*
- 20) *Trip time of day simulation*
- 21) *Intermediate stop location choice*
- 22) *Trip mode choice*
- 23) *Trip time of day*
- 24) Write trips to TransCAD
- 25) TransCAD highway and transit assignment



Roadway and transit skims (path selection)

Representative roadway and transit paths are initially used for all origin-destination transportation analysis zone pairs (2,800 zones by 2,800 zones) and each of the ten time-of-day periods. The paths consider travel time, travel cost and other factors. The time and cost matrices are used extensively in later model components such as location choice, mode choice and time of day choice.

Denver International Airport/commercial vehicle/internal-external/external-external vehicle trips

After optimal paths are identified via the skims, three additional Compass Gravity Model components must be run to generate and assign:

- 1) Trips to and from Denver International Airport
- 2) External trips to, from and through the DRCOG region
- 3) Commercial vehicle trips.

Regular workplace and school location

The work location choice model assigns all regional workers a regular work location transportation analysis zone and point. Characteristics of the worker and their home location are used in combination with other characteristics to determine the relative attractiveness of each transportation analysis zone.

The regular school location choice model assigns each student a regular school location associated with a transportation analysis zone. The model uses information about the student, such as income and age and information such as total school enrollment and distance from home to determine which schools will be attractive for students. There are four school location choice models by student grade level: pre-school, kindergarten-8th grade, 9th-12th grade and university. Four separate models are used to reflect the widely differing characteristics of school location decision making associated with each of the four grade ranges. The models are all multinomial logit with the choice being the location of the school zone.

Auto availability choice

The auto availability choice model is a multinomial logit model that selects number of automobiles available for each household in the region. The choices range from zero cars to 4-plus cars. The model uses information about households such as income, household size and household accessibility to work and school to determine how many autos are available to households.

Tour models

After the Focus Model has assigned the long-term decisions about work and school locations and auto availability, it forecasts daily activities of chained trips that start and end at home, known as tours.

The **daily activity pattern** model determines which combinations of up to seven purposes (work, school, escort a family member, personal business, shopping, dining and social or recreational) a person will make tours or stops along a tour.

The **exact number of tours** model determines how many tours of each type each person will make in his or her day. The tour types predicted for each person include: work, school, escort, personal business, shop, meal and social recreation.

The **work tour destination** type model determines whether a person making a work tour will travel to his or her usual work location, or somewhere else, perhaps to meet with clients or customers, or for off-site training. If the regular workplace is selected, this information is entered into the tours table in the database.

Work-based subtour generation determines whether someone will leave their regular workplace and return during the middle of the day. For example, a person may be eating out, running errands or attending meetings. After this point, the Focus Model treats work-based subtours similarly to home-based ones.

In reality, a person might consider the interactions of destination, mode and departure time choices together in creating an itinerary for the day's travel and activities. Despite its complexity, the Focus Model needs to have some simplifying assumptions to make its mathematical relationships and software workable.

Tour time of day simulation is one such simplification, allowing destination and mode choices to be modeled as if the time of travel is known (so the right time and cost matrices can be used) as an initial guess. The simulated times of days are based on observed survey distributions. The later **tour time of day choice** confirms whether the initially simulated time of day was reasonable, or whether a shift earlier or later might be justified.

The **tour primary destination choice** model selects the destination of tour based the development (e.g., jobs and households) located within the zone. It then assigns a point within each zone as the final destination.

After the tour destination is known, the **tour main mode choice** model predicts the main travel mode used on the tour. The mode chosen is based on the impedances associated with each mode from the tour origin to the tour destination, zonal characteristics such as density, travel mode facilities, and demographic person characteristics. The tour main mode is used for most of the distance of the tour, but not necessarily for all trips. For example, if a parent is driving a child to school, the return trip would, necessarily, be driving alone. In other cases, stops along a tour might be close enough that walking or bicycling would be more attractive than a motorized tour mode. The tour and trip modes are related by rules of precedence used to simplify the Focus Model.

Given the known tour origin, destination and mode from previous models, the **tour arrival and departure time model** predicts the time arriving at the primary destination of the tour and the time leaving the primary destination, both to within one-hour periods.

Trip models

After the tour-level models are run, a series of trip-level models are run. The first trip level model is the **intermediate stop generation** model, which determines the number of intermediate stops on each tour, if any.

As with the tour models, there is a **trip time of day simulation** component to simplify the location and mode choices that are modeled next.

The **intermediate stop location choice** model selects the zone for each intermediate stop. The locations of all intermediate stops on tours are modeled one at a time, first for stops from home to the primary activity and then for stops from the primary activity to home.

The **trip mode choice** model determines the mode of travel for all trips. The tour mode is used in combination with skim data, zonal data, and person data to determine the modes for each trip on these tours.

Given the origin, destination and mode of each trip, the **trip time of day choice** model predicts the time each intermediate stop will occur. The trip time of day choice model has 24 alternatives corresponding to each hour period.

After the trip models have been run, the following information is known for every trip internal to the region:

- Origin and destination zone and point location.
- Trip purpose (work, school, escort, personal business, shop, social recreation).
- Trip mode (driving alone, shared ride of two individuals, shared ride of three or more individuals, walk to transit, drive to transit, walk, bicycle, school bus).
- Trip time of day (one of 24 hours).
- Which tour the trip is part of.
- Which person made the trip.
- What household the person who made the trip belongs to.

The **write trips to TransCAD** component assembles the individual records for auto and transit trips into origin-destination trip tables (matrices) that Transportation Computer Assisted Design can use for assignment. These trip tables are then combined with those developed for DEN, commercial vehicle, internal-external, external-internal and external-external trips developed earlier.

Network assignment

Household vehicle, airport trips, internal-external trips, commercial vehicle trips and external-external trips are assigned to the roadway network via a “user equilibrium” algorithm. The user equilibrium process assigns the trips between each origin and each destination transportation analysis zone in such a way that, by the end of the process, no trip can reduce its travel time by changing its path. The process accounts for the congestion produced by all other trips in the region, each trip is following its minimum path. High-occupancy vehicles are loaded simultaneously with single-occupant vehicles. During this process, TransCAD keeps track of which vehicles are eligible to use high-occupancy vehicle facilities, and which might need to pay a toll to use high-occupancy/toll lanes, such as the reversible I-25 express lanes north of downtown Denver. The model also accounts for the effect of toll costs in roadway route choice by converting toll costs into equivalent time cost using an estimated value of time for automobile trip-makers.

Transit assignment is performed separately, using an all-or-nothing algorithm that does not account for the possibility that high demand or crowding on some transit routes may motivate some riders to shift to other routes. RTD has special modeling tools that allow them to use Focus Model forecasts for more detailed operational planning.

Finally, the model is run through several iterations, feeding back the output speeds from roadway assignment to the input stages that require them as input (among them, the trip distribution stage) until the output speeds and the input speeds match closely enough.

Core model outputs

Final core model results for the base validation year and future reporting years are presented below. Detailed output results are shown in Appendix A. Once comparisons were made of model results against the observed datasets, each model component was calibrated. The calibration involved changing the coefficients describing the mathematical models and travel and adding variables. Then the model was re-run, results compared again, and modifications made again. This process was repeated until satisfactory results were achieved.

The major regional level model results of the validation review for 2020 are shown in Table 3 and Table 4.

Note the 2020 values actually represent the time and travel patterns prior to the COVID-19 pandemic. These tables demonstrate that the aggregate model results reflect the observed representative counts and transit boardings sufficiently well. When summed over the region, the links with observed traffic counts were observed to carry about 28.0 million vehicles per weekday. The sum of Focus Model estimates was within 1% difference.

Table 3: Sum of 2020 weekday observed traffic counts and modeled volumes

	2019/2020 Observed counts (Sum of vehicle miles traveled)	2020 Model link volume (Sum of vehicle miles traveled)	Model variation
Colorado Department of Transportation roadways with counts	17,077,000	17,023,000	0.3%
Highway Performance Monitoring System roadways with counts	24,110,000	23,477,000	-2.6%
Highway Performance Monitoring System urbanized area network estimate	67,381,400	72,256,000	7.2%
All model links with counts	30,341,000	29,464,000	-2.9%

Table 4: Observed estimates and modeled 2020 transit weekday boardings

	2019 observed (est.)	2020 modeled	Model variation
RTD boardings	373,000	393,000	5.4%
RTD trips	261,000	264,000	1.1%

Air quality modeling

Formal air pollutant emissions modeling is conducted by the Colorado Air Pollution Control Division for transportation conformity purposes and by DRCOG for greenhouse gas emission analyses. DRCOG, the Air Pollution Control Division and other agencies work closely together in this effort, both in developing the modeling techniques, assumptions, and parameters and in executing the model runs. Modeled link speed and vehicle miles traveled results from the Focus Model are principal inputs to the MOtor Vehicle Emission Simulator air pollutant emissions model. The model produces estimates of the amount of emissions of greenhouse gases, carbon monoxide, volatile organic compounds, oxides of nitrogen and particulate matter generated by motor vehicles. The results are then combined with numerous assumptions concerning meteorology and atmospheric chemical reactions to produce air pollutant concentration estimates.

Appendix E: Methodology to calculate greenhouse gas emissions using the Motor Vehicle Emission Simulator

Introduction

This appendix summarizes the methodology used to calculate greenhouse gas emissions for the DRCOG metropolitan planning organization area, using emission rates from the Environmental Protection Agency's MOtor Vehicle Emission Simulator (MOVES).

MOVES is a state-of-the-science emissions modeling system that estimates air pollution emissions for criteria air pollutants, greenhouse gases and air toxics. MOVES estimates emissions from on-road vehicles such as cars, trucks and buses, accounting for the phase-in of federal emissions standards; vehicle and equipment activity; fuels; temperatures; humidity; and emission control activities such as inspection and maintenance programs.

In Colorado, the Air Pollution Control Division, a branch of the Colorado Department of Health and Environment, develops the locally defined inputs to MOVES, which is run to establish over 47,000 unique emission rates for each combination of month, hour, road type, speed and vehicle type. The emission rates are then multiplied by distances, total vehicle volumes, volumes per time period, and speeds per time period outputs from DRCOG's Focus travel demand model in a relational database, resulting in a greenhouse gas emissions inventory of surface transportation.

To develop baseline and compliance greenhouse gas emission inventories for the state's Greenhouse Gas Planning Standard, Air Pollution Control Division staff created versions of relational databases for each compliance year (2025, 2030, 2040 and 2050) and provided them to DRCOG. Air Pollution Control Division staff trained DRCOG staff on the methodology to perform the greenhouse gas emissions analysis on Feb. 23, 2022, and, per agreement, is authorized to perform the greenhouse gas emissions analysis for compliance with the rule. In the event of an update to the MOVES relational database, Air Pollution Control Division staff will notify DRCOG staff when there are updates to the MOVES relational database including input assumptions. DRCOG staff will be retrained as necessary to perform greenhouse gas emissions analysis.

The MOVES documentation that follows was developed by the consultant Felsburg Holt & Ullevig on behalf of the Colorado Department of Transportation and has not been modified by DRCOG staff. It describes the inputs and methodology used to create the MOVES relational databases.



MEMORANDUM

TO: Ms. Marissa Gaughan, CDOT Multimodal Planning Branch Manager

FROM: Dale Tischmak and Jake Fritz

DATE: January 21, 2022

SUBJECT: DRAFT MOVES3 Greenhouse Gas Modeling Methodology (117429-32)

Introduction

This document summarizes the methodology used to calculate greenhouse gas (GHG) emissions for the CDOT Statewide Travel Demand Model (TDM). Previous GHG modeling to support CDOT was conducted by APCD. This methodology replicates APCD's modeling process as best as possible.

For more information about GHG modeling using MOVES, see the *Using MOVES for Estimating State and Local Inventories of On-road Greenhouse Gas Emissions and Energy Consumption* guidance document linked to in the references (i.e., EPA 2016).

The process begins with generating emission rates using the EPA's Motor Vehicle Emission Simulator version 3.0.1 (MOVES3). The emission rates are multiplied by the vehicle miles traveled from the TDM. The result is an emissions inventory. A series of data engineering steps are required to prepare the rates and VMT into desirable and compatible formats.

MOVES3 Run Specifications

The run specification (RunSpec) parameters outlined below were used to calculate GHG emission rates with MOVES. They are consistent with APCD's process to calculate GHG emissions.

The four modeled years 2025, 2030, 2040, and 2050 used the same run specifications except for where specified (e.g., the year being modeled). Each of the four modeled years has six related run specifications to separate the emission rates by vehicle type, as described in the On-road Vehicles section.

Scale

The "Scale" parameters define the model type (on-road or non-road), domain/scale, and calculation type.

Model Type

On-road was the model type selected. This estimates emissions from motorcycles, cars, buses, and trucks that operate on roads.

Non-road/off-network emissions were not included. These emissions are from equipment used in applications such as recreation, construction, lawn and garden, agriculture, mining, etc. and are outside of the scope of this analysis.

Domain/Scale

MOVES allows users to analyze mobile emissions at various scales: National, County, and Project. While the County scale is necessary to meet statutory and regulatory requirements for SIPs and transportation conformity, either the County or National scale can be used for GHG inventories. EPA recommends using the

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County scale for GHG analysis. The County scale allows the user to enter county-specific data through the County Data Manager. Providing local data significantly improves the precision of the modeling results (EPA 2016).

The County scale was used.

Calculation Type

MOVES has two calculation types - Inventory (total emissions in units of mass) or Emissions Rates (emissions per unit of distance for running emissions or per vehicle for starts and hotelling emissions) in a look-up table format must be post-processed to produce an inventory. Either may be used to develop emissions estimates for GHGs (EPA 2016).

The Emission Rates calculation type was used.

Time Span

The “Time Span” parameters define the years, months, days, and hours that emissions are calculated.

When Emission Rates is chosen, users may choose to approach the selection of options in the Time Spans Panel differently than when running MOVES in Inventory mode. For example, when modeling running emission rates, instead of entering a diurnal temperature profile for 24 hours, users can enter a range of 24 temperatures in increments that represent the temperatures over a period of time. By selecting more than one month and using a different set of incremental temperatures for each month, users could create a table of running emission rates by all the possible temperatures over an entire season or year (EPA 2016).

When using Emission Rates instead of Inventory, the time aggregation level is automatically set to Hour and no other selections are available. Pre-aggregating time does not make sense when using Emission Rates and would produce emission rates that are not meaningful (EPA 2016). However, the year, month, and day must still be specified and will affect the emission rates calculated.

The time span parameters specified below were also used because the TDM outputs represent an annual average weekday.

Years

The County scale in MOVES allows only a single calendar year in a RunSpec. Users who want to model multiple calendar years using the County scale will need to create multiple RunSpecs, with local data specific to each calendar year, and run MOVES multiple times (EPA 2016).

The years used were 2025, 2030, 2040, and 2050. Emission rates for each of these years were calculated separately. This accounts for information such as a changing age distribution of vehicles and their corresponding fuel efficiency.

Months

MOVES allows users to calculate emissions for any or all months of the year. If the user has selected the Emission Rates option, the Month can be used to input groups of temperatures as a shortcut for generating rate tables for use in creating inventories for large geographic areas (EPA 2016).

The months used were January and July to match the process described by APCD. These represent winter and summer months and generally the extremes in annual weather conditions. This accounts for changes in fuel efficiency between warm and cold temperatures throughout the year. The arithmetic averages of emission rates from January and July were used for the final emissions inventory.

Days

Weekdays and weekend days can be modeled separately in MOVES. MOVES provides the option of supplying different speed and VMT information for weekdays and weekend days to allow the calculation of separate emissions estimates by type of day (EPA 2016).

The days used were weekdays to match the TDM output data. These represented the emission rates for an average weekday. The results were escalated later to approximate a full year.

Hours

The hours used were all 24 hours of the day (i.e., clock hours of 1 AM, 2 AM, 3 AM, etc.). These represent the emission rates for individual hours of a day. This accounts for changes in fuel efficiency between warm and cold temperatures throughout the day.

Geographic Bounds

The “Geographic Bounds” parameter defines the county(s) used. For a county-scale run, only one county can be selected per RunSpec. The county used was Adams County, Colorado. The county defines input parameters such as the meteorology data used to estimate emission rates.

On-road Vehicles

MOVES describes vehicles by a combination of vehicle characteristics (e.g., passenger car, passenger truck, light commercial truck, etc.) and the fuel that the vehicle is capable of using (gasoline, diesel, etc.). The [Panel] is used to specify the vehicle types included in the MOVES run (EPA 2016).

The “On-road Vehicles” parameter defines the source types (i.e., vehicle types) and their fuels (gasoline, diesel, electricity, etc.). All combinations of vehicle types and fuels available in MOVES3 were used to calculate the emission rates. APCD’s process, which was being followed, assigns TDM mileage based on a modified HPMS category. To calculate aggregate emission rates for each HPMS category (i.e., merging all of the relevant source types and fuel types), each of the six HPMS categories used a separate RunSpec. It is important to note that APCD’s modified HPMS category does not match the MOVES HPMS types for source types 21, 31, and 32. When this methodology document refers to HPMS categories, it is generally referring to APCD’s HPMS categories. The figure below illustrates the HPMS categories.

A	B	C	D	E
sourceTyp	sourceTypeName	HPMSVtypeID	HPMSVtypeName	HPMS from APCD
1	11 Motorcycle	10	Motorcycles	10
3	21 Passenger Car	25	Light Duty Vehicles	20
4	31 Passenger Truck	25	Light Duty Vehicles	30
5	32 Light Commercial Truck	25	Light Duty Vehicles	30
6	41 Other Buses	40	Buses	40
7	42 Transit Bus	40	Buses	40
8	43 School Bus	40	Buses	40
9	51 Refuse Truck	50	Single Unit Trucks	50
10	52 Single Unit Short-haul Truck	50	Single Unit Trucks	50
11	53 Single Unit Long-haul Truck	50	Single Unit Trucks	50
12	54 Motor Home	50	Single Unit Trucks	50
13	61 Combination Short-haul Truck	60	Combination Trucks	60
14	62 Combination Long-haul Truck	60	Combination Trucks	60

Road Type

The Road Type Panel is used to define the types of roads that are included in the run. MOVES defines five different road types as shown in Table 3-1. Generally, all road types should be selected including Off-Network. Selection of road types in the Road Type Panel determines the road types that will be included in the MOVES run results (EPA 2016).

Table 3-1: MOVES Road Types

Roadtypeid	Road type	Description
1	Off-Network	Locations where the predominant activity is vehicle starts, parking and idling (parking lots, truck stops, rest areas, freight or bus terminals)
2	Rural Restricted Access	Rural highways that can be accessed only by an on-ramp
3	Rural Unrestricted Access	All other rural roads (arterials, connectors, and local streets)
4	Urban Restricted Access	Urban highways that can be accessed only by an on-ramp
5	Urban Unrestricted Access	All other urban roads (arterials, connectors, and local streets)

All road types available in MOVES3 were used.

Pollutants and Processes

The Pollutants and Processes Panel allows users to select from various pollutants, types of energy consumption, and associated processes of interest. In MOVES, a pollutant refers to particular types of pollutants or precursors of a pollutant but also includes energy consumption choices. Processes refer to the mechanism by which emissions are released, such as running exhaust or start exhaust. Users should select all relevant processes associated with a particular pollutant to account for all emissions of that pollutant. Generally, for this project, that includes running emissions.

The CO2 Equivalent pollutant is the sum of the global warming potential of other greenhouse gases expressed as a unit of CO2 (EPA 2016) and CO2 Equivalents (CO2e) is the pollutant of interest for these GHG calculations. MOVES requires several other prerequisite pollutants for CO2e; however, only the emission rates for CO2e were needed for this project.

General Output

The “General Output” parameters define the output database, units, and activity.

Output Database

Results from the six related HPMS RunSpecs for a single emissions year can be stored in a single output database for convenience. The RunSpecs must have the same units and aggregation (EPA 2016). A different output database is needed for each year of emission rate calculations. A consistent and informative naming convention for all output databases is very valuable.

One output database was used for each year modeled (i.e., 2025, 2030, 2040, and 2050). Each output database contained results for six RunSpecs, where each RunSpec represented a different APCD HPMS type. The naming convention FHU used was as follows:

[firm]_[pollutant]_[year][region]_[description]_[database type]

[firm] = The company or agency performing the analysis.

[pollutant] = The pollutant(s) of interest.

[year] = The year that emission rates were generated for.

[region] = The geographic area that emission rates were generated for.

[description] = An abbreviated description of relevant notes for the RunSpec.

[database type] = Whether the database was an input or output database.

For example, the database “fhu_ghg_2025sw_wev_in” represented an input database for greenhouse gases, the year 2025, the Statewide Transportation Plan, with electric vehicles, and was performed by FHU.

Units

Users are free to choose any of the mass unit selection options but should generally choose a unit whose magnitude is appropriate for the parameters of the RunSpec (EPA 2016).

The units used for models were grams for mass, joules for energy, and miles for distance.

Activity

MOVES allows the user to select multiple activity output options (e.g., distance traveled, population, etc.). For Emission Rate calculations, distance and population are reported automatically, but the values in the output are intermediate steps in the rate calculation and do not represent the true activity (EPA 2016).

When calculating emission rates (as opposed to emission inventories), MOVES selects the activities hoteling hours, population, and starts without the option of changing them.

Output Emissions Detail

This panel allows the user to select the amount of detail provided in the output database. Certain selections on this panel are made by the MOVES software and cannot be changed, based on selections made on earlier panels. The more boxes checked on this panel, the more detail and segregation provided in the MOVES output database. More detail generally is not helpful for this process so no optional selections should be checked on this panel. For example, if Source Use Type were selected on this panel, emission rates for each of the MOVES vehicle Source Use Type categories would be reported in the output database, which would defeat the purpose of performing MOVES calculations based on consolidated HPMS category.

No optional aggregation selections were made on this panel. Source type detail was captured via the six HPMS RunSpecs for each year modeled, as described in the On-road Vehicles section. Since multiple source types were used for HPMS 30, 40, 50, and 60, emission rates were aggregated for into HPMS categories. That is, emission rates for MOVES source types 31 and 32 were aggregated into the HPMS 30 RunSpec, etc.

Input Database/County Data Manager

After completing the RunSpec, the next step is to supply MOVES with data to create an input database that is the basis for the emission rate calculations. When using the County scale, the County Data Manager (CDM) is used to create an input database and populate it with local data. Modelers can either rely on MOVES default information or local data that the user inputs, as is appropriate for the goals of the MOVES modeling. The data contained in the MOVES default database are typically not the most current or best available for any specific county. Therefore, with the exception of fuels, EPA recommends using local data for MOVES for GHG analyses when available to improve the accuracy of GHG emissions estimates. However, the MOVES default data (county level) may be the only or best source of that data readily available. Also consider that data consistency may be more important than data perfection for some GHG analyses. At a minimum, EPA strongly

encourages the use of local VMT and vehicle population data. EPA believes these inputs have the greatest impact on the quality of results. However, if local data are not available, MOVES default data may be useful for some inputs without affecting the quality of the results (EPA 2016).

In Emissions Rates mode, a full gamut of input data must be provided, described below, for MOVES to run. Some of these inputs actually do not affect the ultimate emission rates (they would affect inventory mode output) but reasonable inputs in the CDM should be used for general data integrity. As a general rule, users should input accurate activity for the scenario being modeled regardless of whether MOVES is being used in Inventory or Emissions Rates mode (EPA 2016).

The “Create Input Database” parameters define the region-specific inputs such as distributions of road types, vehicle age distributions, and meteorology data. The parameters specified in RunSpecs pre-populate the input database with default data for some of the parameters. However, region-specific data should be used when available and not all parameters have default data.

One comprehensive input database was created for each year modeled. Each of the six HPMS RunSpecs for that year used that single input database and were saved to a single output database. The input data were entered with the MOVES County Data Manager window, as specified below.

Age Distribution

A typical vehicle fleet includes a mix of vehicles of different ages, referred to as Age Distribution in MOVES. MOVES covers a 31 year range of vehicle ages, with vehicles 30 years and older grouped together. MOVES allows the user to specify the fraction of vehicles in each of 30 vehicle ages for each of the 13 source types in the model. For estimating on-road GHG emissions, EPA recommends and encourages states to develop age distributions that are applicable to the area being analyzed (EPA 2016).

APCD has developed a vehicle age distribution, and it was used for each year modeled.

Average Speed Distribution

This input is more important for Inventory than Emission Rates. Vehicle power, speed, and acceleration have a significant effect on vehicle emissions, including GHG emissions. MOVES models those emission effects by assigning activity to specific drive cycles. The Average Speed Distribution Importer in MOVES calls for a speed distribution in VHT in 16 speed bins, by each road type, source type, and hour of the day included in the analysis. EPA urges users to develop the most detailed local speed information that is reasonable to obtain. However, EPA acknowledges that average speed distribution information may not be available at the level of detail that MOVES needs (EPA 2016).

The Emission Rates option in MOVES will produce a table of emission rates by road type for each speed bin. Total running emissions are then quantified outside of MOVES by multiplying the emission rates by the VMT for each source type in each vehicle speed category. Users should supply an appropriate speed distribution to produce the necessary emission rates (EPA 2016).

APCD uses MOVES default data for all years in emission rate mode for their GHG models. This was used for each year modeled. Since emission rates were calculated (as opposed to emission inventories), the average speed distribution used in MOVES will not change the emission rates calculated. The speeds are accounted for in the TDM data.

Fuel

Entering this input data into MOVES involves four tables – called FuelFormulation, FuelSupply, FuelUsageFraction, and AVFT (alternative vehicle fuels and technology) – that interact to define the fuels used in the area being modeled.

- The FuelSupply Table identifies the fuel formulations used in a region (the regionCounty Table defines which specific counties are included in these regions) and each formulation's respective market share;
- The FuelFormulation Table defines the properties (such as RVP, sulfur level, ethanol volume, etc.) of each fuel;
- The FuelUsageFraction Table defines the frequency at which E-85 capable (flex fuel) vehicles use E-85 vs. conventional gasoline; and
- The AVFT Table is used to specify the fraction (other than the default included in the sampleVehiclePopulation Table) of fuel types capable of being used (such as flex fuel vehicles) by model year and source type.

In general, users should review/use the default fuel formulation and fuel supply data provided in MOVES, with important exceptions noted below. EPA strongly recommends using the default fuel properties for a region unless a full local fuel property study exists.

The GHG effects of changes in the fuel mix used by vehicles can be modeled in MOVES. AVFT can be used to change the fraction of future vehicles using gasoline, diesel, CNG and electricity. These changes will be reflected in MOVES GHG emission rates.

The FuelUsageFraction Table allows the user to change the frequency at which E-85 capable vehicles use E-85 fuel vs. conventional fuel, when appropriate. MOVES contains default estimates of E-85 fuel usage for each county in the U.S. In most cases, users should rely on the default information.

The AVFT Table allows users to modify the fraction of vehicles using different fuels and technologies in each model year. In other words, the Fuel Tab allows users to define the split between diesel, gasoline, ethanol, CNG, and electricity, for each vehicle type and model year. For transit buses, the default table assumes that gasoline, diesel, and CNG buses are present in the fleet for most model years. If the user has information about the fuel used by the transit bus fleet in the county modeled, the user should be sure it is reflected in the AVFT Table (EPA 2016). *****NOTE:** This tab can be critically important in CDOT's GHG calculations. This is where electric vehicle percentages, etc. are defined. This tab may vary among CDOT's scenarios and should not be overlooked.***

APCD uses MOVES default data for fuel supply, fuel formulation, and fuel usage fraction for all years in their GHG models. For AVFT, APCD uses custom inputs that includes electric vehicles for all years. These were used for each year modeled.

Meteorology

Ambient temperature and relative humidity data are important inputs for estimating on-road GHG emissions with MOVES. Ambient temperature and relative humidity are important for estimating GHG emissions from motor vehicles as these affect air conditioner use. MOVES requires a temperature (in degrees Fahrenheit) and relative humidity (in terms of a percentage, on a scale from 0 to 100) for each hour selected in the RunSpec. EPA recommends that users input the average daily temperature profile for each month if they are modeling all 12 months. Temperature assumptions used for estimating on-road GHG emissions should be based on the latest available information. The MOVES database includes default monthly temperature and humidity data for every county in the country. These default data are based on average monthly temperatures for each county from the National Climatic Data Center for the period from 2001 to 2011. These national defaults can be used for a GHG inventory, or more recent data can be used (EPA 2016).

If the Emission Rate calculation type is chosen in the RunSpec, users can enter a different temperature and humidity for each hour of the day to create an emission rate table that varies by temperature for running emissions processes. Emission rates for all running processes that vary by temperature can be post-processed outside of MOVES to calculate emissions for any mix of temperatures that can occur during a day. This creates

the potential to create a lookup table of emission rates by temperature for the range of temperatures that can occur over a longer period of time such as a month or year from a single MOVES run (EPA 2016).

MOVES default meteorology data was used for all years. The county used was Adams County, Colorado for the months of January and July. Emission rates were post-processed to average winter and summer emission rates.

Road Type Distribution

MOVES does not have default data for this input, so it must be developed. The fraction of VMT by road type varies from area to area and can have a significant effect on GHG emissions from on-road mobile sources. EPA expects states to develop and use their own specific estimates of VMT by road type (EPA 2016).

If the Emission Rates option is used, MOVES will automatically produce a table of running emission rates by road type. Running emissions would then be quantified outside of MOVES by multiplying the emission rates by the VMT on each road type for each source type in each speed bin. In that case, data entered using the Road Type Distribution Importer is still required, but is not used by MOVES to calculate the rate. However, road type distribution inputs are important for Emission Rates runs involving non-running processes, because they are used by MOVES to calculate the relative amounts of running and non-running activity, which in turn affects the rates for the non-running processes (EPA 2016).

APCD uses a custom road type distribution for all years in their GHG models. This was used for each year modeled. Since emission rates were calculated (as opposed to emission inventories), the road type distribution used in MOVES will not change the emission rates calculated. The road types are accounted for in the TDM.

Source Type Population

MOVES does not have default data for this input, so it must be developed. APCD uses a custom source type distribution for all years in their GHG models. These data were used for each year modeled. The source type populations used in MOVES will not change the emission rates calculated. However, source population data are still needed as inputs for an emission rates MOVES run.

Vehicle Type VMT

MOVES does not have default data for this input, so it must be developed. EPA believes VMT inputs have the greatest impact on the results of a state or local GHG or energy consumption analysis. Regardless of calculation type, MOVES requires VMT as an input. MOVES can accommodate whatever VMT data is available: annual or average daily VMT, by HPMS class or MOVES source type. Therefore, there are four possible ways to enter VMT, allowing users the flexibility to enter VMT data in whatever form they have. EPA recommends that the same approach be used in any analysis that compares two or more cases (e.g., the base year and a future year) in a GHG analysis (EPA 2016).

The Output Emission Detail panel determines the detail with which MOVES will produce emission rates for running emissions, such as by source type and/or road type in terms of grams per mile. Total emissions are quantified outside of MOVES by multiplying the emission rates by the VMT for each source type and road type. However, users will still need to enter data using the Vehicle Type VMT Importer that reflects the VMT in the total area where the lookup table results will be applied. This is necessary because MOVES uses the relationship between source type population and VMT to determine the relative amount of time vehicles spend parked vs. running (EPA 2016).

APCD uses HPMS as the source type and annual as the time span for their GHG models. This was used for each year modeled. Since emission rates were calculated (as opposed to emission inventories), the VMT used in MOVES will not change the emission rates calculated. The VMT values are in the TDM data. However, VMT data are still needed as inputs for an emissions rate MOVES run.

Inspection/Maintenance Program

If a model is examining any nonattainment/maintenance areas, an inspection and maintenance (I/M) program may apply. I/M program inputs should be those used for SIP and conformity analyses and are generally available as defaults within MOVES. However, if a user is modeling CO₂, N₂O, and/or elemental carbon emissions only, or modeling area where no I/M program applies, the user should check the box on this tab (EPA 2016).

APCD uses the check box for “No I/M Program” for the Statewide Transportation Plan, since there is not a statewide emissions program that applies in these areas. This was used for each year modeled.

Others

APCD assumes MOVES default values for the starts, hoteling, idle, retrofit data, and generic tabs. This was left as is for each modeled year.

Output Database

When a RunSpec is executed in MOVES, the results are stored in the output database specified in the “General Output” parameters. HeidiSQL (or equivalent software) can be used to view and export the calculated emission rates.

MOVES Rate per Distance Table

The critical table in the output database with the calculated emission rates was the “rateperdistance” table. It contained emission rates for each combination of month, hour, pollutant, road type, speed bin, and vehicle type as specified in the RunSpec. The MOVESScenarioID field was the mechanism used by FHU to identify the HPMS source type.

The table was filtered to include only CO₂e (i.e., pollutant ID 98) emission rates and exported to a comma-separated value (CSV) file. Because the table included emission rates for both January and July, and MOVES speed bins are not discrete speeds in miles per hour, post-processing of the emission rates was required to calculate emission inventories.

Processed Emission Rates

APCD provided several Access databases with calculation tools for processing the MOVES and TDM data. These Access databases are the basis for the post-MOVES data processing. The instructions contained below provide a narrative of what occurs, but these actions are already built into the Access databases.

The MOVES rate per distance output table needed to be manipulated to produce emission rates that could be related to the calculated vehicle speeds for road links in the TDM data. The emission rates for January and July needed to be averaged to create composite emission rates. The emission rates for the 16 speed bins (which cover 5 MPH ranges) in MOVES were linearly interpolated to provide emission rates for every mile per hour speed from 1 to 75, which is how speed data are presented in the TDM data.

The resulting table includes a total of 43,776 unique emission rates. That is, an emission rate for each combination of:

- MOVES Road Types 2-5
- HPMS Types 10/20/30/40/50/60
- Hours 1-24
- Speeds 1-75

Processing Annual Average Emission Rates

For each year/rate per distance table (i.e., this process must be repeated for 2025, 2030, 2040, and 2050):

- Filter to include only CO2e (pollutant ID 98) emission rates
- There were unique emission rates for each combination of:
 - Road type
 - HPMS type
 - Speed Bin
 - Hour
 - Month
- To get the average emission rates per year, each combination of road type, HPMS type, average speed bin, and hour were summed and divided by two (to average the corresponding emission rates for January and July)
- Seasonally averaged emission rate = (Winter Rate + Summer Rate)/2

Interpolating Emission Rates from Speed Bin to Integer Speeds

After seasonally averaging the emission rates, these rates were used to interpolate (linearly) between speed bins to get an emission of rate for every mile per hour for the speeds of 1 to 75 miles per hour. In general, the process used was:

- For adjacent speed bins, subtract the lower bin number emission rate from the higher bin number emission rate and divide by five to calculate a per mile per hour change in the emission rate (NOTE: emission rates generally decrease with increased speed)
- Add the appropriate emission rate change to the lower bin avgBinSpeed value to interpolate each mile per hour emission rate between the avgBinSpeed values
- For reference, the table below illustrates the MOVES speed bins
- Example for interpolating emission rate of 11 mph:
 - Speed per mph = 11 mph
 - Speed of Lower Speed Bin = 10 mph
 - Number of Speeds per Speed Bin = 5 (= 2.5 for speed bin 1; = 5 for all other speed bins)
 - ER of Lower Speed Bin = 4055 g/m (dummy data)
 - ER of Upper Speed Bin = 3421 g/m (dummy data)
 - $4055 + (3421 - 4055) * (11 - 10)/5 = 3928$

avgSpeedBinID	avgBinSpeed	avgSpeedBinDesc
1	2.5	speed < 2.5mph
2	5	2.5mph <= speed < 7.5mph
3	10	7.5mph <= speed < 12.5mph
4	15	12.5mph <= speed < 17.5mph
5	20	17.5mph <= speed < 22.5mph
6	25	22.5mph <= speed < 27.5mph
7	30	27.5mph <= speed < 32.5mph
8	35	32.5mph <= speed < 37.5mph
9	40	37.5mph <= speed < 42.5mph
10	45	42.5mph <= speed < 47.5mph
11	50	47.5mph <= speed < 52.5mph
12	55	52.5mph <= speed < 57.5mph
13	60	57.5mph <= speed < 62.5mph
14	65	62.5mph <= speed < 67.5mph
15	70	67.5mph <= speed < 72.5mph
16	75	72.5mph <= speed

Processed TDM

The TDM data are usually presented as an ESRI polyline shapefile format with each traffic link represented as one record (feature) and attributed with distances, total volumes, volumes per time period, and speeds per time period. A series of post-processing steps were performed to relate the relevant TDM data with the appropriate MOVES emission rates, as described below. The first step described below was done using ArcGIS. The other steps were done using the tools in the Access databases.

The resulting table includes aggregated VMT for each combination of:

- MOVES Road Types 2-5
- HPMS Types 10/20/30/40/50/60
- Hours 1-24
- Speeds 2.5-75

This process provides respective county names for each link to aggregate VMT by geography/region.

Attribute TDM with County Name

The first step was to attribute each link with the county name. The county information was necessary because it was used later in the process to filter VMT (and thus, on-road emissions inventory) by geography/region (e.g., MPO or non-MPO traffic). Performing this step later in the process would require significant modifications to the process.

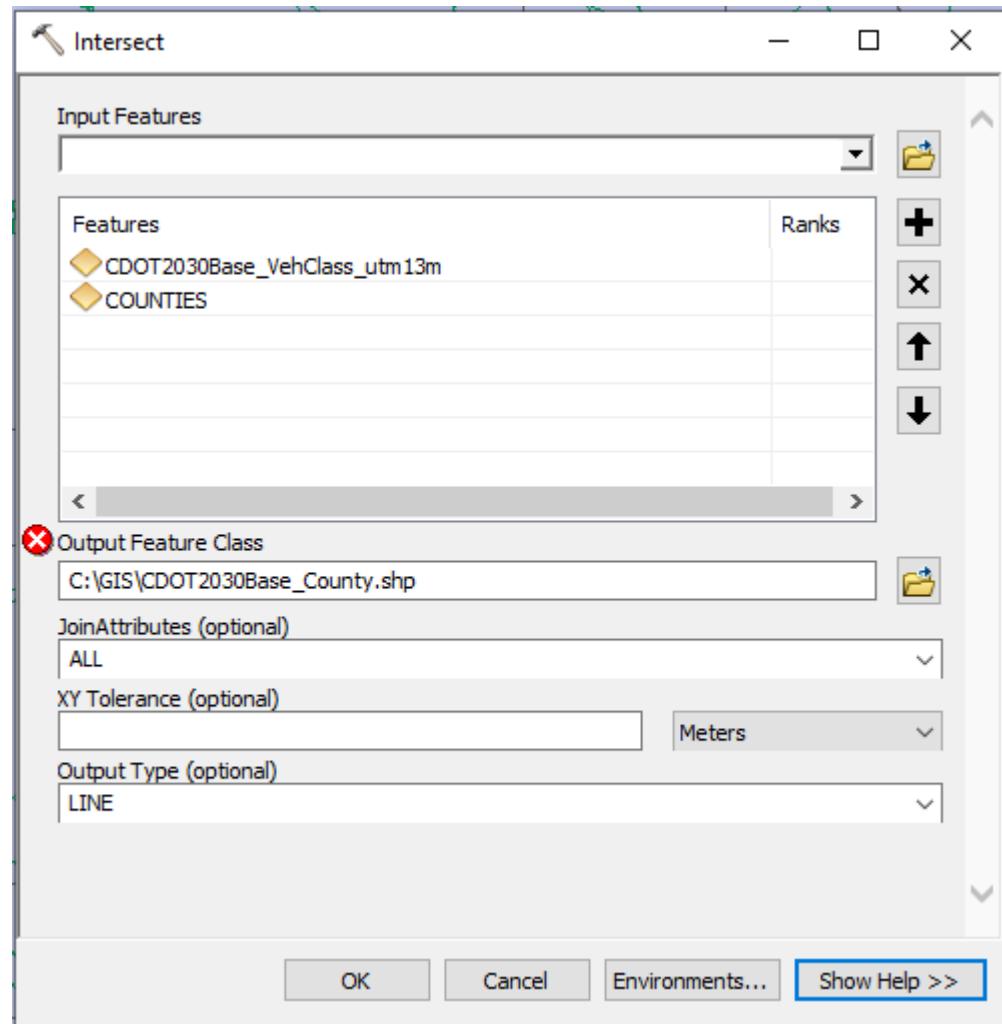
The ArcGIS geoprocessing tool “Intersect” was used to attribute the TDM shapefile with county names for each roadway link (feature). The Input Features were the TDM shapefile and CDOT’s “COUNTIES” shapefile that can be downloaded from OTIS. Unnecessary fields in the counties shapefile were deleted, so that the fields remaining were FID, Shape*, COUNTY, and CO_FIPS. The Output Feature Class name and file path could change, depending on the user’s preference. The Join Attributes parameter was set to “ALL” which kept attributes from both input features. The Output Type parameter was set to “LINE” which set the output feature class to be the geometry of the TDM shapefile. The Environment was defaults except for the Output

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Coordinate System. That was set to the projected coordinate system, “GRS_1980_UTM_Zone_13N” which matched the TDM shapefile’s coordinate system.



The resulting output feature class had the same geometry and attributes as the TDM shapefile except for the following changes:

- Each link was attributed with the county name and FIPS number.
- Links within multiple counties were split (divided) into separate features at the county line(s). In these cases:
 - Both features still had the same attributes except for the county name and FIPS.
 - The distance attribute in the “DIST” field was now invalid since the feature was split.

To account for changes in distances for links that were in multiple counties, a new field “cntyMiles” was added to the output feature class. The geoprocessing tool “Calculate Geometry” was used on the “cntyMiles” field to calculate the distance of each link in miles. The “cntyMiles” field, rather than the “DIST” field, was used later in Access to calculate VMT.

The resulting attribute table was saved as a CSV file and used in the following steps.

Access Database

The TDM CSV file from the step above was imported into an Access database. The remaining post-processing steps were performed in this Access database, as described below.

Speeds

The TDM speeds were in floating decimal format and rounded to the nearest integer. Speeds less than 2.75 mph were rounded to 2.5 mph. This was because emission rates for speeds of 2.5 mph or less were the same, as described in the Processed Emission Rates section.

Time Periods

The TDM model provides aggregated data for 10 blocks of time for a day, not hour by hour—see the "name" column below. The data for these TDM periods were recategorized/interpolated into data for discrete clock hours 1-24 based on methodology from APCD.

The PeriodHour24 table below was used to split the TDM data for different time periods (AM1, PM2, OPI, etc.) into 24 clock hour time periods. VMT was calculated for each combination of integer speed (2.5 – 75mph), interstate (yes or no), road functional class (I-8), rural (yes or no), periodCog (I-10), and county.

The periodCog I-10 were related to hours 1-24 as shown in the “hour” column. That provided a VMT per clock hour for each combination of speed and functional class. This was used to relate the VMT to fractions of VMT by HPMS per functional class and hour.

The cVMT was divided by the number of “periods” corresponding with each clock hour to calculate the VMT.

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Interval	periodCog	name	hour	hrsT	periods
11:00 PM - 6:30AM	7 Op1.bin		1	7.5	7
11:00 PM - 6:30AM	7 Op1.bin		2	7.5	7
11:00 PM - 6:30AM	7 Op1.bin		3	7.5	7
11:00 PM - 6:30AM	7 Op1.bin		4	7.5	7
11:00 PM - 6:30AM	7 Op1.bin		5	7.5	7
11:00 PM - 6:30AM	7 Op1.bin		6	15	7
6:30-7:00 AM	1 Am1.bin		7	1	1
7:00-8:00 AM	2 Am2.bin		8	1	1
8:00-9:00 AM	3 Am3.bin		9	1	1
9:00 AM - 11:30 AM	8 Op2.bin		10	2.5	2.5
9:00 AM - 11:30 AM	8 Op2.bin		11	2.5	2.5
	9 Op3.bin		12	3.5	7
	8 Op2.bin		12	2.5	5
11:30 AM - 3:00 PM	9 Op3.bin		13	3.5	3.5
	9 Op3.bin		14	3.5	3.5
	9 Op3.bin		15	3.5	3.5
3:00-5:00 PM	4 Pm1.bin		16	2	2
3:00-5:00 PM	4 Pm1.bin		17	2	2
5:00-6:00 PM	5 Pm2.bin		18	1	1
6:00-7:00 PM	6 Pm3.bin		19	1	1
7:00-11:00 PM	10 Op4.bin		20	4	4
7:00-11:00 PM	10 Op4.bin		21	4	4
7:00-11:00 PM	10 Op4.bin		22	4	4
7:00-11:00 PM	10 Op4.bin		23	4	4
11:00 PM - 6:30AM	7 Op1.bin		24	7.5	7

Fraction of VMT by HPMS

Once VMT was calculated for each road functional class and clock hour, the fractions of VMT by HPMS for each corresponding functional class and clock hour were applied. This calculated the VMT for HPMS 10-60. The fractions used were from APCD and were consistent with their methodology.

NAA?	Weld?	Rural?	FC	Hr	10f	20f	30f	40f	50f	60f
-1 W	R	1		1	1.12494375281236E-03	0.44295407974564	0.408981870287873	8.24958752062397E-04	3.60006876834793E-03	0.1424780787434
-1 W	R	1		2	6.50325162581291E-04	0.418107821883677	0.388118179039889	1.40070035017509E-03	5.57032759041272E-03	0.186152645973265
-1 W	R	1		3	1.1907462009526E-03	0.402448608970853	0.376594285267901	1.9278748015423E-03	8.86488378110699E-03	0.208973600977645
-1 W	R	1		4	1.88772529102432E-03	0.400795540811441	0.375296865809669	3.5956672209987E-03	8.74568726325532E-03	0.209678513603612
-1 W	R	1		5	1.27600843728028E-03	0.438002933384539	0.406922735865401	8.59352621025494E-04	5.91653137282429E-03	0.1470243831893
-1 W	R	1		6	9.88692049192773E-04	0.462978652961131	0.429325812630245	1.88521686320158E-03	5.20832159466524E-03	9.96149039013637E-02
-1 W	R	1		7	8.56477631797771E-04	0.47063947538398	0.437825973989187	1.19740562115417E-03	7.50554404406707E-03	8.19751233298142E-02

Road Types

The TDM used roadway functional classes that were recategorized to MOVES road types. That allowed the road types from the TDM to be related to the emission rates.

DRCOG Facility	FHWA facility type	rural?	FHWA	Urban	MOVEStrl	FHWA RT	fcCode	Intestate
1	Principal Arterial - Interstate	-1 R	R		2	1 1		1
1	Principal Arterial - Interstate	-1 R	R		2	1 1		0
1	Principal Arterial - Interstate	0 N	U		4	11 1		0
1	Principal Arterial - Interstate	0 N	U		4	11 1		1
2	Principal Arterial - Other	-1 N	R		3	2 2		0
2	Principal Arterial - Other Freeways or Expressways	0 N	U		4	12 2		0
3	Principal Arterial - Other	-1 N	R		3	2 3		0
3	Principal Arterial - Other	0 N	U		5	14 3		0
4	Minor Arterial	-1 N	R		3	6 4		0
4	Minor Arterial	0 N	U		5	16 4		0
5	Major Collector	-1 N	R		3	7 5		0
5	Collector	0 N	U		5	17 5		0
6	Principal Arterial	-1 R	R		2	1 1		0
6	Principal Arterial	0 N	U		4	11 1		0
8	Local System	-1 N	R		3	9 7		0
8	Local System	0 N	U		5	19 7		0

Filter by Geography/Region

The statewide GHG inventory was filtered to contain VMT for all counties in Colorado except for the nine-county region in the ozone non-attainment area. The nine counties excluded were Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, Jefferson, Larimer, and Weld. The statewide results were subdivided further into Pikes Peak area and the rest of the state.

Emissions Inventory

The processed emission rates table and the processed VMT table were related by road type, HPMS type, hour, and speed. This relate was used to multiply the emission rate (g/mi) by the VMT (mi) to get a total in grams of CO₂e for an average weekday. The formula used was:

- CO₂e (g/day) = SUM(Emission Rate (g/mi) * VMT (mi))
- CO₂e (MMt/day) = CO₂e (g/day) * 1 (MMt) / 1e+12 (g)
- CO₂e (MMt/year) = CO₂e (MMt/day) * 338 (TDM weekdays/calender year)

The calculated emissions inventory was for on-road emissions. Non-road emissions were not included in this calculation.

References

EPA. 2016. *Using MOVES for Estimating State and Local Inventories of On-road Greenhouse Gas Emissions and Energy Consumption*. June. <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=PI00OW0B.pdf>

Appendix F: Methodology to represent programmatic funding

Summary

In a typical Regional Transportation Plan update, there are often network changes to regionally significant projects. These are reflected in the Denver Regional Council of Governments Focus Model for each staging year. This year staff is also proposing to make further updates to model inputs and factors to better reflect observed, real-world changes and future categories of “programmatic investments” included in the draft 2022 Updated 2050 RTP.

As adopted in April 2021, DRCOG’s fiscally constrained 2050 RTP contains over \$15 billion in programmatic funding. These programmatic investments are shown as a lump sum and individual projects are not yet identified in these programs. Specific projects within these programmatic investments will be determined through the Transportation Improvement Program process as regional and local priorities evolve over the 30-year life of the plan.

Programmatic funding categories include transit investments, active transportation, safety/Vision Zero, transportation demand management and intelligent transportation system investments, all of which are key strategic investments in improving the region’s multimodal transportation system while also reducing emissions. Despite representing a significant portion of the total investments in the fiscally constrained 2050 RTP, DRCOG has not historically reflected how the programmatic funding may influence future travel behavior in the Focus travel model.

In the context of the Colorado Department of Transportation’s Regulation Governing Statewide Transportation Planning Process and Transportation Planning Regions, DRCOG is now evaluating methodologies to represent these programmatic funds in the travel model in coordination with the North Front Range Metropolitan Planning Organization and CDOT. Through this coordinated effort, we hope to achieve a transparent and consistent methodology to reflect the effects these types of investments could make in future travel within the DRCOG region. DRCOG staff believe that reflecting these programmatic funds in the modeling will result in a more complete and accurate depiction of the total investments included in the 2050 RTP.

The details of model outputs, such as bicycle and pedestrian trips at localized and regional levels, better reflect future increased investments supporting those travel modes in relation to recent observed land use changes. This document details the methodology used to estimate available funding, the specific adjustments made to the model and the reasoning behind those adjustments.

Methodology

DRCOG staff evaluated the categorical and programmatic 2050 RTP funding and estimated the approximate percentage of total funds in each pool associated with additional projects and investments not yet reflected in the travel model. The results are shown in Table 1, which has been reviewed by DRCOG's Transportation Advisory Committee, Regional Transportation Committee and Board workshop committees.

The percentage of the total funds, by category, was estimated by evaluating historic and intended uses of funding for infrastructure and services with the potential to reduce greenhouse gas emissions. The intention was to determine funding and/or enhancements in the use of funds for new infrastructure investments, services or components of projects that were not reflected in the previous 2050 RTP model, such as bicycle/pedestrian infrastructure supporting a bus rapid transit corridor.

The resulting funding estimates will be used along with an estimated cost per unit to approximate the quantity of infrastructure (i.e., new multi-use paths) or service levels (i.e., increased transit service) to be reflected or mimicked in the travel model.

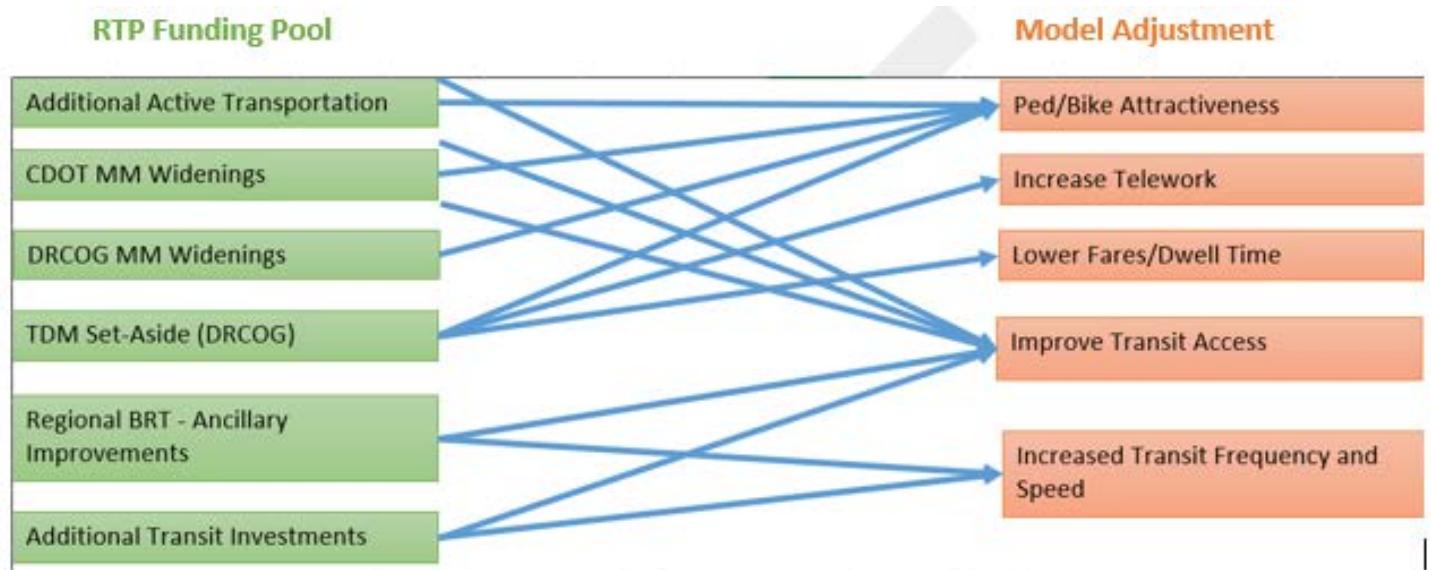
Table 1: 2050 RTP Funding associated with additional greenhouse gas reduction

2050 RTP Investment Categories	Total Investment 2020 Dollars (\$Millions)			
	2021-2030	2031-2040	2041-2050	RTP Total Funds
Additional Transit Investments	\$62	\$379	\$261	\$702
Regional BRT - Ancillary Improvements	\$629	\$256	\$298	\$1,183
Additional Active Transportation	\$52	\$36	\$92	\$180
Multimodal Components of DRCOG Funded Widening Projects	\$221	\$748	\$630	\$1,599
Multimodal components of CDOT Funded Widening Projects	\$3,144	\$1,360	\$1,550	\$6,054
DRCOG TDM Set-Aside	\$34	\$34	\$34	\$102
TOTAL:	\$4,143	\$2,813	\$2,865	\$9,821

Next, DRCOG staff evaluated how to represent these pools of funds, either in the focus travel model, or through an off-model evaluation. DRCOG staff leaned heavily on the methodologies used during a scenario planning exercise from early 2020, as well as methodologies used by CDOT in defining the greenhouse gas targets. DRCOG staff linked each type of 2050 RTP categorical funding with the types of model factors that could be adjusted based on the intended use of the funds. Figure 1 shows how several of the 2050 RTP funding pools are associated with various adjustments in the model.

Estimated % of total funds associated with GHG benefits	Investments Associated with GHG Benefits 2020 Dollars (\$Millions)			
	2021-2030	2031-2040	2041-2050	Total Funds Associated with GHG Benefits
90%	\$56	\$341	\$235	\$632
5%	\$31	\$13	\$15	\$59
100%	\$52	\$36	\$92	\$180
10%	\$22	\$75	\$63	\$160
5%	\$157	\$68	\$78	\$303
10%	\$3	\$3	\$3	\$10
	\$322	\$536	\$486	\$1,344

Figure 1: Model adjustments associated with programmatic funding pools



For funding pools that are associated with multiple types of model adjustments, total funds were divided evenly between model adjustment categories. The total funding available, by model adjustment category, by staging year, is shown in Table 2.

Table 2. Total programmatic funding available by model category

Model Adjustment	2021-2030 Funds	2031-2040 Funds	2041-2050 Funds	Total Funds
Ped/Bike Attractiveness	\$ 159.5	\$ 266.2	\$ 241.2	\$ 666.9
Increase Telework	\$ 1.1	\$ 1.1	\$ 1.1	\$ 3.4
Lower Fares/ Reduced Dwell Time	\$ 43.7	\$ 177.0	\$ 124.9	\$ 345.6
Improve Transit Access	\$ 1.2	\$ 1.2	\$ 1.2	\$ 3.5
Increased Transit Frequency and Speed	\$ 116.9	\$ 90.3	\$ 117.4	\$ 324.6
Grand Total	\$ 322.4	\$ 535.8	\$ 485.8	\$ 1,343.9

2020 Dollars (\$M)

DRCOG staff then estimated the level of adjustment to each model component, based on the funding available, scaled in proportion to estimates used in DRCOG's scenario costing work as well as the methodologies used in CDOT's cost/benefit document developed in relation to the state's greenhouse gas rulemaking.

Model adjustments

The model adjustments, reasoning and funding summaries that support the adjustments are documented below. DRCOG staff will continue to perform research and monitor travel trends to ensure the model adjustments reflect real world conditions into the future.

Share of work at home

Table 3: Model adjustments associated with work at home

Increase telework	2030	2040	2050
Work at home rate for workers	25%	25%	25%
Funding per staging period	\$1.1 million	\$1.1 million	\$1.1 million

- Multiple factors influence work location choice and work trips. Previously, DRCOG targeted 20% of workers working at home on a given day. Current conditions lead DRCOG staff to believe 20% is now an underestimate. An increase to 25% is warranted because of the new way of work we are seeing in the world changed by the pandemic along with increased efforts in travel demand management programs and interest in policies to encourage more working from home at the state and local level.
- It is important to know what “work at home” encompasses. It does not just include telework, or office workers working remotely. Work from home also includes part time workers, self-employed small businesses, home offices, flexible/hybrid working schedules and people who work alternative schedules such as three 12-hour shifts a week, could be doing on a sample day.
- It is also important to note that people that work from home may still take trips, whether it's for personal reasons or work-related.
- Following the pandemic, there has been an increase in businesses, schools, agencies or other communities turning towards a four-day week compressed work week model.
- Before the pandemic, observed data demonstrated a significant increase in people working from home in the Denver region. Post-pandemic we continue to observe elevated levels of remote working or working at home some days of the week.

Bicycle and pedestrian attractiveness

The regional travel model does not have a bicycle and pedestrian network and, thus, specific identified projects cannot be coded. To reflect the programmatic investments in the model, bicycle and pedestrian attractiveness factors are used to represent the additional investments.

Table 4: Model adjustments associated with bicycle and pedestrian attractiveness

Bicycle and pedestrian attractiveness model component	2030	2040	2050
Increase sidewalk density by the following factor	8%	16%	25%
Increase walk and bicycle operating speeds	4 mph / 11 mph	5 mph / 12 mph	5 mph / 12 mph

Increase sidewalk density

- One of many factors correlated with the attractiveness of active transportation modes is “sidewalk density.” As a pre-process to running the travel model, each transportation analysis zone is assigned a sidewalk density value based on the quantity of sidewalks and shared use paths within that zone, divided by the area. Sidewalk density is one factor which represents the ease and comfort of active transportation modes in specific geographic areas.
- To reflect the funds dedicated to active transportation infrastructure in each staging period, DRCOG is proposing to incrementally increase the sidewalk density values for urban and suburban area types over the life of the plan.
- The increased values do not represent an absolute increase in sidewalks, but rather represents select, strategic projects effectively increasing the density by focusing on key gaps and missing links. Through planimetric data and local government data collection and sharing efforts, we can optimize the addition of new sidewalk mileage to create more complete, connected networks.
- The value increases over the staging period because these infrastructure investments are additive over the years.

Increase walking and bicycle operating speeds

- When the walk or bike modes are assigned in the model, they are given an operational travel speed which reflects the average speed for the trip, including, for example, wait time at intersections. Walk speeds were 3 mph and bike speeds 8 mph.
- DRCOG is proposing to increase walk and bicycle speeds incrementally in future staging years, as described in the table above.
- The increase in speed for walk and bicycle modes represent:
 - The electrification of active modes through the adoption of e-bikes¹ and e-scooters². Not only does electrification increase the speed of these modes, but it may make the mode more attractive.
 - The speed increase also represents additional priority being provided to active modes through legislation and infrastructure such as: cyclists given their own right of way and priority signal treatments; legal permissions for traversing intersections; improved sidewalk conditions; new key connections completed; and the perception of faster travel time that occurs when a walking journey is comfortable and on a well-connected network.

¹ <https://denverite.com/2022/05/06/denvers-e-bike-rebates-are-already-gaining-traction-with-residents/>

² <https://www.9news.com/article/news/local/next/scooter-bike-share-denver-released-public/73-1d0e03e1-43fa-4ea7-bc3c-f024ec8db6b4>

Modify person-specific negative attractiveness factors for bike and pedestrian mode choice

- In both real life and in the model, an individual's propensity to walk or bike is influenced by their age and their gender. Based on travel survey data from 2010, the model was calibrated to make walking and bicycling less attractive for women and older adults to reflect the observed data.
- To reflect the buildup of, and enhancements to the region's active transportation system, observed cultural changes, and electrification providing additional mobility to older adults, DRCOG staff removed the negative factors applied to individuals in the model based on gender and adjusted the age where negative factors as described in the table above. This is motivated by the belief that the enhanced multimodal facilities will reduce some barriers for cycling for older people and women.
- Examples of enhancements that might affect the attractiveness of biking and walking include lighting on paths, safe crossings with appropriate time to cross, all new paths having appropriate widths – and added space at potential conflict points. DRCOG staff also know local governments are working to build bike facilities based on comfort for all ages and abilities and targeting key connections to make high comfort complete routes.
- There is research³ to show the perception of increased safety in numbers. For example, knowing other cyclists and walkers will be on a path can help it feel safer for some users or knowing drivers are used to seeing cyclists aids in comfort and sense of safety.

³ <https://www.sciencedirect.com/journal/safety-science/vol/92/suppl/C> ;

<https://www.normalizecycling.com/safety-in-numbers/#:~:text=There%20is%20strong%20evidence%20of%20an%20association%20between.causes%20%28confounding%20factors%29%20that%20are%20not%20being%20measured>

Transit

Table 5- Model adjustments associated with transit

Transit	2030	2040	2050
Reduce fares	20%	20%	20%
Reduce dwell time	20%	20%	20%
Reduce headways	5%	5%	5%
Cap on waiting time	Maximum 15 minutes	Maximum 15 minutes	Maximum 15 minutes
Reduce transit walk-access time	Remove penalties	Remove penalties	Remove penalties
Increase speed on transit walk links	100%	100%	100%
Transit access improvements funding	\$1.2 million	\$1.2 million	\$1.2 million
Improve transit frequency and speed funding	\$117 million	\$90 million	\$117 million
Funds used for lower fares/reduced dwell time	\$44 million	\$177 million	\$125 million
Total additional transit funding	\$162 million	\$268 million	\$243 million

Reduce transit fares

- In the travel model, the cost of a trip influences people's mode choice, as it does in real life. In the model, the cost of transit fare is a single value that represents what, in reality, is a complex pricing system including people with EcoPasses, discounted fares, monthly passes, fare zones and more.
- DRCOG is proposing to reduce this value by 20% for all staging years. This is not suggesting there will be a blanket reduction of 20% in fares, hitting Regional Transportation District revenues in the fare box, but rather it is intended to reflect the experience of users having a perception of lower fare through programmatic investments and strategic partnership, including:

- Through transportation demand management efforts, more people in the region will be able to use transit at a free or reduced cost, through commuter benefits like EcoPass or other programs.
- Ongoing efforts to increase eligibility for discounted fares, and this is intended to reflect that.
- RTD's fare-revenue study is reviewing how to simplify the fare structure, which could reduce fares for some trips or psychologically reduce the cost for people by reducing confusion.⁴
- SB22-180⁵ will pilot free transit for one month a year, which could influence future transit fare decisions.

Reduce transit dwell time

- In the travel model, transit buses have a dwell time based on the type of route. To reflect some of the ancillary benefits of enhanced transit investments, the dwell time was reduced by 20%.
- In general, this change is to reflect transit investments that enhance the travel time competitiveness of transit. The primary reason for this change is streamlined payment and faster boardings.
- It also reflects investment in transit signal prioritization equipment, that allows for a bus to travel through an intersection before or after a stop or more quickly re-enter the flow of traffic, which users can experience as additional dwell time.

Reduce headways

- The frequency of each transit route is included in the model. The time between buses or trains at a particular stop is considered the headway.
- The 5% decrease in headway for all staging years is to reflect an increase in vehicle revenue miles across the region. Because these model adjustments represent programmatic investments, DRCOG staff cannot model specific route changes because this is adaptable based on future needs of the region.

Cap waiting time for longer headway routes

- In the travel model, travelers are assigned a "wait time" equal to half of the transit route's headway for that time period. For all routes, the total wait time was capped at 15 minutes.

⁴ <https://www.rtd-denver.com/farestudy>

⁵ <https://leg.colorado.gov/bills/sb22-180>

- Previously, the model assumed some people would arrive 30 minutes before their bus arrived. This significantly increased the travel time for some transit trips and did not reflect how most people use transit for long headway routes. This adjustment accounts for how smart phones and the investment in real time transit service information have changed how people will plan for their transit trip. Bus tracking specifically also allows people to plan to reduce wait time.

transit, this speed needed to be readjusted. The speed was doubled for these short links to reflect the enhancements in infrastructure, including things like sidewalks, lighting, and more.

- The idea is that more comfortable and direct infrastructure, such as pedestrian bridges over high volume roadways, allows people to travel faster and has a psychological impact on how people experience the length of a journey.

Reduce transit walk-access time

- The model includes information on how people get to transit. For trips where people access transit through active transportation modes the access time penalties were removed.
- This reflects the significant investment being made in active transportation access across the region and DRCOG's prioritization of pedestrian projects near transit. More direct walk routes and pedestrian infrastructure improvements increase the ease of accessing transit.

Increase speed on transit walk links

- The specific pedestrian links that have a distinct connection to transit have a defined user travel speed. Because of the investments in active transportation and the pedestrian environment near

Appendix G: Intergovernmental Agreement

Forthcoming.