



Transportation Master Plan: One year Progress and Implementation Update

City Council Study Session
Aug. 25, 2015



TMP 1 Year: Progress & Highlights

- Focus on Complete Streets
- Multimodal Systems Approach
- Integrated Planning, Design, Construction & Maintenance
- Support city's sustainability framework and community goals





Council Feedback Requested:

- Maintenance initiatives, including the evaluation/transformation efforts
- Transportation capital improvements program/projects
- Measurement and monitoring program
- Evaluation of the Complete Streets' Living Lab Phase II program, including Folsom corridor options



Complete Streets: Maintenance Initiatives



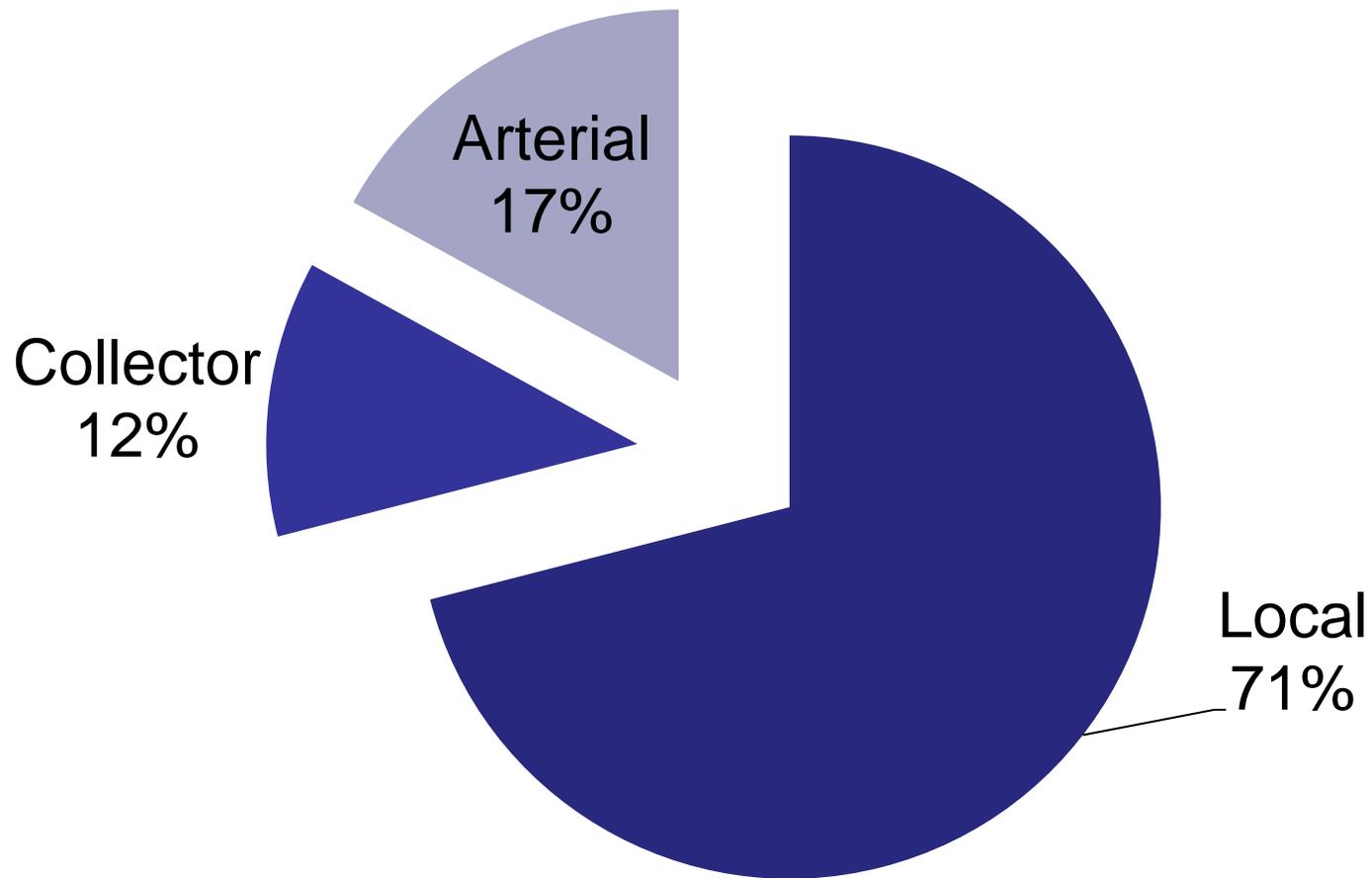


Context

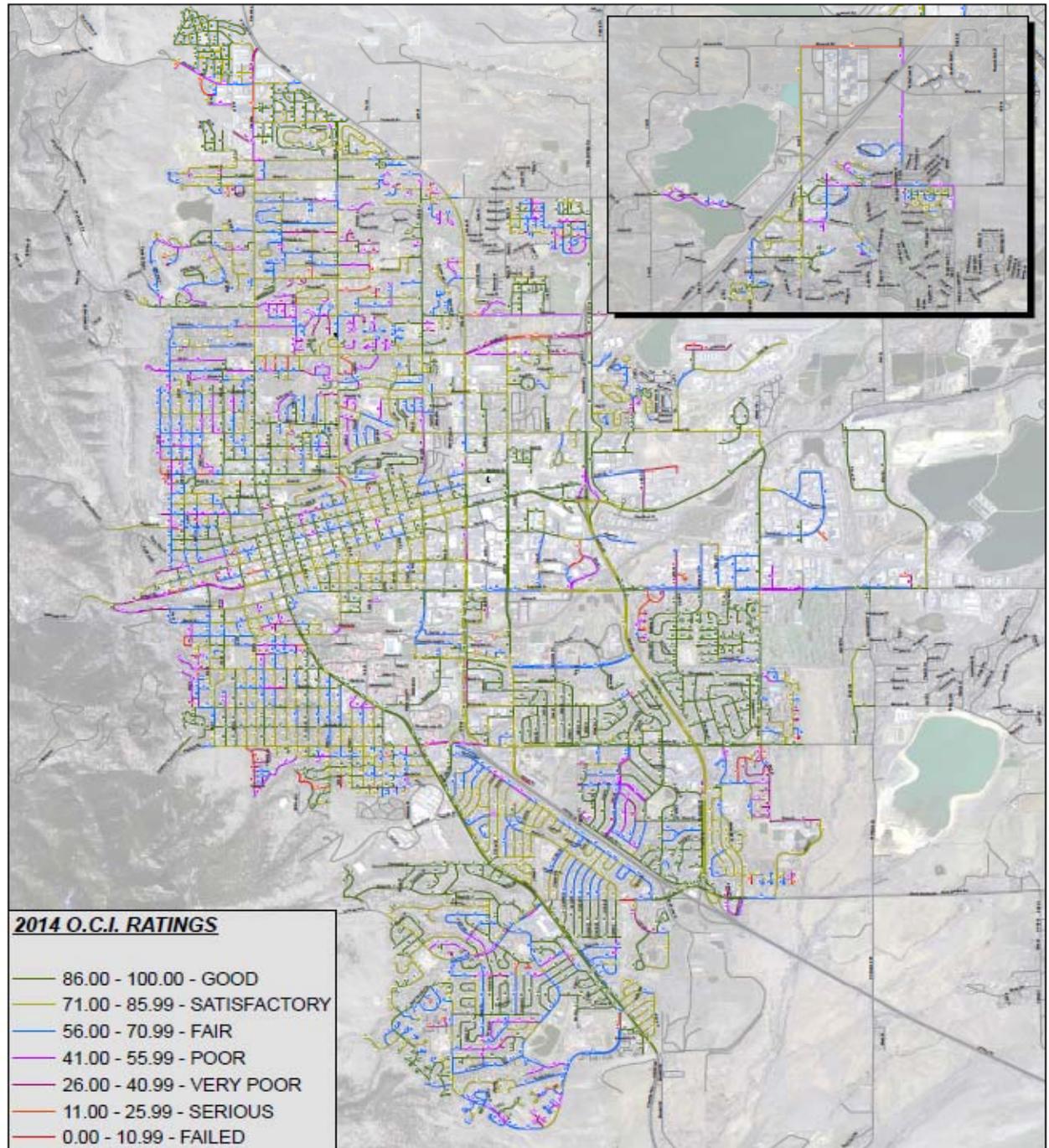
- Sustaining or improving the maintenance of existing assets
- Previous funding levels were not adequate to maintain acceptable street pavement conditions
- Funding derived from sales tax revenues
- 2011 Capital Improvement Bond
 - \$12.5 Million One-Time Funding
- 2013 City of Boulder ballot measures
 - \$1.6 Million Annual Funding

Street Distribution

Proportion of Streets by Road Type



2015 City of Boulder O.C.I. Ratings



OCI Rating Examples

**Excellent - Very Good
(81 - 100)**



**Good - Fair
(50 - 80)**



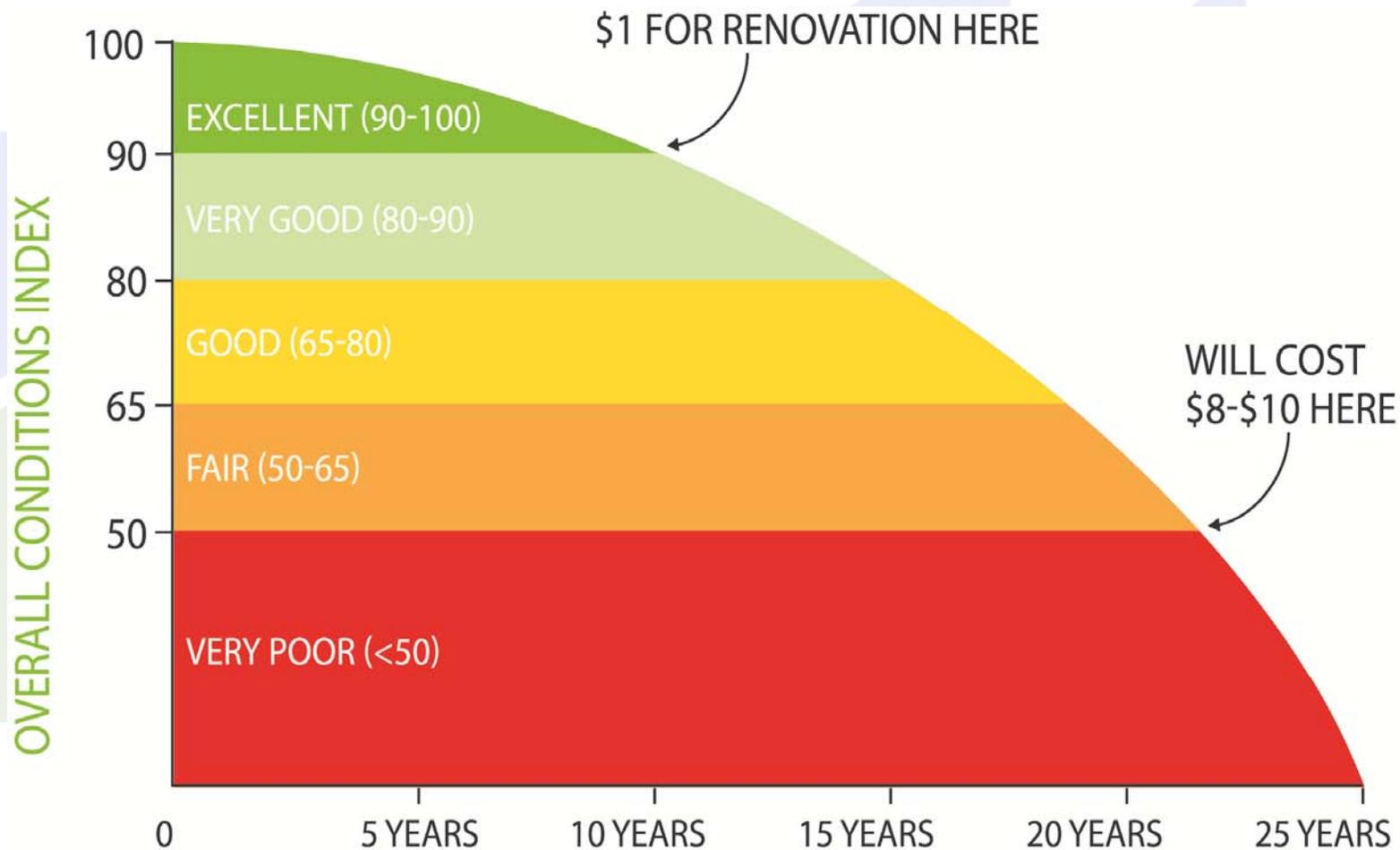
OCI Rating Examples

**Very Poor
(<50)**



Pavement Management Strategy

Identifies the optimal level of funding, timing, and renewal strategies that will keep the roadway network at or above a “Good” OCI rating.



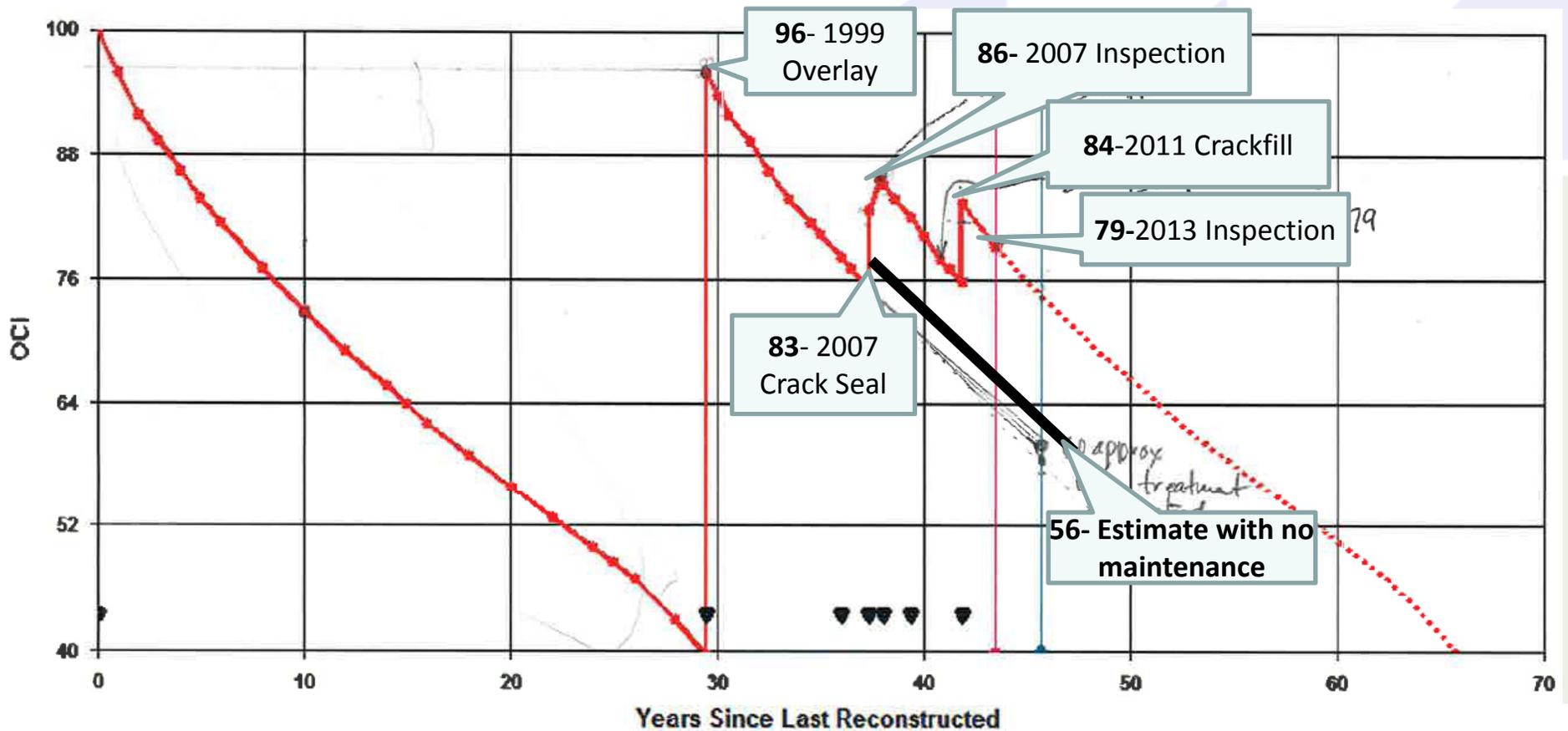
Surface Treatment Types

Type of Treatment	Description	Years After Resurfacing Applied	Average OCI Rating of Streets Receiving Treatment
Crack Sealing	Cracks in the pavement are sealed to prevent moisture from entering the base and sub-base of a roadway, reducing pavement failures and potholes and extending the pavement life.	3 - 5	82
Chip Sealing	A liquid asphalt membrane binder (“seal”) and a layer of small crushed stone (“chip”) are applied over the existing street surface; typically used on residential or lower-volume streets.	8 - 12	75
Asphalt Resurfacing (Overlay)	The roadway is milled and then resurfaced with two inches or more of new asphalt; typically used on higher volume roads or heavily deteriorated lower volume streets.	12 - 14	40 - 65 (arterials & collectors); 20 - 50 (local streets)
Street Reconstruction	The existing asphalt pavement and sub-grade are removed from the roadway and then reconstructed with six to eight inches of new asphalt pavement; often pedestrian ramp and curb and gutter repairs are also required.	30 – 40 (if above treatments were applied)	<40 (arterials & collectors); <20 (local streets)

Surface Treatment Costs

Type of Treatment	Per Lane Mile Cost Estimate (average of last three years)
Crack seal	\$2,000
Chip seal only	\$25,000
Chip seal, with concrete repair and patching	\$60,000
Asphalt Resurfacing (Overlay)	\$140,000
Pavement Reconstruction (Local Streets)	\$350,000
Pavement Reconstruction (Arterials & Collectors)	\$450,000

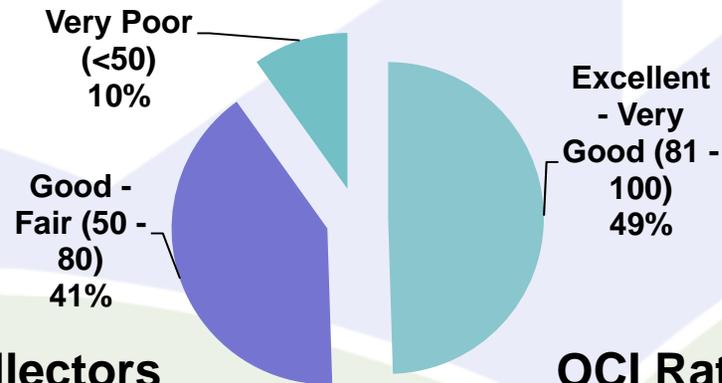
19th Street Maintenance Preferred Practice



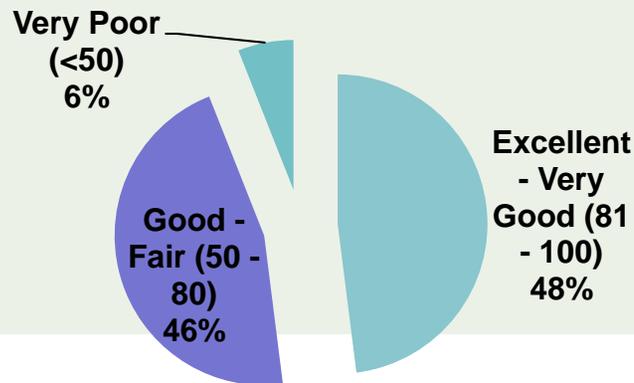
City of Boulder Street OCI Ratings

The City's goal is a system wide average OCI rating of 75 to 80.

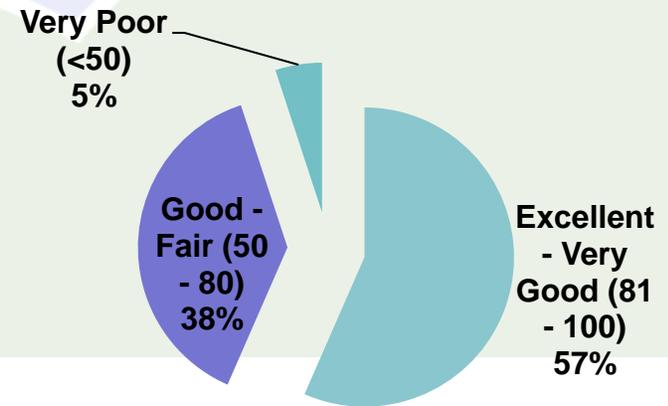
OCI Ratings for Locals



OCI Ratings for Collectors

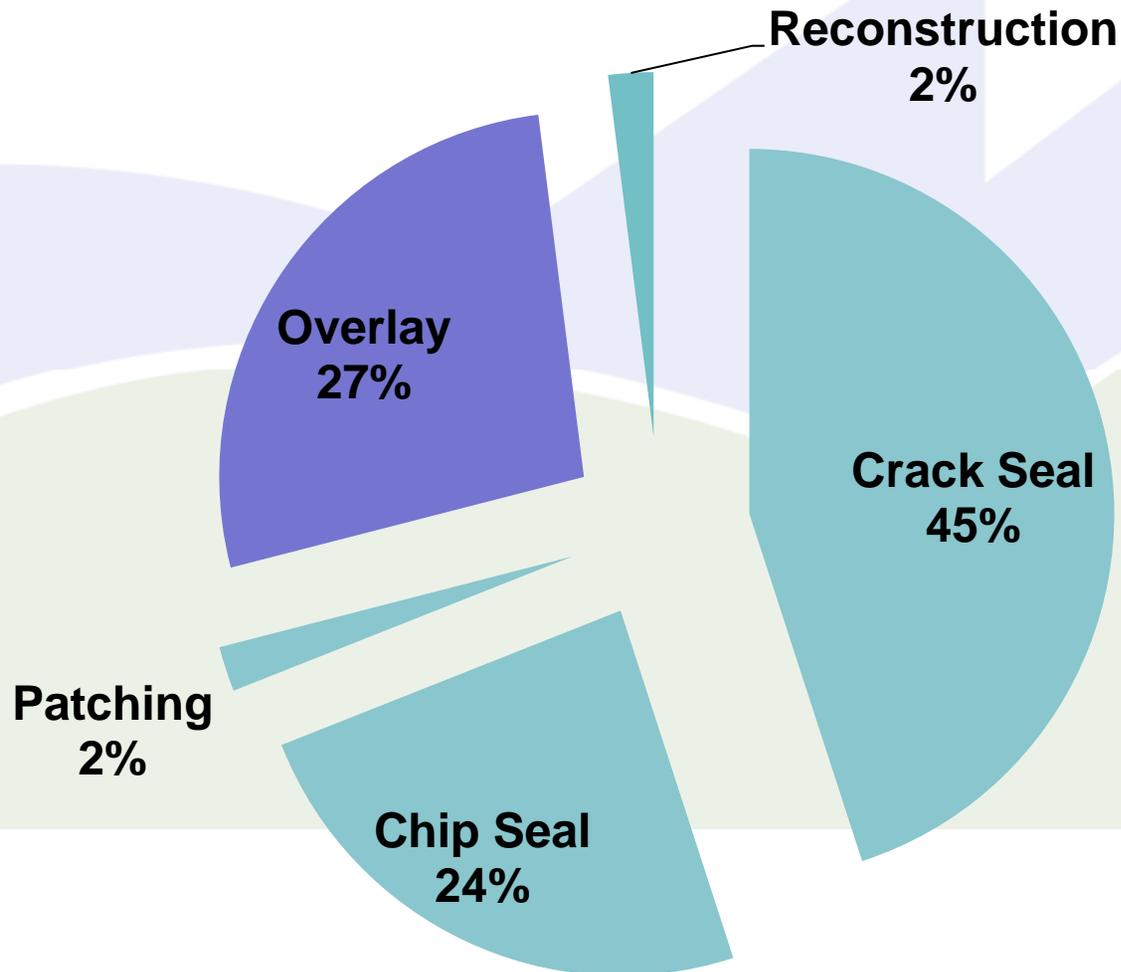


OCI Ratings for Arterials



Approach

2015 Scheduled Surface Treatments



Asset Management Efforts

✓ System
Preservation
✓ Priority
Based
Approach

- Major Capital Maintenance
– Annual \$800k
- Minor Structures Inspection
- Bikeways Capital
Maintenance:
- ~\$125k or a Pedestrian
Overpass/Year

Snow and Ice Control

Program Goals:

- Keep primary and secondary streets, on-street bike facilities, and off-street path systems clear and open
- Respond with enhanced service levels when a significant snowfall impedes the mobility of the traveling public
- Use materials and equipment efficiently and effectively
- Assist Code Enforcement with sidewalk snow removal if unsafe conditions exist
- Communicate information that informs decisions for delayed opening or early releases



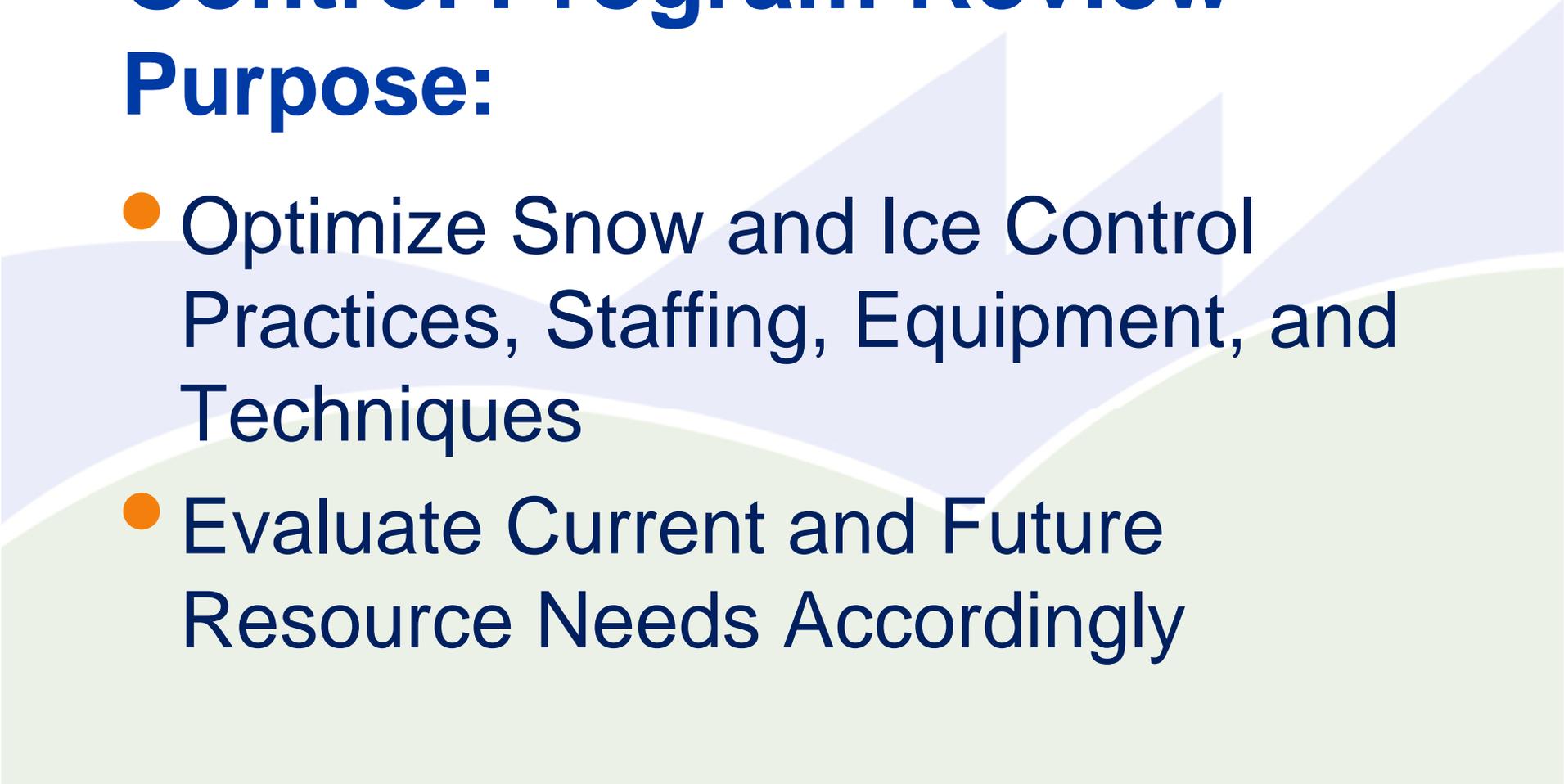
Snow and Ice Control Program Updates

- **Undergoing Comprehensive Review**
 - **Comprehensive Review Initial Findings and Improvements**
 - **Maintenance for Pilot Projects**
 - **Previous Season Lessons Learned**
- 



Comprehensive Snow and Control Program Review

Purpose:

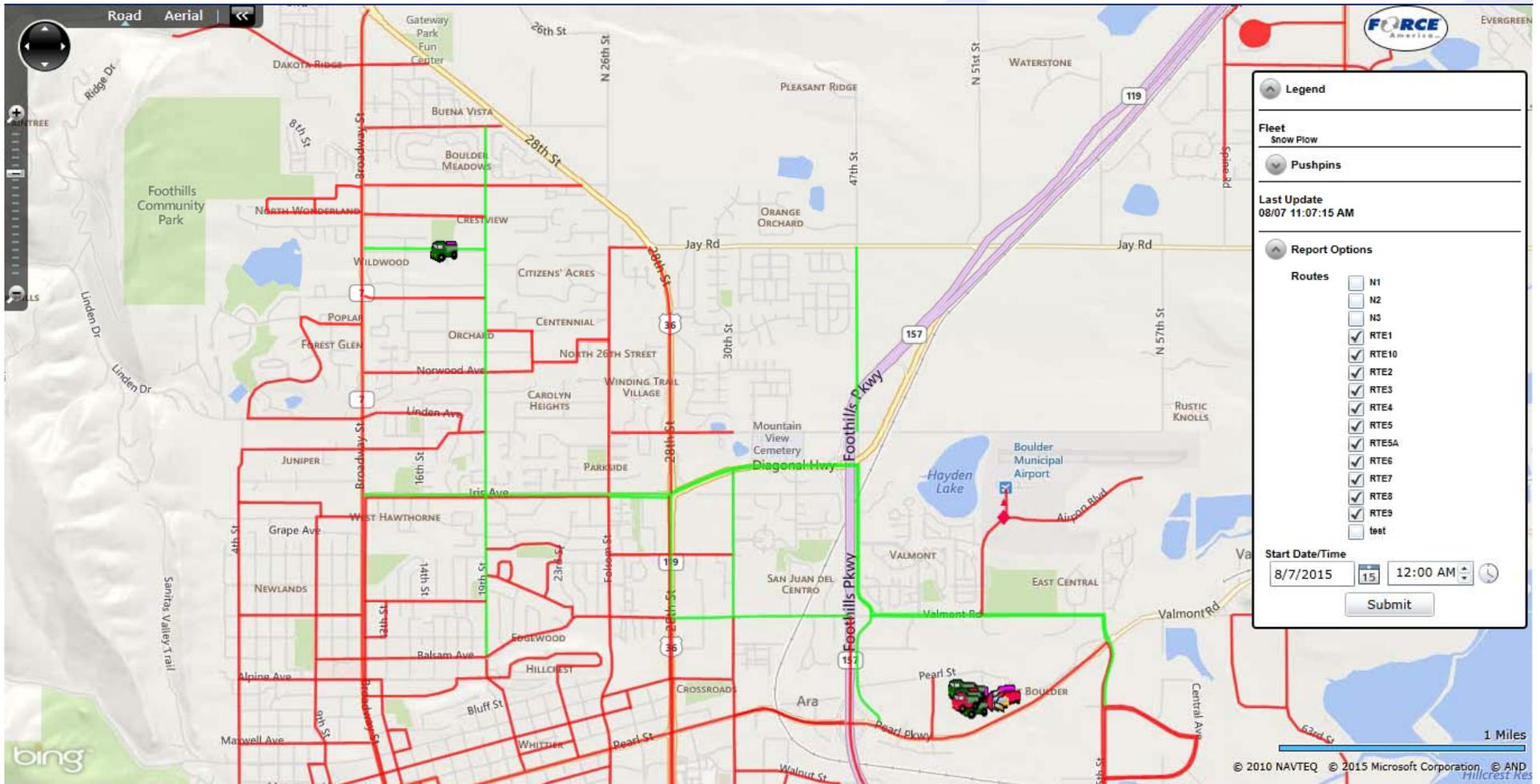
- Optimize Snow and Ice Control Practices, Staffing, Equipment, and Techniques
 - Evaluate Current and Future Resource Needs Accordingly
- 



Comprehensive Review Initial Findings and Identified Improvements for 2015

- **Enhanced Metrics Reporting**
- **Snow Route Optimization**
- **Snow Event Response & Resource Planning**

Real-time Location Information



Winter Maintenance of Living Lab Pilot Projects – Folsom & University Streets

- Level of Service Expectations
- Operational Adjustments
- Vehicle & Equipment Adjustments



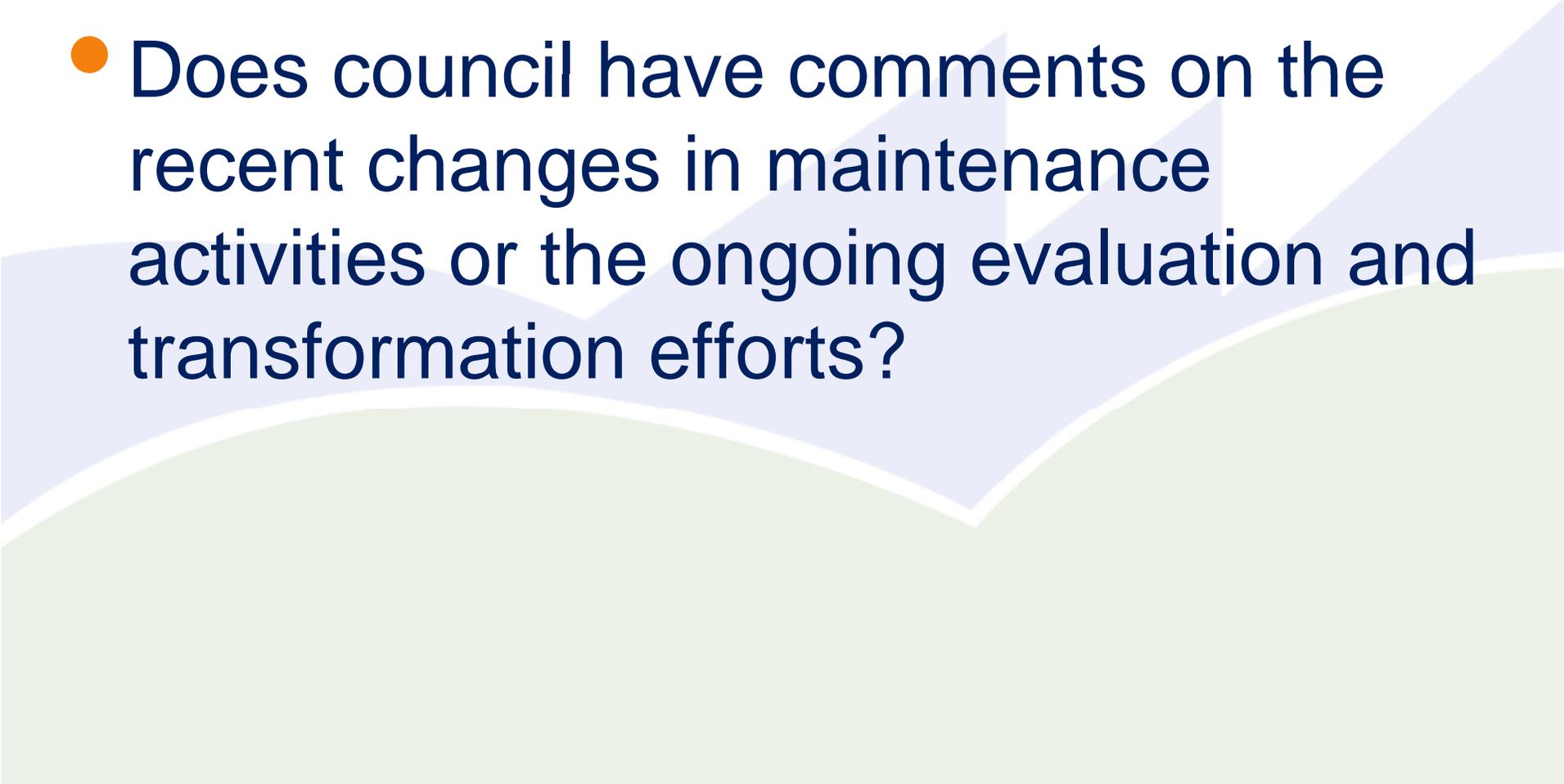
Previous Snow Season “Lessons Learned”

- Transit Stop Service Needs
- Snow Preparedness & Response
- School Routes/Residential Street Additions





Question for Council :

- Does council have comments on the recent changes in maintenance activities or the ongoing evaluation and transformation efforts?
- 



Complete Streets: Capital Projects Implementation





Capital Projects Implementation

- CIP reviewed and approved annually
- About 25% of budget
- Guided by TMP investment priorities and budget guiding principles
- Makes strategic investments in multimodal system
- Leverages external funds

CIP Projects Overview



Foothills/ Valmont Operational Improvements

- ✓ Safety Improvement
- ✓ Congestion Reduction
- ✓ \$124k Local
- ✓ \$812k Grants



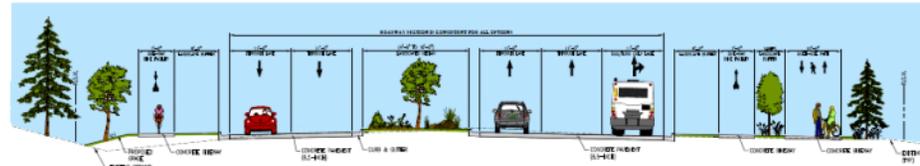
Looking south along Foothills



Looking north during construction

Diagonal Highway

- ✓ Enhance Complete Street Network
- ✓ Leverage External Funding
- ✓ First Raised bike lane
- ✓ \$3M Local
- ✓ \$8.1M Grants

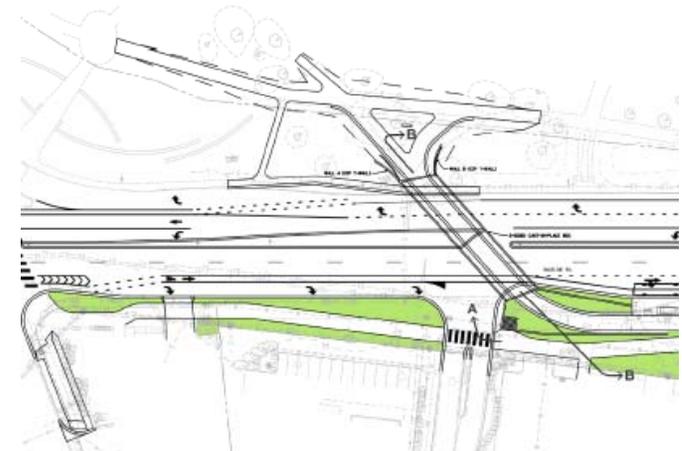
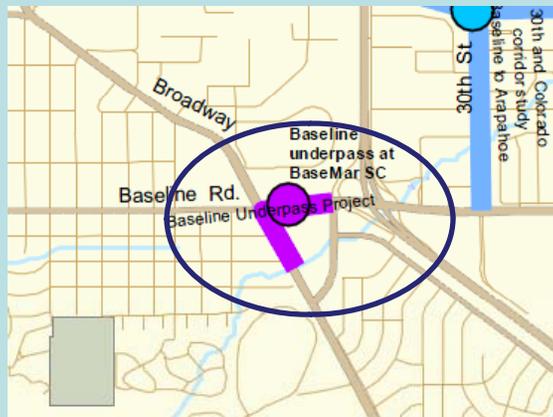


Bike & Pedestrian Typical Section
Detached Cycle Track & Separate Multi-Use Path (South Side)



Baseline Underpass

- ✓ Safety Improvement
- ✓ Bike/Pedestrian Enhancement
- ✓ 80th Underpass
- ✓ \$554K Local
- ✓ \$4.8M Grants



Transit Stops

- ✓ Work with Regional Partners
- ✓ Leverage External Funding
- ✓ Maintenance, Operations, Safety
- ✓ 24 Transit Stops
- ✓ \$179k Local
- ✓ \$380k Grants

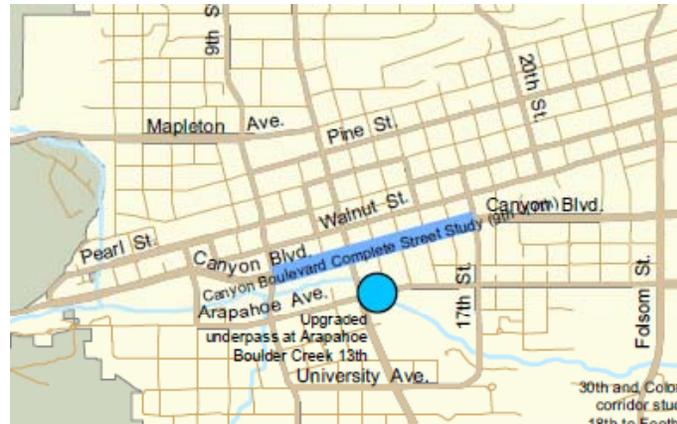


Corridor Studies

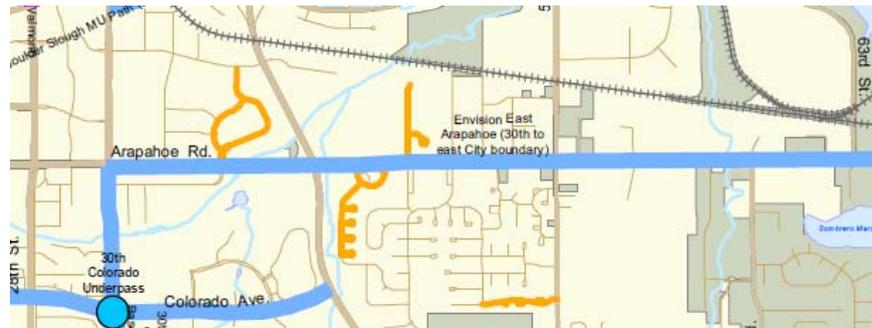
- ✓ Advance System Innovations
- ✓ Enhance Complete Street Network



30th and Colorado



Canyon Boulevard Corridor



East Arapahoe



Question for Council :

- Does council have questions or comments about the ongoing Transportation capital improvements program or its individual projects?
- 



TMP

Measurement & Monitoring





Measurement and Monitoring

- Multiple measures collected
- Vehicle Counts
 - Vehicle count program
 - Arterial counts, Boulder Valley counts, turning movement counts
 - Decline in vehicle counts
 - LOS evaluation (multimodal)
 - 11% of intersections at LOS E/F
 - Travel Time survey
 - Relatively stable on six major corridors



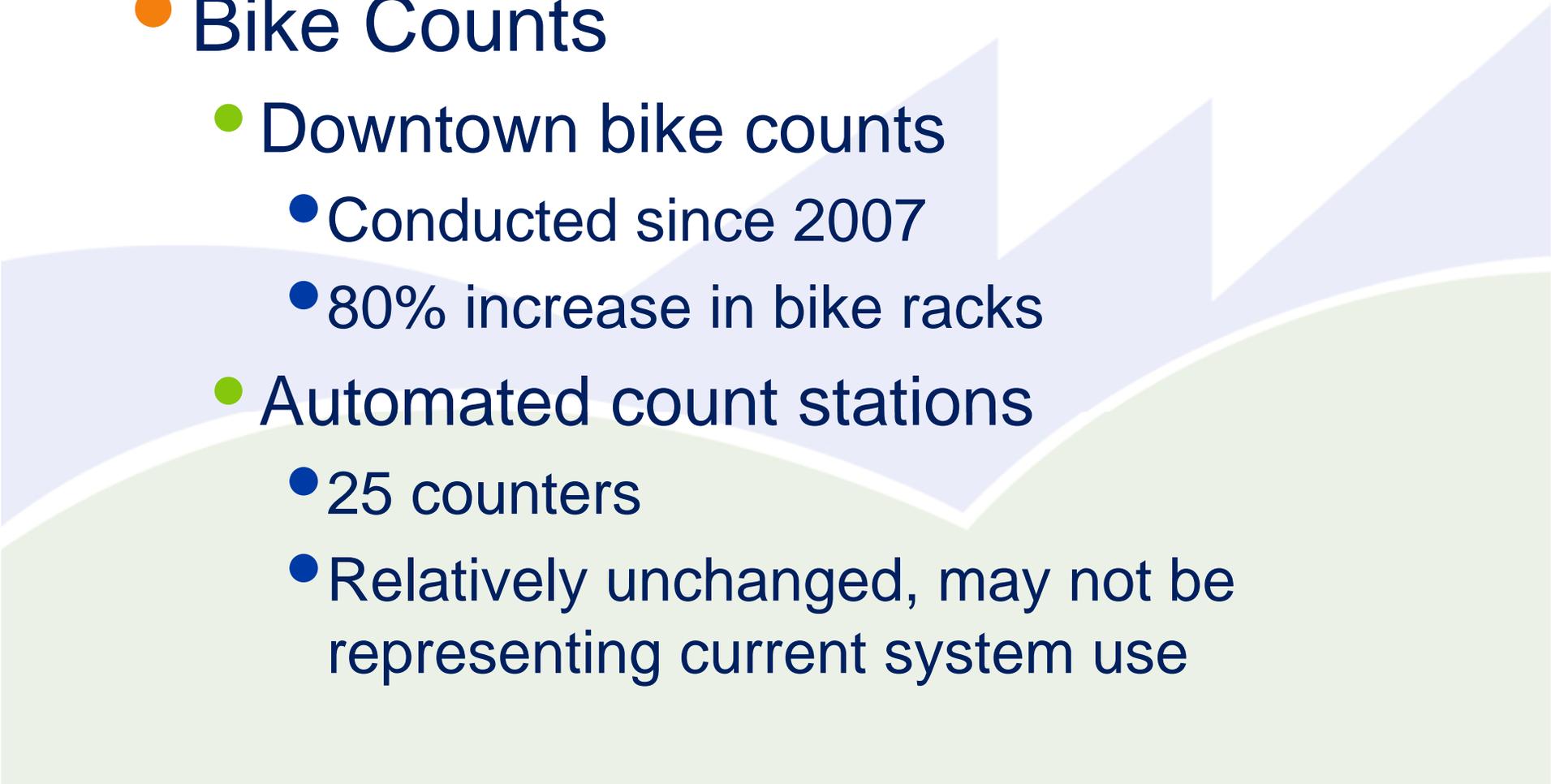
Measurement and Monitoring

- Bike Counts

- Downtown bike counts

- Conducted since 2007
- 80% increase in bike racks

- Automated count stations

- 25 counters
 - Relatively unchanged, may not be representing current system use
- 

Measurement and Monitoring

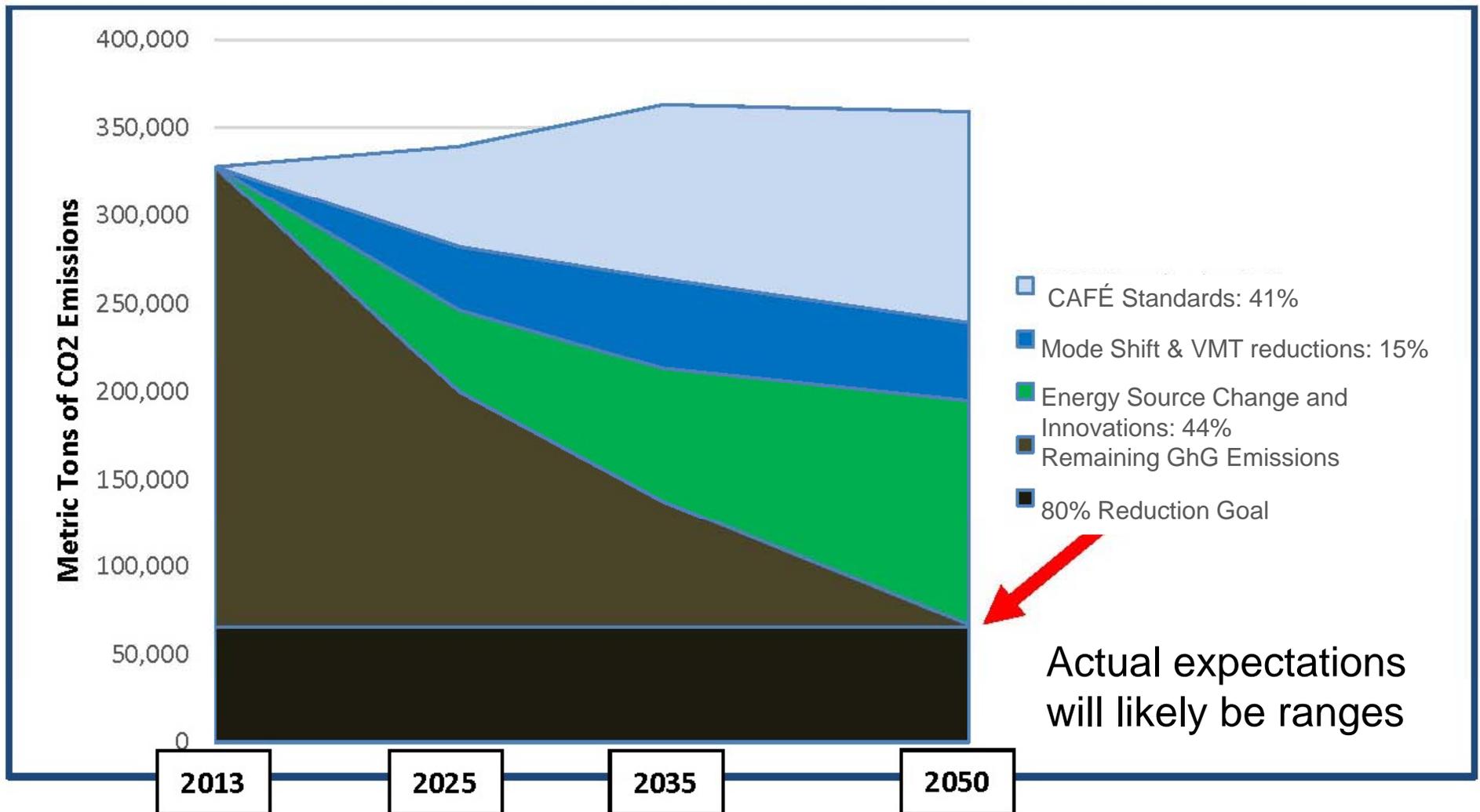
- Employee surveys:
 - BVES (CU and BVSD faculty and staff)
Downtown Employee Survey
 - Continued progress for residents
 - Preparing for Travel Diary this fall
 - Includes demonstration of smart phone app
- Revised Transportation Report on Progress early winter



Climate Commitment Analysis

Projected GHG Reductions by Action Area

From Southwest Energy Efficiency Project 2014 Analysis



TMP Measurable Objectives

No Growth in Long Term Vehicle Traffic

Max of 20% roadways at LOS F

Safety

Reduce SOV to 25% of Trips

Expand Fiscally Viable Alternatives for Residents & Employees

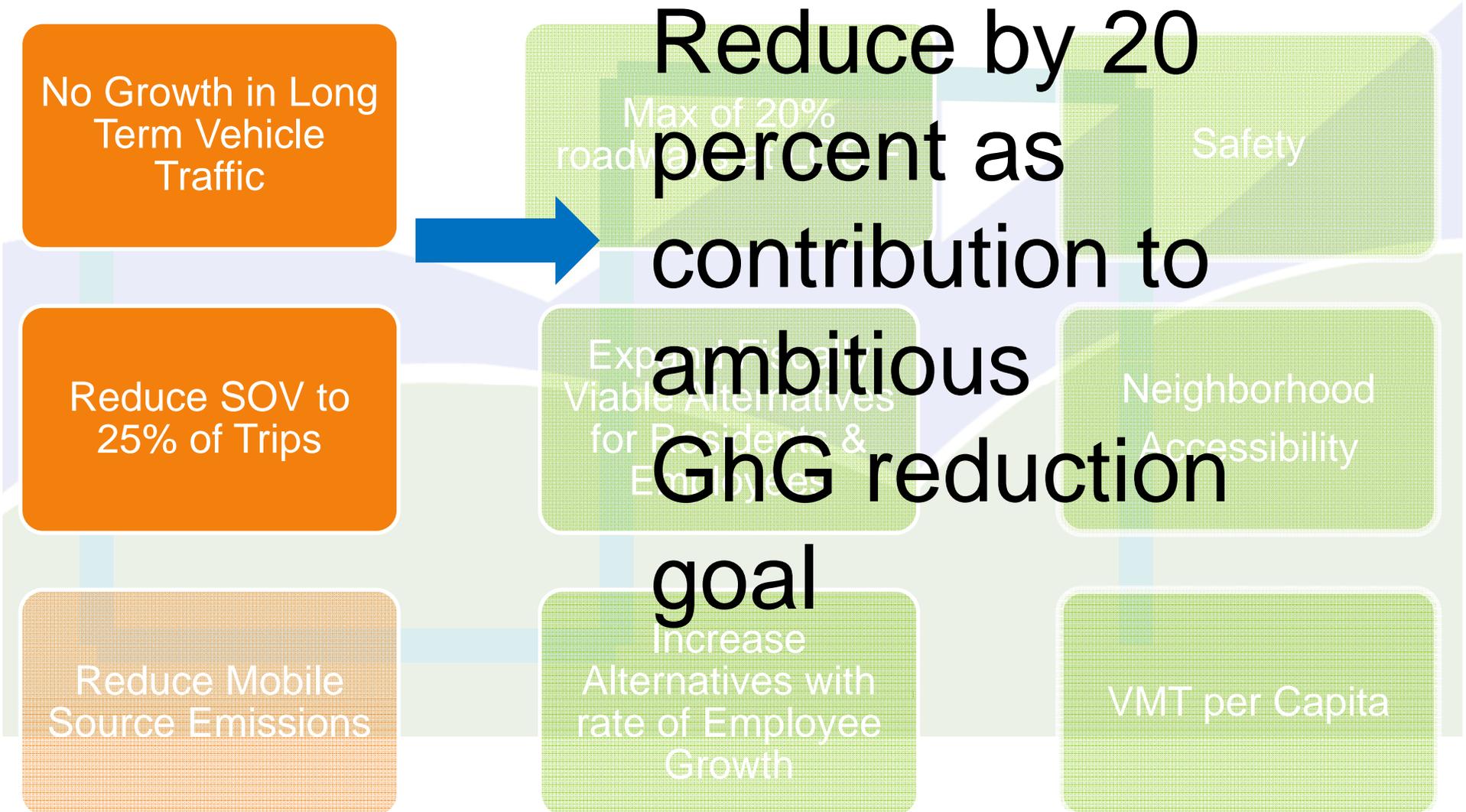
Neighborhood Accessibility

Reduce Mobile Source Emissions

Increase Alternatives with rate of Employee Growth

VMT per Capita

TMP Measurable Objectives





TMP Measurable Objectives

- Safety
 - Preparing updated *Safe Streets Boulder* report for all modes
- Neighborhood access tool
 - Under development as Web based tool
- Per Capita VMT
 - Need reduction to 7.3 miles for residents, 11.4 one way commute for non-residents



Question for Council :

- Does council have feedback on the TMP Measurement and Monitoring Program and suggestions for the development of the 2015 Transportation Report on Progress?

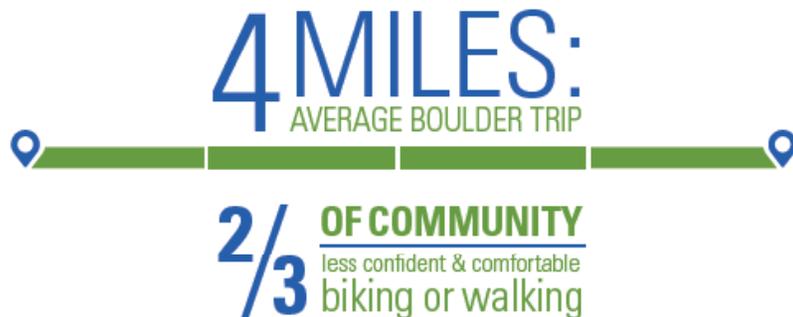


Complete Streets: Living Lab Phase II Corridor Projects





The TMP sets ambitious yet realistic mode share goals of:



TMP Objectives

Reduce Vehicle Miles Traveled (VMT) by 20%

Reduce Single Occupant Vehicles (SOV) to 20% of all trips

Reduce mobile source emissions

Max of 20% roadways at LOS F

Expand fiscally viable alternatives for residents & employees

Increase alternatives with rate of employee growth

Toward Vision Zero traffic injuries

Increase neighborhood accessibility

Reduce VMT per capita by 20% for residents and employees



- > Enhance on-street system to be more **safe and comfortable** to all users
- > Test **innovative** engineering treatments and programs
- > Provide **interactive 'real world'** user experience

Living Lab – Phase I projects

Installed 2013 – 2014

Protected Bike Lane

Baseline road

Buffered Bike Lanes

University Avenue and Spruce Street

Back-in-angle Parking

University Avenue

Electric Assist Bike Pilot

Certain off-street multi-use paths

Dashed (advisory Bike Lanes)

Harvard Lane

Parking protected bike lanes

University Avenue

Evaluation Measures

- Field observations
- Speed & volume
- Crash experience
- Community input

Evaluation Results

- Adjust implementation
- Maintenance
- Informing Phase II

Living Lab – Phase II projects

Candidate Corridors

- **Folsom Street (current project)**
- Iris Avenue (on hold)
- 63rd Street (on hold)
- ~~55th Street~~ (tabled)

Design considerations

- safety of all users
- Walk/bike stress level
- Access to transit
- vehicle delay/travel time





Living Lab – Phase II

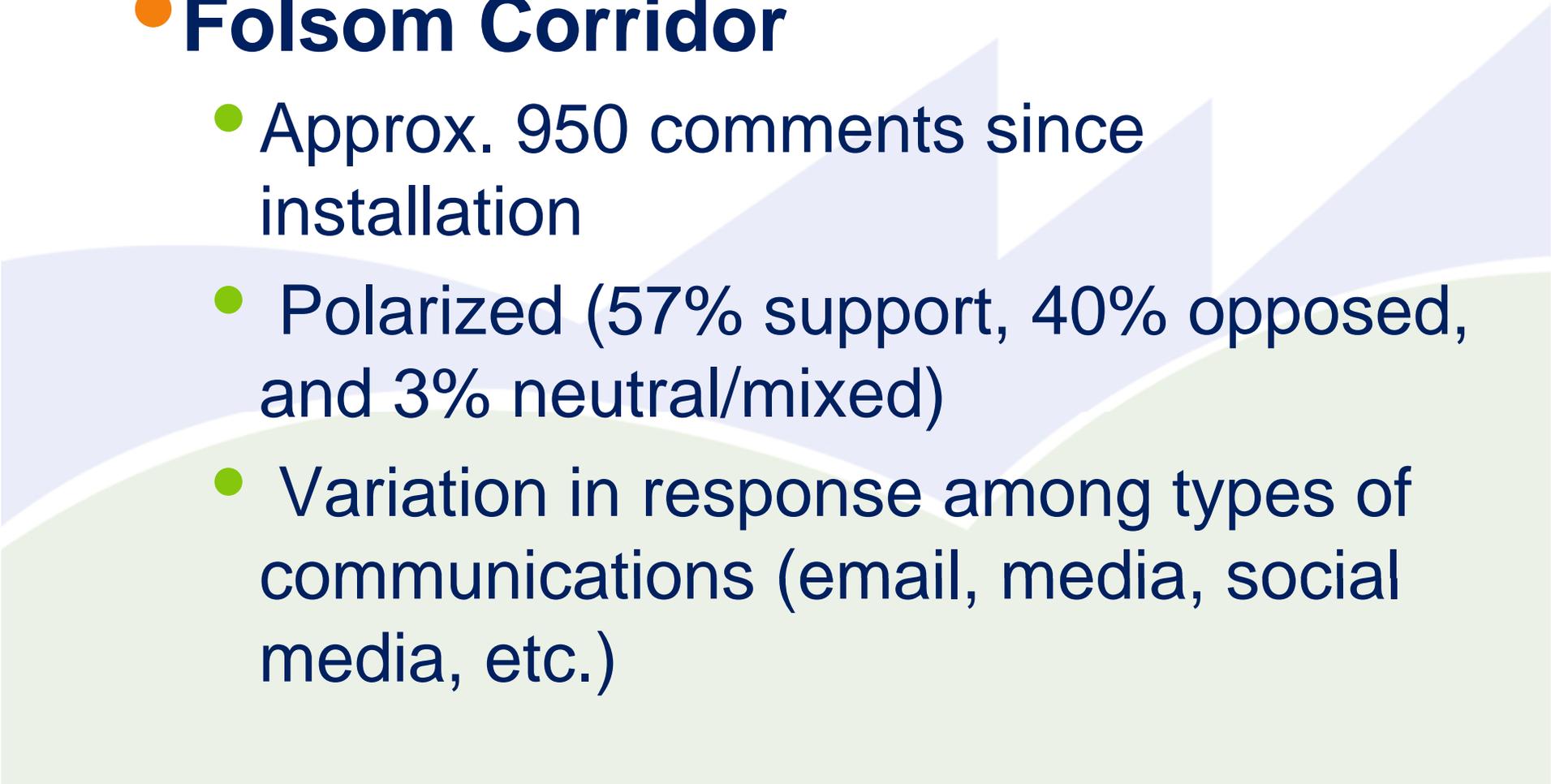
Community Input

- More than 1900 comments received to-date
- All corridors
- Email, social media, Inspire Boulder, web, meetings, phone, etc.



Living Lab – Phase II projects

● Folsom Corridor

- Approx. 950 comments since installation
 - Polarized (57% support, 40% opposed, and 3% neutral/mixed)
 - Variation in response among types of communications (email, media, social media, etc.)
- 



Community Comments

- Concerns
 - Traffic congestion and travel time delays
 - Difficult to turn on/off of Folsom
 - Re-routing to adjacent streets
 - Bicyclists riding on sidewalks
- Positives
 - Protected bike lanes safer for bicyclists
 - Helpful to have center left turn lane
- Neutral
 - Need more time and data to know if works or not, too early to tell

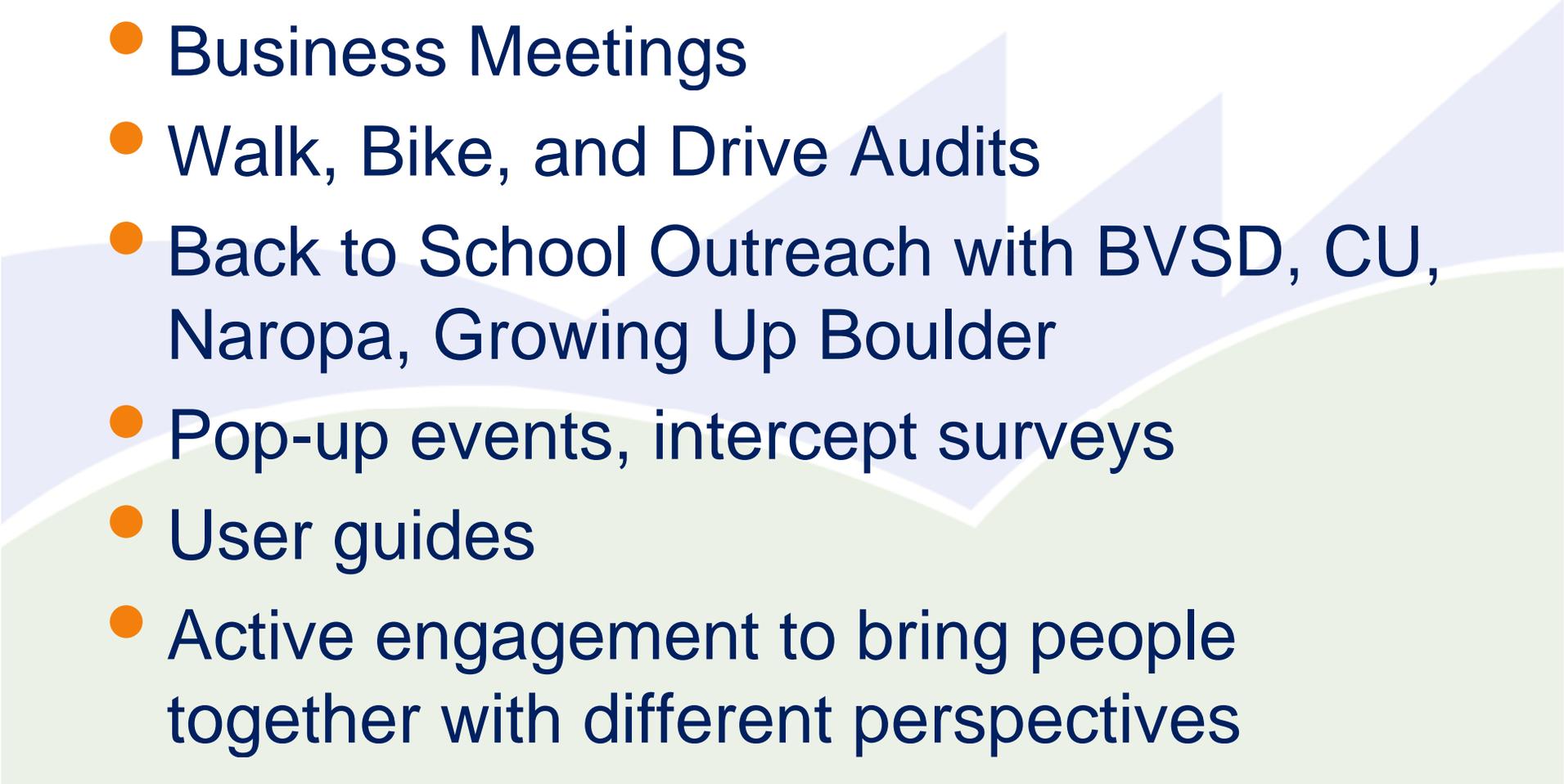


Business Outreach & Comments

- Outreach includes on-site meetings, email, phone
- Listening sessions hosted with Chamber 8/24-8/27
- Traffic congestion, travel time delays
 - Evening peak hour and lunch hour
- Concerns with bollards too close to driveways
- Customer complaints
- Suggestions to improve access to/from side streets



On-going Outreach (Aug – Oct):

- **Business Meetings**
 - **Walk, Bike, and Drive Audits**
 - **Back to School Outreach with BVSD, CU, Naropa, Growing Up Boulder**
 - **Pop-up events, intercept surveys**
 - **User guides**
 - **Active engagement to bring people together with different perspectives**
- 



Living Lab Phase II Folsom Street Preliminary Evaluation





Preliminary Evaluation

> Primary Measures

- Vehicle Volume
- Speed
- Corridor Travel Time
- Bicycle Volume
- Safety
- Feedback from emergency responders

> Secondary Measures

- Demographics
- Pedestrian Crossings
- Transit Ridership
- Diverted Traffic
- Maintenance

> Infographic

- Present early data and on-going tracking

> Details on website & Open data

> Data collection based on national best practices



www.BoulderLivingLab.net



13%

**FEWER AUTOS ON
FOLSOM STREET***

* Preliminary data based on three weeks of collection and evaluation.

www.BoulderLivingLab.net



2 mph

**DECREASE IN VEHICLE SPEEDS
FROM 39 TO 37 MPH
(in 30 mph zone) ***

* Preliminary data based on three weeks of collection and evaluation.

Preliminary “After” Travel Time

- Travel data from 125 drive runs, weeks 1-3
- Variations by time of day and direction
 - Evening peak has the most congestion
 - Southbound trips have more delay/travel time variation than northbound
 - Range of variation is diminishing
- Intersection congestion
 - Pearl, Walnut & Canyon
- Impact of pedestrian crossings



PM Vehicle Travel Time



northbound

southbound

<i>Before</i>	<i>High</i>	4m 52s	3m 44s
	<i>Avg</i>	3m 32s	3m 20s
	<i>Low</i>	2m 46s	2m 13s

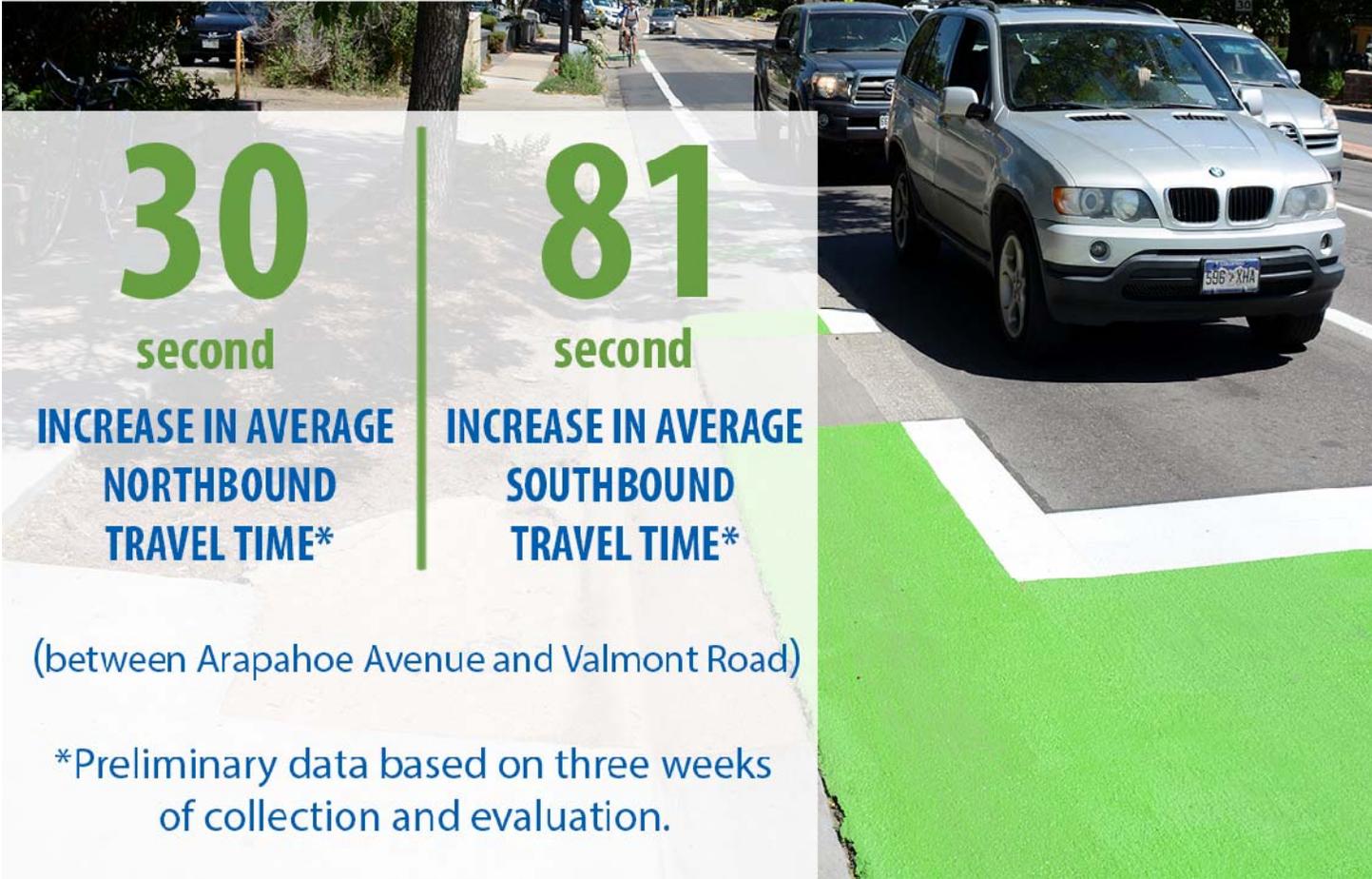
<i>Modeled</i>		4m 30s	4m 30s
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<i>Week 1-2</i>	<i>High</i>	6m 48s	8m 14s
	<i>Avg</i>	4m 15s	5m 36s
	<i>Low</i>	2m 40s	3m 53s

<i>Week 3</i>	<i>High</i>	5m 15s	5m 58s
	<i>Avg</i>	4m 02s	4m 41s
	<i>Low</i>	2m 49s	3m 35s

● Measured from Arapahoe to Valmont, 125 drive runs, weeks 1-3

www.BoulderLivingLab.net



30

second

**INCREASE IN AVERAGE
NORTHBOUND
TRAVEL TIME***

81

second

**INCREASE IN AVERAGE
SOUTHBOUND
TRAVEL TIME***

(between Arapahoe Avenue and Valmont Road)

*Preliminary data based on three weeks of collection and evaluation.

www.BoulderLivingLab.net



Most significant traffic congestion
has occurred along southbound
Folsom Street between Pine Street
and Canyon Boulevard from

4:45-5:45 p.m.

*Preliminary data based on three weeks
of collection and evaluation.

www.BoulderLivingLab.net



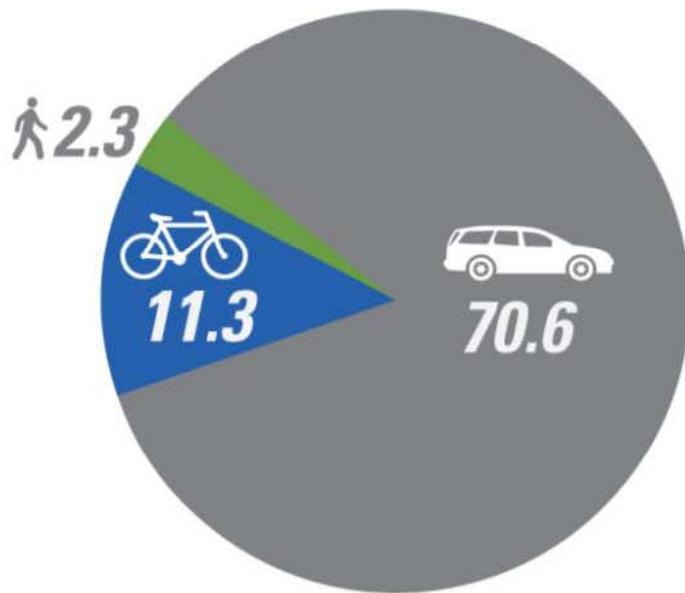
38%

**MORE BIKES ON
FOLSOM STREET***

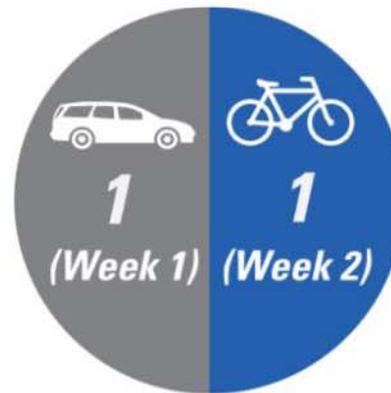
* Preliminary data based on three weeks of collection and evaluation.

“After” Safety Data: Collisions

Before (Average Per Year)



Week 1-2



Week 3



Before collisions are average collision frequency per year (2012-2014):
84.2 collisions per year, average 1.6 collisions per week



Feedback from Emergency Responders

- Fire and Police Departments – monitoring corridor, concerns:
 - Corridor/intersection congestion
 - Snow/ice maintenance will be important
 - Bikes riding on the sidewalk
 - Need to monitor response times and not expect vehicles to drive over bollards
 - More public information needed for how to interact with emergency response vehicles



Lessons Learned





Living Lab Phase II

Lessons Learned

- Public Outreach & Communications
 - Importance of traditional, digital, and social media
 - Need to be more proactive with messages and make info/data easier to find on web
 - More active public engagement early on
 - (1-2+ months more time needed in advance)
 - Recognize larger context of project among other community topics

Living Lab Phase II

Lessons Learned (cont.)

- Public Outreach & Communications
 - More information ready to go prior to installation (FAQs, project purpose, what to expect & when, information on the corridor elements, guides for motorists and bicyclists, evaluation criteria, share early results, etc)
 - Better ways to access and view information quickly (ex. installing camera on corridor for 24/7 viewing)
 - Vocabulary – word choice matters

Living Lab Phase II

Lessons Learned

- Installation

- Underestimated time needed for installation
- More frequent information updates during and post installation
- More quickly provide data on preliminary results
- More quickly respond to community's concerns regarding congestion and provide schedule for evaluation and adjustment

Living Lab Phase II

Lessons Learned

- Data collection, analysis, and reporting
 - Need to clearly communicate the “before” data collected and analyzed to determine the corridor recommendations
 - Information on data/analysis was lost in volume of materials to TAB & Council
 - Helpful to do national peer city design review

Living Lab Phase II

Lessons Learned (cont.)

- Data collection, analysis, and reporting
 - More data displayed on the website, before, during installation, and immediately after
 - Difference in travel time change compared with driver experience
 - Impacts of intersections/segments within overall corridor (ex. Pearl to Canyon)
 - Need to understand impact of mid-block pedestrian crossings



Living Lab Phase II Proposed Options



Living Lab Phase II - Proposed Options

1. Continue Living Lab Phase II project as planned with monthly check-ins with TAB and council with in-depth evaluation at 1, 3, 6, and 12 month milestones
2. Based on initial feedback and evaluation, refine/modify Folsom corridor and/or intersections, particularly in segment between Pearl and Canyon. Continue evaluation weekly, with more frequent updates to TAB and Council. Revisit Folsom in Fall 2015.
3. Make more substantial modifications to corridor/intersections, including the potential removal of individual segments.
4. Remove Folsom corridor Living Lab project.

TAB Feedback

- TAB members support Option 2
- Understand challenges and impacts
- Improve communications, simplify data,
- Living Lab links with larger TMP goals
- Context as a pilot project and experience will help improve Folsom and other potential projects
- Continue data collection and outreach
- Too soon to draw conclusions



Potential Next Steps





Operational Adjustments to Respond to Community Concerns

- Proceed based on feedback from City Council Study Session
 - If desired, continue data collection and community engagement to guide corridor operations refinements and modifications
 - Examples: signal timing/coordination, striping and bollard adjustments, mid-block crosswalk visibility, modify turn lane lengths, and bikelane transitions at intersections

Potential Timeline:

- August- Sept 2015
 - Continue technical evaluation and make additional adjustments and modifications to respond to community concerns, factoring in back-to-school conditions
 - Continue community engagement (business meetings, walk/bike/drive audits, on-line input, etc.)
 - Continue updates to TAB & City Council
- Oct - Nov. 2015
 - In-depth Evaluation Report to TAB, City Council, and community
- Nov - Dec 2015
 - Proceed per Council guidance from review of technical analysis and community input



Future Steps

- Living Lab projects for Iris and 63rd street corridors will not move forward until further direction from City Council
- For more information and updates on the Living Lab program, please see:
 - www.boulderlivinglab.net



Question for Council Feedback on Proposed Options





Question for Council:

- Does Council have feedback on the Complete Streets Living Lab Phase II program, including the Folsom Street corridor project?
 - Feedback on Proposed Options?

Living Lab Phase II - Proposed Options

1. Continue Living Lab Phase II project as planned with monthly check-ins with TAB and council with in-depth evaluation at 1, 3, 6, and 12 month milestones
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3. Make more substantial modifications to corridor/intersections, including the potential removal of individual segments.
4. Remove Folsom corridor Living Lab project.



TMP Next Steps

- Living Lab – based on council guidance:
 - Continue Community engagement & Evaluation
 - Public hearing in Sept.
 - AMPS Study Session Nov. 10
 - East Arapahoe Briefing Dec. 8, 2015
 - Next TMP Implementation Check-in Feb. 2016
- 