Metro Vision Measure Documentation

Data Dictionary – July 1, 2019

Contents

Versions

Date	Description
July 12, 2016	Drafted during *Metro Vision* development
January 18, 2017	Edited to reflect changes after the public review period for *Metro Vision*
June 1, 2018	Edited to reflect changes from *Metro Vision* amendment affecting "Housing and Employment Near High-Frequency or Rapid Transit" entry
July 1, 2019	Edited to reflect changes from *Metro Vision* amendment affecting "Daily Person Delay Per Capita", baseline and target for "Protected Open Space", and baseline for "Housing in High-Risk Areas" entries

Measures Associated with "An Efficient and Predictable Development Pattern"

There are two performance measures related to the outcomes and objectives associated with this overarching theme.

Housing and Employment in Urban Centers
Measure consists of two companion items: **housing** and **employment**.

Urban Center Housing

Description:	Share of the region's total housing units located in urban centers
Lead/Lag:	Lead. A larger share of housing in urban centers will help contribute to changes in travel, such as increased use of travel modes other than single-occupancy vehicles and decreased per capita vehicle miles traveled, which may help decrease average transportation costs relative to household income.
Frequency:	Annual
Unit Type:	Percent of housing units
Polarity:	High values are good
Formula:	$\dfrac{\sum housing\ units\ in\ urban\ centers}{\sum housing\ units\ in\ region}$
Data Source #1:	DRCOG Master Housing Dataset (compiled from local parcel, land use, and building data; supplemented by proprietary data where necessary)
Data Quality: (Source #1)	Good. Compiles best information available from various sources. Not all housing units are recorded, especially in rural foothill and eastern plain areas due to a lack of data availability.
Data Source #2	DRCOG Urban Centers
Data Quality: (Source #2)	Excellent. Local jurisdictions identify urban centers and work with DRCOG to designate them through the process outlined in the *Metro Vision Growth and Development Supplement*.
Baseline:	10.0 percent (2014)
2040 Target:	25 percent
Target Rationale:	Previous measures and targets aimed for 50 percent of new housing to be developed in urban centers. Applying that target to projected growth through 2040, on top of the existing share of housing in urban centers achieves close to 25 percent.
	Directing housing growth to urban centers helps achieve various *Metro Vision* outcomes, as shown through previous scenario modeling exercises (e.g. reducing per capita vehicle miles traveled and greenhouse gas emissions).

Urban Center Employment

Description:	Share of the region's total employment located in urban centers
Lead/Lag:	Lead. A larger share of employment in urban centers will help contribute to changes in travel, such as increased use of travel modes other than single-occupancy vehicles and decreased per capita vehicle miles traveled, which may help decrease average transportation costs relative to household income.
Frequency:	Annual
Unit Type:	Percent of employment
Polarity:	High values are good
Formula:	$$\frac{\sum employment\ in\ urban\ centers}{\sum employment\ in\ region}$$
Data Source #1:	DRCOG Master Employment Level 2 Dataset (Quarterly Census of Employment and Wages; supplemented by proprietary data where necessary)
Data Quality: (Source #1)	Good. Compiles best information available from various sources. Does not include small firms whose precise location information is unavailable.
Data Source #2	DRCOG Urban Centers
Data Quality: (Source #2)	Excellent. Local jurisdictions identify urban centers and work with DRCOG to designate them through the process outlined in the *Metro Vision Growth and Development Supplement.*
Baseline:	36.3 percent (2014)
2040 Target:	50 percent
Target Rationale:	Previous measures and targets aimed for 75 percent of new employment to be developed in urban centers. Applying that target to projected growth through 2040, on top of the existing share of employment in urban centers achieves close to 50 percent.
	Directing employment growth to urban centers helps achieve various *Metro Vision* outcomes, as shown through previous scenario modeling exercises (e.g. reducing per capita vehicle miles traveled and greenhouse gas emissions).

Population-Weighted Density

Description: Population-weighted average of the density of each census tract in the region (in order to represent the density of the place in which the average person lives)

Lead/Lag: Lead. Increased population-weighted density will help contribute to changes in travel, such as increased use of travel modes other than single-occupancy vehicles and decreased per capita vehicle miles traveled, which may help decrease average transportation costs relative to household income. It may also help mitigate demand for converting unprotected open space to other uses, keeping it available for potential protection.

Frequency: Annual

Unit Type: People per square mile (people/mi.^{2})

Polarity: High values are good

Formula:

$$\frac{\sum_{across\ all\ tracts\ in\ region} \left(\frac{population\ of\ census\ tract}{area\ of\ census\ tract} \times population\ of\ census\ tract \right)}{population\ in\ region}$$

Data Source: US Census Bureau 5-Year American Community Survey (ACS) Table B01003 Total Population

Data Quality: Good. To attempt to achieve lower margin of error, ACS relies on five years of sampling. Data released 12 months after period end. Basic table may be less subject to nonsampling error than other ACS tables.

Baseline: 4,850 people/mi.^{2} (2014)

2040 Target: 25 percent increase from 2014

Measures Associated with "A Connected Multimodal Region"

There are five performance measures related to the outcomes and objectives associated with this overarching theme.

Non-SOV (Single-Occupancy Vehicle) Mode Share to Work

Description: Share of workers using a travel mode other than driving alone to commute to work (or work from home)

Lead/Lag: Lead. Increased Non-SOV mode share to work will help contribute to changes in travel, such as decreased per capita vehicle miles traveled, which may help decrease average transportation costs relative to household income.

Frequency: Annual

Unit Type: Percent of workers 16 years and over

Polarity:	High values are good

Formula:

$$\frac{\sum workers\ 16\ years\ and\ over - \sum workers\ 16\ years\ and\ over\ who\ drove\ alone}{\sum workers\ 16\ years\ and\ over}$$

Data Source:	US Census Bureau 5-Year American Community Survey (ACS) Table B08006 Sex of Workers by Means of Transportation to Work
Data Quality:	Fair. To attempt to achieve lower margin of error, ACS relies on five years of sampling. Data released 12 months after period end.
Baseline:	25.1 percent (2014)
2040 Target:	35 percent
Target Rationale:	Target continues a previously established target from *Metro Vision 2035* that was inverted to allow for language around the measure to be positive. Aiming to shift from SOV helps achieve various *Metro Vision* outcomes (e.g. reducing vehicle miles travel and helping mitigate congestion).

Daily Vehicle Miles Traveled (VMT) Per Capita

Description:	Average weekday vehicle miles of travel per capita
Lead/Lag:	Lead. Decreases in per capita VMT will help decrease per capita greenhouse gas emissions and mitigate projected increases in congestion and delay. Fewer vehicle miles may also reduce exposure to potential traffic crashes.
Frequency:	Annual
Unit Type:	Miles (mi.)
Polarity:	Low values are good

Formula:

$$\frac{total\ average\ weekday\ vehicle\ miles\ of\ travel}{population}$$

Data Source #1:	DRCOG Congestion Mitigation Program (CMP) Database
Data Quality: (Source #1)	Good. Database estimates travel volumes based on actual observations at year-round monitoring sites and temporary traffic count locations.
Data Source #2	DRCOG Population Forecast
Data Quality: (Source #2)	Good. Dataset is built around State Demography Office forecasts and local planning assumptions.
Baseline:	25.5 mi. (2010)

2040 Target:	10 percent decrease from 2010

Target Rationale: Target continues a previously established target from *Metro Vision 2035.* Aiming to reduce VMT helps achieve various *Metro Vision* outcomes (e.g. helping mitigate congestion, greenhouse gas emissions, and other air pollution).

Average Travel Time Variation (TTV)

Description: Average variation in travel time on roadway segments when comparing peak (i.e. rush hour) to off-peak conditions

Lead/Lag: Lag. Reductions in per capita vehicle miles traveled will have a direct influence in mitigating the growth of this measure. However, one of the results of not mitigating growth in TTV might be limited ability to grow overall regional employment as it impacts quality of life and the reliability of the system for businesses to move goods.

Frequency: Annual

Unit Type: Ratio

Polarity: Low values are good

Formula:
$$\frac{congested\ travel\ time}{free\ flow\ travel\ time}$$

Data Source: DRCOG Congestion Mitigation Program (CMP) Database

Data Quality: Good. Database estimates travel times based on actual observations at year-round monitoring sites and temporary traffic count locations.

Baseline: 1.22 (2014)

2040 Target: Less than 1.30

Target Rationale: Target aims to beat the 2040 forecast of 1.36 from the *2014 Annual Report on Roadway Traffic Congestion in the Denver Region* through local and regional action toward *Metro Vision* outcomes and objectives.

Daily Person Delay Per Capita

Description: Average weekday person travel delay per capita (which accounts for the cumulative delay experienced across all vehicle occupants)

Lead/Lag: Lag. Reductions in per capita vehicle miles traveled will have a direct influence in mitigating the growth of this measure. However, one of the results of not mitigating growth in delay might be limited ability to grow overall regional employment as it impacts quality of life and the cost for businesses to move goods.

Frequency: Annual

Unit Type:	Minutes (min.)
Polarity:	Low values are good

Formula:

$$\frac{total\ average\ weekday\ person\ hours\ of\ delay \times 60\ \frac{minutes}{hour}}{population}$$

Data Source #1:	DRCOG Congestion Mitigation Program (CMP) Database
Data Quality: (Source #1)	Good. Database estimates travel times based on actual observations at year-round monitoring sites and temporary traffic count locations.
Data Source #2	INRIX freeway speed data
Data Quality: (Source #2)	Good. Proprietary data from INRIX fuses anonymous vehicle probe data from phones, trucks and other sources.
Data Source #3	DRCOG Population Forecast
Data Quality: (Source #3)	Good. Dataset is built around State Demography Office forecasts and local planning assumptions.
Baseline:	6 min. (2017)
2040 Target:	Less than 9 min.
Target Rationale:	Target aims to beat the 2040 forecast of 9 minutes from the *2017 Annual Report on Roadway Traffic Congestion in the Denver Region* through local and regional action toward *Metro Vision* outcomes and objectives.

Annual Traffic Fatalities

Description:	Annual total of traffic-related fatalities resulting from crashes occurring in the region
Lead/Lag:	Lag. Decreases in per capita vehicle miles traveled may help reduce exposure to potential traffic crashes.
Frequency:	Annual
Unit Type:	Fatalities
Polarity:	Low values are good
Formula:	Not applicable
Data Source:	Fatality Analysis Reporting System (FARS)

Data Quality:	Good. Relies on statewide coordination of reporting by local law enforcement officers to the federal system.
Baseline:	185 fatalities (2014)
2040 Target:	Less than 100 fatalities
Target Rationale:	Target aims to continue downward trend through improvements in vehicle technology, emergency response, and other safety improvements.

Measures Associated with "A Safe and Resilient Natural and Built Environment"

There are three performance measures related to the outcomes and objectives associated with this overarching theme.

Surface Transportation Related Greenhouse Gas Emissions Per Capita

Description:	Surface transportation related emissions of greenhouse gases (i.e. carbon dioxide, methane, and nitrous oxide)
Lead/Lag:	Lag. Decreases in surface transportation related emissions would be connected to decreases in per capita vehicle miles traveled or use of travel modes other than single-occupancy vehicle, which are, in turn, connected to measures of development patterns.
Frequency:	Irregular. Model is periodically run for air quality conformity analysis. However, results are only available for five-year intervals.
Unit Type:	Pounds of carbon dioxide equivalent (lbs. CO_2e)
Polarity:	Low values are good
Formula:	$$\frac{total\ surface\ transportation\ related\ greenhouse\ gas\ emissions}{population}$$
Data Source #1:	Motor Vehicle Emissions Simulator (MOVES) as run by the Colorado Department of Public Health and Environment (CDPHE) using results from the DRCOG Focus Travel Model
Data Quality: (Source #1)	Fair. Relies on model results, not actual observations.
Data Source #2	DRCOG Population Forecast
Data Quality: (Source #2)	Good. Dataset is built around State Demography Office forecasts and local planning assumptions.
Baseline:	26.8 lbs. CO_2e (2010)

2040 Target:	60 percent decrease from 2010
Target Rationale:	Target continues a previously established target from *Metro Vision 2035*.
	It accounts for a projected reduction in fuel burned because of more efficient engines and an increase in the number of alternative fuel motor vehicles (e.g. electricity and natural gas), and aspires for changes from local and regional action toward *Metro Vision* outcomes and objectives.

Protected Open Space

Description:	Land protected from development for outdoor recreation; wildlife habitat; natural resources; prominent geographical, geologic, or cultural features; ranching; farming; visual buffering; and/or community separation
Lead/Lag:	Lag. A larger pool of unprotected open space may remain available for potential protection as housing density increases.
Frequency:	Annual
Unit Type:	Square miles (mi.^{2})
Polarity:	High values are good
Formula:	$$\sum area\ included\ in\ DRCOG\ Open\ Space\ Inventory$$ $$-\sum area\ described\ as\ PROPOSED, FUTURE, or\ OPTION$$ $$-\sum area\ typed\ SCHOOL\ or\ SPECIAL\ USE$$
Data Source:	DRCOG Open Space Inventory
Data Quality:	Good. Dataset relies on the annual aggregation and classification standardization of locally updated and maintained open space data.
Baseline:	1,724 mi.^{2} (2014)
2040 Target:	1,980 mi.^{2}
Target Rationale:	Target aspires to continue the increase in protected open space while recognizing that the limited extent of the region of 5,288 mi.^{2} may eventually limit the pace of this increase.

Housing and Employment in High Risk Areas
Measure consists of two companion items: **housing** and **employment**.

Housing in High Risk Areas

Description:	Share of the region's housing in areas with wildfire Fire Threat Index (FTI) values of 4 or 5 ("high threat" and "highest threat") and/or Special Flood Hazard Areas (SFHA), which are areas with a 1 percent chance of inundation per year (often referred to as the "100-year floodplain")
Lead/Lag:	Lag. A decreasing share is likely to lag behind other related measures. For example, protection of additional open space in or near high-risk areas may help move this share in the intended direction.
Frequency:	Annual
Unit Type:	Percent of housing units
Polarity:	Low values are good
Formula:	$\dfrac{\sum housing\ units\ in\ high\ risk\ areas}{\sum housing\ units\ in\ region}$
Data Source #1:	DRCOG Master Housing Dataset (compiled from local parcel, land use, and building data; supplemented by proprietary data where necessary)
Data Quality: (Source #1)	Good. Compiles best information available from various sources. Not all housing units are recorded, especially in rural foothill and eastern plain areas due to a lack of data availability.
Data Source #2	Federal Emergency Management Agency (FEMA) National Flood Hazard Layer (NFHL)
Data Quality: (Source #2)	Good. Maps are maintained as a part of the National Flood Insurance Program (NFIP), but will not reflect property-by-property determinations of map amendments (map revisions based on physical modification of the floodplain are represented in the NFHL).
Data Source #3	Colorado State Forest Service *Colorado Wildfire Risk Assessment Project* (2013)
Data Quality: (Source #3)	Good. The project derived the threat values by combining landscape characteristics including surface fuels and canopy fuels, resultant fire behavior, historical fire occurrence, percentile weather derived from historical weather observations, and terrain conditions, combined using analysis techniques based on established fire science. However, the resultant data is available at 30-meter resolution and reflects characteristics from 2012 or earlier.
Baseline:	1.1 percent (2014)
2040 Target:	Less than 0.9 percent

Target Rationale: A portion of the region's residents may remain in high-risk areas and may even mitigate that risk through investments that do not show up in the regional datasets used above. However, target can be achieved by encouraging growth to occur on land outside these high-risk areas.

Employment in High Risk Areas

Description: Share of the region's employment in areas with wildfire Fire Threat Index (FTI) values of 4 or 5 ("high threat" and "highest threat") and/or Special Flood Hazard Areas (SFHA), which are areas with a 1 percent chance of inundation per year (often referred to as the "100-year floodplain")

Lead/Lag: Lag. A decreasing share is likely to lag behind other related measures. For example, protection of additional open space in or near high-risk areas may help move this share in the intended direction.

Frequency: Annual

Unit Type: Percent of employment

Polarity: Low values are good

Formula: $$\frac{\sum employment\ in\ high\ risk\ areas}{\sum employment\ in\ region}$$

Data Source #1: DRCOG Master Employment Level 2 Dataset (Quarterly Census of Employment and Wages; supplemented by proprietary data where necessary)

Data Quality: (Source #1) Good. Compiles best information available from various sources. Does not include small firms whose precise location information is unavailable.

Data Source #2 Federal Emergency Management Agency (FEMA) National Flood Hazard Layer (NFHL)

Data Quality: (Source #2) Good. Maps are maintained as a part of the National Flood Insurance Program (NFIP), but will not reflect property-by-property determinations of map amendments (map revisions based on physical modification of the floodplain are represented in the NFHL).

Data Source #3 Colorado State Forest Service *Colorado Wildfire Risk Assessment Project* (2013)

Data Quality: (Source #3) Good. The project derived the threat values by combining landscape characteristics including surface fuels and canopy fuels, resultant fire behavior, historical fire occurrence, percentile weather derived from historical weather observations, and terrain conditions, combined using analysis techniques based on established fire science. However, the resultant data is available at 30-meter resolution and reflects characteristics from 2012 or earlier.

Baseline: 2.9 percent (2014)

2040 Target: Less than 2.5 percent

Target Rationale: Certain types of jobs may still need to remain in high-risk areas. However, target
                    can be achieved by encouraging growth to occur on land outside these high-risk
                    areas.

Measure Associated with "Healthy, Inclusive and Livable Communities"

There is one performance measure related to the outcomes and objectives associated with this
overarching theme.

Population Residing in Areas with Housing and Transportation Costs Affordable to the Typical Household in the Region

Description: Share of the region's population living in areas with housing and transportation
                    costs that do not exceed 45 percent of the annual income of the typical household in
                    the region, where the typical household earns the median income for the region,
                    with both the average household size and average number of commuters per
                    household for the region

Lead/Lag: Lag. Improvements in this measure rely on changes in development patters (e.g.
                    increased housing density, as well as growth in urban centers and/or near high
                    frequency transit) and changes in travel (e.g. increasing non-single occupancy
                    vehicle mode share to work).

Frequency: Irregular. The Center for Neighborhood Technology (CNT) plans to update the index
                    every two years, depending on funding.

Unit Type: Percent of population

Polarity: High values are good

Formula: $$\frac{\sum population\ in\ block\ groups\ in\ areas\ with\ affordable\ \text{H+T}}{\sum population\ in\ block\ groups\ with\ \text{H+T}\ calculated}$$

Data Source: CNT Housing and Transportation (H+T®) Affordability Index using data from the US
                    Census Bureau's American Community Survey (ACS), Longitudinal Employer-
                    Household Dynamics (LODES), TIGER (Topologically Integrated Geographic
                    Encoding and Referencing) Line Files, and the General Transit Feed Specification
                    (GTFS)

Data Quality: Fair. Housing costs reflect aggregated answers from the ACS. Transportation costs
                    must be modeled based on neighborhood and household characteristics, and do not
                    reflect direct observation. The transportation cost model is proprietary and subject to
                    ongoing improvements; longitudinal comparison of results may be limited.

Baseline: 41 percent (2013)

2040 Target: 50 percent

Target Rationale: Target can be reached with progress toward 1) providing more opportunities for people to live in areas with affordable H+T, and 2) expanding the extent of areas with affordable H+T, both through local and regional action toward *Metro Vision* outcomes and objectives.

Measures Associated with "A Vibrant Regional Economy"

There are two performance measures related to the outcomes and objectives associated with this overarching theme.

Regional Employment

Description: The total number of jobs in the region

Lead/Lag: Lag. Growth in employment relies on the ability of the region to attract, retain, and grow businesses, which is partially related to other measures, such as travel time variation, delay, and housing and transportation costs.

Frequency: Annual

Unit Type: Jobs

Polarity: High values are good

Formula:
$$\sum Employment\ in\ DOLA\ Region\ 3\ from\ Data\ Source\ \#1$$
$$+ \sum Employment\ in\ DRCOG\ portion\ of\ Weld\ County\ from\ Data\ Source\ \#2$$

Data Source #1: Colorado Department of Local Affairs (DOLA), State Demography Office

Data Quality: (Source #1)   Good. The State Demography Office combines various sources of employment data, including the US Bureau of Labor Statistics (BLS) Quarterly Census of Employment and Wages (QCEW) and the US Census Bureau Nonemployer Statistics. Source does not aggregate the data to allow for a separate accounting of the portion of southwest Weld County in the region.

Data Source #2: DRCOG Master Employment Level 3 Dataset (Quarterly Census of Employment and Wages; supplemented by proprietary data where necessary)

Data Quality: (Source #2)   Good. Compiles best information available from various sources. Includes small firms whose precise location information is unavailable. This allows for comparison to county-level sources that include these firms (i.e. DOLA).

Baseline: 1.8 million jobs (2014)

2040 Target: 2.6 million jobs

Target Rationale: Target corresponds with the forecast by the State Demography Office and is the basis of assumptions in various regional plans.

Housing and Employment Near High-Frequency or Rapid Transit
Measure consists of two companion items: *housing* and *employment*.

Housing Near High Frequency or Rapid Transit

Description:	Share of the region's housing within ½ mile of rapid transit stations, or within ¼ mile of bus stops with 96 or more departures per weekday (average of 4 per hour)
Lead/Lag:	Lead. A larger share of housing in urban centers will help contribute to changes in travel, such as increased use of travel modes other than single-occupancy vehicles and decreased per capita vehicle miles traveled, which may help decrease average transportation costs relative to household income.
Frequency:	Annual
Unit Type:	Percent of housing units
Polarity:	High values are good

Formula:

$$\frac{\sum housing\ units\ near\ high\ frequency\ transit}{\sum housing\ units\ in\ region}$$

Data Source #1:	DRCOG Master Housing Dataset (compiled from local parcel, land use, and building data; supplemented by proprietary data where necessary)
Data Quality: (Source #1)	Good. Compiles best information available from various sources. Not all housing units are recorded, especially in rural foothill and eastern plain areas due to a lack of data availability.
Data Source #2	Regional Transportation District (RTD) General Transit Feed Specification (GTFS) reflecting the fourth and final service change of the calendar year
Data Quality: (Source #2)	Excellent. Data represents schedule as maintained by RTD within an industry standard format.
Baseline:	14.0 percent (2014)
2040 Target:	20 percent
Target Rationale:	Target recognizes that the reach of high frequency transit is already set to increase through projects that have opened since the baseline number, or are under construction, and aspires to account for further system improvements and development near high frequency transit.

Employment Near High Frequency or Rapid Transit

Description:	Share of the region's employment within ½ mile of rapid transit stations, or within ¼ mile of bus stops with 96 or more departures per weekday (average of 4 per hour)
Lead/Lag:	Lead. A larger share of employment in urban centers will help contribute to changes in travel, such as increased use of travel modes other than single-occupancy vehicles and decreased per capita vehicle miles traveled, which may help decrease average transportation costs relative to household income.
Frequency:	Annual
Unit Type:	Percent of employment
Polarity:	High values are good
Formula:	$$\frac{\sum employment\ near\ high\ frequency\ transit}{\sum employment\ in\ region}$$
Data Source #1:	DRCOG Master Employment Level 2 Dataset (Quarterly Census of Employment and Wages; supplemented by proprietary data where necessary)
Data Quality: (Source #1)	Good. Compiles best information available from various sources. Does not include small firms whose precise location information is unavailable.
Data Source #2	Regional Transportation District (RTD) General Transit Feed Specification (GTFS) reflecting the fourth and final service change of the calendar year
Data Quality: (Source #2)	Excellent. Data represents schedule as maintained by RTD within an industry standard format.
Baseline:	32.3 percent (2014)
2040 Target:	45 percent
Target Rationale:	Target recognizes that the reach of high frequency transit is already set to increase through projects that have opened since the baseline number, or are under construction, and aspires to account for further system improvements and development near high frequency transit.