AGENDA
REGIONAL TRANSPORTATION COMMITTEE

Tuesday, August 16, 2016
8:30 a.m.
1290 Broadway
Independence Pass Board Room

1. Call to Order

2. Public Comment

3. July 19, 2016 RTC Meeting Summary
(Attachment A)

ACTION ITEMS

4. Discussion on participation in the Mobility Choice Blueprint Initiative and administratively modify the *2016-2021 Transportation Improvement Program* (TIP) to include $500,000 of Surface Transportation Program-Metro funds towards the endeavor.
(Attachment B) Douglas Rex

5. Discussion on project selection recommendations for funding in fiscal years 2016 and 2017 for the *Traffic Signal System Improvement Program* (TSSIP) and the *Regional Intelligent Transportation System (ITS) Deployment Program* miscellaneous equipment call for projects.
(Attachment C) Greg MacKinnon

INFORMATIONAL ITEMS

6. Discussion on the proposed update to *The Prospectus-Transportation Planning in the Denver Region*.
(Attachment D) Douglas Rex

7. Briefing on the draft *Active Transportation* component of the *2040 Metro Vision Regional Transportation Plan.*
(Attachment E) Melina Dempsey

ADMINISTRATIVE ITEMS

8. Member Comment/Other Matters

9. Next Meeting – September 20, 2016

10. Adjournment

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

ATTACHMENT A

MEETING SUMMARY
REGIONAL TRANSPORTATION COMMITTEE
Tuesday, July 19, 2016

MEMBERS PRESENT:

Shannon Gifford	Colorado Department of Transportation
Ed Peterson	Colorado Department of Transportation
Gary Reiff	Colorado Department of Transportation
Debra Perkins-Smith (Alternate)	Colorado Department of Transportation
Jackie Millet (Alternate)	Denver Regional Council of Governments
Douglas Rex (Alternate)	Denver Regional Council of Governments
Ron Rakowsky	Denver Regional Council of Governments
Jennifer Schaufele	Denver Regional Council of Governments
Ashley Stolzmann	Denver Regional Council of Governments
Ken Lloyd	Regional Air Quality Council
David Genova	Regional Transportation District
Tom Tobiassen (Alternate)	Regional Transportation District
Ernest Archuleta (Alternate)	Regional Transportation District

Others Members Present:

Paul Jesaitis (Alternate)	Colorado Department of Transportation
Anthony Graves (Alternate)	Denver Regional Council of Governments
Bill Van Meter (Alternate)	Regional Transportation District

DRCOG Staff: Steve Cook, Jacob Riger, Todd Cottrell, Will Soper, Matthew Helfant, Mark Northrop, Casey Collins

Call to Order
Past Chair Jackie Millet called the meeting to order at 8:34 a.m.

Public Comment
There was no public comment heard.

Summary of March 15, 2016 Meeting
The summary was accepted as written.

ACTION ITEMS

Discussion on amendments to the *2016-2021 Transportation Improvement Program* (TIP).
Todd Cottrell presented the nine proposed amendments. The projects described are to be amended into the 2016-2021 TIP. The TIP project Rollover List was updated to include full descriptions of included projects. These projects also are in conformance with the State Implementation Plan for Air Quality.

1. DRCOG "Second Commitment in Principle" to FasTracks Amendments (Northwest Corridor)

2012-010	DRCOG Second Commitment to FasTracks Pool	Funds will be removed from the pool to reflect the Northwest Corridor Partners' partial drawdown ($5.058 M) of their allocated funds. Fund fiscal years will be changed to reflect actual year of expenditure.
New Project	City of Boulder Quiet Zones	The project will construct quiet zones along the BNSF corridor in the City of Boulder using funds from TIPID 2012-010 DRCOG Second Commitment to FasTracks Pool as agreed upon by the Northwest Corridor Partners.
New Project	Boulder County Quiet Zones	The project will construct quiet zones along the BNSF corridor in Boulder County using funds from TIPID 2012-010 DRCOG Second Commitment to FasTracks Pool as agreed upon by the Northwest Corridor Partners.
New Project	Longmont Rail Road Bridge Replacement	The project will replace a deficient BNSF bridge that is part of the FasTracks system within the City of Longmont using funds from TIPID 2012-010 DRCOG Second Commitment to FasTracks Pool as agreed upon by the Northwest Corridor Partners.
New Project	Louisville-Lafayette Quiet Zones	The project will construct quiet zones along the BNSF corridor in the Cities of Louisville and Lafayette using funds from TIPID 2012-010 DRCOG Second Commitment to FasTracks Pool as agreed upon by the Northwest Corridor Partners.

2. CDOT Region 4 Amendments

2007-095	Region 4 Surface Treatment Pool	Update Previous Funding column and remove four projects from pool. Removed pool projects will be individually depicted in the Rollover List and do not need to be duplicated in the current TIP.
2008-106	Region 4 FASTER Transit Pool	Remove all projects from pool. Pool projects will be individually depicted in the Rollover List and do not need to be duplicated in the current TIP.
2012-109	Region 4 RAMP Project Pool	Remove all projects from pool. Pool projects will be individually depicted in the Rollover List and do not need to be duplicated in the current TIP.

Ron Rakowsky MOVED to recommend to the Board of Directors the amendments to the *2016-2021 Transportation Improvement Program* (TIP). The motion was seconded and passed unanimously.

Discussion on amendments to the *FY2016-2017 Unified Planning Work Program* (UPWP).
Doug Rex presented the proposed revisions to the UPWP, which serves as the management tool for scheduling, budgeting, and monitoring planning activities of participating entities and was adopted in July 2015.

Changes to the document included updating MAP-21 references to FAST Act, minor clarifications to work tasks and activities; financial updates and clarifications to Appendix A finance tables; and minor updates to several deliverable completion dates in activity descriptions and in Appendix B.

Debra Perkins-Smith MOVED to recommend to the Board of Directors amendments to the *FY2016-2017 Unified Planning Work Program* (UPWP). The motion was seconded and passed unanimously.

Discussion on policies and information requirements related to HOV/Toll/Managed Lanes.
Jacob Riger presented the proposed additional information requirements for *Fiscally Constrained Regional Transportation Plan* project submittals with a tolling component. This final draft proposal is the result of multiple Transportation Advisory Committee discussions over the past six months, and proposes that:

- the CDOT/HPTE version (Attachment 2) directly incorporate CDOT's new HOV policy language
- the private toll company version (Attachment 3) incorporate the content addressed by CDOT's HOV policy in the form of asking whether such projects will include an HOV3+ component, and if not, why; and
- both versions of the RTP additional information requirements specifically ask whether the proposed toll project will also include provisions for transit service, and if not, why.

Comments

- Gary Reiff commented this is a good balance and not overly prescriptive.
- Jackie Millet agreed that it allows flexibility.
- Bill Van Meter asked for clarification on transit service. Staff noted the project sponsor would not be directly responsible for funding transit service, but would be required to provide information on how the project would accommodate transit existing or future transit service.
- Ken Lloyd asked whether modeling has been done on the upcoming conversion from HOV2+ to HOV3+. Staff said specific local modeling has not been done.
- Mr. Lloyd asked if a corridor could ever revert to HOV2+. Debra Perkins-Smith said HOV3+ is travel reliability/trigger, and that consistency is ideal.
- Anthony Graves asked what the current HOV3+ ridership is. Debra Perkins-Smith said such data is not yet available because the system is not currently configured to detect the third person in a vehicle. .
- Mr. Graves and Ms. Millet asked how other large metropolitan areas are addressing HOV3+ (ridership and participation). Doug Rex said staff would research this.

Tom Tobiassen MOVED to recommend to the Board of Directors the updated additional information requirements for *Fiscally Constrained Regional Transportation Plan* project submittals with a tolling component. The motion was seconded and passed unanimously.

INFORMATIONAL ITEMS

Discussion on the proposed Moderate Area 2008 8-Hour Ozone Standard State Implementation Plan (SIP)
Doug Rex introduced Ken Lloyd who presented on the Regional Air Quality Council's efforts over the last year and one-half to develop a new 8-Hour Ozone SIP to ensure compliance with federal air quality standards. The AQCC rulemaking hearing and SIP approval is scheduled for October 2016.

The meeting was adjourned at 9:33 a.m. The next scheduled meeting is August 16, 2016.

ATTACHMENT B

To: Chair and Members of the Regional Transportation Committee

From: Douglas W. Rex, Director, Transportation Planning and Operations
303 480-6747 or drex@drcog.org

Meeting Date	Agenda Category	Agenda Item #
August 16, 2016	Action	4

SUBJECT

The proposed creation of a Mobility Choice Blueprint for the region and a request for DRCOG's participation.

PROPOSED ACTION/RECOMMENDATIONS

Recommend approval to participate and contribute funding towards the Mobility Choice Blueprint.

ACTION BY OTHERS

July 25, 2016 - TAC recommended approval.
July 20, 2016 - Board discussion about DRCOG's participation.
December 15, 2015 - Don Hunt briefing on the Mobility Choice Initiative.

SUMMARY

At the July 2016 DRCOG Board meeting, retired CDOT Director Don Hunt and Kelly Brough, President and CEO of the Greater Metro Chamber of Commerce, provided a briefing on a new initiative called Mobility Choice. Its stated purpose is to:

> *Maximize existing investments in the metro Denver transportation system by leveraging technology to meet future workforce mobility needs, resulting in enhanced economic opportunity and quality of life.*

Since this spring, DRCOG staff has been participating in a discussion with the Denver Metro Chamber, CDOT and RTD about forming a partnership to create an environment embracing advanced transportation technologies to improve future mobility.

To advance this goal, it is proposed the partners fund a study, called the Mobility Choice Blueprint, to further understand the future of transportation technology and what is needed to prepare the region for its inevitable expansion. Attachment 1 details the purpose and outcomes of the Mobility Choice Blueprint initiative. Once complete, the Blueprint – which includes a large public involvement process – would be used to recommend investment priorities for the Regional Transportation Plan (RTP) and future Transportation Improvement Programs (TIPs). Recommended projects or programs would come from either "existing funding" or "new funding models", which could result in reallocation of funds in the fiscally constrained RTP.

The Blueprint development would be overseen by a Mobility Choice Board of Directors and the Chamber will finance the operations of the Board, hiring an executive director. The Board will be made up of private and public sector leaders and DRCOG will be a member (See attachment 1 for a list of Board member names and organizations).

The estimated cost of the Blueprint is $1.5 million and will be equally shared among the three public agencies (DRCOG, CDOT and RTD). As noted above, the Denver Metro Chamber is providing the funds to operate the Mobility Choice Board. Consequently, DRCOG's share would be $500,000 and, if the DRCOG Board decides to participate, staff recommends using Surface Transportation Program-Metro funds available, as a result of additional funds from the FAST Act and returns from completed projects.

The success of this endeavor is contingent on all three public agencies contributing funding. To date, CDOT has secured its share and RTD plans to present to its Board in September.

At the July meeting, the DRCOG Board informally expressed a willingness to participate in this endeavor leading to this formal action.

PREVIOUS DISCUSSIONS/ACTIONS

N/A

PROPOSED MOTION

Move to recommend to the Board of Directors approval to participate in the Mobility Choice Blueprint Initiative and administratively modify the *2016-2021 Transportation Improvement Program* (TIP) to include $500,000 of Surface Transportation Program-Metro funds towards the endeavor.

ATTACHMENT

1. Mobility Choice Blueprint Initiative
2. Presentation slides

ADDITIONAL INFORMATION

If you need additional information, please contact Douglas Rex at 303 480-6747 or drex@drcog.org.

MOBILITY CHOICE
BLUEPRINT INITIATIVE

MOBILITY CHOICE BLUEPRINT INITIATIVE
FOR THE METRO DENVER AREA

How we move is changing. In the post-war history of mobility in our region, personal cars have been central to nearly every trip. Getting a driver's license was a major rite of passage for most Americans, and owning a car was part of living the American dream. Accordingly, transportation planning processes were built around that expectation, with a focus on maximizing and increasing the amount of cars our roads can hold.

But technology is changing these values. Today, Americans spend on average 17 percent of their household budgets on transportation, largely toward owning and maintaining a car. Driving is an unproductive commitment of personal time. Meanwhile, connected cars are already being produced, driverless cars are coming faster than anticipated and the sharing economy is growing. With that, transportation planning must change.

We are proposing a mobility planning effort that takes into account the types of changes we are experiencing due to advancing technology and shifting values. By uniting the public and private sectors we can better plan for the mobility needs of our future workforce. If we don't act now, our growth and congestion could work against us when it comes to attracting tomorrow's employers.

The Denver Metro Chamber of Commerce, the Colorado Department of Transportation, the Regional Transportation District and the Denver Regional Council of Governments are ready to embrace a new approach to planning for connected mobility in the metro Denver area.

Our Purpose

Maximize existing investments in the metro Denver transportation system by leveraging technology to meet future workforce mobility needs, resulting in enhanced economic opportunity and quality of life.

The Mobility Choice Organization

Mobility Choice is a partnership among the Denver Metro Chamber of Commerce, Colorado Department of Transportation, Regional Transportation District, and Denver Regional Council of Governments. Mobility Choice is the non-profit overseeing the preparation of the 2030 Blueprint, supporting a process and generating a document that will articulate how metro Denver can join together public and private interests, incorporate technological change and opportunity, and provide alignment for strategic transportation investment.

The Mobility Choice Board of Directors is composed of private and public leaders:

- **Bruce Alexander**, President & CEO, Vectra Bank Colorado
- **Kelly Brough**, President and CEO, Denver Metro Chamber of Commerce
- **Colorado Department of Transportation**
- **Denver Regional Council of Governments**
- **Regional Transportation District**
- **Jack Hilbert**, former Douglas County Commissioner
- **Aiden Mitchell**, Vice President, IoT Global Solutions, Arrow Electronics
- **Becca O'Brien Kuusinen**, Associate Principal, Denver, McKinsey & Company
- **IHS Inc.**
- **Kaiser Permanente**
- **Will Toor**, former Boulder County Commissioner
- **Jarrett Wendt**, VP Strategic Initiatives and Business Development, Panasonic Enterprise Solutions Company

Don Hunt, retired CDOT Executive Director, is the convening Executive Director of Mobility Choice.

Blueprint Products/Outcomes

The Mobility Choice Blueprint, a strategic direction for transportation in the Denver region, will produce specific products and outcomes:

1) **Engagement** of the general public and key stakeholders in metro Denver's mobility future in a way that provides education and awareness of technological change in transportation, and meaningful input to the Blueprint process and recommendations
2) A 15-year **scenario** for most probable technological impact on mobility and transportation
3) Year 2030 recommendations for:
   a) Changes to regional transportation **policies**
   b) Elimination of or additions to transportation **projects** (e.g. highway capacity, express toll lanes, rail transit, station connections, bus rapid transit)
   c) Reductions in or additions to transportation/mobility **programs** (e.g. local bus service, on demand mobility, TDM, bicycle, pedestrian, signal systems, managed highway systems, customer trip decision information, integrated electronic payment, private mobility provider integration, freight movement)
4) **Funding** requirements and sources to implement recommended projects and programs by 2030
   a) Use of existing funding
   b) New funding models
5) **Continuing processes** to:
   a) Effectively engage the **private sector** and employers in transportation solutions
   b) Maintain **strategic alignment** of CDOT, RTD and DRCOG transportation project and program investments
   c) Evaluate the pace of technological change and **make mid-course corrections** to regional plans for effective transportation and mobility investments

ATTACHMENT 2

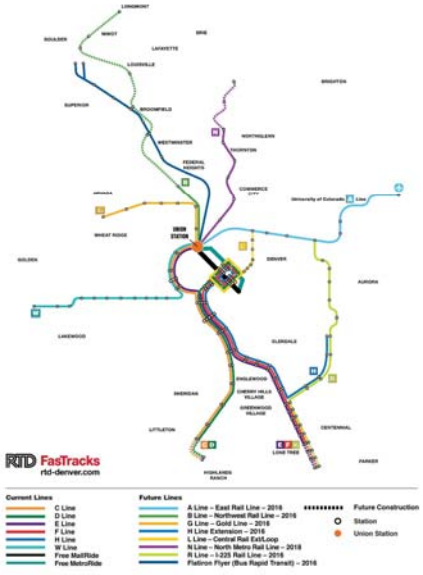
Mobility Choice Blueprint

MAXIMIZE EXISTING INVESTMENTS IN OUR TRANSPORTATION SYSTEM BY LEVERAGING TECHNOLOGY TO PLAN FOR OUR FUTURE WORKFORCE AND EMPLOYER MOBILITY NEEDS AND INCREASE ECONOMIC OPPORTUNITIES AND QUALITY OF LIFE.

Mobility Choice: Why?

1. In 2016, the RTD will open
   - US36 Flatiron Flyer
   - University of Colorado A Line
   - Westminster B Line
   - Arvada-Wheat Ridge G Line
   - Aurora R Line.

What is metro Denver's post-2016 mobility strategy?



ATTACHMENT 2

Mobility Choice: Why?

2. More than ever before, mobility will be the critical element in keeping metro Denver economically healthy.

   How do we bring private employers into the transportation planning process?

   How can DRCOG, RTD and CDOT align for maximum effectiveness?

Mobility Choice: Why?

3. Technology is rapidly changing urban mobility. Connected, shared, and automated mobility are changing the ways we travel.

   How do we invest in mobility choices
   - to avoid stranded investments and
   - leverage new technology to create continued economic health and quality of life?

ATTACHMENT 2

Mobility Choice Organization

Don Hunt
Convening Executive Director

Board of Directors (12 members) –

Private Sector
- Bruce Alexander, Vectra Bank
- Kelly Brough, Denver Metro Chamber
- Brian Oehler, IHS
- Aiden Mitchell, Arrow Electronics
- Jarrett Wendt, Panasonic
- Becca O'Brien Kuusinen, McKinsey
- _____, Kaiser Permanente

Public Sector
- Jennifer Schaufele, DRCOG
- Dave Genova, RTD
- Shailen Bhatt/Mike Lewis, CDOT
- Will Toor, Boulder County
- Jack Hilbert, Douglas County

Mobility Choice Blueprint

- Mobility Choice Blueprint funded in partnership with private firms, DRCOG, RTD, and CDOT, each contributing $500,000
- A strategic direction for metro Denver mobility investment
- Blueprint technical content developed by agency staff and consultant team
- Blueprint preparation October 2016-December 2017
- Extensive public engagement effort
- Mobility Choice Board for governance, leadership, and policy

ATTACHMENT 2

Success "Home Runs" Technology Enabled Mobility

- Reduce existing roadway congestion and increase system reliability through the application of **connected and big data technology** (adaptive signal systems, managed motorways, connected corridors).
- Maximize utility of the RTD rail system investment by deploying connected, automated, and electric vehicle technology to provide **first mile/last mile on-demand mobility** to transit stations (Transportation Network Companies, eg Uber, Lyft, Bridj, and Bikeshare).
- Increase shared vehicle trips/increase vehicle occupancy through real-time mode information apps and **integrated electronic payment** (Moovel, Go Denver app, TriMet Mobile Ticket).

Success "Home Runs" Transportation Investment Process

- Develop policies and programs to ensure that new mobility options are available to and affordable for **disadvantaged, disabled, and senior** communities.
- Identify how CDOT, RTD, DRCOG, and local transportation programs can **strategically align investments** and anticipate/utilize new mobility technologies for system efficiency.
- Develop a mechanism for continuing **private sector and employer participation** in the regional transportation planning and investment process.

Success "Home Runs" Transportation Investment Process

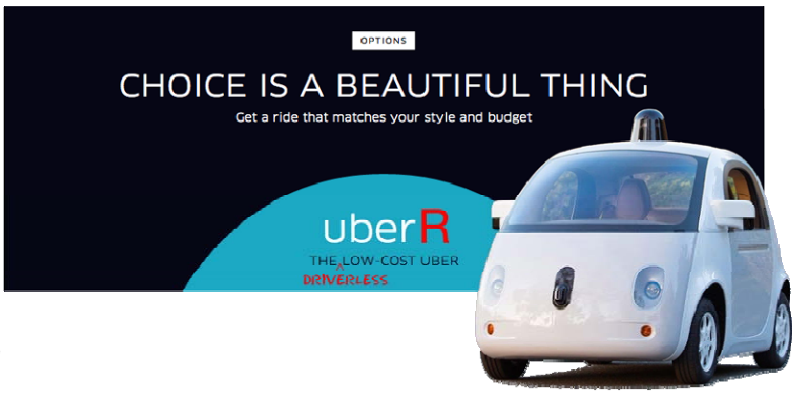
- Identify where mobility program and project investments may use **existing funding** or require **new funding models** for success.

- Year 2030 recommendations for:
  - Changes in transportation **policies**
  - Elimination of or additions to transportation **projects**
  - Reductions in or additions to transportation **programs**

A Closing Thought……

"It is not our task to predict the future, but to be well prepared for it."

Pericles, 5th Century B.C., Athens



ATTACHMENT C

To: Chair and Members of the Regional Transportation Committee

From: Greg MacKinnon, Regional Transportation Operations Program Manager
303-480-5633 or gmackinnon@drcog.org

Meeting Date	Agenda Category	Agenda Item #
August 16, 2016	Action	5

SUBJECT

This item describes the recommendations to allocate fiscal year 2016 and 2017 federal funds for contingency and Multimodal Signal Operations Support identified in the *Traffic Signal System Improvement Program* (TSSIP) and the *Regional Intelligent Transportation System (ITS) Deployment Program*.

PROPOSED ACTION/RECOMMENDATIONS

DRCOG staff recommends approval of the proposed miscellaneous equipment projects.

ACTION BY OTHERS

July 25, 2016 Transportation Advisory Committee recommended approval of project selection recommendations.

June 22, 2016 The Regional Transportation Operations Working Group, comprised of project sponsors and other stakeholders, affirmed DRCOG staff recommendations.

April 20, 2016 DRCOG Board approved project selection process.

March 28, 2016 Transportation Advisory Committee approved project selection process.

SUMMARY

The Traffic Signal System Improvement Program (TSSIP) [adopted September 2013] and the Regional Intelligent Transportation System (ITS) Deployment Program [adopted June 2014] both identify contingency funds to ensure the programs' capital improvements are fully funded. After any contingencies are satisfied, the remaining funding is available to purchase needed "miscellaneous" equipment. In addition, the TSSIP program identifies funding for Multimodal Signal Operations Support.

On April 26, 2016, the DRCOG Transportation Operations Program solicited requests for miscellaneous equipment applications in three categories:

	FY16	FY17	Total
TSSIP	$435,000	$328,000	$763,000
Multimodal Signal Operations Support		$356,000	$356,000
ITS	$127,300	$513,700	$641,000
			$1,760,000

Seven operating agencies submitted 9 projects for consideration by the deadline, totaling about $1,400,000. The requests for TSSIP miscellaneous funds amounted to about $836,000 and the requests for ITS Pool miscellaneous funds amounted to about $562,000. There were no requests for multimodal signal operations support funding.

Evaluation Process

DRCOG staff reviewed all applications for completeness and eligibility.

TSSIP Miscellaneous Eligibility Requirements

- TSSIP funds are eligible for 100% federal share.
- Projects must be on the DRCOG Regional Roadway System.
- Projects must be consistent with the current update of the *DRCOG Traffic Signal System Improvement Program* (TSSIP).
- TSSIP funds are designated for signal improvements that promote and support coordinated signal timing operations. Corridors that were retimed before **2013** and have an average signal spacing no greater than ½ mile are eligible for funding.

ITS Pool Miscellaneous Eligibility Requirements

- The ITS Pool funds require a minimum 20% non-federal match.
- Projects must be on the DRCOG Regional Roadway System.
- Projects must be consistent with the current update of the *DRCOG Regional Intelligent Transportation Systems Deployment Program*.
- ITS Pool funds are designated for technology projects that promote and support improved regional transportation operations.

DRCOG staff then reviewed the applications based on the type of funds the applicant was requesting and the previously-adopted project prioritization tables. The *TSSIP Miscellaneous Priority Table* and the *ITS Pool Miscellaneous Priority Table are attached (Attachments 1 and 2 respectively)*. Projects were ranked by priority within each funding category and funds were allocated until exhausted or all the eligible projects were funded. In the event that projects within a priority level exceeded total available funding, the evaluation considered additional criteria provided on the priority table to further prioritize projects within the priority level.

Recommendations

DRCOG staff's funding recommendations are shown below:

Jurisdiction	Project	Federal Allocation	Non-Federal Match
Arvada	Extend communications on 64th Ave	$15,380	$0
Brighton	Upgrade traffic signal controllers citywide	$40,584	$0
CDOT	Travel time monitoring system equipment	$104,000	$26,000
CDOT	Travel time monitoring system equipment	$345,600	$86,400
Centennial	Extend communications on Arapahoe Rd	$2,200	$0
Commerce City	Upgrade cabinets and controllers on Quebec St	$33,000	$0
Commerce City	Upgrade cabinets and controllers on SH 2	$99,000	$0
Superior/Louisville	Upgraded signal control system on McCaslin Blvd	$142,300	$0
Remainder Unallocated		$977,936	

A detailed explanation for staff's recommendations is shown in Attachment 3. As stated in the previously-adopted selection process, the remaining $977,936 will be rolled into the total funding to be programmed in the Regional Transportation Operations Improvement Program that will begin development later this year.

PREVIOUS DISCUSSIONS/ACTIONS

N/A

PROPOSED MOTION

Move to recommend to the Board of Directors the proposed miscellaneous equipment projects for fiscal year 2016 and 2017 federal funds identified in the *Traffic Signal System Improvement Program* (TSSIP) and the *Regional Intelligent Transportation System (ITS) Deployment Program*.

ATTACHMENTS

1. TSSIP MEPP Prioritization Table
2. ITS MEPP Prioritization Table
3. Staff recommendations detail

ADDITIONAL INFORMATION

If you need additional information, please contact Greg MacKinnon, Regional Transportation Operations Program Manager, at 303-480-5633 or gmackinnon@drcog.org.

ATTACHMENT 1

2016 TSSIP Miscellaneous Prioritization Table

Priority Level	Priority Justifications
1	Purchases to assure proper operation of existing traffic signal systems, in descending priorities: **a.** Replacement of equipment that is obsolete/incompatible or has a demonstrated history of poor reliability. **b.** Replace/upgrade communications equipment/system where existing communication has a demonstrated history of poor reliability. **The application must illustrate how the equipment is obsolete/incompatible and/or document history of poor reliability.**
2	Purchases to extend the reach of traffic signal system control to locations not currently under system control (operating agency must already have an operational system to which the proposed locations would be added), in descending priorities: **a.** Installation of controller (and related) equipment. **b.** Installation of communications equipment.
3	Purchases to install uninterruptable power supply (UPS) at signalized intersections where existing power has a demonstrated history of poor reliability. **The application must document history of poor reliability.**
4	Purchases that facilitate coordinated traffic signal operations across multiple agencies, in descending priority: **a.** Improvements in or expansion of the shared (inter-agency) communications network. **b.** Improvements in inter-agency data sharing. **c.** Improvements in performance measures reporting. **d.** Improvements in shared monitoring between jurisdictions. **e.** Improvements in coordination and integration of multi-modal traveler information. **The operating agency must demonstrate significant commitment from all stakeholders.**
5	Purchases that upgrade beyond base level signal control for agencies migrating from a base-function control system with an already-owned higher-function control system, in descending priorities: **a.** Upgrading agency-owned communication, which is incompatible with the higher-function system. **b.** Migrating from leased to agency-owned communication, if required by the higher-function system. **c.** Deploying system detector equipment to support adaptive traffic control improvements. **d.** Implementing higher system functions at traffic signal controller locations to support operation improvements for pedestrians, bicycles, and transit at signalized intersections or crossings.
6	Purchases that enhance systems operational capabilities, in descending priorities: **a.** Upgrading to newer/higher version of existing system software or upgrading beyond base level signal control. **The jurisdiction must define in the application the functions/features determined to be necessary that are not available in the current signal system.** **b.** Advancement of traffic signal system management to support bicycle and pedestrian operations. **c.** Deploying TSP equipment on transit vehicles.

ATTACHMENT 1

2016 TSSIP Miscellaneous Prioritization Table

Notes: Traffic control signalization projects are counted among select safety projects that are eligible for an increased federal share.

Eligible projects are those that are:

- Focus on traffic control signalization
- Improve inter-agency signal timing coordination
- Located on Principal Arterials and higher
- Corridors that have not implemented new signal timing with DRCOG traffic operations program assistance since 2012

Poor Reliability = Equipment has a documented history of failures or malfunctions that impact corridor coordination. **Documentation that illustrates both failure/malfunction and the consequent impact on coordinated signal operations and travel time reliability. The threshold is an impact on four or more peak periods in one month.**

In the event that projects within a priority level exceed total available funding, the evaluation will consider the following criteria:

1. Foremost, the congestion and air quality benefits of installing equipment must be documented by either a signal timing project or similarly credible benefits analysis. Projects that anticipate positive congestion and air quality benefits are considered more critical.
2. Other factors that will be considered:
    a. projects with a signal spacing of ½ mile or less are considered more critical; and,
    b. projects on corridors that have not been retimed in less than 4 years are more critical.
    c. projects on corridors with a higher congestion grade in the *DRCOG Congestion Management Process* (CMP) are considered more critical;
    d. projects on corridors and at intersections with poor safety performance scores in the *Report on Transportation Safety in the Denver Region* are more critical; and,
    e. projects on corridors within a ½ mile of a planned transit park-n-Ride are considered more critical.
3. Projects will be examined to determine feasibility of splitting into more than one project.
4. Relevant applicants will be contacted, if necessary, to further ascertain their priorities and perspectives.

Last Update: 10/09/15

ATTACHMENT 2

2016 ITS Pool Miscellaneous Prioritization Table

Priority Level	Priority Justifications
1	Purchases that facilitate coordinated operations across multiple agencies, in descending priority: **a.** Improvement in regional traffic incident management **b.** Improvements in or expansion of the shared (inter-agency) communications network. **c.** Improvements in inter-agency data sharing. **d.** Improvements in performance measures reporting. **e.** Improvements in shared monitoring between jurisdictions. **f.** Improvements in coordination and integration of multi-modal traveler information. **The operating agency must demonstrate significant commitment from all stakeholders.**
2	Purchases that extend traffic monitoring infrastructure, in descending priority: **a.** Arterials **b.** Freeways The operating agency will follow CDOT's *Regional Integrated Traveler Information Display Guidelines* and will commit to efforts (following/establishing regional standards and implementing CTMS software modifications, as necessary) to share data produced by the project with CDOT's CTMS. **The operating agency must coordinate to share monitoring data (and access) with at least CDOT and potentially other neighbors. The operating agency must demonstrate significant commitment from all stakeholders.**
3	Purchases that improve work zone/special event management, in descending priority: **a.** Improvements in Regional Traveler Information coordination. **b.** Field implementation projects (i.e. work zone management)
4	Purchases that enhance systems operational capabilities, in descending priorities: **a.** Deploying CCTV field equipment at traffic signal controller locations. **b.** Deploying Road-Weather Stations.

ATTACHMENT 2

2016 ITS Pool Miscellaneous Prioritization Table

Notes: In the event that projects within a priority level exceed total available funding, the evaluation will consider the following criteria:

1. Foremost, the congestion and air quality benefits of installing equipment must be documented by either a signal timing project or similar before-after analysis. Projects that anticipate positive congestion and air quality benefits are considered more critical.
2. Projects that assist the DRCOG region in achieving the *Denver Regional Concept of Transportation Operations* (RCTO) goals and objectives are considered more critical, in descending order of priority:
    a. Improvements focused on incident management coordination (active management).
    b. Improvements focused on performance monitoring.
    c. Improvements focused on shared monitoring (active monitoring).
3. Other factors that will be considered:
    a. projects on corridors with a higher congestion grade in the *DRCOG Congestion Management Process* (CMP) are considered more critical;
    b. projects on corridors and at intersections with poor safety performance scores in the *Report on Transportation Safety in the Denver Region* are more critical; and,
    c. projects on corridors within a ½ mile of a planned transit park-n-Ride are considered more critical.
4. Projects will be examined to determine feasibility of splitting into more than one project.
5. Relevant applicants will be contacted, if necessary, to further ascertain their priorities and perspectives.

* Equipment that is used mainly for traffic signal coordination purposes can be considered for 100% federal funds.

Last Update: 09/23/15

ATTACHMENT 3

Staff Recommendations Detail

City of Arvada (one request)

1. Arvada requests TSSIP funds to extend system control to 72nd Avenue/Quaker Street by extending fiber communications to these signals (Priority 2b). Arvada also requests TSSIP funds to upgrade existing communications from wireless to fiber for four other locations (64th Avenue/Kendrick, 64th Avenue/McIntyre Street Drive, 64th Avenue/Pike Street, 64th Avenue/Quaker Street) demonstrating (Priority 1b). Arvada's justification for this request is record of poor communications reliability through an existing SCADA system, which was not primarily constructed for the traffic signal system. This request provides the equipment to move these signals to a more reliable dedicated traffic signal communications system.

   Except for 72nd Avenue/Quaker Street, all the request locations are on the Regional Roadway System with an average signal spacing of less than ½ mile.

   This request has a low risk assessment with systems engineering complete in the TSSIP.

DRCOG staff recommendation:

1. Allocate funding for Request 1 with the exclusion of 72nd Avenue/Quaker Street. Note that as there will be some disturbance as part of equipment implementation, Arvada will have to coordinate with CDOT to acquire environmental clearance for the work.

City of Brighton (one request)

1. Brighton requests TSSIP funds to procure 15 upgraded controllers on Bridge Street (3 signals), Bromley Lane (9 signals), and 27th Avenue (3 signals). Brighton's justification for this request is bring these intersections up to Brighton's new controller standard for the on-going signal interconnect project along these corridors (Priority 6a).

   All the request locations are on the Regional Roadway System with an average signal spacing of less than ½ mile.

   This request has a low risk assessment with systems engineering complete in the TSSIP.

DRCOG staff recommendation:

1. Allocate full funding for Request 1.

ATTACHMENT 3

Staff Recommendations Detail

City of Centennial (three requests)

1. Centennial requests TSSIP funds to upgrade intersection detection at 7 intersections along Smoky Hill Road. Centennial's justification for this request is the need to upgrade and standardize intersection detection to video detection. There is no TSSIP priority for intersection detection.

   All the request locations are on the Regional Roadway System with an average signal spacing of less than ½ mile.

   This request was assessed as low risk.

2. Centennial requests TSSIP funds to upgrade intersection detection at 10 intersections along Arapahoe Road. Centennial's justification for this request is the need to upgrade and standardize intersection detection to video detection. There is no TSSIP priority for intersection detection.

   All the request locations are on the Regional Roadway System with an average signal spacing of less than ½ mile.

   This request was assessed as low risk.

3. Centennial requests TSSIP funds to extend system control to the intersection of Franklin Street/Arapahoe Road with wireless communications (Priority 2b).

   All the request locations are on the Regional Roadway System with an average signal spacing of less than ½ mile.

   This request has a low risk assessment with systems engineering complete in the TSSIP.

DRCOG staff recommendations:

1. Allocate no funds for Request 1 as the request is not a priority in the TSSIP.
2. Allocate no funds for Request 2 as the request is not a priority in the TSSIP.
3. Allocate full funding for Request 3.

Colorado Department of Transportation (two requests)

1. CDOT requests ITS funds to procure a travel time monitoring system along Wadsworth Boulevard. The system will be procured in combination with CDOT's second project request (Greenwood Village's bid). Specific coordination has been agreed upon at the boundaries with Lakewood. CDOT's justification for this request is the need to improve the CDOT's awareness of traffic conditions on the corridor (Priority 2b), which will be identified as a Route of Significance.

All the request locations are on the Regional Roadway System.

CDOT committed a 20% non-federal match for this request.

This request has a low risk assessment with systems engineering complete in the *Concept of Operations for the Multi-Agency Arterial Travel Time Monitoring Project*.

2. CDOT requests ITS funds to expand Greenwood Village's travel time monitoring system along Arapahoe Road. CDOT will own and maintain the equipment on Arapahoe Road while Greenwood Village hosts the server managing the system. CDOT's justification for this request is the need to improve the CDOT's awareness of traffic conditions on the corridor (Priority 2b), which is being identified as a Route of Significance.

   All the request locations are on the Regional Roadway System.

   CDOT committed to a 20% non-federal match for this request.

   This request has a low risk assessment with systems engineering complete in the *Concept of Operations for the Multi-Agency Arterial Travel Time Monitoring Project*.

DRCOG staff recommendations:

1. Allocate full funding for Request 1.
2. Allocate full funding for Request 2.

City of Commerce City (two requests)

1. Commerce City requests TSSIP funds for upgraded cabinets and controllers for 6 signals along Highway 2 from 72nd Avenue to 104th Avenue. Commerce City's justification is the need to upgrade the controllers and cabinets to be compatible with Commerce City's system (Priority 6a). Intersection detection equipment was included in the request. Intersection detection is not a priority in the TSSIP.

   All the request locations are on the Regional Roadway System with an average signal spacing of about 1 mile. Despite the signal spacing, this corridor was the subject of a signal timing project in 2009.

   This request has a low risk assessment with systems engineering complete in the TSSIP.

2. Commerce City requests TSSIP funds for upgraded cabinets and controllers for 2 signals along Quebec Street from 58th Avenue to 60th Avenue. Commerce City's justification is the need to upgrade the controllers and cabinets to be compatible

with Commerce City's system (Priority 6a). Intersection detection equipment was included in the request. Intersection detection is not a priority in the TSSIP.

All the request locations are on the Regional Roadway System with an average signal spacing of less than ½ mile.

This request has a low risk assessment with systems engineering complete in the TSSIP.

DRCOG staff recommendations:

1. Allocate partial funding to Request 1; fund the request without the intersection detection equipment.
2. Allocate partial funding to Request 2; fund the request without the intersection detection equipment.

Town of Superior/Town of Louisville (one joint request)

1. Superior and Louisville jointly request TSSIP funds to procure an upgraded traffic signal system on McCaslin Boulevard from High Plains Drive to Via Appia Way. This request consists of workstation upgrades, signal system software upgrades, and miscellaneous communications equipment. The sponsors' justification for this request is the need to bring all traffic signals on either side of the Diverging Diamond Interchange (DDI) at US 36 under the control of one system in order to improve monitoring and management of the new conditions (Priority 4a).

   All the request locations are on the Regional Roadway System with an average signal spacing of less than ½ mile.

   This request has a low risk assessment with systems engineering complete in the TSSIP and Denver's open procurement (with functional requirements definition).

   This request also included requests for CCTV and related equipment as well as roadway detection equipment. These items are defined as part of a vision of a larger, integrated Advanced Transportation Management System—an ITS-related request. These items are not eligible for TSSIP funding.

DRCOG staff recommendation:

1. Allocate partial funding for Request 1; fund the request except for the CCTV and related equipment and the roadway detection station equipment. Note that as there will be some disturbance as part of equipment implementation, Superior and Louisville will have to coordinate with CDOT to acquire environmental clearance for the work.

ATTACHMENT D

To: Chair and Members of the Regional Transportation Committee

From: Douglas W. Rex, Director, Transportation Planning and Operations
303-480-6747 or drex@drcog.org

Meeting Date	Agenda Category	Agenda Item #
August 16, 2016	Information	6

SUBJECT

Updates to *The Prospectus–Transportation Planning in the Denver Region*.

PROPOSED ACTION/RECOMMENDATIONS

RTC review and comment on draft document.

ACTION BY OTHERS

N/A

SUMMARY

DRCOG staff has been working with RTD and CDOT to update the *Transportation Planning in the Denver Region* document to respond to the FAST Act and incorporate other updates since RTC last approved it in 2011. The document's purpose is to detail how the Denver region transportation planning process will work. Specifically the document:

- describes the policies and procedures of the process;
- details how the three partners (DRCOG, CDOT, RTD) cooperate in carrying out the process;
- identifies the key regional transportation planning products required by federal law and explains how the participants work to produce those products; and
- shows how the regional process dovetails with individual processes of the three partners, and interacts with local governments, air quality planning agencies, and other participants to accomplish transportation planning in the Denver region.

Draft changes are shown in the linked track-changes and clean versions of the document (Attachments 1 and 2, respectively). Draft changes address the topics listed above, including RTC's previous input on its role/responsibilities and schedule vis-à-vis Board meetings. The draft document has also been reviewed by the Agency Coordination Team, a staff working group of DRCOG, CDOT, RTD, RAQC, FHWA, and other transportation planning stakeholders.

Staff will describe the proposed changes at the RTC meeting and seek further input and guidance. RTC will take action on the updated *Transportation Planning in the Denver Region* document at a future meeting.

PREVIOUS DISCUSSIONS/ACTIONS

May 19, 2015 – RTC Meeting

September 15, 2015 – RTC Meeting

PROPOSED MOTION

N/A

ATTACHMENTS

Links – Draft *Transportation Planning in the Denver Region* document:

1. Track changes version
2. Clean version

ADDITIONAL INFORMATION

If you need additional information, please contact Douglas W. Rex, Director, Transportation Planning and Operations, at 303-480-6747 or drex@drcog.org.

ATTACHMENT E

To: Chair and Members of the Regional Transportation Committee

From: Melina Dempsey, Transportation Planner
303-480-5628 or mdempsey@drcog.org

Meeting Date	Agenda Category	Agenda Item #
August 16, 2016	Information	7

SUBJECT

Status update on active transportation component of the new *2040 Metro Vision Regional Transportation Plan* (2040 MVRTP).

PROPOSED ACTION/RECOMMENDATIONS

N/A

ACTION BY OTHERS

N/A

SUMMARY

RTC has recently received briefings on the draft transit and freight components of the 2040 MVRTP. The focus of this month's MVRTP discussion is the preliminary draft text of the Active Transportation component (Attachment 1).

The concept of active transportation (walking and bicycling) is receiving greater emphasis at the federal, state, and local levels. This component provides more depth and breadth of content than the Bicycle and Pedestrian sections of the 2035 MVRTP. Additionally, this component sets the stage for undertaking the Active Transportation Plan, a task in DRCOG's *2016-2017 Unified Planning Work Program*. The Active Transportation Plan will expand the breadth and depth of content addressing non-motorized transportation and, once completed, will become part of the 2040 MVRTP.

DRCOG staff will provide an overview of the preliminary draft Active Transportation component (presentation attached).

PREVIOUS DISCUSSIONS/ACTIONS

N/A

PROPOSED MOTION

N/A

ATTACHMENTS

1. Draft Active Transportation component of the new MVRTP
2. Staff presentation

ADDITIONAL INFORMATION

If you need additional information, please contact Melina Dempsey, Transportation Planner, at (303) 480-5628 or mdempsey@drcog.org.

ACTIVE TRANSPORTATION

A. Introduction

The DRCOG region, known for its arid climate and abundance of sunshine, is an ideal place for walking and bicycling. Also referred to as active transportation, walking and bicycling are flexible, accessible, healthy, and clean modes of transportation and can be used exclusively or in conjunction with other modes. The cycling culture is especially strong not only in the DRCOG region, but statewide. The number of people who bike to work in the DRCOG region is more than twice the national average and is increasing at a greater rate than any other mode.

Presently, there are almost 900,000 trips made each day by walking or bicycling in the region. Trends point to a continued uptick in the number of people who get around by walking and bicycling. While the region has a robust sidewalk and bicycling network, there are gaps to be filled and needs to be addressed in order to meet the demands for walking and bicycling; provide safe and comfortable options for people of all ages and abilities; and to fulfill the performance measures and targets currently being established as part of Metro Vision 2040.

The Active Transportation section of the RTP addresses the following topics; existing conditions for walking and bicycling in the DRCOG region, future projections for these modes, regional goals for active transportation, and strategies for meeting the goals. There will be an opportunity to delve deeper into active transportation topics during the development of the Active Transportation Plan, scheduled to commence in late 2016. The Active Transportation Plan will eventually be adopted as part of the RTP.

B. Defining Active Transportation

Active transportation[1] is defined as a way of getting around powered primarily by human energy, via pedestrian and bicycling modes of travel. Pedestrian travel includes people walking or using wheelchairs[2], longboards, segways, and other mobility devices, such as walkers or crutches. Bicycling includes any type of wheeled and pedaled cycle, with or without an attached motor. Such means of travel enables multimodal transportation solutions to connect people of all ages, incomes, and abilities to where they need to go.

C. Walking and Bicycling in the DRCOG Region – Existing Conditions

Every day, almost 900,000 trips are made by walking and bicycling in the DRCOG region (*Source: DRCOG Travel Mode, 2015*). The region has a strong walking and bicycling culture, as evidenced by the country's second-largest annual Bike to Work Day. As the region's population continues to increase, so will the number of people who travel via active transportation modes. While pedestrians and bicyclists make up only seven percent (*Source: DRCOG Travel Model, 2015*) of all person trips, they account for about 25 percent (*Source: NTSA – FARS, 2014*) of traffic fatalities, a disproportionally high percentage considering the shorter distances and travel times by these modes.

1. Miles of Active Transportation Facilities

DRCOG collects and maintains Geographic Information Systems (GIS) data for the region including pedestrian and bicycle facilities. While there are limitations in determining the exact miles of active transportation facilities, especially sidewalks, the technology and method of data collection is rapidly evolving and improving. Through the *Denver Regional Aerial Photography Project* (DRAPP) endeavor,

Planimetrics and quantifying sidewalk miles

In 2015, DRCOG began working on a region-wide project to map infrastructure features and assets, including sidewalk centerlines.

This project is ongoing, but so far 1,308 square miles of the urban core in the DRCOG Region have been mapped. Within that area, there is approximately 17,700 miles of sidewalk.

[1] "Active transportation" and "bicycling and walking" will be used interchangeably throughout this document.
[2] All reference to walking and pedestrian travel in this document includes people using wheelchairs.

DRCOG is in the process of obtaining sidewalk data throughout the region.

The method, referred to as *planimetrics*, currently captures sidewalks that are five feet wide or more. In the future, it might be possible to capture the entire sidewalk system, including total mileage. Regional planimetrics data collected to date can be accessed here.

Obtaining bicycle facilities data and determining the number of miles is attainable by means of GIS. DRCOG collects GIS data from member governments annually, which includes bicycle facilities. Through this effort DRCOG is able to map and quantify the number of miles of bicycle facilities in the region. The DRCOG region has a robust bicycle network comprised of over 2,300 miles of bicycle facilities. Table 1 classifies the bicycle facilities and associated miles into four categories including: roadways with signed shared lanes; roadways with bicycle lanes, roadways with protected bicycle lanes, and multi-use trails.

Table 1
Miles of Bicycle Facilities in the DRCOG Region

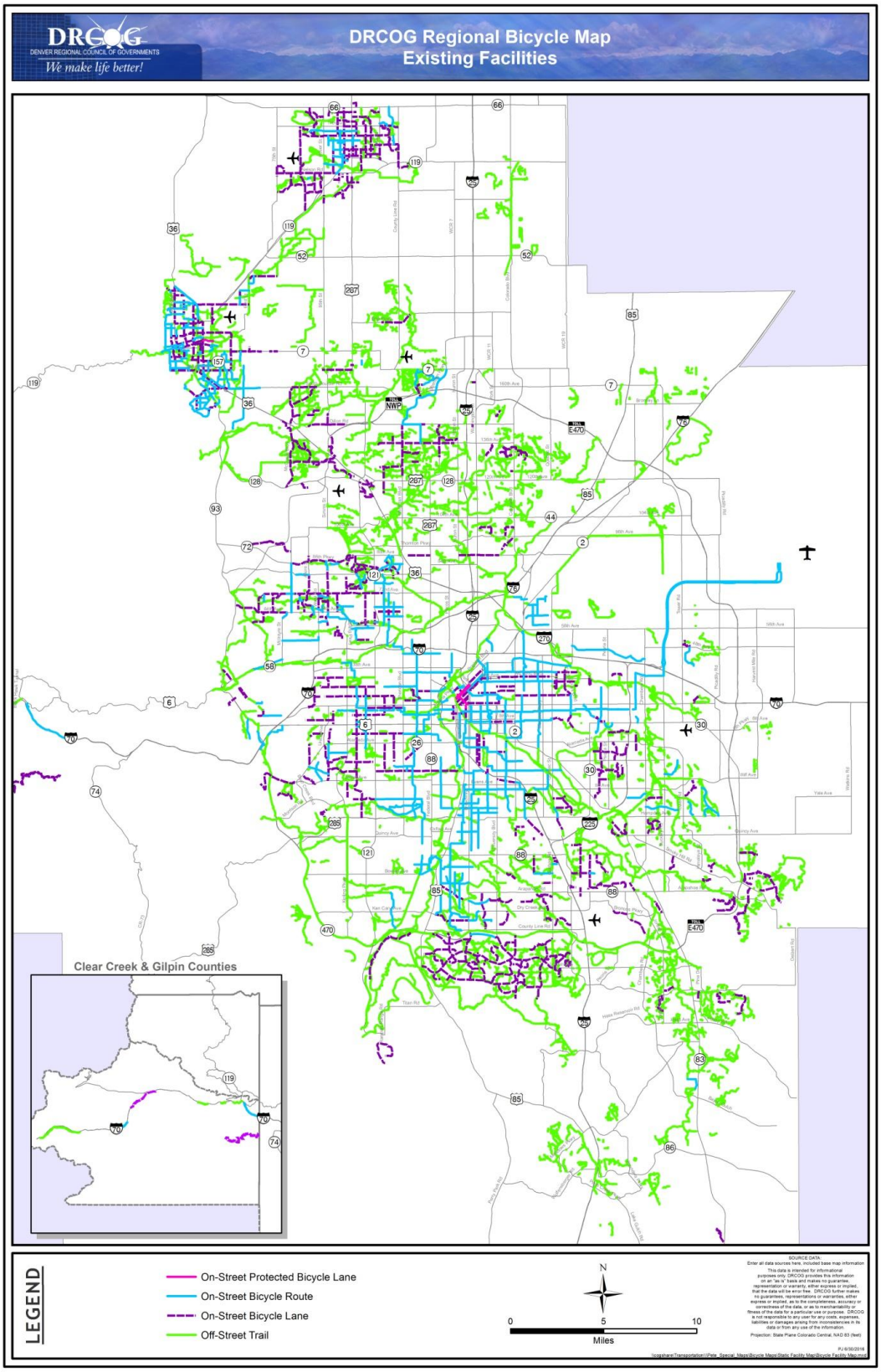
Bicycle Facility Type	Miles
Roadways with Signed Shared Lanes:	
Bicycle Route	325
Marked Shoulder Lanes	28
Roadways with Bicycle Lanes	430
Roadways with Protected Bicycle Lanes	3
Multi-use Trail:	
Wide Sidewalk*	35
Off-street Trail	1523
Regional Total	**2344**

*** The multi-use trail category includes selected sidewalks (some communities permit bicycling on wide sidewalks, particularly as connections between other bicycle facilities and along busy major arterials).**

2. Maps

DRCOG uses the GIS bicycle facilities data collected to maintain the *Denver Regional Bicycle Map*, an interactive map of the existing bicycle inventory throughout the region. The method for mapping and classifying bicycle facilities varies among jurisdictions. DRCOG classifies bicycle facilities for mapping purposes into four categories: on-street bicycle route; on-street bicycle lane; on-street protected bicycle lane; and off-street trails. The map also includes bicycle share station locations. Figure 1 is an image of the *Denver Regional Bicycle Map*.

Figure 1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DENVER REGIONAL COUNCIL OF GOVERNMENTS
We make life better!
DRCOG Regional Bicycle Map
Existing Facilities
Clear Creek & Gilpin Counties
LEGEND
On-Street Protected Bicycle Lane
On-Street Bicycle Route
On-Street Bicycle Lane
Off-Street Trail
N
0
5
10
Miles
SOURCE DATA

3. Active Transportation Facility Types in the DRCOG Region

There is a wide cross-section of pedestrian and bicycle facility types throughout the region which can be classified into two main categories. First, there are travelways, which is the infrastructure people walk and bicycle on. Then there is the infrastructure which supports walking and bicycling such as trees and other landscaping along sidewalks, wayfinding, and bicycle parking. Both travelways and the supporting infrastructure are important components in enabling active transportation by making these modes more convenient, accessible, and comfortable.

- ***Pedestrian facilities.*** The characteristics and quality of pedestrian facilities vary throughout the region. Many new residential and commercial developments incorporate wide sidewalks or buffered multiuse facilities. Conversely, many older neighborhoods have narrow and/or crumbling sidewalks, making it difficult to accommodate large numbers or people using wheelchairs or other mobility devices. In many places, facilities are non-existent and pedestrians are forced to travel along the road or on an unpaved social path.

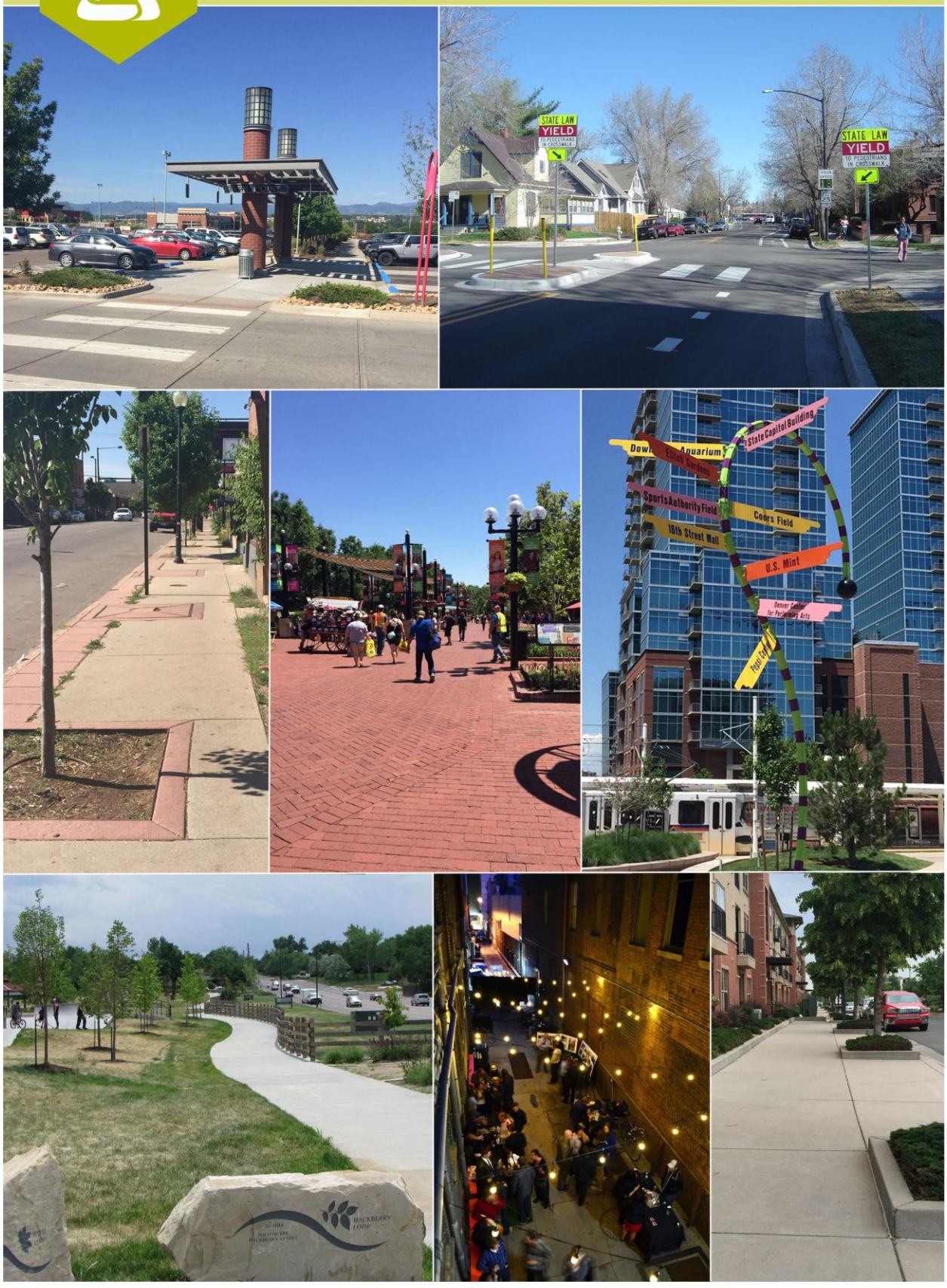
  > ***Conduits for walking***
  >
  > As conduits for pedestrian movement and access, (sidewalks) enhance connectivity and promote walking.
  >
  > — NACTO Urban Street Design Guide

  Pedestrian facilities go beyond the sidewalk. On-street facilities refer to pedestrian treatments and travelways within the street used to improve and enhance pedestrian safety. Table 2 and the corresponding photo gallery include a cross-section of pedestrian facility categories and types found throughout the region.

Table 2
Pedestrian Facility Types in the DRCOG Region

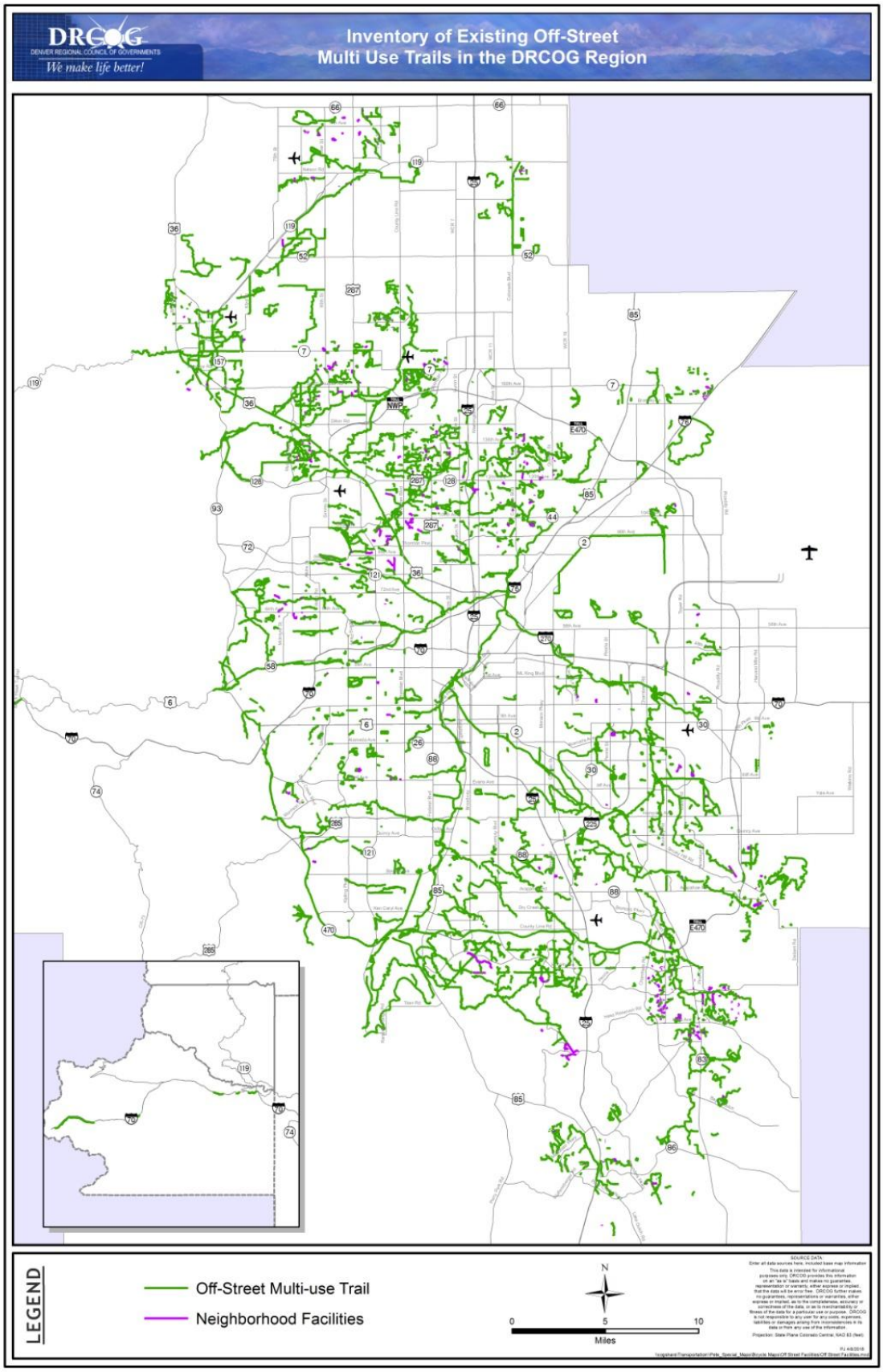
Pedestrian Facility Category	Facility Type	Description	Photo #
Sidewalks	*Attached Sidewalks*	Pedestrian travelways connected to the curb or motor vehicle travel lane edge.	Attached sidewalk #1 Attached sidewalk #2 Attached sidewalk #3
	Detached Sidewalks	Pedestrian travelways separated from vehicle travel lanes using a planting strip or other appropriate buffer treatment.	Detached sidewalk
	Shared-Use Paths	Accommodating both pedestrians and bicyclists, these travelways are physically separated from motorized vehicular traffic by an open space or buffer and are either within the roadway right-of-way or within an independent right-of-way. Shared-use paths can be located (but not limited to) in a park, greenway; along rivers, railroads, utility rights of way; and along roadways.	Shared-use path
On-Street	*Crosswalks*	Typically defined as the portion of a roadway designated for pedestrians to use in crossing the street at an intersection (conventional), or between intersections (mid-block). Mid-block crosswalks are used to facilitate pedestrian crossings when there is significant distance between designated crossings and/or where there are destinations/places people want to go (pedestrian desire lines) but are not well served by existing traffic signals.	Crosswalk and pedestrian island
	Pedestrian Islands	Pedestrian islands can be located in the middle of a street at an intersection or at mid-block crossings. These islands provide a refuge for individuals moving at a slower speed when crossing a roadway. They are generally applied where there are higher speeds and volumes, but may be used on both wide and narrow streets.	
	Shoulders (rural)	Roadway shoulders provide a gravel or paved area for pedestrians to walk next to the roadway, particularly in rural area where sidewalks and pathways are not feasible (FHWA Safety Program).	N/A
Other	*Alleys*	Sometimes used by pedestrians (except where prohibited), function primarily as a place for trash collection, service vehicle access, and parking access. In some places such as downtowns and urban areas, alleys have been converted to public spaces for people to walk, play and interact.	Alley transformed to a public space (Source: Downtown Denver Partnership)
	Intersections at Alleys	When an alley crosses a sidewalk, potential conflicts can occur between pedestrians and vehicles. Rumble strips, warning signs, and raising the intersections to the sidewalk grade could mitigate conflict.	N/A
	Pedestrian walkways in parking lots and structures	Sidewalks provided through parking lots to the destination they are serving and to nearby pedestrian facilities, provides a safe place for pedestrians to travel.	Pedestrian walkways in parking lot
	Pedestrian Zones and Plazas	Also known as auto-free zones and car-free zones, are areas of a city or town reserved for pedestrian-only use and limits/prohibits vehicular traffic.	Pedestrian zones and plazas
Pedestrian Support Infrastructure	*Wayfinding*	Signage and/or pavement markings to guide both pedestrians and bicyclists to their destinations. Many jurisdictions have implemented or are implementing a destination-direction-distance based wayfinding system.	Wayfinding - whimsical

Pedestrian Infrastructure in the DRCOG Region



- ***Bicycle Facilities.*** The DRCOG region has a robust bicycle system comprised of off-street trails, roadways with bicycle lanes, protected bicycle lanes, signed shared lanes, shoulders, and shared-use sidewalks. As illustrated in Table 1 and Figure 1, the majority of the existing bicycle network is comprised of multi-use trails accommodating both pedestrians and bicyclists, either in the form of off-street trails or wide sidewalks. Figure 2 depicts the over 1,500 miles of multi-use trails in the region. Table 3 and the corresponding photo gallery include a cross-section of bicycle facility categories and types within the region.

Figure 2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We make life better!
Inventory of Existing Off-Street
Multi Use Trails in the DRCOG Region
LEGEND
Off-Street Multi-use Trail
Neighborhood Facilities
N
0
5
10
Miles

Table 3
Bicycle Facility Types in the DRCOG Region

Bicycle Facility Category	Facility Type	Description	Photo Links
On-Street Bicycle Facilities	*Conventional Bicycle Lanes*	On-street bike lanes for exclusive use by bicyclists through the use of pavement markings and signage. They are *typically* on the right side of the roadway, located adjacent to and flow in the same direction as motor vehicle traffic. While less common, bike lanes are sometimes placed on the left side of one-way streets or two-way median divided streets.	Conventional bike lane #1 (Source: City & County of Denver) Conventional bike lane #2
	Buffered Bike Lanes	On-street conventional bike lanes paired with an additional buffer from motor vehicle traffic by means of pavement markings and/or a parking lane. Parking Protected Bike Lanes refer to bike lanes buffered (or protected) from motor vehicle traffic by parked cars. Parking Protected Bike Lanes sometimes fall under the Protected Bike Lane category.	Buffered bike lane
	Protected Bike Lanes (PBL)	These bicycle facilities have three key characteristics: 1.) There is physical, stationary, vertical separation between the bike lane and motor vehicle traffic. Examples of vertical separation may include bollards, curbs, plastic posts, planters, raised bumps or parked cars; 2.) They are exclusively for bicycles; 3.) They are on or immediately adjacent to the roadway. PBL's are part of the street grid and can be at street level, raised to the sidewalk level, or somewhere in between. The three types of protected bike lanes include one-way, two-way and raised.	Protected bike lane with flex tubular markers (Source: City & County of Denver) Protected bike lane w/planters
	Bicycle Boulevards	Also referred to as Neighborhood Bikeways, Neighborhood Greenways, etc., these are streets with low traffic speeds and volumes that are designated and designed to give priority to bicycle travel through a range of design treatments. Typically, there is not a dedicated bike lane, but rather the street is shared by motor vehicles and bikes.	N/A
	Paved Shoulder Bicycle Routes	Paved shoulders are typically applied along roadways in rural communities or less developed areas. They should be striped and signed as a bicycle route and provide adequate space for bicyclists.	Paved shoulder with bike lane
Off-Street Bicycle Facilities	*Shared-use Paths*	Description provided in Pedestrian Section. There are three categories of shared-use paths: along roadway with buffer; along roadway with no buffer (sidepath); along waterway, railroad, through open space, etc.	Shared-use path along roadway Shared use path-waterway (Source: City & County of Denver)
	Bridges/Overpasses and Underpasses	Provide crossings for bicyclists and pedestrians where barriers exist, both real and perceived, such as: interstates, freeways, arterials with high speeds and volumes, railroads, rivers, and other obstacles.	Underpass - multiuse
Other Bicycling Support Infrastructure	*Bike Share*	Bicycles available for short-term use from a network of stations within a given geographic area.	Bike share
	Bicycle Libraries	Similar to bike share, but differ in that the bikes are typically checked out at a central location and are intended for longer-term use.	Bicycle library (Source: City of Golden)
	Bicycle Parking	There are many forms of short-term bicycle parking options such as U-racks, bike trees and bike corrals located on sidewalks and streets. These should be both visible and convenient to the businesses and locations they support.	Bicycle parking at transit Bicycle parking corral (Source: City & County of Denver)
	Secure Bicycling Parking	Intended for longer-term bicycle parking offering secure, weather-protected places to park bicycles at locations such as residential buildings, office buildings and at transit stations.	Secure bicycle parking (Source: Boulder County)
	Wayfinding	Signage and/or pavement markings to guide both bicyclists and pedestrians to their destinations. Many jurisdictions have implemented or are implementing a destination- direction-distance based wayfinding system.	Wayfinding


Bicycle Infrastructure in the DRCOG Region
BROADWAY
16th Street Mall
City Park
15th Street / LoDo

4. Mode Share and Trip Statistics

On a typical day in the Denver region over 737,000 pedestrian trips and over 123,000 bicycle trips are made (*DRCOG Travel Model, 2015*). As of 2014, the combined percentage of people in the DRCOG region who commute to work by bicycle or walking throughout the year was 3.7 percent (*US Census, 5 year ACS 2010-2014)*. This percentage is higher in summer months and also in downtowns like Boulder and Denver. While the percentage is small, the number of people who bicycle or walk to work has increased significantly over the past decade. For example, between 2005 and 2014, there was a 32 percent increase in the number of people who walk and bicycle to work (*Source*).

Pedestrian Travel

Everyone is a pedestrian at some point. Walking is the most flexible mode of travel and part of nearly all trips, even those taken primarily by another mode. Therefore, it is important that people have access to inviting and safe facilities to walk or travel by wheelchair. For some people, pedestrian travel may be the exclusive mode to get from one place to another. For others, pedestrian travel may be used in combination with other travel modes, such as transit, bicycling or driving. Walking is often the first and/or final mode of travel when combined with other modes.

- ***All Trips.*** Of the more than 12 million total person trips (all modes) made in the region per day, six percent of these trips are made by walking. Countless more short walking "trips" are made at the start or finish of trips by other modes. As expected, most walk trips are short, with an average distance of about 0.4 miles (*Source: DRCOG 2010 FRTC*). Of all the daily trips in the region that are 0.4 miles or less, around 100,000 are made by driving alone (*Source: DRCOG model 2015*).

- ***Work Trips.*** On a typical day in the region about 37,000 people, or 2.4 percent, of the working population walk to work (*US Census, 5 year 2010-2014*). This percentage is much higher when weather is nicer and in more dense locations with a mix of land uses. While the percentage of people walking to work has declined since 1980, trends have remained relatively steady since 2000 with slight fluctuations.

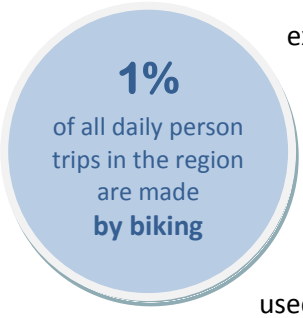
Walk to Work (35 year trend – DRCOG Region)

	1980	1990	2000	2010	2014
Mode Share	4.7 %	3.4 %	2.4 %	2.2 %	2.4 %

Source: US Census (1980-2010); 5-Year ACS (2010-2014)

Bicycle Travel

The DRCOG region has one of the highest rates of bicycle use in the nation and a strong bicycling culture. The climate, relatively concentrated urban development, extensive off-street trail system, expanding bike share systems, and health-oriented population contribute to the popularity of bicycling. Bicycles provide an efficient means of transportation for short- to medium-length trips. The number of people who bike to work has doubled in the DRCOG region between 2000 and 2014; the greatest percentage increase of all modes. Like pedestrian travel, bicycling may also be used in combination with other modes of transportation, especially transit.



- ***All Trips.*** Of the more than 12 million total person trips (all modes) made in the region per day, about 123,000 or one percent of these trips, are made by bicycling. The average bike trip distance in the DRCOG region is about two miles (*Source: DRCOG 2010 FRTC*). There are more than one million or 17 percent of drive-alone trips made each day that are two miles or less (*Source: DRCOG model 2015*).There is potential for some of these short drive-alone trips to be bicycle trips.

- ***Work Trips.*** The number of people who bike to work is increasing at a greater rate than any other mode. On a typical day in the region about 20,000 people or 1.3 percent of the working population bike to work (*US Census, 2014*) which is more than double the national average of 0.6 percent (*US Census ACS – Five Year 2010-2014*). This percentage is much higher in warm weather months and in more dense locations where there is a mix of land uses, mobility options such as bikeshare, and bicycle infrastructure. There is a clear gender gap in bicycle commuters. In the DRCOG region, 71 percent of bicycle commuters are male, whereas 29 percent are female (*ACS, 5 year, 2010-2014*). This trend is typical nationwide.

Bike to Work (35 year trend – DRCOG Region)

	1980	1990	2000	2010	2014
Mode Share	.7 %	.7%	.7 %	1.1%	1.2%

US Census, 1980 – 2000; ACS Data 2010 – 2014

SUMMARY
Pedestrian Crash Characteristics
in the DRCOG Region

20% of traffic fatalities were pedestrians

61% of pedestrian crashes occur mostly on arterial streets

63% of pedestrian crashes occur at an intersection

77% of **fatal** pedestrian crashes involved a vehicle going straight

60% of **fatal** pedestrian crashes occur mid-block

17% of all traffic fatalities are those 65 and older, who currently make up 10% of the regional population

5. Safety

Pedestrians and bicyclists are particularly vulnerable transportation system users due to the high level of injury severity in the event of a crash. Active transportation users account for a disproportionately high percentage of traffic fatalities, considering the distance and time of travel by these modes. Lack of adequate sidewalks and crosswalks could lead pedestrians to compromise their safety by walking in the street or crossing mid-block. Lack of adequate bicycling infrastructure can result in bicyclists taking to the sidewalks due to safety concerns, creating unintended conflict with pedestrians. Also, bicycling on sidewalks could potentially lead to conflicts with turning vehicles at intersections if the bicyclist rides through the crosswalk.

Pedestrian Crash Statistics in the DRCOG Region

From 2010-2014, there were 868 traffic fatalities in the DRCOG region. Pedestrians made up 175, or 20 percent, of the fatalities (*NHTSA - FARS data*), yet only six percent of all trips were made by walking (*Source: DRCOG Travel Model, 2015*). The majority of pedestrian crashes occur on arterial streets (61%) and at intersections (63%). The vast majority of fatal pedestrian crashes occurred with a vehicle travelling straight (77%), with many occurring at mid-block (60%). While those 65 or older make up only ten percent of the regional population, they comprise 17 percent of pedestrian fatalities (*CDOT 2010-2012, NHTSA, 2014*).

Many factors contribute to collisions involving pedestrians. Some examples include:

- high-volume and high-speed roadways;
- turning vehicles at intersections;
- driver distractions – texting, talking, using the phone; and
- lack of dedicated crossing areas – e.g., significant gaps between crossing locations; and streets designed primarily for motor vehicles.

Bicycle Crash Statistics in the DRCOG Region

During the period from 1991 to 2014, about 80 percent of bicycle crashes resulted in injury. Like pedestrians, bicyclists are considered vulnerable transportation system users, due to the high level of injury severity in the event of a crash. There are approximately 100 bicyclists seriously injured in reported traffic crashes each year in the DRCOG region.

Of the 868 total traffic fatalities in the DRCOG region from 2010-2014, thirty, or 3.5 percent of the fatalities, were bicyclists (*FARS data*). Around 12 percent of bicycle crashes results in a fatality or serious injury. (*CDOT 2010-2012*). The majority of bicycle crashes occur on arterial streets (53%) and at intersections (74%). Fatal bicycle crashes usually involved a vehicle going straight (71%). Bicyclists age 15 to 24 had the highest crash involvement. (*CDOT 2010-2012, FARS through 2014*).

Many factors contribute to collisions involving bicyclists. Some examples include:

- high-volume and high-speed roadways;
- turning vehicles at intersections;
- driver distractions – texting, talking, using the phone; and
- driver or bicyclist failure to signal or stop.

Understanding crash characteristics (how, why, where, and who) and trends is important in understanding how to apply appropriate mitigation strategies and countermeasures. Roadway types, existing infrastructure, crash history, pedestrian activity, and bicyclist usage (existing and anticipated) should also be considered when determining mitigation strategies.

More details on pedestrian and bicycle safety, including statistics and mitigation strategies, are available in the *Pedestrian and Bicycle Safety in the Denver Region Report* (2012 currently available, to be updated in 2016).

SUMMARY

Bicycle Crash Characteristics

in the DRCOG Region

80% of bicycle crashes resulted in injury from 1991-2014

100 bicyclists **seriously injured** in reported traffic crashes each year

12% of bicycle crashes results in a fatality or serious injury

53% of bicycle crashes occur mostly on arterial streets

74% of bicycle crashes occur at an intersection

71% of **fatal** bicycle crashes involved a vehicle going straight

Those ages 15 to 24 had the highest crash involvement

Safety Initiatives

Safety concerns are a leading barrier to more people walking and bicycling as a mode of travel. Many people are discouraged from walking and bicycling because of the real or perceived danger of vehicle traffic. This concern is most prevalent for bicycling. Many local and national organizations are striving to improve safety for all transportation users, with bicyclists and pedestrians being no exception. Two leading national efforts are Towards Zero Deaths and Vision Zero Initiatives. These efforts, aiming to reduce and eliminate traffic deaths and severe injuries, have been gaining traction throughout the United States.

- ***Toward Zero Deaths.*** Toward Zero Deaths (TZD), supported by FHWA, is a highway safety vision in the U.S. that includes numerous organizations committed to reducing annual U.S. traffic fatalities to zero. The TZD Plan provides organizations in the fields of engineering, law enforcement, education and emergency medical services (EMS) with initiatives and safety countermeasures designed to eliminate traffic fatalities. The State of Colorado joined this national effort in March 2015. CDOT's *Strategic Highway Safety Plan* incorporates Moving Towards Zero Deaths as a core value within the plan. CDOT's plan establishes a 2.9 percent annual reduction rate of all traffic fatalities starting in 2014 through 2019.

- ***Vision Zero.*** Vision Zero is an initiative which aims to eliminate traffic-related fatalities and serious injuries on the roadways while increasing safe, healthy, equitable mobility for all. Vision Zero, started in Sweden and implemented throughout Europe, is now gaining momentum in major U.S. cities. In early 2016, Denver joined other major U.S. cities that have adopted a Vision Zero policy.

A safe active transportation system is paramount in reducing and eliminating pedestrians and bicyclists from being seriously injured or killed, and in instilling confidence in more people to get around by walking and bicycling.

D. Benefits of Active Transportation

Active transportation is a key component in a robust transportation system providing mobility options for all people. There are many quality of life benefits associated with active transportation including: personal mobility, environmental quality, public health, and economic benefits.

Personal Mobility

Some people choose not to drive, while others cannot drive. According to the 2010 Census, about 70,000 households in the region did not have an automobile available. A robust and safe pedestrian and bicycle infrastructure network can provide cost-effective mobility options for people of all ages, abilities, and incomes, especially when combined with the region's transit network. Walking and bicycling are essential modes of travel for many people to access jobs, school, groceries, health care, and other activities of daily living.

Comfort and Safety

The 8 to 80 rule is a litmus test that involves imagining a public space, especially a busy city street or intersection, and asking whether it is suitable for children, persons with disabilities, and older adults alike.

– Citylab, The 8 to 80 Problem: Designing Cities for Young and Old

Environmental Benefits

Active transportation is an important tool to help the region address environmental challenges related to transportation, such as reducing air pollution, greenhouse gas emissions, and vehicle miles of travel. About one million drive-alone trips are made each day that are equal to or less than the average bicycle trip distance (1.8 miles) and over 100,000 drive-alone trips that are equal to or less than the average walk trip distance (0.4 miles). There are a number of factors as to why these trips are made by driving alone; however, there is potential to shift some of these trips to walking and bicycling.

Opportunity for Change

There are over 1 million trips made each day by driving alone that have the potential to shift to bicycling or walking.

Health Benefits

One out of every two U.S adults is living with a chronic disease such as heart disease, cancer or diabetes and more than two-thirds of American adults are either overweight or obese. While Colorado leads the nation in terms of healthy people, obesity rates in the state are projected to more than double by 2030 (*Source: Surgeongeneral.gov, 2016*). Additionally, the percentage of overweight children in the United States is growing at an alarming rate, with more than one-third of children and adolescents considered overweight or obese. In Colorado, 27% children ages 2 – 14 were considered overweight or obese in 2013 (Source: Colorado Department of health, March 2015). Walking and bicycling can be one factor in helping to reduce or mitigate stress, obesity, and chronic disease. Children who ride a bike two or more times a week are less likely to be overweight. Adolescents who bike are 48% less likely to be overweight as adults (*Source: People for Bikes, Statistics*

Library). The health benefits of active transportation are no longer isolated to the health care field and have become a central topic in planning and policy.

Economic Benefits

Walking and bicycling are cost effective options for getting around, can help people save money, and benefit local economies. Opting to bicycle or walk instead of driving can help reduce motor vehicle ownership costs, such as gasoline, maintenance and parking. These savings can equate to more money spent on local goods and services. Additionally, while the cost to construct these facilities greatly varies, many roadways can easily be retrofit to accommodate bicycles and pedestrians through the use of low-cost materials such as paint, planters and trees. Demonstration, pilot and interim design projects are low-cost options to test out projects and applications where budgets are limited, and/or public education and buy-in is necessary.

Good Design

"Decisions and plans made by the transportation, land use, and community design sector can affect whether communities and streets are designed to support walking.

This sector can change the design of communities and streets through roadway design standards, zoning regulations, and building codes and improve the pedestrian experience through landscaping, street furniture, and building design.

This sector is also integral in the planning and implementation of public transit systems."

— Surgeon General, 2015

Economic Development

"The number one thing they want is bike lanes. Ten years ago we never would have thought that walkability or bike lanes would be economic development tools."

— Tami Door, Downtown Denver Partnership, on what tech companies say they want in order to locate to or stay in Denver

Supporting the Framework of Metro Vision

In addition to the aforementioned benefits, a robust, safe and well-connected active transportation system supports the framework of DRCOG's Metro Vision Plan. Active transportation is a key component in many of the Outcomes and Regional Objectives developed as part of the draft Metro Vision Plan. Additionally, an expanded active transportation system and increased use of these modes are essential elements in meeting the Performance Measures and Targets in the plan, such as increasing non-SOV mode share to work, and reducing greenhouse gas emissions, vehicle miles of travel, and number of traffic fatalities.

E. Future Trends for Active Transportation – Projections for 2040

Looking forward to 2040, all total person trips are projected to increase by 35 percent, whereas walking and bicycling trips are projected to increase by 56 and 45 percent, respectively. Currently, about 737,000 or six percent of trips are made by walking. By 2040, over one million trips will be made by walking each day, accounting for almost seven percent of all weekday person trips. Bicycle trips are also projected to increase, from around 123,000 to 180,000 trips per day, but are forecast to still account for only one percent of all weekday person trips by 2040 (*Source: DRCOG travel model*).

Walking and Bicycling Trips: 2015 and 2040

Number of daily person trips	2015	2040
All Trips	12,977,100	17,475,878
By Walking	736,942	1,148,311
By Bicycling	122,759	178,501

F. Active Transportation Goals

To summarize active transportation in the DRCOG region:

- By 2040, the region's population is projected to increase by 37% and the number of active transportation trips is projected to increase by 54%.
- While the DRCOG region has a robust pedestrian and bicycle network, there are many gaps in the system and barriers to bicycling and walking.
- The quality of life benefits associated with walking and bicycling are numerous.
- A mode share increase in walking and bicycling is necessary in order to meet *Metro Vision* outcomes, objectives, and performance measures and targets.
- Pedestrians and bicyclists are vulnerable transportation system users and are more susceptible to being killed or seriously injured in the event of a crash.

In order to address the demands and challenges associated with regional growth, the demand for active transportation options, and support the framework of *Metro Vision*, the following goals pertaining to active transportation must be addressed:

1. Increase walking and bicycling mode share and trips beyond what is projected.
2. Provide a robust walking and bicycle network for people of all ages and abilities.

3. Improve the safety of the pedestrian and bicycle network thereby reducing (and ultimately striving to eliminate) serious injuries and deaths as a result of crashes.

These three goals are synergistic; where, for example, a robust and safe active transportation network should result in a mode share increase for both bicycling and walking. How does the region:

- achieve these objectives?
- achieve and maximize the benefits of walking and bicycling?
- improve the safety of the network?
- create a network where people of most ages and abilities feel comfortable walking and bicycling?
- and ultimately, increase the active transportation mode share?

G. Elements to Fulfill Active Transportation Goals

This section identifies some of the elements that are necessary to fulfill the three goals identified. While this is not an all-encompassing list, it does include the major pillars necessary in supporting the goals and vision for active transportation by 2040. These and additional elements will be further explored and expanded upon in the development of DRCOG's *Active Transportation Plan*, scheduled to commence in late 2016.

1. Low Stress (or High Comfort) Network

One of the most important elements in attracting more people to walking and bicycling is a low-stress network of active transportation facilities. Low-stress facilities, also referred to as high-comfort facilities, induce the least amount of stress on the users, and attract a wider segment of the population to walk and bicycle. Low-stress facilities are *typically* on or adjacent to roadways with lower traffic volumes and lower speeds (especially if the facility is on-street) and can include wide sidewalks buffered by landscaping, protected bike lanes, sidepaths, multiuse facilities, buffered bike lanes, bicycle boulevards, and neighborhood bikeways. Pedestrian and bicycle bridges and underpasses also provide a low-stress

Low-stress Connectivity –
Attracts the Widest Possible Segment to Bicycling

In a 2012 study from Northeastern University, *Low Stress Bicycle Bicycling and Network Connectivity*, researchers write: "For a bicycling network to attract the widest possible segment of the population, its most fundamental attribute should be low-stress connectivity. That is, providing routes between people's origins and destinations that do not require cyclists to use links that exceed their tolerance for traffic stress, and that do not involve an undue level of detour."

—Furth et al., *Network Connectivity for Low-Stress Bicycling,* Submitted to TRB for the 2013 Annual meeting and publication in Transportation Research Board

experience, allowing active transportation users to avoid busy intersections and roadways, and enabling mostly uninterrupted travel.

Over the past few years, there has been a regional focus on constructing, expanding and connecting a low-stress network of facilities to appeal to a wide audience of ages and abilities. Pedestrian and bicycle facilities alike should be planned and developed for the most vulnerable users (children, older adults, and people with disabilities).

2. Connecting the Active Transportation Network

Also essential to attracting a wider segment to walking and bicycling is continuity and consistency in the active transportation system achieved by **connecting the low-stress network**. In addition to filling in gaps and connecting facilities, it is important to identify and connect to desirable destinations and to other modes of transportation. A low-stress, well-connected network of active transportation facilities can be obtained through the following actions:

- Taking inventory of the existing bicycle and pedestrian network.
- Identifying missing segments and barriers in the existing network.
- Filling in gaps and removing barriers to the existing network.
- Identifying gaps and barriers to first and final mile connections.
- Filling in gaps and removing barriers to first and final mile connections.
- Create a consistency in the network.
- Expanding the active transportation network, ideally with low-stress facilities.

3. Multimodal Transportation Nodes

Having a mix of transportation options and amenities conveniently available and located at popular destinations, in urban and town centers, and at transit stations, can make walking and bicycling more feasible. People might be willing to get around more by walking or bicycling if modes were clustered together and easily accessible, such as carshare, transit, transportation network companies (Uber, Lyft) and taxis, bike share and secure bicycle parking. Denver Union Station is a premier example of a multimodal transportation node in the Denver region. However, multimodal transportation nodes are not reserved only for urban cores, and they have the potential to be successful in suburban town centers and suburban transit-oriented development.

4. Complete Streets

Complete streets are designed to safely accommodate both motorized and active modes of

transportation. According to the National Complete Streets Coalition, complete streets are those designed and operated to enable safe access and travel for all users. Pedestrians, bicyclists, motorists, transit users, and travelers of all ages and abilities will be able to move along the street network safely. Although the FHWA does not have an official complete streets policy, the concept is closely associated with the principles promoted by the Interagency Partnership for Sustainable Communities, a joint endeavor involving the U.S. Department of Transportation (USDOT), U.S. Department of Housing and Urban Development (HUD), and U.S. Environmental Protection Agency (EPA). *(Source: FHWA, Public Roads, July/August 2010*). All modes, including walking and bicycling, should be considered in new roadway and reconstruction projects to enable safe travel for all transportation users. As of 2016, the only known jurisdictions in the DRCOG region to have adopted or incorporated complete streets in policies, resolutions, or plans include the City of Denver and City of Golden.

5. Supporting Infrastructure and Technology

Infrastructure and amenities supporting active transportation are influential to their usage. Examples of supporting infrastructure include: pedestrian shelters at transit stops; shade trees and landscaping along sidewalks; bicycle racks and secure bicycle parking; and wayfinding. Additionally, real-time multimodal transportation applications and routing capabilities further support and enable walking and bicycling as stand-alone modes or used in conjunction with another mode. For example, technology could easily enable people using transit to reserve a bicycle (bikeshare) or car (carshare) at the end of the trip to access their final destination. Supporting infrastructure, amenities, and technology should be convenient, easily accessible and intuitive.

H. Role of DRCOG in Implementing Active Transportation Projects

DRCOG plays an integral role in both supporting and funding active transportation in the DRCOG region. Projects categorized as pedestrian and bicycle infrastructures are funded directly through the TIP process. The percentage of funds allocated to pedestrian and bicycle projects has increased over the past three TIP cycles. In the current TIP (2016-2021), 22 percent of funds are allocated to projects classified as bicycle and/or pedestrian infrastructure and 100 percent of these projects selected were either protected or grade separated from the roadway. Pedestrian and bicycle projects are also funded indirectly as elements of larger TIP projects, such as roadway projects. Roadway projects have been incentivized in the TIP application process to include multimodal features like bicycle and pedestrian travelways and support facilities.

In 2016, DRCOG will undertake the development of an Active Transportation (AT) Plan. It is intended for

the Active Transportation Plan to eventually become an element of, and adopted into the MVRTP. The Active Transportation Plan will expand upon the elements of this section of the MVRTP and incorporate additional components and products such as a Regional Bicycle Network Vision. DRCOG staff will work closely with member jurisdictions and other stakeholders in the development of this plan.

I. Design Guidelines and Resources

Pedestrian and bicycling facility typologies and design are not one size fits all and will vary depending on local community character factors such as existing/planned land uses, density, adjacent roadway types and widths, density, and usage. Recognizing the great diversity in the region, DRCOG does not prescribe blanket design guidelines and requirements that apply equally to all jurisdictions and projects. The TIP policy establishes certain requirements for the project selection process, such as minimum widths for multiuse facilities, and directs jurisdictions to follow ADA and AASHTO design standards. Additionally, there are a variety of design resources (Figures 4 and Figure 5) available which are continually evolving. In addition to local guidelines and requirements, jurisdictions should utilize these guides in the planning and design process of pedestrian and bicycle facilities. DRCOG encourages jurisdictions and counties to communicate and coordinate where possible on pedestrian and bicycle plans and projects with neighboring jurisdictions and other applicable stakeholders to achieve consistency and connectivity across boundaries.

Figure 4

DESIGN GUIDE RESOURCES FOR PEDESTRIAN FACILITIES

- *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, July 2004, (AASHTO Pedestrian Guide)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach*. (ITE Guide). This guide is useful in gaining an understanding of the flexibility that is inherent in the AASHTO "Green Book," *A Policy on Geometric Design of Highways and Streets*.
- *Urban Street Design Guide*, 2013, (National Association of City Transportation Officials)
- *Guidance Memorandum on Promoting the Implementation of Proven Safety Countermeasures,* 2012, (FHWA)
- *2010 ADA Standards for Accessible Design,* (Department of Justice)
- *Proposed Guidelines for Pedestrian for Pedestrian Facilities in the Public Right-of-Way (PROWAG)*, (United States Access Board), 2011

Figure 5

DESIGN GUIDE RESOURCES FOR BICYCLE FACILITIES

- *Guide for the Development of Bicycle Facilities*, 2012 – Fourth Edition, (American Association of State Highway and Transportation Officials)
- *Urban Bikeway Design Guide*, 2014 – Second Edition, (National Association of City Transportation Officials)
- *CDOT Roadway Design Guide – Chapter 14 Bicycle and Pedestrian Facilities, Jan 2013, Revision 1, (CDOT).*

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MVRTP Active Transportation Section

RTC – August 16, 2016

What is Active Transportation?





People getting around by:
- Walking
- Biking
- Wheelchair
- Skate/Longboard

All ages, abilities and trip types

4 Main Topic Areas

Existing Conditions	• Miles, Maps, Facility Types, Mode Share, Safety, Benefits
Future Projections	• How many people will be walking and bicycling in 2040?
Regional Goals	• What is the vision for Active Transportation in the region?
Strategies	• How do “we” get there?

The status of walking and bicycling in the Denver Region

EXISTING CONDITIONS

How many trips are made by bicycling and walking in the region each day?

a) 250,000

b) 500,000

c) 900,000

d) 2,000,000

Miles of AT Facilities

Bicycling Facilities

- 2300 miles
  - Source: GIS Data

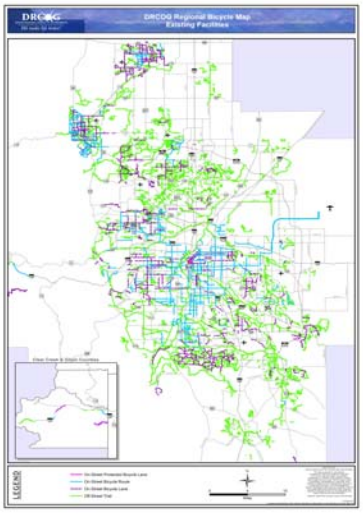
Pedestrian Facilities

- 18,000 miles
- Sidewalks ≥ 5 feet
- 1300 square miles already mapped
- Project still underway
  - Source: Planimetrics

Miles – Bicycle Facilities

Bicycle Facility Type	Miles
Roadways with signed shared lanes	353
Roadways with bicycle lanes	430
Roadways with protected bike lanes	3
Multiuse Trail	**1,558**
Total:	2,344

Maps – Existing Facilities



DRCOG Regional Bicycle Map

- Web-based interactive map
- 2,344 miles
- Robust but gaps and barriers present.

Types of Facilities - Pedestrian

- Table 2 and Pedestrian Infrastructure Gallery (4 categories):
  - Sidewalks
  - On-street (crosswalks, pedestrian islands..)
  - Other (alleys, pedestrian plazas..)
  - Pedestrian support infrastructure (wayfinding)

Types of Facilities - Bicycle

- Table 3 and Bicycle Infrastructure Gallery (3 categories):
  - On-street bicycle facilities (bike lanes)
  - Off-street bicycle facilities (shared-use path)
  - Bicycling support infrastr. (bike parking)

Mode Share (to work)

Walking

- 37,000 people (daily)
- 2.4% mode share

Bicycling

- 20,000 people (daily)
- 1.2% mode share

	1980	1990	2000	2010	2014
Walking	4.7%	3.4%	2.4%	2.2%	2.4%
Bicycling	.7%	.7%	.7%	1.1%	1.2%

US Census, ACS Data, 5 year

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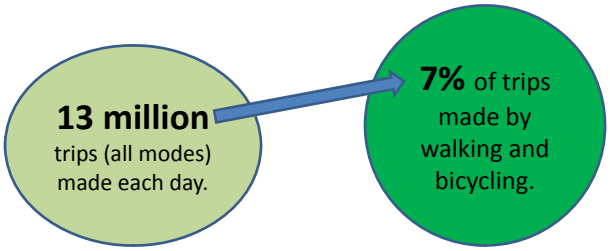
All trips

Walking

- 737,000 trips daily
- 6% of all trips

Bicycling

- 123,000 trips daily
- 1% of all trips



Source: DRCOG Travel Model, 2015

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Safety

- Pedestrians and bicyclists are vulnerable transportation users.
  - high level of injury severity in event of crash.
- Disproportionately high percentage of traffic fatalities.

6% trips made by walking

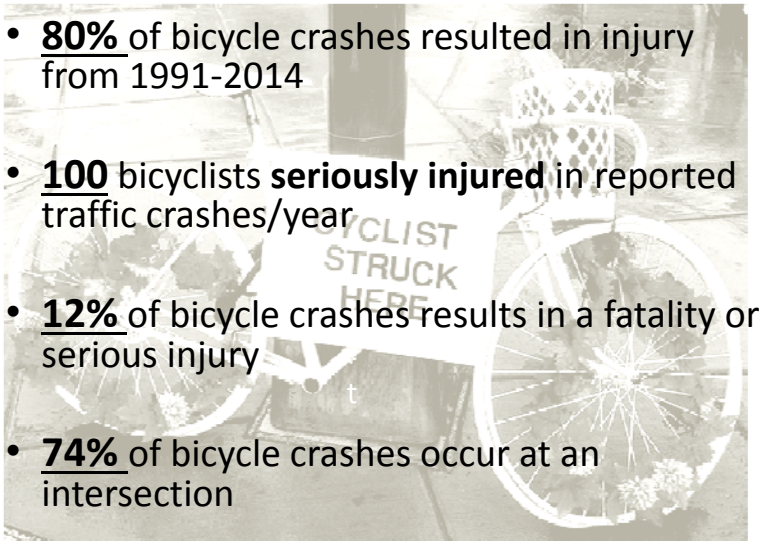
Yet..

20% of traffic fatalities were pedestrians

Safety – Pedestrian Crash Characteristics

- **61%** of pedestrian crashes occur mostly on arterial streets.
- **77%** of fatal pedestrian crashes involved a vehicle going straight.
- **60%** of **fatal** pedestrian crashes occur mid-block.

Safety – Bicyclist Crash Characteristics



- **80%** of bicycle crashes resulted in injury from 1991-2014
- **100** bicyclists **seriously injured** in reported traffic crashes/year
- **12%** of bicycle crashes results in a fatality or serious injury
- **74%** of bicycle crashes occur at an intersection

Benefits of AT

- Personal Mobility
- Environmental Benefits
- Health Benefits
- Economic Benefits

Did you know.....
About 70,000 households in the region did not have an automobile?

A robust bicycle and pedestrian network can provide cost-effective mobility options for people of all ages, abilities and incomes.

Benefits of AT

- Personal Mobility
- Environmental Benefits
- Health Benefits
- Economic Benefits

- Did you know…
  Over 1 million drive alone trips are made daily equal or less than the average bike/walk trip distances?

Opting to walk or bike in lieu of driving alone reduces congestion, air pollution, GHGs, and VMT.

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Benefits of AT

- Personal Mobility
- Environmental Benefits
- Health Benefits
- Economic Benefits

- Did you know…
  1 of 2 U.S. adults is living with a chronic disease and two-thirds are overweight or obese?

  27% of children 2-14 in CO are obese or overweight?

Walking and bicycling can help to reduce or mitigate obesity, stress and chronic disease.

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Benefits of AT

- Personal Mobility
- Environmental Benefits
- Health Benefits
- Economic Benefits

- Cost-effective modes.
- Can be constructed at relatively low-costs.
- Demonstration, pilot, and interim design projects.
- AT is an economic development tool.

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Looking forward to 2040

FUTURE TRENDS FOR ACTIVE TRANSPORTATION

Future Trends for AT

Number Daily Per Trips	2015	2040	% Increase
All trips	12,977,100	17,977,100	35%
Walking	736,942	1,148,311	**56%**
Bicycling	122,759	178,501	**45%**

- Active transportation trips are projected to increase from 7% to **8%** of all trips by 2040.
- Bicycling trips are projected to account for only **1%** of all trips by 2040.

Recap of AT in the Region

- Active transportation trips projected to increase by **54%.**
- Robust system but with gaps and barriers.
- Many benefits associated with AT.
- Pedestrians and bicyclist are vulnerable transportation users.

The Vision for Active Transportation

REGIONAL GOALS FOR ACTIVE TRANSPORTATION

Goals for Active Transportation

1. Increase walking and bicycling mode share beyond what is projected.
2. Provide a robust walking and bicycling network for people of all ages and abilities.
3. Improve the safety of the pedestrian and bicycle network thereby reducing (and ultimately striving to eliminate) serious injuries and death as a result of crashes.

Goals for Active Transportation

How do we get there?

The Strategies

ELEMENTS TO FULFILL ACTIVE TRANSPORTATION GOALS

Element 1
Low Stress (High Comfort) Network

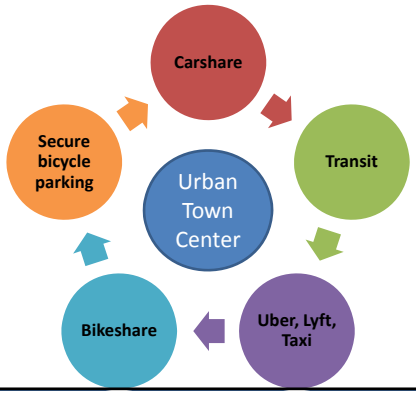
- Attracts a wide segment of the population.
- On/adjacent to lower speed/volume roads.
  - e.g. - wide sidewalks buffered by landscaping, protected bike lanes, multiuse facilities….

Element 2
Connecting the AT Network

- Continuity and consistency in the network.
- Connecting a low-stress network.
- Fill in gaps, remove barriers within existing network and to first/final mile connections.

Element 3
Multimodal Transportation Nodes

- Cluster transportation options and amenities at popular destinations, transit stations, and urban/town/suburban centers.



Element 4
Complete Streets

- <u>Safely</u> accommodate motorized <u>and</u> active transportation users of all ages and abilities

  along the street network.

Element 5
Supporting Infrastructure and Technology

- Bicycle and Pedestrian support infrastructure
  - Pedestrian shelters at transit stops
  - Shade trees, landscaping along sidewalks/trails
  - Bicycle Parking
  - Wayfinding
- Real-time, multi-modal trip planning

DRCOG's Role in Implementing Active Transportation

- Fund bike/ped projects in TIP
- In current TIP (2016-2021):
  - 22% of funds allocated directly to b/p projects.
  - 100% of b/p projects selected are protected or grade-separated from the roadway.
  - $ to b/p projects as part of larger roadway projects.
- Development of a Regional Active Transportation Plan in 2016
  - To become part of the RTP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Questions or Comments?