Welcome and Introductions
Project Partners

- Regional Transportation District (RTD)
- Colorado Department of Transportation (CDOT)
- Denver Regional Council of Governments (DRCOG)
- City of Aurora
Meeting Purpose and Agenda
What We’ve Heard

- How and when did the City decide to evaluate center-running BRT on Colfax?"
- What is center-running BRT and how does it work?
- What impact does BRT have on retail sales?
- How will vehicular traffic and access to businesses along the corridor be impacted (e.g. how will left turns work, will there be traffic diversion to side streets)?
Meeting Purpose

- Provide project background and progress to-date
- Overview of what center-running BRT is and how it works
- Review key opportunities/differentiators/tradeoffs of new concept
- Answer key questions and identify areas where more information is needed
Agenda

- Project History and Evolution
- Center Running BRT Concept
- BRT Case Studies
- Benefits/Differentiators of Center-Running BRT
- Tradeoffs of Any BRT System
- Q&A
- Next Steps
Project History and Evolution:
*How we got here and where we’re going*...
Purpose of the Project

To identify and provide a package of multi-modal transportation improvements in the East Colfax corridor that:

- Improve mobility, connectivity, safety, and accessibility
- Meet current and future person-trip demand
- Encourage a shift of auto trips to alternative modes
- Interact seamlessly, efficiently, and safely with other transportation corridors, systems, and modes
- Are consistent with area economic development, placemaking/streetscaping and liveability plans and principles
Study Area
Key Challenges and Opportunities

- Moving more people along and to destinations along East Colfax without adding lanes or taking property
- Growth of Denver region even greater than expected
- Very high Colfax corridor ridership today (22,000 / weekday)
Why is This Project Needed?

(2010 to 2035)

Population Growth

107,000
135,000

Employment Growth

168,000
280,000

+ 25%
+ 67%
Why is This Project Needed?

Person-Trip Growth

- 2010: 168,000
- 2035: 209,000

Bus Trip Growth

- 2010: 28,000*
- 2035: 34,000*

*(ridership includes 10, 20, and 15 & 15L)

(2010 to 2035)
Project Background

- **Study began in 2012**
  - Public Scoping (2012)
  - Alternatives Analysis (2013)
  - Bus Rapid Transit (BRT) identified (2014)
  - Side-Running BRT using peak-period lanes (2016)
Community and Agency Feedback

**Supported Outcomes**

- Doubles existing ridership
- Increases person-trip capacity
- Reduces transit travel time
- Reliability
- Enhanced Passenger Experience

**Opportunities for Improvement**

- Be bold – think long term
- 24-hour transit lane
- Placemaking – opportunity to reimagine Colfax as Main Street
- Prioritize pedestrians and bicycle safety and access (Vision Zero)
Project Evolution

- Side-Running BRT concept refined based on community input, project goals and mobility needs
- Analyzed potential alternative options
- Center-Running BRT design better addresses key community, safety and mobility priorities
It's getting too hard to move around Denver and too many people are getting hurt on our streets. Our infrastructure is deteriorating, transportation options are limited and the ones we have are major sources of pollution.

The time to act is now. We must be smart and we must be bold. Denver's Mobility Action Plan will support the transportation choices people want to make and move more people, more efficiently and more safely. It will increase mobility options, improve safety, address climate change, improve public health, and create more accessibility.

$2+ billion over the next 12 years to make it safer and easier to get where we need to go.

**Denver's Mobility Action Plan**

Denver is ready to transform its transportation system.

**Strategic Goals**

**CHOICE**
Providing more choices: Walk, Bike, Drive, Transit or Share

**SAFETY**
Improving safety through Vision Zero

**CLIMATE & HEALTH**
Expanding use of electric vehicles and charging stations

**ACCESSIBILITY**
Increasing technology to make your trip easier and faster
Center Running Bus Rapid Transit
The Colfax BRT Opportunity

Center-Running Exclusive Lanes
The Colfax BRT Opportunity

Center transit lanes - similar to urban rail

Single-direction station platforms far side of intersection

Left turn lanes at signals

Less conflict between buses and autos
Center BRT w/ Split Platform
The Colfax BRT Opportunity
Conceptual Operations

Project Map

To Denver Union Station
Midpark LRT
15th
Civic Center Station
Pensylvania
Downing
Williams
Josephine York
Steele
Colorado
Bannock
Hudson
Karnelie
Monaco
Quaker
Linda
Yale
Dayton
Havard
Holmes
Pepita
Scanton
Aurora Ct.
Aurora Metro Center | R Line

To Aurora Metro Center | R Line

Enhanced Bus Section

d Center-Running Exclusive Lane Section

Conceptual BRT Stations

Conceptual Standard Bus Stop

d Study Boundary

d colfax corridor connections
Delivering a Complete Corridor with BRT at the Center
BRT as Centerpiece of A Complete Street

Delivering on transit and walkability

- Provides healthy transportation options
- Allows the economy to grow
- Protects and improves our environment
- Supports vibrant, walkable neighborhoods
- Improves safety and comfort
Center Running BRT Evolution

- Many early arterial BRT projects used side lanes
- 10 years of experience shows downsides

- Center running BRT becoming the preferred solution for urban corridors
- Helps deliver on safety, placemaking, and long-term operations
Denver’s Peers are Building Quality BRT

- Cleveland: HealthLine
- Seattle: Madison
- Chicago: Ashland
- NYC: Fordham Road Select Bus Service
- Eugene: EmX
- Boston: Silver Line
HealthLine BRT in the Euclid Avenue Corridor, Cleveland
Signature Stations
Street Design
Steve Manka, “Chorus Line”
$5.8 BILLION in new investment resulting from the Euclid Avenue Streetscape and BRT Project.
Paving the way to economic development

Michelle Jarboe | The Plain Dealer

The remaking of Euclid Avenue was primarily a transportation project — a $897 million federally funded effort to improve a major artery and to connect downtown Cleveland to University Circle using a bus rapid transit line. But the project also promised economic development, with the revived road acting as a corridor for construction.

That growth is happening. More than $3.3 billion in projects have been in the planning stages, under construction or completed near Euclid during the past two years. That number might be higher, if not for timing. The corridor re-opened in October 2008, when the nation was at the height of a financial crisis. The recession, a lending crunch and a real estate crisis have stalled some projects and wiped out others. And a number of projects that have emerged or survived are driven by institutions or propped up by tax credits and other subsidies.

This map gives an overview of much of the development around the Euclid corridor.
Healthline BRT, Cleveland

https://youtu.be/kF6EF3kOGQE
Eugene: EmX

- At least $100 million in investment along the corridor since implementation
- 10% job growth within 0.25 miles compared to -5% job growth citywide (includes 4% increase in retail jobs)
Serving Established Corridors

Geary BRT & Van Ness BRT, San Francisco
Serving Established Corridors

- Similar corridor and ridership to Colfax
- Population living within 0.5 miles of Ashland corridor expected to grow by 55,000 (about 24%) by 2040.

Ashland Corridor, Chicago
NYC: Fordham Road Select Bus Service

- 24% increase in retail sales in first year post-implementation
- 71% increase in retail sales after three years, compared to only 38% in the surrounding neighborhoods
Seattle Madison BRT

- Serves several neighborhood retail districts
- Purpose is to deliver high-quality mobility to accommodate current and expected growth
Those living and working in the survey area reported the lowest average spending of all major respondent groups. Among this group, people who used a personal vehicle reported spending far less than those taking transit or walked/biked, on average.

### Average Spent ($) Among Live/Work in Area

<table>
<thead>
<tr>
<th></th>
<th>$25.17</th>
<th>$26.36</th>
<th>$28.52</th>
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</thead>
<tbody>
<tr>
<td>Overall</td>
<td></td>
<td></td>
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<tr>
<td>Pers. Vehicle (11%; 40n)</td>
<td>$7.51</td>
<td></td>
<td></td>
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<tr>
<td>Transit (50%; 182n) (36%;131n)</td>
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### Relative Spending Power Among Live/Work in Area

<table>
<thead>
<tr>
<th></th>
<th>% of Visitors</th>
<th>Avg. Spent ($)</th>
<th>Relative Spent ($)</th>
<th>Relative Spending Power</th>
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</thead>
<tbody>
<tr>
<td>Personal Vehicle</td>
<td>11%</td>
<td>7.51</td>
<td>.83</td>
<td>1.00</td>
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<tr>
<td>Transit</td>
<td>50%</td>
<td>26.36</td>
<td>13.17</td>
<td>15.87</td>
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<tr>
<td>Non-Motorized</td>
<td>36%</td>
<td>28.52</td>
<td>10.27</td>
<td>12.37</td>
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**Q16. How much money do you plan to spend during your visit?**
While visitors arriving using a personal vehicle are more likely to spend more per capita than transit users, these costs are more likely to reflect travel and parking-related costs. Visitors who use transit report spending less – on average – but retain higher relative spending power by virtue of their subgroup size.

### Average Spent ($)

- **Personal Vehicle**: $125.89
- **Transit**: $101.95
- **Non-Motorized**: $146.80

### Relative Spending Power

<table>
<thead>
<tr>
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<th>Avg. Spent ($)</th>
<th>Relative Spent ($)</th>
<th>Relative Spending Power</th>
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</thead>
<tbody>
<tr>
<td>Personal Vehicle</td>
<td>24%</td>
<td>125.89</td>
<td>30.72</td>
<td>1.00</td>
</tr>
<tr>
<td>Transit</td>
<td>44%</td>
<td>101.95</td>
<td>45.21</td>
<td>1.47</td>
</tr>
<tr>
<td>Non-Motorized</td>
<td>18%</td>
<td>146.80</td>
<td>26.03</td>
<td>0.85</td>
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</table>

Q16. How much money do you plan to spend during your visit?
Madison BRT, Seattle

https://youtu.be/nmpCkw9dPkw
Benefits/Differentiators of Center-Running BRT
Transit Capacity & Ridership

- **Current bus ridership more than doubles** – Colfax BRT projected ridership of up to 50,000 by 2035

- **Shift from vehicles to transit due to improved travel times**, reliability and convenience of BRT

- **Improved transit travel times** – up to 15 minutes faster during peak periods in 2035 than if we do nothing
Transit Capacity & Ridership

- HealthLine (Cleveland): 48% ridership increase
- EmX (Eugene): 100% ridership increase in 1st year of operations
- Orange Line (Los Angeles): Achieved 15-year forecast of 20,000+ riders in first seven months
Transit Speed and Reliability

- Eliminates many curbside conflicts
- Future proofing as land-use, traffic, and curb uses change
- Frequent service (every 3-5 minutes)
- High quality stations
Safety
Vision Zero

- Island stations calm traffic
- Pedestrian refuges reduce crossing distance
- Shorter crossing distances = less exposure to vehicle traffic
- Eliminating unprotected lefts improves pedestrian safety
- Station lighting enhances security
Safety
Pedestrian/Bicycle first design

- Improved multi-modal access and connectivity
- Designs that protect the most vulnerable users
- Safer, more accessible, walkable and bikeable neighborhoods

HealthLine BRT passengers crossing from a center station platform near the Cleveland Clinic
Tradeoffs of Any BRT System
Tradeoffs

- Local access and turning movements
- Traffic and parking
- Stop consolidation/local bus service
## Turning Movements

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Significantly reduces number of vehicle conflicts with other vehicles and peds/bikes</td>
<td>• Left turns only allowed at signalized intersections. May require U-turns or multiple lefts to get to destinations.</td>
</tr>
<tr>
<td>• Improved safety</td>
<td>• No crossing over center BRT lanes except at signals</td>
</tr>
</tbody>
</table>
Turning Movements

Before Center-Running

After Center-Running
## Vehicle Traffic and Parking

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ More people using transit</td>
<td>▪ Some vehicle trips will shift to parallel corridors</td>
</tr>
<tr>
<td>▪ Overall reduction of volume of vehicles along BRT corridor</td>
<td>▪ Grid street network can absorb diversion with minimal vehicle travel time increases</td>
</tr>
<tr>
<td>▪ Some on-street parking spaces added by moving stations to center</td>
<td>▪ Some on-street parking spaces eliminated near station locations</td>
</tr>
<tr>
<td>▪ Operational improvements: signal optimization, extended/new turn lanes, re-striping, minor curb/gutter relocation (within existing ROW)</td>
<td></td>
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</tbody>
</table>
## Station Spacing

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Challenges</th>
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</thead>
<tbody>
<tr>
<td>▪ BRT provides efficiencies local services can’t provide</td>
<td>▪ Maintain local service that will complement the BRT system</td>
</tr>
<tr>
<td>▪ Provide enhanced efficiencies without a fare increase for local service or higher fare for BRT</td>
<td>▪ Some local stops consolidated</td>
</tr>
<tr>
<td>▪ Opens up sidewalk space for pedestrians, retail activation</td>
<td></td>
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</tbody>
</table>
Local Service/Stop Consolidation

- Local and Limited use one set of high-quality stations in Denver
  - Local would have slightly longer stop spacing
  - Limited would have slightly closer stop spacing
- 3-5-minute headways between 15 and 15L

Colfax has a well connected urban sidewalk network providing good access to the corridor
How stop spacing affects walking distances

<table>
<thead>
<tr>
<th></th>
<th>1/8 mi. Service</th>
<th>BRT 1/4 mi.</th>
<th>BRT 1/2 mi.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household A</td>
<td>2 blocks</td>
<td>3 blocks</td>
<td>3 blocks</td>
</tr>
<tr>
<td>Household B</td>
<td>3 blocks</td>
<td>3 blocks</td>
<td>5 blocks</td>
</tr>
<tr>
<td>Household C</td>
<td>3 blocks</td>
<td>3 blocks</td>
<td>4 blocks</td>
</tr>
</tbody>
</table>

Walking Travel Path to Transit Stop:
- - - 1/8 mi. Service Stop and Path
- - - BRT Stop (1/4 mile stop spacing) and Path
- - - BRT Stop (1/2 mile stop spacing) and Path

colfax corridor connections
Questions?
Next Steps
Where Do We Go From Here?

- Identify Local/Regional Funding Sources
- Compete for Federal Funding*
- Gather community feedback and complete more detailed design and implementation schedule
- Business/property owner or developer representation on Task Force

  Next Task Force Meeting: October 5, 2017

*requires environmental clearance by Federal Transit Administration and funding availability