

**Boulder City Council
STUDY SESSION**

Televised

**Tuesday
August 25, 2015**

5:30-6:30 PM

Presentation

Boulder County Demographic Trends

6:30-7:30 PM

Briefing

Boulder Valley Comprehensive Plan (BVCP) Update

7:30-9 PM

Transportation Master Plan (TMP) Update

**Council Chambers
Municipal Building
1777 Broadway**

Submit Comments to City Council
Email: council@bouldercolorado.gov

or

Attention: Alisa Lewis, City Clerk
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STUDY SESSION MEMORANDUM

TO: Members of City Council

FROM: Jane S. Brautigam, City Manager
Maureen Rait, Executive Director of Public Works
Michael Gardner-Sweeney, Interim Director of Public Works for Transportation
Gerrit Slatter, Principal Transportation Projects Engineer
Greg Izzo, Public Works Maintenance Manager
Kathleen Bracke, GO Boulder Manager
Bill Cowern, Traffic Operations Engineer

DATE: August 25, 2015

SUBJECT: **Study Session on twelve-month TMP Implementation, including Complete Streets Living Lab Program, Transportation Maintenance, Capital Projects, and measurement/monitoring updates**

I. EXECUTIVE SUMMARY

The City of Boulder has a multimodal transportation system that serves as a model for many aspects of sustainable travel in the U.S. Boulder's Transportation Master Plan (TMP), outlines the vision for transportation and provides the policy and investment direction for achieving the community's access and mobility goals.

The 2014 TMP builds upon a strong multimodal policy foundation and continuing refinements to the existing system. The TMP includes a focus on "Complete Streets," with work programs centered on a variety of Bicycle and Pedestrian Innovations as well as the community's Renewed Vision for Transit. In August 2014, City Council approved the updated TMP, and work in 2015 and beyond is centered on implementing the TMP based on the **TMP Action Plan's** list of "immediate" action items for 2014 to 2016.

The TMP implementation continues to focus on an integrated approach, with partnerships across Transportation and with other city departments, and collaboration with local and regional community partners. The TMP implementation is being coordinated and integrated with the city's priority-based budgeting approach and capital investment strategies. The 2014 TMP update was developed through an extensive community engagement process and the spirit of ongoing community participation continues in all areas of TMP implementation. Please see www.BoulderTMP.net for more details.

This is the second study session reviewing the implementation of the 2014 TMP in the 12-month period since the plan was accepted by council. These six-month check-ins ensure that the TMP implementation remains consistent with the council's priorities and the city's efforts to promote long-term sustainability and resiliency.

Highlights of the second six months of Complete Streets related TMP implementation include:

- Living Lab Phase II Corridor Projects, including a one-month check-in on the Folsom Street pilot project;
- Progress on Maintenance Initiatives, reflecting additional funding in this area;
- Advancement of Capital Projects Implementation under the three-year bond funding approved by the voters in November 2011 and the sales tax reallocation in 2013;
- TMP Measurement and Monitoring Program update in advance of the development of the scheduled 2015 Transportation Report on Progress.

The Analysis section contains more information about these and other implementation actions, organized into areas seeking more in-depth input from council and a section providing general updates on ongoing efforts.

II. QUESTIONS FOR COUNCIL

1. Does council have feedback on the Complete Streets Living Lab Phase II program, including the Folsom Street corridor project?
2. Does council have comments on the recent changes in maintenance activities or the ongoing evaluation and transformation efforts?
3. Does council have questions or comments about the ongoing Transportation Capital Improvements Program (CIP)?
4. Does council have feedback on the TMP Measurement and Monitoring Program and suggestions for the development of the 2015 Transportation Report on Progress?

III. BACKGROUND

A. Transportation Master Plan (TMP)

The TMP is set within the broader context of the Boulder Valley Comprehensive Plan and supports the sustainability and quality-of-life goals set by the community. Boulder's TMP establishes the goals, policy guidance, and measurable objectives for operating and investing in the city's multimodal transportation system. In collaboration with local and regional partners and the Boulder community, the TMP focuses on creating a complete transportation system providing multiple travel options for increased person trips, managing traffic congestion, and reducing air pollution and noise. Boulder has achieved the prior TMP objective to maintain Vehicle Miles Traveled (VMT) at 1994 levels. However, the 2014 TMP contribution needed to meet the city's Climate Commitment goals, which is a 20 percent reduction in VMT by 2035.

The 2014 TMP includes an extensive **Action Plan** identifying priority work items. TMP implementation continues to focus on an integrated approach, with partnerships across Transportation and with other city departments, and collaboration with local and regional community partners. The TMP implementation is being coordinated and integrated with the city's priority-based budgeting approach and capital investment strategies.

The first City Council check-in was held at a **Feb. 25, 2015 study session**. This City Council Study Session reviews the implementation of the 2014 TMP in the year since the plan was accepted by council in August 2014, with a focus on the second six-month period. These periodic check-ins ensure that TMP implementation remains consistent with the council's priorities, remain integrated with other city planning efforts, and support the city's efforts to promote long-term sustainability and resiliency.

IV. ANALYSIS AND ISSUES

This section is organized into two sets of topics:

1. Items where staff is seeking comment and discussion from council; and
2. General updates on ongoing activities.

Implementation work continues in all TMP focus areas and on the vast majority of the near-term items identified in the **TMP Action Plan**. A brief summary of the work and progress to-date is provided in the two sections below for each of the five focus areas.

A. TMP Focus Area Progress: For Discussion

1. Complete Streets

The Complete Streets focus area strives to accommodate all modes of travel by planning, designing, building, and maintaining facilities for people walking, biking, riding transit, and driving. This focus area aims to develop the complete street systems needed to accommodate increased travel by enhancing options for biking, walking, and transit while reducing single-occupant vehicle (SOV) use.

a. Complete Streets "Living Laboratory" Projects

To achieve the TMP goals of improving access and safety for all roadway users, the Living Lab program tests new roadway designs through experimentation and collection of community feedback. By fine-tuning the system, the goal is to enhance the user experience by creating a more safe and comfortable corridor for people using all modes of transportation.

The Living Lab has been deployed in two phases of pilot projects, with qualitative and quantitative analysis, including extensive community feedback used to evaluate the potential for long-term application in Boulder. Evaluation of the Phase I projects is ongoing and will be completed this summer. In September 2015, staff will present a draft Phase I evaluation report for consideration by the Transportation Advisory Board (TAB) with a report to council in October. This report will provide recommendations for the next steps for the installed Phase I experiments. Experience from the Phase I projects continues to inform implementation of the Phase II projects.

Phase II of the Living Lab pilot projects is intended to test and evaluate whether repurposing vehicle lanes on some streets will enhance travel safety and multimodal accessibility. In June,

City Council supported the installation of three pilot projects that include the temporary repurposing of vehicle lanes along three roadway segments:

- Folsom Street from Valmont Road to Canyon Boulevard;
- Iris Avenue from Folsom Street to Broadway; and
- 63rd Street from Lookout Road to Gunbarrel Road/Nautilus Drive.

City Council also considered a fourth proposal to repurpose vehicle lanes along 55th Street between Pearl Parkway and Arapahoe Avenue and decided to put that project on hold. The city began installation of the Folsom Street corridor project in mid-July and is currently evaluating the results and receiving community feedback. None of the other corridors are moving forward at this point pending additional community feedback, evaluation and council direction.

i. Public Process

The Living Lab Phase II pilot project along Folsom Street has generated considerable community interest and differences in opinion regarding project benefits, needs, and impacts. User experience is a vital component of the Living Lab evaluation process. The city encourages feedback from residents, bicyclists, pedestrians and motorists on the impacts – positive, neutral or negative – that this project has on the ability to get around Boulder. Community input, along with the technical analyses, will be used to determine whether these types of street treatments are an effective way to help the community achieve its goals for safer streets and a more sustainable transportation system.

A variety of strategies are being used to collect community feedback on the Living Lab projects. The community can share their perspective by participating in a walk, bike or drive audit of the projects; contacting staff, TAB, and City Council; attending a public meeting; sharing input on the Inspire Boulder digital town hall; uploading a comment and/or photo on Commonplace; or using the #BldrLivingLab hashtag on social media.

Staff has compiled frequently asked questions (FAQs) about the Phase II of Living Lab program, which are posted at www.BoulderLivingLab.net along with other project materials, including a schedule of related events and additional opportunities to provide input. The Transportation Division will continue to update the list of questions and responses based on community feedback throughout Phase II. City staff is following up on specific concerns that have been observed (such as lines of cars backed up at left-turn lanes that block through traffic during peak travel times) to determine whether improvements are needed to address these issues.

In response to business concerns along Folsom Street, staff is meeting with business owners and providing public meetings to focus on concerns from the business community.

ii. Public Input

Since May, the city has received more than 1,300 comments from email, Inspire Boulder, Inquire Boulder, social media, and phone calls. Staff is also keeping track of the Daily Camera articles, guest opinions, and letters to the editor.

Since mid-June, approximately 600 comments have been collected and reviewed by staff. Of these comments, 240 originated before installation and an additional 360 comments have been

received during and after installation of the Folsom Street corridor project. The comments to-date have been polarized, demonstrating either support or opposition to the project. Among the various means of communication, social media has generated more supportive comments toward the project while other more traditional means of communications, such as email and phone calls have been more opposed. The majority of opposed comments express concern with auto congestion, and the majority of supportive comments express increased safety and improvements for bicycling.

On Aug. 10, TAB received a briefing on the initial evaluation of the Folsom Street project. Prior to the item, approximately 12 members of the community provided comments on the project during the general public comment period at the start of the meeting. Again, there was a range of comments both supporting and opposing the project. Below is a summary of the major points made in the community feedback:

Opposed:

- Increased traffic congestion
- Traffic diversion onto side streets
- Vehicle delays turning off and on to Folsom Street
- Negative effect on businesses
- Flexible bollards make road confusing and hard to negotiate
- See very few bicyclists using the corridor
- New treatments are not aesthetically pleasing
- Some drivers and bicyclists don't feel safer
- Some concern this project pits motorists against bicyclists.
- Concern that with recent development and perceptions regarding associated community impacts, there is limited public interest and capacity for additional change at this time; staff didn't consider the larger context
- City should be spending transportation funds on maintaining the system (pavement repairs benefit all users)

Supportive:

- Improved bicycle safety and comfort
- Now using facility with children
- Primary bicycle route connecting North Boulder with Boulder Creek
- Not experiencing major vehicle delays
- Slower vehicle speeds
- Cars not drifting into bike lane north of Pine

Neutral:

- Need for more data, too early to know actual results
- Data collected after implementation is not statistically valid
- Need more information and time before making decision

iii. Preliminary Evaluation

Staff has prepared an evaluation matrix and data summary for the Folsom Street corridor in **Attachment A**, that provides information on the data collected before project installation and new data that has and will continue to be collected after and throughout the duration of the

experiment. Due to the community concerns arising with the installation of the Folsom Street project, staff immediately began collecting “after” data beginning the week of July 27. This preliminary evaluation provides results on the immediate changes in travel operations along Folsom during weeks 1 through 3, and provides initial comparisons with the “before” data, as well as with the projected traffic data staff developed during the planning phase of the project. Staff recognizes that it is still early days for the Folsom Street project and that more time and data collection is needed before the results will be substantial enough to draw conclusions from – however, this initial data provides an opportunity to identify areas of the corridor that could benefit from minor adjustments and refinements to improve operations and address community concerns. Ongoing data collection and monitoring will provide additional data points and trends that then can be used to provide a more in-depth, comprehensive analysis of the corridor project and be the basis for future modifications to address any continuing operational concerns.

Based on national examples, these types of projects generally mature or normalize over a period of 12 to 18 months and at that point provide consistency regarding trends in data.

Staff began collecting preliminary data the week of July 27 during the morning, afternoon, and evening peak periods. Preliminary evaluation is focused on the following criteria:

- Motor vehicle speed and volume
- Motor vehicle corridor travel times
- Collision history (safety)
- Bicycle volume
- Emergency response

Below is a list of observations based upon the first three weeks of data that was collected following the installation of the Folsom project. **Attachment B.** provides a detailed breakdown of all of the preliminary data collected to-date, and **Attachment C.** consists of an infographic that simplifies the comparison of the before and after data.

Motor vehicle volume and speed

Staff has collected motor volume and 85th percentile speed* along the Folsom Street corridor, which has a posted speed limit of 30 mph.

Weeks 1-2

- A reduction of approximately 3,000 vehicles per day occurred north of Canyon Boulevard between June 2015 and August 2015.
- The 85th percentile speed* decreased from 39 to 37 mph north of Bluff Street.

Week 3

- A reduction of approximately 2,490 vehicles per day occurred north of Canyon Boulevard between June 2015 and August 2015.
- The 85th percentile speed* decrease remained the same from 39 to 37 mph north of Bluff Street.

* *The 85th percentile speed is the speed at which 85 percent of the drivers are driving that speed or less.*

Motor vehicle corridor travel times

Staff and consultants have performed 125 corridor travel runs, during peak times of day, following the installation of the project. Below are the preliminary results:

Weeks 1-2

- Northbound A.M. peak: Average travel time has increased by 14 seconds from before conditions.
- Northbound P.M. peak: Average travel time has increased by 43 seconds from before conditions.
- Southbound A.M. peak: Average travel time has increased by 20 seconds from before conditions. .
- Southbound P.M. peak: Average travel time has increased by 136 seconds from before conditions.

Week 3:

- Northbound A.M. peak: Average travel time has increased by 13 seconds from before conditions.
- Northbound P.M. peak: Average travel time has increased by 30 seconds from before conditions.
- Southbound A.M. peak: Average travel time has increased by 2 seconds from before conditions.
- Southbound P.M. peak: Average travel time has increased by 81 seconds from before conditions.

Additional observations:

- Travel time varies along the corridor by time of day and direction of travel, with the more pronounced delays in the 5:00 – 5:30 p.m. period – creating the “peak of the peak”.
- The Walnut Street and Spruce Street mid-block bike/pedestrian crossings are having a greater than anticipated impact on northbound P.M. peak average travel times.

Safety (Crash Data)

The average collision frequency is roughly 84 per year. Eleven of those crashes involve bicycles and two of those collisions involve pedestrians. Fortunately, no fatalities have occurred in the last three years; however, approximately one person per year is seriously injured in a collision on the Folsom corridor.

Since the installation of the project, three collisions have occurred along the corridor resulting in no serious injuries:

- Week 1: One collision - vehicle vs. vehicle at the intersection of Valmont Road at Folsom Street

- Week 2: One collision – vehicle vs. bicycle – north of South Street at Folsom Street – Vehicle failure to yield to southbound cyclist.
- Week 3: One collision – vehicle vs. vehicle – northbound Folsom Street at Canyon Blvd. – Sideswipe.

Bicycle Volume

Bicycle volume was collected prior to the project installation on June 30th at two locations on Folsom Street: north of Pine Street and south of South Street. Additionally, an automated bicycle count station was installed on Folsom Street south of Arapahoe Avenue and has been operating since 2012. During the installation of the project, two additional automated bicycle count stations were installed along the corridor in both north and southbound directions: north of Pine Street and south of South Street*.

North of Pine Street (both directions)

- Before Data: 877 (one data point)
- After Data: 1207 (daily (weekday) average)

South of South Street (both directions)

- Before Data: 777 (one data point)
- After Data: 1016 (daily (weekday) average)

South of Arapahoe Avenue (both directions)

- Before Data: 1076 (daily (weekday) average)
- After Data: 1129 (daily (weekday))

* Validation of counters is currently in progress. Volumes may be adjusted to account for potential variances, i.e. some types of bicycles may not be counted due to frame material and/or bicyclists riding two abreast.

The City of Boulder has created an online public viewing format to access the bicycle volume data at any point in time. The data can be viewed at the following URL web address:

<http://www.eco-public.com/ParcPublic/?id=699>.

Emergency Response

Transportation staff has been coordinating with the Boulder Police Department and Boulder Valley Fire Department. While it is too soon to determine if the new configuration will have an

effect on the operation of overall emergency services, the Boulder Police Department and Boulder Valley Fire Department has offered the following comments:

- Corridor/intersection vehicle congestion concerns.
- Driver behavior when turning at driveways or intersections.
- The maintenance of snow and ice from the roadway and protected bike lane will be important for public safety.
- Few bikes seen riding the corridor, some instances of bicycles on sidewalks.
- Will monitor response times.
- Drivers are not expected to run over flexible delineators.
- Drivers appear uncertain where to go when emergency vehicles enter this section of Folsom

Staff will continue to coordinate with emergency responders to identify and address concerns that arise over time. Additional evaluation data, including multimodal criteria such as transit ridership, bicycle demographics, and pedestrian crossing counts are being collected as part of the evaluation process. Details about additional evaluation criteria and the collection time periods for each can be found at www.BoulderLivingLab.net.

iv. Lessons Learned

The Folsom Street project is the first corridor demonstration pilot project with the city's new Living Lab program and was implemented under an "enhanced and focused" public process. Preparations for the Phase II Living Lab projects recognized that the potential tradeoffs of these projects would be controversial but the recent experience suggests that the project was implemented too quickly and the staff and community could have benefited by having more time to share information prior to installation. Additional analysis was also needed to recognize the limitations within the existing street geometrics and to identify the existing problems with left turns. In evaluating the implementation of the Folsom Street project, staff believes the following "lessons learned" are helpful and constructive to improve the Living Lab Phase II project on Folsom as well as any future projects.

Public Outreach and Communications

Staff recognizes the importance of utilizing both traditional modes of communication and social media and the need to be more proactive with messages while making information and data easier to find on the project website. More time was needed for the community outreach process, including a minimum of one to two months of time needed in advance of project implementation.

Staff needs to have more information ready to go prior to installation of the project, such as project purpose, what to expect and when, information on the corridor elements, evaluation plan/criteria, FAQs, etc. Additionally, staff needs to provide better ways to access and view information quickly such as having a camera installed on the corridor for 24/7 viewing, which is now planned for installation at the Folsom and Canyon intersection.

Staff also needs to carefully consider the vocabulary used as word choice matters. While "rightsizing" is widely used in the transportation field, it had negative connotations and is value laden.

Installation

Staff underestimated the time and complexity needed for the install process which created extended impacts to the traveling public. Staff needs to have more information available for the community to view during the install process. Staff also needs to provide more frequent updates during the installation process as well as provide data on preliminary results to the community in a more timely fashion. When responding to the community's immediate concerns regarding traffic congestion, staff should provide a schedule for evaluation and a plan for adjustment in order to address identified problems.

Data Collection, Analysis and Reporting

While extensive "before" data was collected and analyzed to determine the project design and installation recommendations, these were not clearly communicated to the community. The important and key information on data and analysis was lost in the volume of materials provided to TAB and council. A significant contribution to the project was the National Association of City Officials (NACTO) peer city design review which provided practical experience and advice; however, this information was not provided to the community and should have been shared in more detail. More data should be displayed on the website, including data from before, during, and immediately after installation, and staff recognizes the difference in actual travel time change compared with driver experience. In addition, the impact of the mid-block pedestrian crossings has been greater than modeled, so this needs to be understood and addressed for the Folsom corridor as well as factored into modeling for future projects.

v. Project Options

Based upon the early data and community comments, staff has developed the following potential options for council feedback: (these options were shared with TAB at the Aug.10 meeting)

1. Continue Living Lab Phase II project as planned with monthly check-ins with TAB and council with in-depth evaluation at one-, three-, six-, and 12-month milestones
2. Based on initial feedback and evaluation, refine/modify Folsom corridor and/or intersections, particularly in the 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

Individual TAB members generally supported option two and agreed that improved communication is needed about the project and its data. TAB stressed the need for additional data and analysis prior to making any decisions affecting the Folsom Street project.

Additional comments from TAB members are summarized below:

- TAB realizes the first month for this type of project is difficult and impacts the community.

- Simplify the Folsom Street data “infographic” when disseminating to the community, particularly making it easier to see specific measures via social media.
- Frame the discussion of the lane repurposing project in the context of the TMP goals.
- Important to remind people that this project is an experiment and will help identify opportunities to improve Folsom Street and for potential future projects.
- Communicate data clearly.
- TAB agreed with staff’s “lessons learned.”
- The body of research supporting this type of project is heavy and should be applied to how it is working – or not— for the Boulder community.
- Continue to foster communication and collect feedback from the business community.
- The traffic modeling software has presented some reliability concerns in terms of accuracy; however, the predicted corridor average travel times were not far off.
- Performing a Green House Gas (GHG) analysis of the corridor would be helpful.
- TAB would like to understand more regarding staff’s future outreach plans concerning the Folsom corridor.
- The city of Austin report does a great job illustrating the benefits and challenges associated with these types of corridor projects. Learn more from their experience.
- Continue to collect more data points during the experiment.
- Too soon to draw any conclusions from the preliminary data. Need to collect more data before making any substantial changes to the corridor.

vi. Living Lab Phase II Next Steps

City staff will continue to evaluate and assess the Folsom Street corridor and will be working to improve communications about the project to the community. This effort will include installing a video camera for 24/7 public viewing of the corridor, providing more frequent updates and data results on the project website, and conducting outreach to the businesses along the corridor. Staff will continue to provide updates to TAB. Staff will continue to post community feedback, field observations, and travel data on the Folsom Street Living Lab to the project **website: www.boulderlivinglab.net**. The other Living Lab corridors are not moving forward at this time pending additional community feedback, outreach and council direction.

b. Maintenance Initiatives

Since the 1996 TMP, providing a safe and well maintained multimodal transportation system has been the first investment priority of the TMP. Reflecting this priority and the analysis conducted as part of the transportation funding work, additional funding has been directed toward transportation maintenance activities. In November 2013, the Boulder voters passed a transportation tax to help fund deferred transportation maintenance and some key multimodal improvements which are reflected in the current and proposed Capital Improvements Program (CIP). In November 2013, Boulder voters passed two ballot measures which dedicated additional sales tax revenues for transportation maintenance and operations through 2029. This additional sales tax included approximately \$1.6 million annually for street pavement maintenance, and \$800,000 per year for major capital construction and maintenance (which address operational and/or functional deficiencies with existing multimodal facilities).

Public Works Transportation staff is coordinating to address maintenance operations for Living Lab projects. Prior experience with the protected bike lanes on University Avenue, as part of Phase I of the Living Lab program, created new insights on how to remove snow, ice, and debris from the roadway, including the protected bike lanes. Staff is also exploring new strategies, technology, and equipment for maintaining the new facilities based upon research from peer communities regionally and nationally. Transportation Maintenance has recently visited other cities who share similar experiences with maintenance of protected bike facilities.

i. Pavement Management progress report

The Transportation Division has established a Pavement Management Program (PMP) for Boulder's 300-mile street system, which includes inspecting and rating all streets on a three-year interval to maintain awareness of existing conditions and guide where pavement repairs will be made in future years. The goal of the PMP is to identify the optimal level of funding, timing, and renewal strategies that will keep the roadway network at or above a "Good" Overall Condition Index (OCI) rating, for average OCI rating of 75 to 80 for all streets in Boulder. The additional transportation funding provided by the 2011 Bond and 2013 sales tax ballot initiatives have supported progress toward meeting the city's PMP objective. The city's goal of a 75 to 80 OCI is consistent with other communities in the Denver metro area. The average OCI rating for City of Boulder roadways is currently 76.5. However, it is still early in the implementation of the PMP and much work remains to be completed. Updated results of the PMP will be included in the ***Transportation Report on Progress*** that will be released early this winter.

ii. Asset Management System Expansion efforts

The Transportation Division will also be expanding its Asset Management Program to include condition assessments on smaller structures and features such as underpasses, retaining walls, and wing walls. This inventory will help prioritize spending for the Major Capital Reconstruction budget which was created in 2015 due to the 2013 Transportation Revenues ballot items passage. This conditions assessment will begin in late 2015 and continue through 2016.

iii. Snow and Ice Control Study progress report

Recent year snow season accumulations have placed a strain on existing staffing resources, vehicles, and equipment in order to maintain current levels of service and have exposed some vulnerabilities in staffing and equipment resources. Public Works is currently conducting a comprehensive review of its Snow and Ice Control Program. The project will include a third party review by experts who will focus on identifying operational efficiencies including snow/ice control program management, fleet and equipment expertise, snow/ice control field operations, vehicle routing analysis and other supporting technologies. The study will review/evaluate, make recommendations, and provide alternative investment strategies that meet the city's short- and long-term goals of improving and potentially expanding the City of Boulder Snow/Ice Control Program.

Early implementation of study results will enable the city to immediately make adjustments and changes to its current operations. Some examples of study results from the third party review that will be implemented as part of the upcoming snow season will include:

- Enhanced reporting –Real time information will be used to guide performance for snow removal operations. Metrics will include input, output and outcome measures for control of process and level of service continuity across the city.
- Route optimization – The review is currently analyzing snow routes for optimal routing capability using GIS and applied routing technology. Initial findings and results are not expected until late August, 2015 however an unbalance in routing has already been identified through initial findings and will be corrected. Other findings will be applied to upcoming snow season.
- Snow response – Immediate adjustments to staffing assignments and snow shift scheduling will result in a more pro-active response to winter weather events, and allow for predictability and an improved work/life balance for the Operators.
- Adjustment of fleet resources including a reduction in equipment size to accommodate Ling Labs projects that alter the use and configuration of traffic/channelization on select city streets.

TAB Feedback

TAB members were supportive of the outside evaluation efforts and quick win strategies to improve the city’s maintenance efforts. Members particularly supported the need to meet community expectations around snow removal, both on roadways and at transit stops.

c. Capital Projects Implementation

The annual transportation Capital Improvements Program (CIP) is approved by Council and supported from a number of funding sources. As illustrated in the CIP projects described below, the CIP supports improvements for all modes of travel. More details on these projects are available on the **Transportation Projects Web** page.

i. Recently Completed or CIP Projects

Foothills/Valmont Operational Improvements Project – This safety improvement and congestion reduction project was completed in early July and extended the third southbound lane from the Diagonal Hwy on-ramp to the Pearl Street off-ramp. The **Foothills Parkway Operational Improvements** also included re-construction of the northwest and southwest corners including new signal poles and pedestrian crossings, and the addition of transit stop amenities to the westbound Valmont bus stop. The estimated vehicular delay reduction is calculated at 100 hours for each weekday. Project funding totaled \$900,000 which included Transportation Improvements Program (TIP) funds from the Denver Regional Council of Governments (DRCOG), leveraging city and state funds with federal transportation funds.

Diagonal Highway (28th/Independence Road) Transportation Improvements Project – Construction of this project began in August and includes pavement reconstruction, provision of continuous bicycle and pedestrian facilities, transit stop enhancements, storm drainage, water quality features, over 300 new trees and other new landscaping and irrigation systems, and public art. Completion is anticipated for fall 2016. The \$9 million project leverages city transportation funds with federal and state funds including TIP and Responsible Acceleration of Maintenance and Partnerships (RAMP) grants.

28th Street (Iris-Yarmouth) Bicycle and Pedestrian Improvements Project – Construction of this \$2.3 million project began in August and will be substantially complete by the end of 2015 with final landscaping to occur in spring 2016. The project will construct a multi-use path on the west side of 28th Street/US 36 from Iris Avenue to Fourmile Canyon Creek, new pedestrian/bicycle bridge over Fourmile Canyon Creek, provision of a continuous on-street bicycle facility from Iris Avenue to Yarmouth Avenue and trees, landscaping and public art. This project improves connectivity between north and central Boulder and to the Wonderland Creek trail. Construction coordination between this project and the upcoming Wonderland Creek Greenways Project from 28th Street to Foothills Parkway will take place throughout the construction periods.

Baseline Road Underpass Project – Construction of this \$5.4 million project is anticipated to begin in the fall of 2015 and take one year to complete pending negotiations with the Colorado Department of Transportation (CDOT). This safety and bike/pedestrian connectivity project includes replacement of the existing pedestrian signal with a grade separated underpass at a highly utilized bicycle and pedestrian crossing location. The project also includes connections to existing bicycle and pedestrian facilities, a multi-use path on the east side of Broadway south of Baseline Road, median reconstruction, new landscaping, and street overlay. This project is also funded with state, federal and transportation funds.

Transit Stop Improvements – This project is supported by city and Funding Advancements for Surface Transportation and Economic Recovery Act (FASTER) funds. Construction of this project will begin in September 2015 and will be completed in early 2016. The project includes various levels of improvements to more than 25 bus stops in Boulder ranging from bus stop pads to benches, bike racks and other amenities. This project supports ease of access to transit which is part of the Renewed Vision for Transit of the 2014 TMP.

ii. Projects in planning – Canyon Complete Street, 30th Street, Colorado Avenue and East Arapahoe

To advance the TMP goals for Complete Streets, three corridor studies have been identified and funded in the city's Capital Improvements Program (CIP). These corridor studies will develop a vision, identify a set of prioritized projects and address issues to provide complete streets along the Canyon, East Arapahoe and 30th Street/Colorado corridors. The Canyon Complete Streets Study will begin in September 2015 and take one year to complete and will be in coordination with the Civic Area master planning work, East Arapahoe Transportation Study findings and other nearby projects.

The 30th and Colorado Corridors Study will begin in late 2015/early 2016 and will be conducted in coordination with the design of the 2016-2021 TIP funded 30th and Colorado Underpass Project. The East Arapahoe Transportation Plan and the closely related SH 7 Study are described in the Regional Focus Area below.

TAB Feedback

TAB members were supportive of the scope and variety of the capital projects underway. Several members were particularly impressed with the amount of leveraging of local dollars represented in the projects and suggested that this be totaled and highlighted in future materials.

2. TMP Measurement and Monitoring

The TMP places a high priority on measurable objectives and tracking performance toward accomplishing the community's transportation goals. These are reported every other year in the ***Transportation Report on Progress*** while a variety of materials are on the **Transportation Metrics Web** page. Brief summaries of the different metrics areas are presented below while graphs and a more detailed discussion are contained in **Attachment B**.

a. TMP Measurable Objectives:

Performance of the city's multimodal street system is evaluated using numerous different measures including traffic volumes, peak hour intersection level of service, travel time data collected on arterial roadways as well as measures regarding bicycle, pedestrian, and transit. Bike counts are collected at 25 on- and off-street locations and an annual bike parking survey is conducted for the downtown area. The Boulder Valley Employee Survey is one of two primary surveys of travel behavior conducted since 1990 while the Downtown Employee Survey has been conducted every three years since 1995.

b. Vehicle Counts

Traffic volume data is collected by three annual count programs: the Arterial Count Program, Boulder Valley Count Program, and Turning Movement Count Program. The results of the roadway system evaluation indicate that traffic conditions and operational performance have remained relatively stable over the past 10 years. Traffic volumes on the city's arterial roadways have generally decreased over time despite the growth in population and employment. 10-year traffic count volumes from the Arterial Count Program shows that, on average, traffic volumes on the city's arterial roadways have been decreasing by approximately 1.1 percent annually. The Level of Service (LOS) evaluation and travel time studies show similar patterns, as vehicle delay and travel times have not increased in recent years. The percentage of intersections at overall LOS E or F has remained around 19-21 percent during the last several LOS updates but dropped to 11 percent in the 2015 report. Travel times on the six arterial corridors measured have remained relatively steady over the past 10 years.

c. Bike Counts

Since 2007 bicycle parking data has been collected and analyzed for downtown Boulder. During the period of the downtown bike parking counts, bike parking has gone up significantly and this increase has largely been accommodated through a roughly 80 percent increase in bike parking racks.

Since 1996, the city began installing a set of automated bike count stations. Including several stations operated by the Colorado Department of Transportation (CDOT), there are currently 25 bike count locations in the Boulder Valley, including three on-street stations and 22 counters on bike path locations. The city's automated bike count data has been the subject of several academic research projects, including an effort to predict annual bike ridership from limited data and a study of weather factors affecting bike ridership. Over the period of automated bike counts, there has not been a significant increase in bike counts. This is not consistent with the increase in resident bike mode share shown in the Boulder Valley Employee Survey, where bike mode share has increased from 13 percent in 2001 to 18 percent in 2014. This might reflect the location of

the count stations, which might be counting older parts of the bike system while recent improvements have made other routes or corridors more attractive.

d. Surveys

With the 1989 TMP's call for a better understanding of travel in the Boulder Valley, two primary surveys were created to measure travel: the travel diary survey producing the *Mode Shift Report* to measure how Boulder residents travel and the *Boulder Valley Employee Survey* (BVES) to measure travel by both resident and non-resident employees in the Boulder Valley. As more than half of Boulder employees commute in from outside the Boulder Valley, trips by non-residents are a large share of the travel puzzle. The 2014 BVES shows continued progress in reducing the single-occupancy vehicle (SOV) mode share of the work commute. From 1991 to 2014, SOV mode share for Boulder Valley employees commute trips declined from 73 percent to 67.8 percent. The Executive Summary of the 2014 BVES is included in **Attachment C**. For the Downtown Employee Transportation Survey, SOV mode share for the day of the survey was 43 percent in 2014, unchanged from 2011. Comparable surveys were conducted for University of Colorado (CU) faculty and staff, Boulder Valley School District faculty and staff, and City of Boulder employees. Results for all five groups are included in the comparison report available on the city's **Transportation Use Measurements** Web page.

The travel diary survey is scheduled for the fall of 2015 and preparations are underway by staff and consultants. The 2015 survey will be conducted using paper travel logs as in the past but will also pilot a smart phone version of the survey. The city held an RFP process and has contracted with DV mobile of Denver to develop the first iteration of a smart phone app for the travel diary survey. The app is being developed to allow for enhancement and data collection in a number of upcoming events, including Winter Bike to Work day and Bike to Work month.

e. TMP Measurable Objectives

The 2014 TMP modified the plan's existing measurable objectives by expanding the number from six to nine and continues the Transportation Metrics program of reporting the results of our efforts to the community. Relative to the TMP measurable objectives, the recent LOS report shows a significant improvement and that the system is well under the "no more than 20 percent congested" TMP objective. Continued reduction in the resident SOV mode share for the work commute will contribute to meeting the TMP objective of a "20 percent SOV mode share" for all trips and a "20 percent reduction in resident per-capita vehicle mileage traveled (VMT). The lack of SOV mode share reduction for non-resident employees confirms the identified challenge of affecting mode shift in these trips. As part of this program, both the *Safe Streets Boulder* and *Transportation Report on Progress* are scheduled to be updated in 2015 and will provide a comprehensive report to the community of progress in these areas.

The three new objectives relate to increasing safety, increasing the share of residents living in complete "15 minute" walkable neighborhoods, and reducing resident and non-resident per capita VMT.

i. Safety

While the first *Safe Streets Boulder* report was produced in 2012, safety was not a TMP objective until the 2014 TMP. The Vision Zero strategy adopted as a TMP objective has been

adopted by a number of cities across the world and was recently promoted by the U.S. Department of Transportation in the Mayors' Challenge for Safer People, Safer Streets. The city is participating in this challenge and staff has begun the process of updating and expanding our accident analysis to include accidents for all modes of transportation. The proposed metrics for the TMP safety objective are:

- Total crashes, fatalities, and serious injuries
- Total bike crashes, fatalities, and serious injuries
- Total pedestrian crashes, fatalities, and serious injuries

In order to work toward achieving our TMP safety goal, the *Safe Streets Boulder Report* will review and analyze bike, pedestrian, and motor vehicle crashes. The report will provide a more detailed look into crash trends and how they can be mitigated and will evaluate:

- Injury severities
- Crashes vs. mode share and/or miles traveled
- Locations of crashes (intersection, driveway access, parking lot, crosswalk, etc.)
- Citations and driver actions
- Demographics of persons involved in crashes
- Crashes by time of day, day of week, and month of year
- Crash types
- High crash locations

ii. 15 Minute Neighborhoods

The 15 minute neighborhood access tool developed as part of the TMP process is being developed into a Web based tool that will be useful to a broader set of city staff and potentially the community. Staff and consultants have been working with the city's Information Technology (IT) department to address security and compatibility concerns. A scope of work has been defined and approved by IT and development work should be completed by the end of August.

iii. Per Capita Vehicle Miles of Traffic

Developing an objective for VMT per capita provides residents and employees with a goal that resonates on a more personal level and allows a connection between their day-to-day travel choices and overall community goals. To achieve a 20 percent reduction in VMT from current levels, daily VMT needs to be reduced to 7.3 miles for residents for all trips and to 11.4 miles (one-way work trip) for non-resident employees.

According to the 2012 Modal Shift Report the average VMT per capita for Boulder residents is 11.2 miles. According to the 2011 BVES, the average VMT per capita for work trips (one-way) by non-resident employees is 15.3 miles, an increase from the 14.4 miles reported as part of the TMP.

TAB Feedback

Given the late hour, TAB had little comment on this item but looks forward to the revised *Transportation Report on Progress* toward the end of the year.

B. TMP Focus Area Progress: General Updates

The following material provides updates on the ongoing TMP implementation activities in each of the focus areas. Many of these areas were covered in more detail in the **Feb. 25, 2015 study session packet**.

1. Complete Streets Focus Area

a. Bicycle and Pedestrian Innovations

This element of the Complete Streets focus area seeks to broaden the safety and appeal of bicycling and walking in Boulder. An emphasis is placed on fine-tuning the existing system through targeted enhancements to support a broad range of cyclists and pedestrians of all ages and abilities. Engineering improvements coupled with strategies to encourage, educate, enforce and evaluate bicycling and walking are the “Five E’s” that comprise a comprehensive approach to increasing walk and bike mode share.

i. Cycling and Walking Programs

Enhancing programmatic efforts to create a culture of cycling and walking as realistic options for getting around town for all types of people is a priority for meeting our transportation, sustainability, and Climate Commitment goals. The city has made progress on introducing and expanding programs to educate and enforce the rules of the road and path, as well as encouraging and increasing the safety and appeal of walking and bicycling for daily travel. These efforts aim to foster a bike culture in Boulder going beyond sport cycling and to build a coalition of community-based organizations supporting walk-friendly community design. Program highlights include:

ii. Boulder Walks Program

As a designated **Gold-Level Walk Friendly Community**, Boulder is a place where walking is generally both desirable and enjoyable. The Boulder Walks program aims to celebrate and encourage walking as a travel choice for residents and employees. In partnership with the Colorado-based **Walk2Connect**, Boulder Walks launched a free walking program in 2015 providing opportunities for neighbors to connect with one another and with their neighborhood. A Boulder Walks Meet Up group launched this spring has more than 150 members. A total of 48 community members participated in one of 13 community walks hosted in May. Visit **BoulderWalks.org** for more information and a schedule of upcoming walk events.

In March 2015, the Youth Opportunities Advisory Board (YOAB), GO Boulder, and the Downtown and University Hill Management Division/Parking Services (DUHMD/PS) conducted a Walk Audit of the University Hill commercial district. The Audit was a valuable experience and helped identify areas of interest to youth on the Hill as well as places for improving connectivity, accessibility, and quality of the pedestrian environment.

iii. Walk & Bike Month

This is the primary celebration of Boulder’s unique and nationally recognized bicycling and pedestrian culture. Walk & Bike Month includes a diverse list of more than 75 free events for adults and children alike, including mountain bike rides, running races, scavenger hunts, historical bike tours, hikes and more. Bike to Work Day 2015, held on June 25 encouraged an

estimated 8,100 participants to ride all or part of the way to work. The event was also widely covered in print and social media, with 15 newspaper articles and more than 32,000 e-newsletter views.

iv. . Heads Up Mind the Crosswalk

The 2015 campaign is funded by a federal grant and is a partnership among the city's Transportation and Police Departments, CU-Boulder Transportation and Police Departments and the cycling community. Education and outreach activities began in May 2015 to raise awareness of crosswalk related ordinances. These efforts support heightened enforcement activities during the weeks of July 20 through July 25 and Sept. 7 through Sept. 12, 2015 at top accident locations in an effort to reduce traffic related injuries and fatalities. The city has been awarded a FY16 OTS grant program that will expand the program to include restorative justice and ticket diversion activities.

v.. Love to Ride Boulder

A fun and free competition to encourage more people to ride bikes, Love to Ride will introduce the Boulder Bike Challenge in September 2015. Organizations and individuals from across the region are invited to sign up at www.lovetoride.net/boulder, ride for 10 minutes or more, log rides, and encourage friends and colleagues to participate. The organization with the highest percentage of team involvement will win prizes and there are also incentives and spot prizes along the way to encourage individual participation.

vi. The Way of the Path!

Introduced in fall 2014, the Way of the Path! campaign is designed to improve the safety and experience of people using the city's multi-use paths. Throughout the summer and fall, path users are asked to pledge to follow path rules and etiquette in order to ensure a safe and courteous atmosphere for everyone. Participants will receive weekly blog posts with tips on the rules of the path, a survey and be entered in a random prize drawing. More than 330 people have participated and many voiced appreciation for the campaign. This fall, the campaign will be repeated and expanded to include social media, advertisements and Karma cards along with incentives.

vii. Paint the Pavement

To encourage community building and public art as a means to transform roadway public space into neighborhood assets, Paint the Pavement is a city program that allows mural painting on public streets. Neighborhoods interested in pursuing a Paint the Pavement project submit an application to obtain city approval and authorization to deem the mural art rather than graffiti. The mural is installed as part of a Block Party event. The neighborhood applicant is responsible for maintenance of the mural.

To date, Paint the Pavement projects have been installed in three neighborhoods. The city is reviewing designs submitted by the North Boulder Arts District to install murals on sidewalks along North Broadway. The Arts Commission will consider the designs in the August program. Should the city and the Commission approve the proposal; the designs will be installed in September 2015.

A survey of existing neighborhoods will be conducted this fall to gather community feedback on the existing murals. This will help guide future programs and initiatives.

b. *Bicycle and Pedestrian Planning*

i. ADA Transition Plan

The City of Boulder created its first ADA Transition Plan in the early 1990s following the passage of the Americans with Disabilities Act in 1990. The city's plan has not been updated since then, although the Transportation Division adjusts its practices to current ADA standards and focuses funding and program efforts on improving access to transportation facilities through all of its programs. The city will be updating the plan, including evaluation of current practices, policies, projects and programs to identify areas needing improvement. These findings will be used to develop a three year implementation plan to remove priority areas that are barriers to accessibility. This effort is expected to begin in 2016 when funding becomes available to support the effort.

ii. 2.0 Bike Network

An expanded analysis is underway to evaluate the level of stress of the city's existing bicycle network and to identify low-stress connectivity. Staff is developing a programmatic approach to fine tune the network to identify and prioritize improved bicycle facilities supporting a more complete low-stress bicycle network. It is envisioned that the results of the Living Lab pilot projects will help the city develop Bicycle Facility Installation Guidelines to create a "2.0 bicycle network" of a complete and connected low-stress network.

iii. Bike Parking

GO Boulder staff have performed a bike parking demand analysis for the downtown commercial area. Staff has been collecting bike parking data since 2007 and has identified specific areas of the downtown area with deficient bike parking. The area of west Pearl Street was identified as the top location with deficient bike parking and Public Works staff has installed additional bike racks to meet the bike parking demand in this area. Staff has also reviewed the existing on-street bike parking stall on west Pearl Street and plans to replace the existing rack with a new bike parking configuration that will improve parking efficiency and design aesthetics.

iv. Platinum to Diamond BFC

Boulder is currently designated as a platinum level Bicycle Friendly Community by the League of American Bicyclists and is one of four cities within the U.S. who share this top honor. In 2013, the League of American Bicyclists announced a new designation – diamond. The diamond level designation represents a community that has advanced bicycling similar to that of many European cities such as Utrecht, Netherlands or Freiberg, Germany. The diamond level designation identifies specific objectives to achieve with respect to crash rates, bicycle mode share, quality and quantity of bicycle facilities, and the public's level of satisfaction with bicycling. GO Boulder is developing a progress report card that will enable the city to track this baseline data while pursuing goals that are in concert with the 2014 Transportation Master Plan to attain the diamond level designation in the coming years.

c. Renewed Vision for Transit

The 2014 TMP Renewed Vision for Transit is based on a comprehensive set of improvements in service, capital, policies and programs. Planning for the start of US 36 Flatiron Flyer bus rapid transit (BRT) service in January 2016 has been a major focus of work in this effort. Progress in each of Renewed Vision for Transit areas is discussed in the following section.

i. Service Element

East side circulator/Funding (TIGER grant)

As one of the TMP action items, the City of Boulder and University of Colorado (CU) have been working jointly to define elements of the Central-East Circulator project. This City-CU partnership is intended to leverage the regional US 36 BRT investment and advance the goals of the University and the City's Renewed Vision for Transit. This project will connect the CU main and east campuses, Williams Village, and Boulder Junction to the US 36 Bus Rapid Transit (BRT). The project is intended to create the needed station infrastructure at Williams Village and along the new circulator route, make complete streets improvements along these corridors and to incorporate innovative electric vehicle transit technology. The continuing technical work includes scoping and cost estimates for the Central-East Circulator Project and preparation for pursuing potential funding sources.

Broadway & 28th Lane Analysis

With US 36 BRT service starting in early 2016, staff has been working with consultants to consider options for enhancing BRT operations along Broadway and 28th Street. Specifically, this study is evaluating the concept of converting outside through/right-turn lanes to transit and right-turn only lanes along Broadway between Table Mesa Drive and Regent Drive, and along 28th Street between Arapahoe Avenue and Pearl Street. These lane conversions would allow BRT and local buses to operate with higher reliability and speed through these corridors versus traveling in the general purpose lanes.

The Fox Tuttle Hernandez (FTH) Group completed an initial Level of Service (LOS) assessment on the feasibility of lane conversion on these two corridors. Both of these roadway segments have three through lanes in the northbound and southbound direction, with the third through lane also serving right-turning traffic at most driveways and intersections. The initial LOS screening shows that the Broadway corridor segment could maintain acceptable Levels of Service (LOS D or better) with conversion of the third through lane to BRT/right turn only. On 28th Street, the conversion would degrade the LOS at Arapahoe Avenue northbound and southbound to LOS E and/or LOS F, likely resulting in increased queuing and delay. More detailed analysis is needed for 28th Street and FTH is using the VISSIM microsimulation model to evaluate traffic conditions in more detail. The analysis and simulations will describe impacts to travel times, queue lengths, and potential spill back into adjacent intersections. More detailed analysis, coordination with CDOT, and public input will take place in 2015-16 prior to making any decisions about whether or not to advance this concept.

ii. Capital Element

Boulder Junction

The vision of Boulder Junction as a pedestrian-oriented development is coming to fruition with a series of public and private projects. These include the completed bike lanes on 30th Street, the 30th Street underpass at the Boulder Slough, the connection from 30th Street to the Goose Creek multimodal path, and the south side of the multi-way boulevard on Pearl Parkway in 2012. Construction on the north side multimodal path and multi-way boulevard began in 2013 with extensive waterline, sanitary sewer and major drainage way improvements and continued in coordination with the Depot Square development at 3151 Pearl Parkway. This section of Pearl Parkway will be substantially completed by August 2015 in coordination with the adjacent private development. The Junction Place Bridge at Goose Creek began construction in late 2013, was completed in June 2015 and opened on July 24. Final landscaping is scheduled for completion in summer 2015. Additional public improvements in the area include the public park along Goose Creek and the bike connection through the park to the Goose Creek multi-use path which were completed in June 2015.

The City of Boulder and RTD celebrated the opening of the new transit station “Boulder Junction at Depot Square” on August 13. In August 2015, the existing HX, S, and 206 routes will begin serving Boulder Junction. Route 206 will serve the station on-street. In January 2016, the new Flatiron Flyer service will begin service to Boulder Junction as well as the downtown transit station. The new Flatiron Flyer service will replace the existing routes HX and S. Other existing routes, such as 205, 206, Flex, HOP, and Bolt will also service Boulder Junction.

The Boulder Junction Transportation Demand Management (TDM) Access District program and services are operating with residents of 3100 Pearl and employees of the Hyatt Place hotel receiving Eco Passes, discounted bikeshare memberships and free carshare registration. The TDM programs for residents and employees will continue to expand as new developments open.

Transportation and Planning staff continue to work with the Depot Square developers and the Parks Department to establish a location for a long-term bicycle parking structure to be managed by Boulder County through their Bus-then-Bike program. The current location under consideration is in the park area west of Junction Place and adjacent to the spur connecting to the Goose Creek Path. This location would be in direct line of sight to the bus depot entrance, provide direct access to the multi-use path system, and potentially reduce bicycle and pedestrian conflicts in Depot Square’s plaza area.

North Boulder Mobility Hub

Conceptual planning for the North Boulder mobility hub continues to advance. A future mobility hub would provide a combined set of transportation services on one site; including a transit station, bus turnaround, Boulder B-cycle bike share, a Bus-then-Bike shelter, and car share services. The site under consideration for the North Boulder mobility hub is located at the southeast quadrant of the US 36/Broadway intersection and is currently owned and used by CDOT for material storage. Staff continues to work with CDOT to relocate the use of sand/material storage to another site.

Staff presented preliminary design concepts for the North Boulder mobility hub to City Council at their TMP **February 2015 study session**. In response to council comments that the concepts looked too suburban and needed a more urban design and attractive gateway features, staff has

been working with consultants to refine the design concepts, incorporating the following design principles:

- Compact, urban form incorporating vertical elements, such as iconic roof structures. It should not include on-site bus turnarounds and parking that creates expanses of concrete.
- Vertical elements, such as the bus shelter(s), lighting, and signage, that have enough “mass” to feel substantial, and to have a presence in the open north Boulder landscape.
- Streetscape elements, landscaping and paving materials that frame and define spaces designed for specific purposes, such as boarding areas, paths, kiss-n-ride areas, etc.
- A large sculptural gateway element located on the north corner of the site that announces the entrance into North Boulder and adds to the “presence” of the mobility hub.

Staff is also assessing the feasibility of additional uses on the site. While the size and configuration of the parcel is a limiting factor, mixed-use development is being considered as a longer-term buildout scenario for the mobility hub. The potential for public/private partnerships to provide shared “edge” parking on properties adjacent to the site is being explored along with enhanced pedestrian crossings on Broadway.

HOP Vehicle Replacement

An important priority in the TMP is to replace older HOP vehicles and obtain funding to help pay for the vehicle replacement. The city partnered in 2014 with Via and RTD to apply to replace three HOP diesel buses with hybrid electric vehicles but Via was not selected. For future FTA grant applications, Via will likely need a more aggressive plan to replace more vehicles requiring a significantly more local match. Via was also awarded statewide FASTER funding (FY 2016) to fund 75 percent of three clean diesel buses as well as funding to rehab two additional buses. This is a significant transitional step toward the City of Boulder’s TMP and sustainability goal of pursuing green vehicle technology for the transit fleet to reduce transit GhG emissions.

The HOP is also turning 21 this year and staff is planning a campaign to refresh the service and a weeklong celebration in late September/early October. A HOP Renewal working group will convene to consider ways to upgrade HOP service and revisit routing with Boulder Junction and Google now coming online. Proposed stakeholders include representatives from downtown, Boulder Junction, CU, the Hill, 29th St, etc. to develop a strategy for long term HOP upgrades including service and routing options, stop facilities, and marketing and funding.

iii. Program Element

Real Time information

Implementing real-time passenger information is one of the top priorities in the Renewed Vision for Transit. There are two components to the real-time information programs that will serve Boulder residents:

- In early 2015, CU contracted with ETA Transit and implemented real-time passenger information for the HOP and Buff Bus. At this time, ETA Transit offers a traditional website for customers to obtain real-time route information. The website, www.boulderbustracker.com, is being advertised through on bus advertisements and

the city's website. Additionally, ETA Transit has released a smart phone application for Android operating systems and continues to develop the Apple version.

- RTD plans to implement real-time passenger information on all RTD buses, BRT, and light/commuter rail vehicles in two phases. Phase one includes a real-time website and information displays that are expected to be launched in first quarter 2016. The second project phase will open-source the data to 3rd party developers for creating mobile apps in late 2015 or early 2016. The RTD effort does not include the HOP buses due to hardware issues. However, ETA Transit data is open-source and there is the potential for coordination with RTD to incorporate HOP real-time information in the RTD's system. Staff continues to work with agency partners to pursue real-time information for passengers using all transit routes serving the Boulder community.

Wayfinding standards

The TMP's Renewed Vision for Transit calls for developing BRT and transit wayfinding design standards and specifications in partnership with RTD. In 2014, the City of Boulder was part of the DRCOG SCI Northwest Corridor Bicycle and Pedestrian Accessibility Study that recommended the implementation of a uniquely-branded wayfinding and signage system for Northwest Corridor transit stations and along the US 36 Bikeway.

In July 2015, 36 Commuting Solutions, in partnership with local jurisdictions, applied for a DCROG Urban Center/STAMP grant to fund final design and construction drawings for unified corridor-wide signage at US 36 BRT stations, including the downtown Boulder, Boulder Junction and Table Mesa transit centers, and along the US 36 Bikeway. Branded wayfinding signage will help users locate multimodal access points and direct travelers to and from destinations within the first and final mile of station areas and to the US 36 Bikeway. The City of Boulder has committed to providing \$12,500 of the local match to help fund the \$225,000 project. Other funding partners include Boulder County, Town of Superior, City of Louisville, City and County of Broomfield and the City of Westminster. Notification of grant awards is expected in August 2015.

2. Regional Travel

a. US 36 Flatiron Flyer BRT implementation

The TMP identifies high quality bus rapid transit (BRT) service on US 36 as a high priority and pivotal opportunity for improving regional transit service to Boulder. In November 2014, RTD released the first draft of a proposed service plan for US 36 BRT and the associated local service plan modifications scheduled for January 2016. City of Boulder staff coordinated review of the proposed service plans with RTD staff and staff from Boulder County, CU and the US 36 corridor communities. In response to agency comments, RTD released a revised proposed service plan for US 36 BRT in January 2015 and subsequent drafts in March and June 2015. City staff and our agency partners submitted comments on each iteration of the service plan. The June 2015 final proposal reflects minor modifications in response to these comments and was approved by the RTD's board of directors on July 28, 2015. Remaining primary areas of concern with the final proposal include:

- the lack of midday express service on Broadway;

- the lack of midday and weekend service to Boulder Junction; and,
- elimination of the proposed increase in frequency to route AB Skyride service.

RTD’s investment in the US 36 BRT service is approximately \$991,000 per year funded through the FasTracks program. This represents an approximate 5 percent return on investment from the northwest corridor communities. RTD Board Chair Chuck Sisk committed to continue working with the corridor communities to improve US 36 BRT service over time.

b. US 36 2015-16 grand opening events

Opening celebrations for the first phase of the US 36 project were held in the spring 2015. The celebration of the first phase high occupancy toll (HOT) lanes was held at the Broomfield Park and Ride on June 22, 2015. A separate celebration on June 24, 2015 recognized the completion of the adjacent 11-mile portion bikeway from Westminster to Louisville/Superior. As requested by RTD, US 36 BRT station parties are planned to precede the launch of the US 36 “Flatiron Flyer” BRT service in January 2016.

c. FLEX

City of Boulder staff is working with Boulder County, Longmont, RTD, CU, CSU, Loveland, and Fort Collins/Transfort to extend one seat ride interregional transit service to Boulder on the FLEX route along US287 and SH119. Funding for this service was approved by DRCOG and service is planned to begin in January 2016. Over the last six months, staff has worked on identifying stop locations within the City supporting FLEX service to Boulder Junction and the Downtown Boulder Station. The layover location will be on the CU Boulder campus. City staff is working with TransFort to coordinate signage and striping at the layover location.

d. East Arapahoe Transportation Plan

The **East Arapahoe Transportation Plan** grew out of the former **Envision East Arapahoe Study** that was put on hold in late-2014. This long-range plan is considering a number of potential transportation improvements within the East Arapahoe corridor, including biking and walking enhancements, Bus Rapid Transit (BRT) and local bus service and automobile travel.

Council was briefed on the interactive public workshop for community members as part of the Feb. 24, 2015 **study session** on the East Arapahoe Corridor. Since then, the project team has been working to more fully define the ideas proposed by workshop participants. Transportation improvement alternatives have been refined and evaluated to test their performance and to understand the trade-offs associated with different types of transportation infrastructure.

Conceptual alternatives will include each of the following elements:

- BRT: Alternatives illustrate BRT running in the center lanes of east Arapahoe Avenue (Center Running) or in the outside lanes (Side Running) with right turning traffic. Potential BRT station locations and alternative routing to and from the Boulder Transit Center in downtown Boulder will also be shown.

- Bicycle facilities: Alternatives illustrate both on-street and off-street (or multi-use path) facilities for bicyclists along east Arapahoe Avenue. On-street facilities can include a buffer-protected bikeway that is separated from traffic by striping and/or a (barrier-protected bikeway) that is separated from traffic by a simple curb, bollards, landscaping, or any other form of physical protection.
- Pedestrian facilities: Alternatives illustrate multi-use paths, such as the existing 12-foot path located along much of east Arapahoe Avenue today, along the extent of the corridor. Potential mid-block and/or new pedestrian crossings at BRT stations along east Arapahoe Avenue will also be shown.
- Landscaping: Alternatives illustrate planting along east Arapahoe Avenue located on street in planting strips or medians and off-street along bicycle and pedestrian paths.

Staff is conducting a preliminary evaluation of all transportation improvement alternatives and will compare each to future conditions without improvements. The evaluation considers factors such as:

- Percent of trips expected to be made via walking, biking, transit and auto;
- Pedestrian and bicycle comfort and accessibility;
- Transit and vehicle operations and travel time;
- Safety; and,
- Ability to meet the city's sustainability goals.

Staff will present these draft concepts and a preliminary evaluation of the concepts at the Nov. 9, 2015 TAB meeting and to City Council as a briefing at the Dec. 8, 2015 study session meeting.

e. SH7 BRT

In April 2015, DRCOG TIP funding was awarded for the State Highway (SH) 7 BRT Study as the next step in advancing arterial BRT between Boulder and Brighton. The \$250,000 study is being led by Boulder County with the support and involvement of all jurisdictions along SH 7 including the City of Boulder. The Study will:

- build on the 2014 SH 7 Planning and Environmental Linkages (PEL) Study by extending the PEL further west to 75th Street, and
- study the feasibility, operations and cost of BRT on SH 7 between Brighton and downtown Boulder incorporating findings from the East Arapahoe Transportation Plan.

A Policy Advisory Committee (PAC) composed of leaders and decision-makers from corridor municipalities, county governments, CDOT, RTD, and DRCOG has been formed. The PAC will be supported by a Technical Advisory Committee (TAC) made up of planning staff from the involved agencies. Both committees held kick-off meetings in April 2015 and will meet quarterly through the duration of the study. The scope of work is currently in development and the study is expected to begin in December 2015/January 2016.

f. SH119 BRT

In April 2015, DRCOG TIP funding was also awarded for the State Highway (SH) 119 BRT Study between Boulder and Longmont. The \$1.25 million study will be led by RTD with the support and involvement of all jurisdictions along the corridor, including the City of Boulder. RTD will be issuing an RFP for the Hwy 119 BRT Study in early 2016. The purpose of the study is to:

- Conduct preliminary engineering work for the project;
- Receive National Environmental Policy Act (NEPA) clearance; and
- Conduct a Phase I tolling feasibility study.

RTD is showing a demonstrated funding commitment for this project by including it as a 2021 construction project (pending matching funds) in its draft Strategic Business Plan that will be adopted by the RTD Board in August 2015.

3. Transportation Demand Management (TDM)

TDM strategies offer programs and options designed to influence travel behavior and make more efficient use of existing transportation facilities. The city has been involved with TDM programs since the early 1990s with the Eco Pass proving to be a valuable tool in promoting mode shift.

a. Existing Eco-Pass Program

In 2015, the Neighborhood Eco Pass Program experienced significant growth. Although one neighborhood was unable to raise the necessary funds, two neighborhoods that had previously dropped out of the program were revived and six new neighborhoods were added. Overall the number of eligible households increased from 6,239 to 6,638. The total 2015 RTD contract was \$687,000 and the city provided \$230,000 in subsidies.

The Business Eco Pass Program in CAGID/BID also experienced expansion in 2015. Since 2013, the number of employees eligible to receive CAGID/BID Eco Passes has increased from 6,392 to 6,854 with 1,186 employers now present in the district.

The Business Program outside of CAGID also grew in 2015. In partnership with GO Boulder, Boulder Transportation Connections signed up 15 new businesses with a total of 450 new employees eligible to receive Eco Passes. With an additional nine businesses in the second year of rebates, approximately \$32,000 in rebates has been provided to these newly participating businesses.

b. Community Wide Eco-Pass

Under direction from the Policy Advisory and Technical Advisory Committees, city and county staff are working with a consultant to establish transit level of service estimates for areas throughout the county. This analysis aims to understand how pass pricing may vary due to the quality of transit service and also how much each municipality within Boulder County would pay based on population and pass pricing. City and County staff will be issuing an RFP for a consultant to use the transit level of service analysis to establish pricing zones and assess the most viable funding strategies or mechanism for each scenario option considered: resident-only,

employee-only, or all residents, employees, and students; and for which geographic context. It is estimated that both analyses will be completed in the first quarter of 2016. The PAC and TAC will then develop a proposal for the RTD staff and Board on a feasible community-wide Eco Pass program.

On July 14, 2015, members of the Boulder City Council discussed potential uses of revenue raised by a possible Occupational Privilege Tax (OPT) or “head tax.” In this discussion, there was support for using the funds for transportation, and specifically for the Community-wide Eco Pass program by some council members. The rationale for this concept is that Boulder is an employment center and approximately half of individuals that work in Boulder live outside of the city and that this situation results in additional demand for local and regional transportation infrastructure, programs and services.

The Community-wide Eco Pass Policy Advisory and Technical Advisory Committees have discussed the use of a head tax to fund the employee portion of a city or county-wide Eco Pass program. For the City of Boulder, it was estimated that an employee-only pass program would cost about \$5.86 million per year. This cost includes both the Eco Passes and the mid-range estimate for additional transit service needed to meet the new demand and provide higher transit level of service. It was estimated that the cost to replace the fare box for an employee-only program is \$5.38 million and the additional transit service needs could range from approximately \$340,000 to \$940,000, with a mid-point of \$476,000.

Currently, the Advisory Committees in partnership with RTD are working with consultants to further analyze transit level of service throughout the County, pass pricing, and possible finance mechanisms. It is anticipated that this work will be concluded in early 2016. After completion of the analyses, the Advisory Committees will engage in public outreach and stakeholder process to communicate the results and investigate the feasibility of implementation with the RTD Board and staff.

If OPT revenues are not used to fund an employee-only program or a portion of a larger program that includes employees, residents and university students, there are a variety of other transportation uses. For example, revenue from a head tax could be used to improve regional and local transit service or provide new or expanded transportation demand management or first and final mile programs.

On Aug. 4, 2015, City Council decided to not pursue the “head tax” at this time.

c. Van/carpool program

In 2014, GO Boulder initiated a new subsidy program to encourage vanpooling. Under the Vanpool Recruitment and Retention Program, anyone using a vanpool to commute into or out of Boulder is eligible to receive a \$20 per month subsidy. Currently 150 individuals qualify for the subsidy from both the Denver-based “Way to GO” program and the North Front Range MPO’s VanGo program. In the fall of 2015, GO Boulder and Boulder Transportation Connections will be conducting a new outreach and marketing campaign to increase awareness of the subsidy program. This campaign will target specific large employers in the Flatirons Park and Gunbarrel areas that have lower transit levels of service.

d. TDM Plans for new development

Under the Access Management and Park Strategies (AMPS) work program, city staff continues to work on refining a TDM Plan ordinance for new developments. Based on feedback from Boards and council, staff is working on two options to implement an ordinance. The first option is to examine a city-wide ordinance for new developments. The second option is based on using the Boulder Junction TDM Access District model in existing districts and then creating a separate ordinance for new developments proposed outside of those districts.

At this time, the TDM Group staff of the AMPS program is teamed up with the Parking Code Group to conduct stakeholder and public process in tandem. Based on feedback from the development and business communities, it became clear that the TDM Plan ordinance process needed to coincide with proposed changes in parking codes, as the supply of parking is directly connected to the level of TDM service necessary for a new development to function and to minimize the impact on the transportation system. The stakeholder process is scheduled to begin in August 2015. At the November 2015 AMPS study session, staff will return with a summary of the stakeholder process and recommendations on both the TDM Plan ordinance and parking code recommendations.

4. Funding

a. Impact Fee Study progress report

City staff is in the process of hiring consultants to examine impact fees, including a possible multimodal impact fee. City staff will continue to update council once consultant work has begun.

5. Integration with other Sustainability Initiatives

Under the Sustainability Framework, the city has established the expectation that all planning efforts will be coordinated across the city organization and contribute to the city's goals of long term sustainability and GhG reduction. The TMP established an organizational structure that includes a bi-weekly interdepartmental staff team and monthly executive team meetings to coordinate sustainability planning efforts. The bi-weekly staff meeting has been changed to have an alternating focus on the Boulder Valley Comprehensive Plan (BVCP) and the other planning projects, reflecting the upcoming focus on the BVCP update. Transportation staff is leading the East Arapahoe Transportation Project and is actively involved with the Civic Center effort, Housing Boulder, AMPS, Climate Commitment and the Boulder Valley Comprehensive Plan update. The 2014 TMP and the GhG inventory work conducted through the TMP continues to inform each of these planning efforts.

a. GhG Reduction and Alternative Fuels

The City of Boulder and partners (Boulder County, CU Boulder, UCAR/NCAR and BVSD) have focused on electrification of the fleet as the most current viable option for the Boulder area for reducing GhG emissions from vehicles. In May 2015, the Southwest Energy Efficiency Program office completed "**Boulder Electric Vehicle Infrastructure and Adoption Assessment**" report jointly funded by the city, County and CU.

Building on the recommendations from this report, the city is engaged in a number of actions to further development of alternative fuel vehicles, particularly electric vehicle adoption. These actions include:

1.) City Fleet EV Contract Exploration

The city is exploring the potential for entering into an EV leasing contract with a Boulder Venture funded initiative called “Vision Fleet.” Under this contract, the city would be able to replace up to 20 of its existing vehicles with electric or plug in hybrid vehicles, thereby reducing emissions from vehicle use.

2.) Pooled Purchasing for EVs

The city is partnering with Boulder County and a number of other public agencies to put together an RFP with Vote Solar, a nonprofit, with expertise in pooled purchasing for residential rooftop solar. Leveraging Vote Solar’s experience with the solarize model, the city wants to offer this same type of pooled purchasing for EVs and provide city employees a discount on EVs. The addition of a multi-agency group purchase approach for EV would be the first such initiative in the country.

3.) EV Workplace Charging Challenge (Starting with the city and then moving to large employers)

The city, County, BVSD, CU and NCAR are also jointly pursuing funding from the State “Charge Ahead” program to install additional charging stations for across these organizations. After greater installations of needed EV infrastructure, other private larger employers will be encouraged to do the same.

The city has also purchased eight electric-assist bicycles for employee travel needs, eliminating vehicle additions to the fleet as staff needs continue to grow. On September 16, 2015, the city will host the second annual electric drive event in conjunction with National Drive Electric Week. In Colorado, last year’s events in Boulder, Littleton and Colorado Springs drew 650 attendees, with 320 taking test drives and over 80 vehicles. A two-minute video from the 2014 event in Boulder which is held in conjunction with the Wednesday Farmers Market is available at <https://vimeo.com/106642751>.

Currently, electric vehicles are not able to provide the wide range of capabilities that are needed of all transportation vehicles so the city continues to monitor the progress and availability of more renewable sources of other fuels like renewable diesel, hydrogen and ethanol. These advanced fuels are being developed at NREL and brought to test market in California.

V. PUBLIC PROCESS

As discussed earlier in this memo, TMP implementation efforts continue to involve agency partners and the community in a variety of expanding ways. These include the upcoming public meetings, walk/bike audits, transit planning coordination with agency partners, and the active use of Inspire Boulder and other social media to publicize various TMP implementation efforts. More detailed information is available at: www.bouldertmp.net and www.goboulder.net.

VI. NEXT STEPS

The TMP remains a dynamic, living document with implementation guided by the **TMP Action Plan**. Transportation staff continues to integrate the TMP with city-wide planning initiatives, including coordination with Boulder Valley Comprehensive Plan update. Staff will continue work in all of the TMP focus areas and will incorporate feedback from TAB and City Council in this activity over the next six months.

Staff will continue with the ongoing community engagement and provide future check-ins with Boards and council at key milestones. Upcoming items include the public hearing for the Living Lab Phase II projects in September, the AMPS City Council study session in November, and the East Arapahoe Transportation Plan briefing in December. The next TMP six-month progress update is planned for February 2016.

For more information and updates regarding the 2014 Transportation Master Plan, please visit: **www.bouldertmp.net**

ATTACHMENTS

- A. Living Lab Evaluation Matrix
- B. Detailed Preliminary Data
- C. Folsom Living Lab Infographic
- D. Transportation Metrics Review
- E. 2014 Boulder Valley Employee Survey Executive Summary

Living Lab - Phase II Corridor Evaluation
"Before" Data Summary
August 2015



Primary Metrics (PM)

- Crash History
- Vehicle Volume
- Vehicle Speed
- Vehicle Travel Time
- Bike Volume



Living Lab – Phase II Corridor Evaluation

Evaluation Criteria	Data Collection	Data Collection Source	Data Analyzed	Before Data	After Data 1 – 8 weeks	After Data 3 months	After Data 6 months	After Data 12 months
SAFETY								
Crash History (PM)	Intersections and segments along Iris, Folsom, 63rd	Review City of Boulder Accident Reports	<ul style="list-style-type: none"> • Fatal & serious injury crashes • Crashes involving bicyclist or pedestrian • Crash types (rear end, approach turn, right angle, etc.) 	Yes (3 year)	✓	✓	✓	✓
Right Turn Treatments & Turning Movement Conflicts	Iris & Broadway Folsom & Canyon Folsom & Pearl 63 rd & Spine	Video Observation (AM & PM Peak Hour)	<ul style="list-style-type: none"> • Bicycle, pedestrian, and vehicle interactions in right turn treatments • Turning motorist failure to yield to pedestrian or bicycle • Compliance with signage and striping treatment 	No		✓		✓
VEHICLES								
Volume (PM)	Iris e/o 19 th Folsom n/o Canyon Folsom & Pearl Folsom n/o Bluff 63 rd s/o Longbow	Jamar, Miovision, Wavetronix	<ul style="list-style-type: none"> • Counts of traffic volume: 24 hour, AM, Noon or PM peak hour 	Yes (1 week ADT)	✓	✓		✓
Speed (PM)	Iris e/o 19 th Folsom n/o Bluff 63 rd s/o Longbow	Jamar, Miovision, Wavetronix	<ul style="list-style-type: none"> • Average daily speed of vehicles • 85th Percentile speed • Speed limit 	Yes (1 week ADT)	✓	✓		✓

Evaluation Criteria	Data Collection	Data Collection Method	Data Analyzed	Before Data	After Data 1 month	After Data 3 months	After Data 6 months	After Data 12 months
VEHICLES – cont'd								
Traffic Neighborhood Diversion	Iris Corridor: Broadway, 14 th , 15 th , 16 th , Iris Ct., 17 th , 19 th , Hermosa/22 nd , 25 th , Folsom <i>To be collected:</i> Glenwood, Grape, Hawthorne, Kalmia, Linden, Twin Lakes	Jamar, Miovision, Wavetronix	<ul style="list-style-type: none"> Counts of traffic volume: 24 hour, AM, Noon or PM peak hour 	Yes		✓		✓
Left Turn from Side Streets	Iris & 16 th Iris & 22 nd	Video Observation and Turning Movement Counts	<ul style="list-style-type: none"> Measure of delay in executing left turn movements from side streets along Iris corridor 	Yes		✓		✓
Vehicle Travel Time (PM)	Iris Corridor Folsom Corridor 63 rd Corridor	Field Data Collection or Acyclica Data	<ul style="list-style-type: none"> Average AM & PM peak driving time by segment for each corridor 	Yes (Multiple & Acyclica)	✓	✓	✓	✓
Level of Service (LOS) Analysis	Iris Corridor Folsom Corridor 63 rd Corridor	Turning Count Movement Data (AM & PM Peak Hour)	<ul style="list-style-type: none"> Synchro capacity analysis for each intersection turning movement using data collected during City turning movement counts 	Yes (1 day AM/PM)				✓
Left Turn Queue Length	Iris & Broadway Folsom & Canyon Folsom & Pearl	Video Observation (PM Peak Hour)	<ul style="list-style-type: none"> Average & maximum queue Number of times left-turn queue blocks through lane 	Yes		✓		✓
BICYCLES								
Volume (PM)	Iris & Broadway 1400 Block Iris* Iris & 19 th Iris & Folsom Kalmia & 16 th * Folsom s/o Arapahoe* Folsom & Arapahoe Folsom s/o South* Folsom & Canyon Folsom & Pearl Folsom & Pine Folsom s/o Canyon* Folsom & Valmont 63 rd s/o Spine*	<p>Before: Miovision counters (AM, Noon, PM Peak and Daylight* Hours) Video Observation (AM & PM Peak Hour)</p> <p>After: 24 Hour Counters* Video Observation (AM & PM Peak Hour)</p>	<ul style="list-style-type: none"> Bicycle volume by direction and time of day 	Yes (@ Pine = 1 day daylight hours @South = 1 day daylight hours s/o Arapahoe = 2012-2015 with gaps)	✓	✓	✓	✓

Evaluation Criteria	Data Collection	Data Collection Method	Data Analyzed	Before Data	After Data 1 month	After Data 3 months	After Data 6 months	After Data 12 months
BICYCLES – cont'd								
Demographics	Folsom & Pearl Iris & Broadway 63 rd & Spine	Video and Field Observation	<ul style="list-style-type: none"> Ratio of male, female, and children cycling on the road 	Yes		✓		✓
PEDESTRIANS								
Crossing Volume	Folsom & Arapahoe Folsom & Canyon Folsom & Goss Folsom & Pearl Folsom & Pine Folsom & Spruce Folsom & Walnut Folsom & Valmont Iris & Broadway Iris & 19 th Iris & Folsom 63 rd & Spine	Miovision counters Video and Field Observation	<ul style="list-style-type: none"> Number of crossing pedestrians by direction and time of day 	Yes (1 day)		✓		✓
TRANSIT								
Ridership	Transit Stops on Iris and 63 rd Corridors	RTD data	<ul style="list-style-type: none"> Number of passengers boarding and alighting at stops along rightsized corridors 	Yes				✓
Bus Transition From Buffer to Travel Lane	Iris & 22 nd /Hermosa RTD stop	Observation (PM peak)	<ul style="list-style-type: none"> Maximum and average length of time buses wait to merge 	No		✓		✓
Transit and Bicycle Interactions	Iris & 22 nd /Hermosa RTD stop	Observation (PM Peak)	<ul style="list-style-type: none"> Interactions and yielding behaviors of cyclists, transit vehicles in buffer, and motorists in travel lane 	No		✓		✓
FACILITY DESIGN								
Overall Maintenance	Iris Corridor Folsom Corridor 63 rd Corridor	Public Works Department	<ul style="list-style-type: none"> Snow, ice, and debris removal along corridors 	No		✓	✓	✓
Emergency Response Times	Iris Corridor Folsom Corridor 63 rd Corridor	Input from Boulder Fire- Rescue Department	<ul style="list-style-type: none"> Response time of emergency vehicles along corridors Ability of emergency vehicles to maneuver within corridors 	No	✓	✓	✓	✓
PUBLIC FEEDBACK								
Public Feedback	All Corridors	Open Houses, Online Feedback, Popup Demonstrations	<ul style="list-style-type: none"> Online and community feedback 	Yes	✓	✓	✓	✓

Evaluation Criteria: Crash History

Folsom Street Crash Summary

Intersection/Segment	Total Crashes				Correctable Crashes	Ped	Bike	Fatal	Serious Injury	
	2012	2013	2014	Total						
Folsom St and Valmont Rd	6	5	6	17	2	12%	0	2	0	0
Folsom St and Bluff St	1	0	3	4	0	0%	0	0	0	0
Folsom St and Mapleton Ave	0	0	1	1	0	0%	0	1	0	0
Folsom St and Pine St	9	8	4	21	2	10%	0	2	0	1
Folsom St and Spruce St	5	5	0	10	0	0%	0	1	0	0
Folsom St and Pearl St	11	7	8	26	3	12%	0	4	0	0
Folsom St and Walnut St	1	3	1	5	0	0%	1	0	0	0
Subtotal	33	28	23	84	7	8%	1	10	0	1
Folsom St and South St	1	2	0	3	1	33%	0	2	0	0
Folsom St: South St to Canyon	3	1	0	4	1	25%	0	2	0	0
Subtotal	37	31	23	91	9	10%	1	14	0	1
Folsom St and Canyon Blvd	16	28	25	69	0	0%	3	6	0	2
Folsom St: Canyon Blvd to Goss St	1	2	0	3	1	33%	0	1	0	0
Folsom St and Goss St	5	0	0	5	1	20%	0	0	0	0
Folsom St and Grove St	2	2	2	6	0	0%	0	2	0	0
Folsom St and Arapahoe Ave	24	21	23	68	5	7%	1	6	0	0
Total	85	84	73	242	16	7%	5	29	0	3
Folsom St: Arapahoe to Colorado	7	3	1	11	0	0%	2	5	0	1
Total	92	87	74	253	16	6%	7	34	0	4

Evaluation Criteria: Crash History

Iris Avenue Crash Summary

Intersection/Segment	Total Crashes				Correctable Crashes	Ped	Bike	Fatal	Serious Injury	
	2012	2013	2014	Total						
Iris Ave and 13th St	3	0	1	4	2	50%	0	0	0	
Iris Ave and 14th St	1	1	0	2	0	0%	0	0	0	
Iris Ave and 15th St	1	1	1	3	1	33%	1	0	0	
Iris Ave and 16th St	2	5	4	11	4	36%	0	0	0	
Iris Ave and Iris Ct	0	1	1	2	0	0%	0	0	0	
Iris Ave and 17th St	1	0	0	1	1	100%	0	0	0	
Iris Ave and 19th St	4	2	1	7	0	0%	0	2	0	
Iris Ave and 22nd St	1	0	0	1	0	0%	0	0	0	
Iris Ave and Hermosa Dr	0	0	2	2	1	50%	0	0	0	
Iris Ave and 25th St	1	0	1	2	0	0%	0	1	0	
Iris Ave and Folsom St	4	12	8	24	3	13%	0	6	0	
Total	18	22	19	59	12	20%	1	9	0	1

3/yr

63rd Street Crash Summary

Intersection/Segment	Total Crashes				Correctable Crashes	Ped	Bike	Fatal	Serious Injury
	2012	2013	2014	Total					
63rd St and Lookout Rd	11	4	8	23	0	0%	1	0	0
63rd St and Spine Rd	6	7	5	18	0	0%	0	1	0
63rd St and Longbow Dr	2	0	1	3	0	0%	0	0	0
63rd and Gunbarrel/Nautilus	2	0	1	3	3	100%	0	0	0
Total	21	11	15	47	3	6%	1	1	0

Additional data:

Safety Analysis for Phase II Projects (5-19-15)

Evaluation Criteria: Vehicle Volume and Speed

Corridor Volumes and Speed

Count Location			Month-Year	ADT Weekday (vpd)	Average Speed (mph)	85th Percentile Speed (mph)	Speed Limit (mph)	AM Peak (vph)	Noon (vph)	PM (vph)
Iris Avenue	e/o	19th Street	Mar-15	22,900	35	39	35			
Iris Avenue	w/o	16th Street	Jul-15	17,410	35	39	35			
Folsom Street	n/o	Bluff Street	Apr-15	15,780	35	39	30			
Folsom Street	s/o	Pearl Street	Apr-15					1,218	1,298	1,601
Folsom Street	n/o	Canyon Blvd	Jun-15	18,970	29	34	30			
63rd Street	s/o	Longbow Drive	May-15	11,090	41	45	40			

ADT = average daily traffic

vpd = vehicles per day

mph = miles per hour

vph = vehicles per hour

Evaluation Criteria: Traffic Neighborhood Diversion

Iris - Nearby Street Volumes and Speed

Count Location			Month-Year	ADT-Weekday (vpd)	Average Speed (mph)	85th Percentile Speed (mph)	Speed Limit (mph)	
Broadway	n/o	Iris Ave	May-15	22,600	33	37	35	
Broadway	s/o	Iris Ave	Mar-15	24,260	33	38	30	
16th Street	n/o	Iris Ave	May-15	1,240	20	24	25	
19th Street	n/o	Iris Ave	May-15	6,830	27	32	30	
19th Street	s/o	Iris Ave	May-15	4,900	26	29	30	
Folsom Street	s/o	Iris Ave	May-15	10,680	29	31	30	
Glenwood	w/o	Folsom St	<i>To be collected prior to Iris installation</i>					
Grape	w/o	Folsom St	<i>To be collected prior to Iris installation</i>					
Hawthorne	w/o	Folsom St	<i>To be collected prior to Iris installation</i>					
Kalmia	w/o	16th St	<i>To be collected prior to Iris installation</i>					
Kalmia	w/o	Catalpa Wy	<i>To be collected prior to Iris installation</i>					
Linden	w/o	26th St	<i>To be collected prior to Iris installation</i>					
Twin Lakes Rd.	n/o	Idylwild Ct.	<i>To be collected prior to Iris installation</i>					

Count Location			Month-Year	AM Peak (vph)	Noon (vph)	PM (vph)
13th Street	s/o	Iris Avenue	Jan-15	14	--	22
14th Street	s/o	Iris Avenue	Jan-15	7	--	17
15th Street	s/o	Iris Avenue	Jan-15	17	--	23
16th Street	n/o	Iris Avenue	Jan-15	106	--	101
16th Street	s/o	Iris Avenue	Jan-15	25	--	27
Iris Ct.	n/o	Iris Avenue	Jan-15	11	--	12
17th Street	n/o	Iris Avenue	Jan-15	6	--	11
22nd Street	n/o	Iris Avenue	Jan-15	27	--	41
Hermosa Street	s/o	Iris Avenue	Jan-15	10	--	13
25th Street	s/o	Iris Avenue	Jan-15	12	--	13

Evaluation Criteria: Left Turn from Side Streets

See "Iris Side Street Analysis Summary 6-1-15"

Evaluation Criteria: Corridor Travel Time

Field-Measured Travel Time by Corridor

Corridor	Month-Year	Direction	Average Travel Time (min)	
			AM	PM
Iris (Broadway - Folsom)	Nov-14	eastbound	2:26	2:03
	Nov-14	westbound	2:40	2:53
Folsom (Arapahoe - Valmont)	Nov-14	northbound	2:18	3:32
	Nov-14	southbound	3:03	3:20
63rd (Lookout to Gunbarrel)	Jul-15	northbound	1:11	1:17
	Jul-15	southbound	1:03	1:14

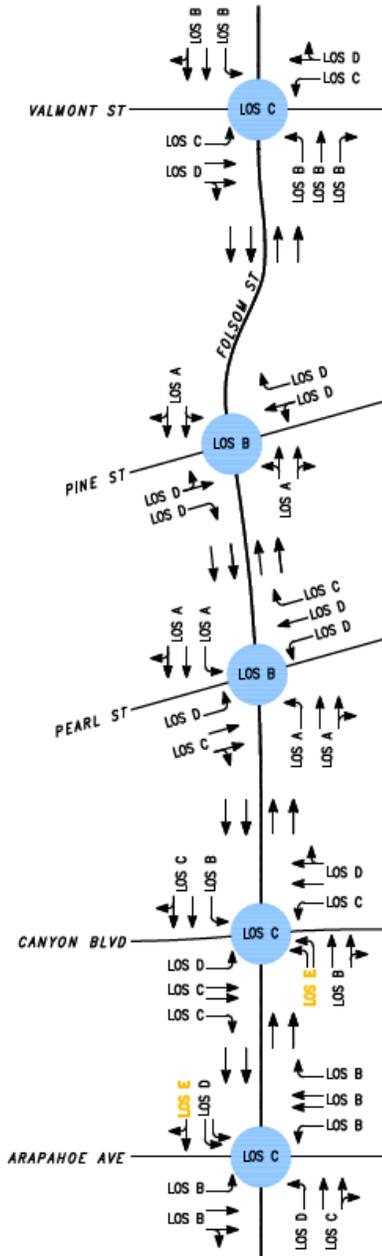
Additional data:

Technical Analysis Memo 4-29-15

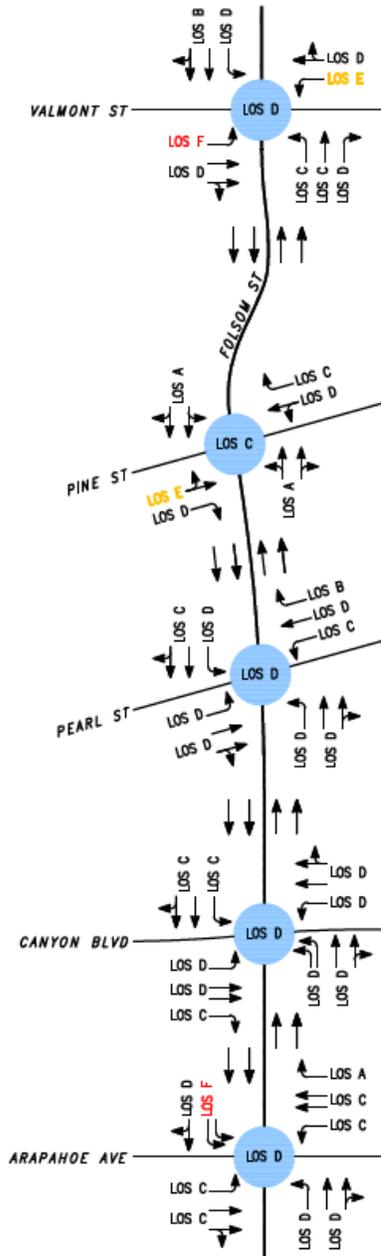
Evaluation Criteria: Level of Service (LOS)

Folsom St - Arapahoe Ave to Valmont St

EXISTING LANEAGE - AM PEAK HOUR



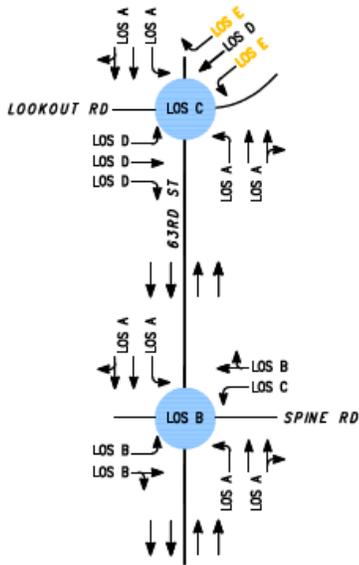
EXISTING LANEAGE - PM PEAK HOUR



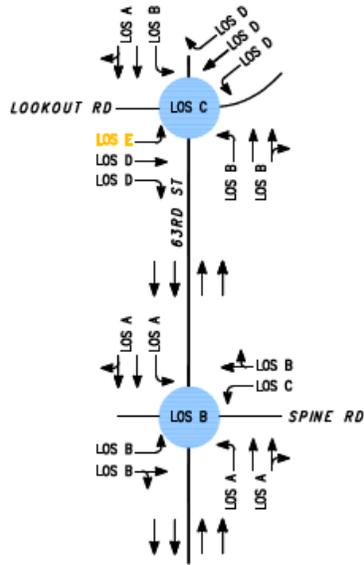
Evaluation Criteria: Level of Service (LOS)

63rd St - Lookout Rd to Spine Rd

EXISTING LANEAGE - AM PEAK HOUR



EXISTING LANEAGE - PM PEAK HOUR



Evaluation Criteria: Left Turn Queue Length

PM Peak Hour Left Turn Queue Length

Intersection	Direction	Date	Number Left Turn Lanes	# of Vehicles in Left Turn Queue		% Through Lane Blocked by LT Lane	% of PM Peak Hour Left Turn Lane Did Not Clear During Cycle
				Average	Maximum		
Folsom St and Canyon Blvd	NB	Apr-15	2	4.5	11	0%	0%
Folsom St and Canyon Blvd	SB	Apr-15	1	3.7	9	16%	20%
Folsom St and Pearl St	NB	Apr-15	1	2.3	8	32%	0%
Iris Ave and Broadway Ave	WB	May-15	2	18.5	26	0%	89%

NB = northbound

SB = southbound

WB = westbound

Evaluation Criteria: Bicyclist Volume and Demographics

Bicyclists Riding on Roadways During "Daylight" Hours (6am -9pm)

Iris Avenue

Location	Date	Time	Eastbound Bicycles	Westbound Bicycles	Total Bicycles
1400 Block Iris	7/1/2015	6:00 AM - 9:00 PM	89	72	161

Folsom Street

Location	Date	Time	Northbound Bicycles	Southbound Bicycles	Total Bicycles
Folsom north of Pine	6/30/2015	6:00 AM - 9:00 PM	394	422	816
Folsom south of South	6/30/2015	6:00 AM - 9:00 PM	366	368	734

Note: Bicycle volumes to be collected on Kalmia and 63rd prior to Iris and 63rd installations.

24 Hour Automated Eco-Counter Roadway Bicyclist Volume by Year

Folsom at Boulder Creek (south of Arapahoe)

Month	2012	2013	2014	2015
January	10,618	13,855	9,395	<i>no data</i>
February	11,184	14,018	10,052	10,242
March	20,183	9,139	15,990	16,832
April	26,224	<i>no data</i>	22,341	21,119
May	24,175	2,385	20,505	15,924
June	23,186	23,479	24,545	23,180
July	23,333	20,572	21,437	
August	29,501	22,694	14,076	
September	37,102	12,491	<i>no data</i>	
October	30,547	30,481	25,908	
November	22,573	19,140	11,629	
December	13,545	8,718	7,779	

Evaluation Criteria: Bicyclist Volume and Demographics

Summary: Bicyclists Riding on Roadways by Intersection

Intersection	Date	Cyclists on the Road		
		Total AM	Total PM	Total Noon
Iris @ Folsom	6/11/2014	14	13	8
Iris @ 19th	5/29/2014	16	10	8
Iris @ Broadway	5/26/2015	13	4	--
Folsom @ Valmont	7/9/2013	75	82	34
Folsom @ Pine	6/10/2014	88	94	48
Folsom @ Pearl	4/28/2015	61	102	34
Folsom @ Canyon	8/7/2014	55	107	39
Folsom @ Arapahoe	10/21/2014	85	148	63
63rd @ Spine	6/26/2015	16	6	--

Evaluation Criteria: Bicyclist Volume and Demographics

Iris Avenue

Intersection	Date	Hour	Bicycles on Road		Total
			Eastbound	Westbound	
Iris @ Folsom	6/11/2014	AM	9	5	14
		Noon	2	6	8
		PM	8	5	13
		Total	19	16	35
Iris @ 19th	5/29/2014	AM	9	7	16
		Noon	6	2	8
		PM	8	2	10
		Total	23	11	34
Iris @ Broadway	5/26/2015	AM	10	3	13
		PM	2	2	4
		Total	12	5	17

Folsom Street

Intersection	Date	Hour	Bicycles on Road		Total
			Northbound	Southbound	
Folsom @ Valmont	7/9/2013	AM	14	61	75
		Noon	17	17	34
		PM	55	27	82
		Total	86	105	191
Folsom @ Pine	6/10/2014	AM	23	65	88
		Noon	26	22	48
		PM	62	32	94
		Total	111	119	230
Folsom @ Pearl	4/28/2015	AM	10	51	61
		Noon	18	16	34
		PM	76	26	102
		Total	104	93	197
Folsom @ Canyon	8/7/2014	AM	18	37	55
		Noon	19	20	39
		PM	62	45	107
		Total	99	102	201
Folsom @ Arapahoe	10/21/2014	AM	17	68	85
		Noon	36	27	63
		PM	113	35	148
		Total	166	130	296

Evaluation Criteria: Bicyclist Volume and Demographics

63rd Street

Intersection	Date	Hour	Bicycles on Road		
			Northbound	Southbound	Total
63rd @ Spine	6/26/2015	AM	11	5	16
		PM	3	3	6
		Total	14	8	22

Demographics

Corridor	Male	Female	Family
Iris (e/o 19th)	76%	24%	0%
Folsom (n/o Pine)	72%	28%	4%
63rd (s/o Spine)	73%	27%	0%

Evaluation Criteria: Pedestrian Crossing Volume

Crossing Pedestrians by Intersection - Summary

Intersection	Date	Total AM	Total PM	Total Noon
Iris @ Folsom	6/11/2014	14	7	13
Iris @ 19th	5/29/2014	15	14	5
Iris @ Broadway	5/26/2015	69	33	--
Folsom @ Valmont	7/9/2013	14	18	10
Folsom @ Pine	6/10/2014	7	15	4
Folsom @ Pearl	4/28/2015	21	38	13
Folsom @ Canyon	8/7/2014	14	57	23
Folsom @ Arapahoe	10/21/2014	35	91	59
63rd @ Spine	6/25/2015	31	6	--

Evaluation Criteria: Pedestrian Crossing Volume

Iris Avenue

Intersection	Date	Hour	Pedestrians				Total
			Southbound	Westbound	Northbound	Eastbound	
Iris @ Folsom	6/11/2014	AM	5	2	5	2	14
		Noon	3	3	7	0	13
		PM	2	1	1	3	7
		Total	10	6	13	5	34
Iris @ 19th	5/29/2014	AM	4	5	4	2	15
		Noon	2	2	0	1	5
		PM	4	4	1	5	14
		Total	10	11	5	8	34
Iris @ Broadway	5/26/2015	AM	24	18	12	15	69
		PM	8	8	12	5	33
		Total	32	26	24	20	102

Evaluation Criteria: Pedestrian Crossing Volume

Folsom Street

Intersection	Date	Hour	Pedestrians				Total
			Southbound	Westbound	Northbound	Eastbound	
Folsom @ Valmont	7/9/2013	AM	8	6	7	6	14
		Noon	2	8	5	3	10
		PM	12	6	13	6	18
		Total	22	20	25	15	42
Folsom @ Pine	6/10/2014	AM	4	3	2	4	7
		Noon	1	3	2	5	4
		PM	8	7	2	3	15
		Total	13	13	6	12	26
Folsom @ Pearl	4/28/2015	AM	10	11	10	11	21
		Noon	8	5	6	20	13
		PM	24	14	15	43	38
		Total	42	30	31	74	72
Folsom @ Canyon	8/7/2014	AM	9	5	12	10	14
		Noon	7	16	19	12	23
		PM	22	35	17	40	57
		Total	38	56	48	62	94
Folsom @ Arapahoe	10/21/2014	AM	16	19	7	38	35
		Noon	23	36	37	55	59
		PM	39	52	38	81	91
		Total	78	107	82	174	185

Evaluation Criteria: Pedestrian Crossing Volume

63rd Street

Intersection	Date	Hour	Pedestrians				Total
			Southbound	Westbound	Northbound	Eastbound	
63rd @ Spine	6/25/2015	AM	14	2	3	12	31
		PM	1	3	1	1	6
		Total	15	5	4	13	37

Evaluation Criteria: Transit Ridership

Average Daily Transit Boardings and Alightings, January 1, 2015 - May 15, 2015

Iris Corridor

Stop Location	Stop ID	Route(s)	Average Daily		AM Peak		PM Peak	
			Boardings	Alightings	Boardings	Alightings	Boardings	Alightings
Iris & 13th	14595	208	5.98	32.36	0.37	7.25	2.72	9.73
Iris & Broadway	14596	208	30.31	7.83	5.19	2.02	9.44	2
Iris & 16th	14597	208	4.61	3.68	0.77	0.07	1.14	2.64
Iris & Iris Ct	14598	208	3.87	3.56	2.5	0.14	0	1.18
Iris & 19th	14599	208	4.95	1.43	1.38	0.07	0.89	0.77
Iris & 19th	14600	208	0.96	5.32	0.37	0.54	0.2	2.39
Iris & 22nd	14601	208	1.93	0.96	1.28	0.07	0.13	0.76
Iris & Folsom	14611	208	12.22	0.73	5.71	0.13	1.98	0.27
Iris & Folsom	14612	208	1.38	7.79	1.01	0.52	0.25	4.42
Iris & Hermosa	14613	208	0.33	1.04	0.13	0	0	0.47

63rd Corridor

Stop Location	Stop ID	Route(s)	Average Daily		AM Peak		PM Peak	
			Boardings	Alightings	Boardings	Alightings	Boardings	Alightings
63rd & Longbow	19689	205	2.95	0.23	0.02	0.08	1.82	0.09
63rd & Gunbarrel	19690	205	48.85	9.25	10.74	2.22	13.61	1.65
63rd & Nautilus	19809	205	3.72	48.41	0.66	15.53	0.27	9.89
63rd & Longbow	19810	205	0.06	4.63	0.02	3	0	0.09
63rd & Lookout	25942	205	0	1.42	0	0.24	0	0.14

Source: RTD

Folsom Corridor

Transit ridership data is collected at the route level for the HOP.

MEMORANDUM

To: David Kemp

From: Bill Fox
Jessica Hernandez

Date: August 18, 2015

Project: Folsom Street Living Laboratory

Subject: Week 1-3 After Data Early Observations

As part of the Folsom Street Living Laboratory, data on vehicle and bicycle volumes, vehicle speed, and collisions was collected before the installation of protected bicycle lanes, during weeks 1-3 after the installation, and will continue to be collected as part of the ongoing evaluation process. Fox Tuttle Hernandez was asked to compile the after data available for these core criteria and summarize early observations from the Weeks 1 to 3 after the installation of the protected bicycle lanes on Folsom Street. While the after data from these early weeks is important, it is preliminary and ongoing data collection and analysis in the coming weeks will continue to inform the evaluation of the project.

Additional evaluation data, including multimodal criteria such as bicycle demographics, pedestrian crossing counts, and transit ridership, is being collected as part of the evaluation process. Details about additional evaluation criteria and the collection time periods for each can be found at www.BoulderLivingLab.net.

Unless otherwise noted, Weeks 1-2 refers to July 27th to August 9, 2015 and Week 3 refers to August 10th to August 16th, 2015. Before data collection time periods vary and are noted in the individual tables below.

Folsom Street Living Laboratory

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Vehicle Volume and Speed

Total 24-hour daily vehicle volume and speed was collected at two locations along Folsom Street before the installation of the protected bike lanes and two and three weeks after the installation. The before vehicle data was collected in late April, 2015 while both Boulder Valley School District (BVSD) and Colorado University (CU) were in session. Some portion of the higher vehicle volumes recorded before the installation are likely due to CU and BVSD-related trips. CU and BVSD have not been in session during the after data collection time periods to this point.

Vehicle volumes on Folsom north of Bluff and north of Canyon decreased during Week 2 as compared to the volumes before the installation. Week 3 vehicle volume remained fairly steady on Folsom Street north of Bluff as compared to Week 2, increasing by about 140 vehicles per day (vpd). Week 3 vehicle volume increased slightly more north of Canyon as compared to Week 2, by about 690 vpd.

Average vehicle speed and 85th percentile speed has decreased compared to the before installation speed at both locations along Folsom. The average vehicle speed and 85th percentile speed remained the same on Folsom north of Bluff during Weeks 2 and 3 after installation. The average vehicle speed decreased 2 mph from 35 to 33 mph and the 85th percentile speed decreased from 39 to 37 mph on Folsom north of Bluff. Both speeds remain above the posted speed limit of 30 mph.

Average vehicle speed on Folsom north of Canyon decreased from 29 mph to 25 mph during Week 2 and again to 24 mph during Week 3. The 85th percentile speed decreased from 34 mph to 30 mph during Week 2 and to 29 mph during Week 3. Average vehicle speeds and 85th percentile speeds north of Canyon are now both below the posted speed limit of 30 mph. It is interesting to note that in the southern end of the corridor, the travel times are decreasing even as the average and 85th percentile speeds are decreasing as well. There are many variables at play in each metric, but it does appear that motorists driving through the corridor at slower speeds can actually help lower the overall travel time as well.

Folsom Street north of Bluff Street – Posted Speed Limit = 30 mph

Evaluation Period	Date Collected	ADT-Weekday (vpd)	Average Speed (mph)	85th Percentile Speed (mph)
Before	4/27/15-5/1/15	15,780	35	39
After-Week 2	8/5/15-8/7/15	13,790	33	37
After-Week 3	8/12/15-8/14/15	13,930	33	37

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Folsom Street north of Canyon Blvd. – Posted Speed Limit = 30 mph

Evaluation Period	Date Collected	ADT-Weekday (vpd)	Average Speed (mph)	85th Percentile Speed (mph)
Before	6/30/15-7/2/15	18,970	29	34
After-Week 2	8/3/15-8/5/15	15,790	25	30
After-Week 3	8/10/15-8/12/15	16,480	24	29

ADT = Average Daily Traffic

VPD = Vehicles per Day

MPH = Miles per Hour

Corridor Travel Time

The travel time it takes to drive the Folsom corridor end-to-end from Valmont to Arapahoe in the northbound and southbound directions was measured by driving the corridor before and after the installation of the protected bike lanes. The project team used the before travel time measurements to help calibrate the VISSIM modeling software, and then to forecast the expected travel time after the installation. During Weeks 1-2 after the installation, the project team drove the corridor 65 times (34 times during the PM commute/peak hour) and 60 times during Week 3 (23 times during the PM peak hour).

Travel times have been collected during the AM peak hour (8-9am), midday/early afternoon (noon to 4:30), and PM peak hour (4:30-6pm). The travel times vary throughout the day, with the shortest travel times in the morning and increasing throughout the day. The following table summarizes the average travel times for the morning and midday/early afternoon time periods. The AM peak hour and midday/early afternoon travel times have remained fairly consistent during Weeks 1-3 after installation. The Week 3 average AM peak hour travel times are similar to the model forecasted travel times. The project team did not model the midday/early afternoon travel times.

Northbound Average Morning and Afternoon Travel Times (in minutes:seconds)

Evaluation Period	AM Peak	Afternoon
Before (Nov. 2014)	2:18	n/a
Modeled	2:45	n/a
Week 1-2	2:32	3:29
Week 3	2:31	3:10

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Southbound Average Morning and Afternoon Travel Times (in minutes:seconds)

Evaluation Period	AM Peak	Afternoon
Before (Nov. 2014)	3:03	n/a
Modeled	3:01	n/a
Week 1-2	3:23	4:13
Week 3	3:05	4:09

In the PM peak hour, the model forecast an increase of about 58 seconds during the PM peak hour for northbound traffic and an increase of about 1 minute and 10 seconds for southbound traffic. These projected increases in travel time represent projected conditions after the traffic patterns have settled down and travelers are familiar with the changes in the corridor. We would have expected this “learning curve” or “settling period” to take at least a month after the project was fully implemented and CU was back in session.

Travel time measurements taken in weeks 1-4, immediately after implementation, have not had the benefit of this “learning curve”, but are being offered as immediate or “early” observations, and they should be considered in this context.

The average Week 1-2 PM peak hour travel times varied by over 4 minutes in both directions. The longest travel time, over 8 minutes, was recorded in the southbound direction. Factors that may have influenced these earliest observations include:

- SB trips have more travel time variation than NB. It appears that this is influenced by the location of the flashing pedestrian crossings at Spruce Street and Walnut Street in relation to the adjacent traffic signals.
- Non-typical travel patterns during Week 2
 - Pre-Ironman Boulder visitors
 - Final installation small changes were still being made
 - August 1st student “move in” (leases begin)
 - Horizon West lot repaving

Average northbound PM peak hour travel times recorded during Week 3 were slightly shorter than those recorded during Weeks 1-2 and showed less variability. The longest travel time recorded in the northbound direction was about 1 minute 30 seconds shorter than the time recorded during Weeks 1-2. Average southbound PM peak hour travel time was over a minute shorter than during Weeks 1-2. The variability in travel time also decreased, by almost 2 minutes, with the longest travel time recorded at just under 6 minutes.

The Week 3 northbound average travel time is about 28 seconds shorter than the model forecast travel time. The Week 3 southbound average travel time is about 11 seconds longer than the model forecast travel time.

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Average PM Peak Hour Travel Times (in minutes:seconds)

Evaluation Period	PM Northbound	PM Southbound
Before (Nov. 2014)	3:32	3:20
Modeled	4:30	4:30
Week 1-2	4:15	5:36
Week 3	4:02	4:41

Northbound PM Peak Hour Travel Time Variability (in minutes:seconds)

Evaluation Period	Average	High	Low	Variability
Before	3:32	4:52	2:46	2:06
Week 1-2	4:15	6:48	2:40	4:08
Week 3	4:02	5:15	2:49	2:26

Southbound PM Peak Hour Travel Time Variability (in minutes:seconds)

Evaluation Period	Average	High	Low	Variability
Before	3:20	3:44	2:13	1:31
Week 1-2	5:36	8:14	3:35	4:21
Week 3	4:41	5:58	3:35	2:23

Collisions

Collision data for the Folsom corridor from Valmont to Colorado is being compiled from police reports. The following summarizes the average collision frequency per year from 2012 to 2014 for vehicle-vehicle, vehicle-bicycle, and vehicle-pedestrian collisions. The totals include all crashes at the intersections and in segments along the corridor. The collisions reported for Weeks 1-3 are also summarized below by mode.

Summary of Before Collisions Along Folsom Street from Valmont to Colorado from 2012-2014

Before Time Period	Vehicle-Vehicle	Vehicle - Bike	Vehicle - Pedestrian	Total
2012-2014	212	34	7	253
Average per Year	70.7	11.3	2.3	84.3

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After Weeks 1-3 Collisions Along Folsom Street from Valmont to Colorado

After Evaluation Period	Vehicle-Vehicle	Vehicle-Bike	Vehicle-Pedestrian	Total
Week 1-2	1	1	0	2
Week 3	1	0	0	1
Total	2	1	0	3

Bicycle Volume

Daily bicycle volumes are being collected at three locations along Folsom: Boulder Creek, South Street, and Pine Street. BVSD and CU were not in session during the before or after data collection periods. Before and after volumes at Boulder Creek have been collected by a permanent 24-hour counter. The before volumes at South and Pine Street were collected from 6am to 9pm on June 30th, 2015 and after volumes are being collected by permanent 24-hour counters installed in late July, 2015. Note that the validation of the counters is currently in progress and volumes may later be adjusted to account for potential variances. As noted above in the Travel Time section, there were non-typical travel patterns during Weeks 1-2 after installation, including the Boulder Ironman, and these may have influenced the bicycle volumes recorded during this time period.

Daily Weekday Average Bicycle Volumes Along Folsom Street at South Street

Evaluation Period	Northbound	Southbound	Total
Before	388	389	777
Week 1	497	578	1,075
Week 2	512	556	1,068
Week 3	406	500	906
Average Weeks 1-3	472	545	1,016

Daily Weekday Average Bicycle Volumes Along Folsom Street at Pine Street

Evaluation Period	Northbound	Southbound	Total
Before	437	440	877
Week 1	620	655	1,275
Week 2	551	625	1,176
Week 3	554	616	1,170
Average Weeks 1-3	575	632	1,207

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Daily Weekday Average Bicycle Volumes Along Folsom Street at Boulder Creek

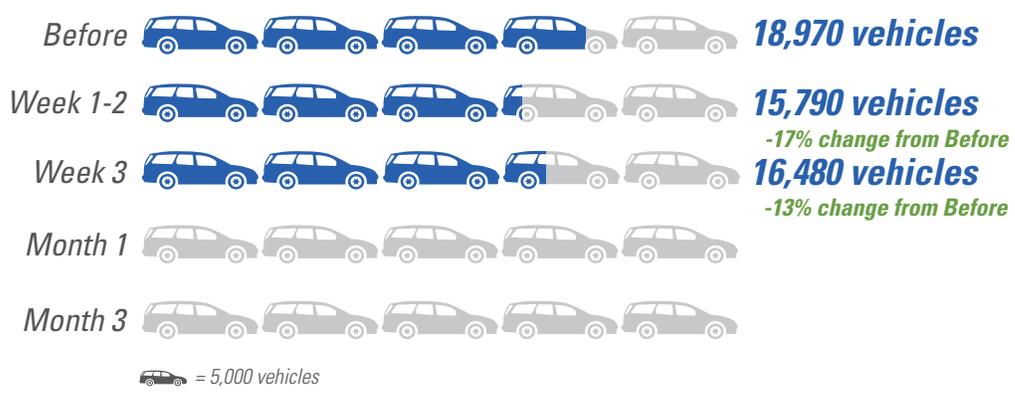
Evaluation Period	Northbound - Adjusted	Southbound - Adjusted	Total - Adjusted
Before	592	483	1,076
Week 1	683	521	1,204
Week 2	607	497	1,104
Week 3	603	478	1,081
Average Weeks 1-3	631	498	1,129

Notes:

- “Before” volumes at Pine and South were collected from 6am – 9pm on June 30th, 2015 and converted to daily volumes using the average hourly distribution from the permanent counter data.
- “Before” volumes at Boulder Creek are an average of weekday volumes from the last week of July and first two weeks of August from 2012-14.
- “After” volumes are an average of daily volumes on Tuesday, Wednesday, and Thursday during the corresponding week.
- Volumes from Folsom at Boulder Creek have been adjusted using previously determined adjustment factors. Volumes from Pine and South have not yet been adjusted.



Auto Weekday Volume



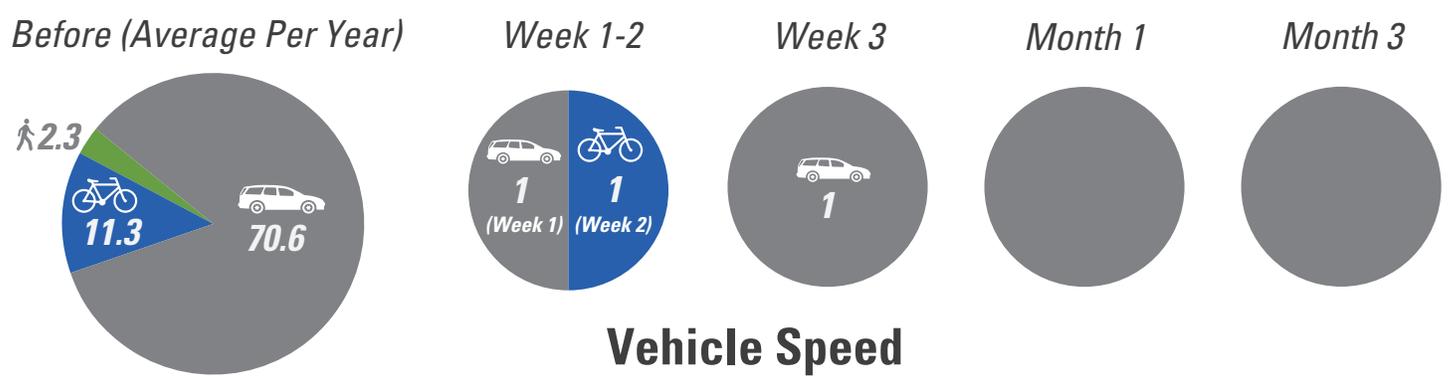
Bicycle Weekday Volume



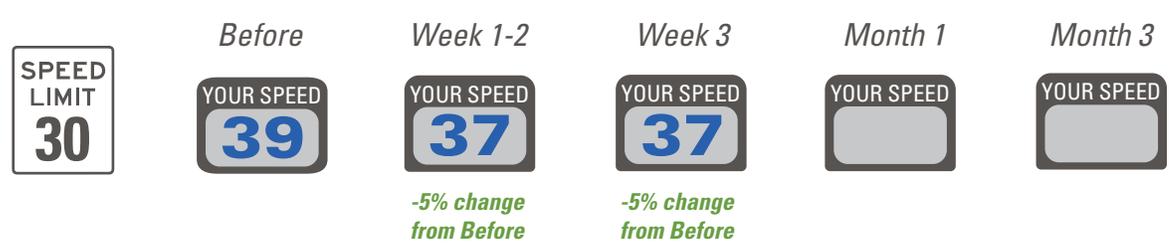
PM Vehicle Travel Time

	northbound	southbound	
Before	High	4m 52s	3m 44s
	Avg	3m 32s	3m 20s
	Low	2m 46s	2m 13s
Modeled	4m 30s	4m 30s	
Week 1-2	High	6m 48s	8m 14s
	Avg	4m 15s	5m 36s
	Low	2m 40s	3m 53s
Week 3	High	5m 15s	5m 58s
	Avg	4m 02s	4m 41s
	Low	2m 49s	3m 35s
Month 1	High	m S	m S
	Avg	m S	m S
	Low	m S	m S
Month 3	High	m S	m S
	Avg	m S	m S
	Low	m S	m S

Collisions



Vehicle Speed





Notes:

- **Modifications to the infographic are based on feedback from TAB**
- **Additional data on demographics, pedestrians, and transit will be added as more data is available to report**
- **Week 1-2: July 27 to August 9**
- **Week 3: August 10 to August 16**
- **Weekday vehicle volume measured at Folsom north of Canyon**
- **Average weekday cyclist volume measured at Folsom north of Pine**
- **Vehicle Travel Time measured between Arapahoe and Valmont**
- **Before collisions are average collision frequency per year (2012-14)**
- **Vehicle Speed = 85th %-tile @ Bluff**

Boulder Valley Employee Survey

Executive Summary

The Boulder Valley Employee Survey has been conducted for the Transportation Division nine times previous to the 2014 implementation; every two or three years between 1991 and 2011. Employees were targeted for inclusion in the study through a two-stage selection process; first a group of employers was randomly chosen, and then employees from within the selected organization were invited to participate in the survey. All companies in Boulder Valley, considered to be the zip codes of 80301 through 80310, were eligible for the study. A total of 1,150 employers were selected for the study, 350 from the downtown area, and 800 from the rest of Boulder Valley. These selected organizations were mailed a letter explaining the importance of the study, and were contacted over the next few weeks to invite participation. Most employers emailed an online survey invitation to their employees. For some organizations like restaurants, retail stores and hotels, research staff worked with a contact person at the organization to drop off hard copy surveys which the employer would distribute and collect, to be later picked up by research staff. A total of 2,060 surveys were collected from employees in 374 organizations. The company response rate was 24% in the downtown area and 44% in the rest of Boulder Valley. The employee response rate was 34% in the downtown area and 31% in the rest of Boulder Valley. The data were weighted to account for the differential response rates of organizations and employees to more accurately represented employees of the Boulder Valley. With a sample size of over 1,000, the margin of error around the results is approximately $\pm 2\%$ per year.

Survey Highlights

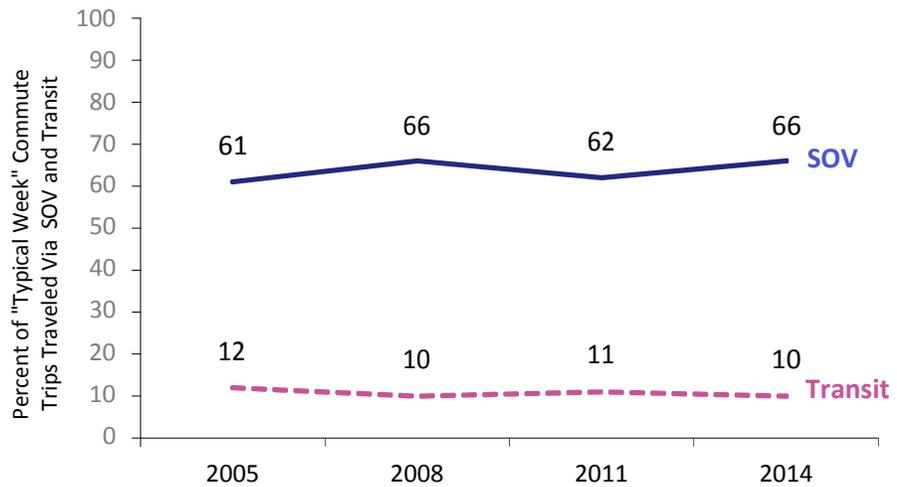
About two-thirds of work commute trips made during a “typical” week are made by driving alone.

One of the main purposes of the Employee Transportation Survey is to determine the “modal share” of trips made to and from the place of employment by those who work in Boulder Valley; that is, the proportion of work commute trips made via each method of transportation. Several questions on the survey relate to the work commute modal share.

One question asked how many days various modes of transportation were used for the commute to work during a typical week. Driving alone was the most common form of transportation used during a typical week, used for 66% of trips. Driving with another person was used for 6% of trips. Riding the bus and biking were each used for 7% of trips. Multi-mode travel (e.g., car then bus, bike then bus, etc.) was used for 3% of trips in a typical week. Walking to work accounted for 5% of trips. Working from home replaced about 4% of trips, while a compressed work week replaced another 2% of trips. Less than 1% of trips were by other modes.

Little change has been observed in the modal share of work commute trips in a typical week since the question was first asked in 2005.

Modal shift examines how the use of various modes changes over time. There has been little change in the reported modal share of work commute trips in a typical week since the question was first asked in 2005, with the proportion of single-occupancy vehicle (SOV) trips ranging from 61% to 66%.

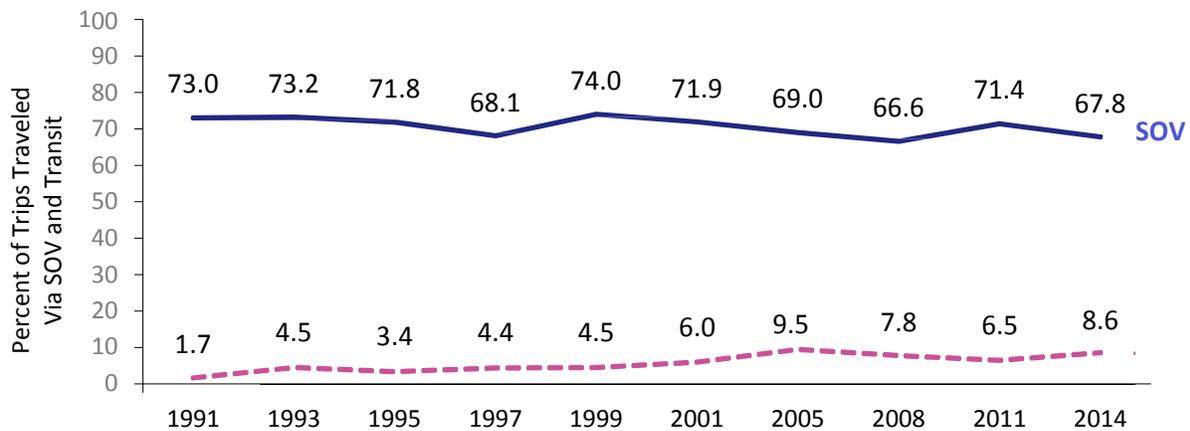


When asked how they traveled to work on the day they completed the survey, about two-thirds of respondents had commuted by driving alone.

In 2014, 68% of work commute trips on the day the survey was completed were made by driving alone. Using transit and bicycling were the next most common forms of commuting to work, representing 9% and 8% of trips, respectively. About 5% of respondents had shared a ride with at least one other person, and 4% walked to work. Approximately 3% telecommuted on the day they completed the questionnaire and 2% used multiple modes.

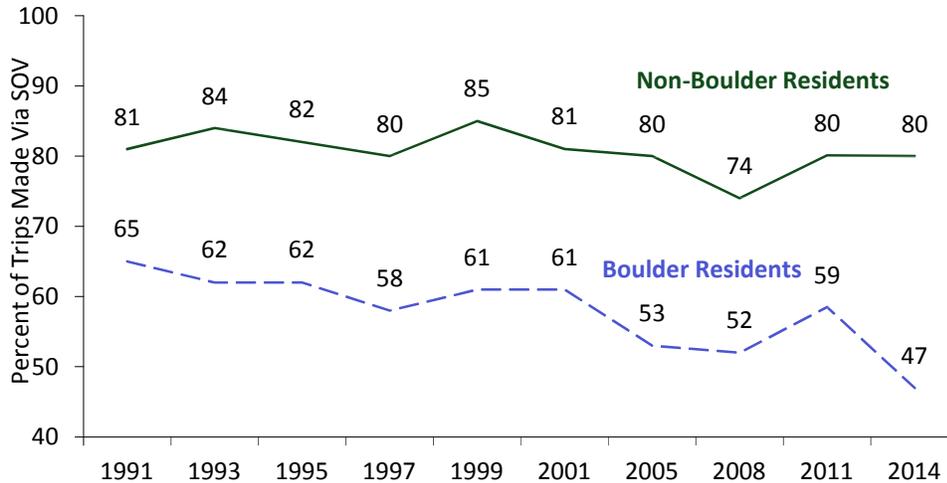
Since the survey was first conducted in 1991, the proportion of those who work in Boulder Valley and commute to work using a single-occupancy vehicle (SOV) has remained fairly constant, ranging from a low of 67% in 2008 to a high of 74% in 1999.

Transit use reached a peak of nearly 10% in 2005 from a low of 1.7% the first time the survey was administered in 1991. In 2014, transit was nearly as high as the peak with 9% of respondents reporting the rode a bus to work on the day the completed the survey.



Those who live outside Boulder were more likely drive alone for the work commute than were those who live in Boulder.

About 38% of respondents reported the live in the city of Boulder, and the remaining 62% lived outside of Boulder. When the modal shift over time is examined by place of residence, a trend of decreasing use of the single occupancy vehicle (SOV) was seen over time among those who lived in Boulder between 1999 and 2008. In 2011, however, rates increased and were similar to those of years prior to 2005. Then, in 2014 a large decrease was seen, to 47%, a level five percentage points below that observed in 2008, continuing the overall downward trend. For those



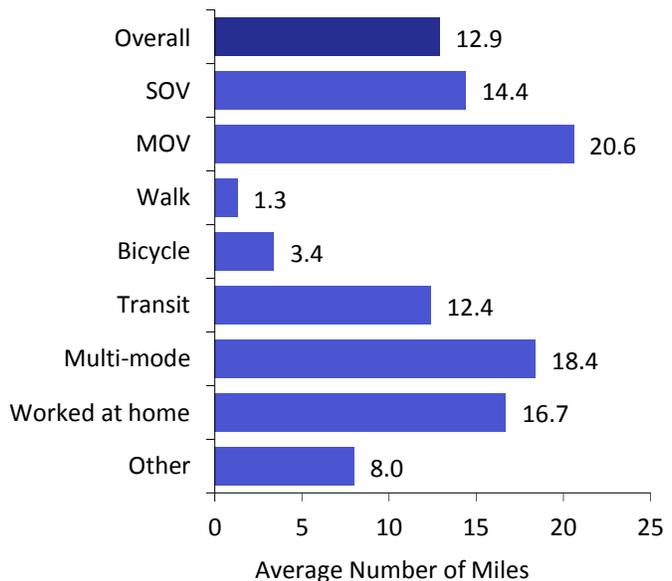
who lived outside of Boulder, where the prevalence of driving alone for the work commute was greater, SOV share decreased between 1999 and 2008. As with Boulder residents, SOV share increased in 2011, but then leveled off in 2014, to remain at 80%.

Those who walked or bicycled for their work commute lived much closer to work, on average, than did those who used vehicles, either private or transit, for their work commute.

The average distance of an employee’s work commute was 12.9 miles in 2014, while the average duration was 27.7 minutes.

The average walk commute distance was 1.3 miles, while the average bicycle commute was 3.4 miles.

The distance of the work commute increased gradually from 1991 to 2001, and then has remained relative stable. Average duration of the work commute has been generally increasing over time, with a larger jump from 23.2 minutes in 2011 to 27.7 minutes in 2014.

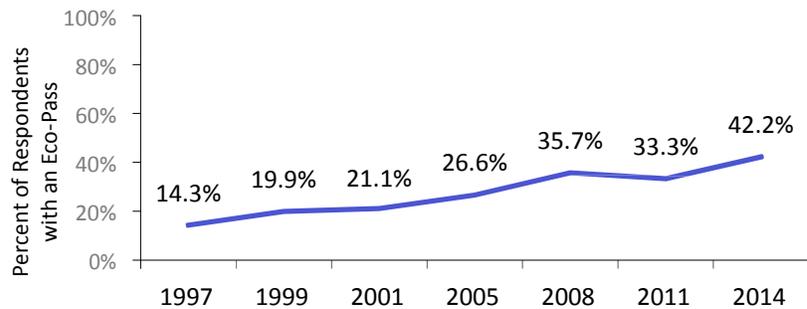


About 6% of the private motor vehicles used for the work commute were hybrid gas/electric vehicles.

About 8 in 10 respondents reported a motor vehicle was available to them for their work commute. For the first time in 2014, these respondents were asked about the characteristics of the type of vehicle available for the work commute. Of those with a vehicle available for the work commute, 6% were hybrid (gas/electric) vehicles. Nine percent of these vehicles were a partial zero emissions vehicle. Very few (0.2%) were electric vehicles, and only a couple of respondents (0.1%) used a Level 2 EV charger at work.

Eco-Pass holdership continued to climb.

In 2014, four in 10 respondents reported they had an Eco-Pass. Eco-Pass possession increased steadily from 1997 to 2008, leveled off from 2008 to 2011, and then increased again in 2014.



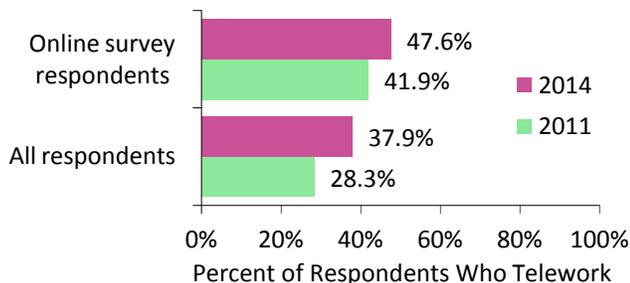
When asked if they ever ride a bus to work, about a third of those completing the employee transportation survey said they did so.

This was similar to results from previous years. About one in five respondents reported riding a bus for **non-commute trips** during a typical week. This represents a slight decrease from 2011, but is similar to what had been observed in 2008 and 2005. The average number of trips per respondent made during a typical week for non-commute trips on the bus was 0.6 trips per week. Among those who typically made at least one trip, the average number of non-commute bus trips per week was 3.0.

As observed in previous years, Eco-Pass possession was associated with use of transit for work and non-work trips. Almost 1 in 5 of employees with an Eco-Pass rode a bus for the work commute on the survey day compared to just 4% of those without an Eco-Pass. This was similar to levels reported since 2008, although the proportion of those riding with an Eco-Pass was slightly lower, and the proportion riding without an Eco-Pass was slightly higher.

The proportion of employees who ever telework for their job continued to increase.

The percentage of respondents who telework at least some of the time increased from 2005 to 2008 and remained stable between 2008 and 2011, with another increase in 2014. As this



question was only asked of those who completed the web version of the survey in 2014, the increase compared to 2011 was examined by mode in which the respondent completed the survey. Even when comparing only those who completed the online version of the survey in 2011 and 2014, an 8% increase was seen in the proportion those ever able to telework.

Transportation Metrics Review

Vehicle Counts

Traffic volume data is collected by three yearly count programs: the Arterial Count Program, Boulder Valley Count Program, and Turning Movement Count Program. The Arterial Count Program has been used since 1982 to capture average daily traffic (ADT) volumes on a selection of arterial roadway sections throughout the City. The Boulder Valley Count Program has been in place since 1993 and captures all traffic entering and exiting the City. The results of the roadway system evaluation indicate that traffic conditions and operational performance have remained relatively stable over the past 10 years. Traffic volumes on the City’s arterial roadways have generally decreased over time despite the growth in population and employment. The LOS evaluation and travel time studies show similar patterns, as vehicle delay and travel times have not increased in recent years.

Traffic Volumes

An analysis of 10-year traffic count volumes from the Arterial Count Program shows that, on average, traffic volumes on the City’s arterial roadways have been decreasing by approximately 1.1% annually. During this time, the City’s population has grown by approximately 0.3% annually and employment has increased by approximately 0.4% each year. Additional population and jobs result in additional trip making potential. However, these added trips have not resulted in increased traffic volume on our arterial roadways. These trends are illustrated in **Figure 1**. More detailed information on the City’s Count Programs can be found on the City’s website at the following address: http://gisweb.ci.boulder.co.us/agswebsites/pds/pds_traffic/.

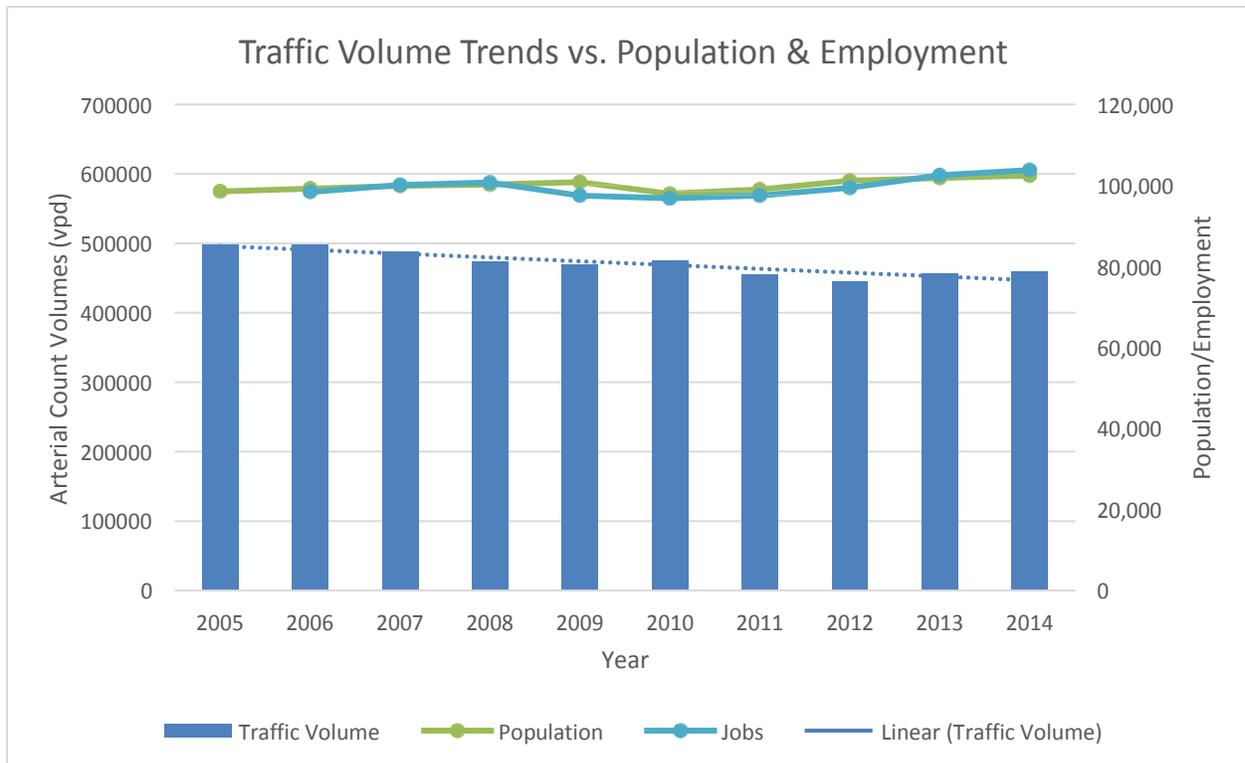


Figure 1. Trends in Boulder Traffic Volumes, Population, and Employment

Level of Service

Level of service is an operational analysis method that assigns a qualitative measure (level of service A through F) based on quantitative results such as average vehicle delay. Since the capacity and performance of arterial roadways are controlled by the signalized intersections, an operational analysis of these intersections is used to evaluate the City’s transportation system. An update of vehicle LOS at all signalized intersections based on intersection traffic volumes from 2012-2014 was completed in 2015. The vehicle LOS at signalized intersections has not degraded, even as the City grows in population and employment. The number of intersections with an overall vehicle LOS of E or F during any peak hour is tracked and the percentage of intersections at overall LOS E or F has remained around 19-21% during the last several LOS updates but dropped to 11% in the 2015 report. The results of the recent LOS analyses are summarized in **Table 1**. This reflects the decrease in traffic volumes during the three previous years. In response to concerns raised during the TMP update, the 2015 LOS update also began tracking the percentage of traffic in each peak period that experiences a movement of LOS E or F. This new metric is shown in **Table 2** and is a baseline metric that staff will be tracking with all future LOS updates.

Year	Total # Signalized Intersections	# at LOS E or F in Any Peak Hour	% of Total
2007	132	25	19%
2009	133	25	19%
2011	133	28	21%
2015	138	15	11%

Table 1. Summary of Level of Service Results

Peak Hour	Total Entering Volume	# of Entering Vehicles Experiencing LOS E or F	% of Entering Vehicles Experiencing LOS E or F
AM	275,116.00	18,128.00	7%
Noon	275,391.00	9,783.00	4%
PM	351,425.00	33,520.00	10%

Table 2. Vehicles Experiencing LOS E or F

Travel Times

In addition to traffic volumes and level of service, travel times are also considered when evaluating the City’s transportation system. Travel time studies are conducted every three years for six major east-west corridors and north-south corridors. These corridors are Arapahoe Avenue, Broadway, Balsam/Edgewood/Valmont Road, 28th Street, Peal Street, and Foothills Parkway. Travel time studies were completed for Broadway, 28th Street, and Foothills Parkway

in 2012 and for Arapahoe Avenue, Valmont Road, and Broadway in 2014. Changes in corridor travel times can be caused by a variety of factors including intersection improvements, modifications to traffic signal timing, construction projects, and fluctuations in traffic volumes. Thus, increased traffic congestion would likely adversely affect travel times. The latest travel time studies provided results consistent with past studies, revealing no significant changes to the time it takes to traverse these corridors.

The results of the travel time runs can be compared to the theoretical minimum travel time based on the speed limit of each corridor. As shown in **Figure 2**, travel times have remained relatively steady over the past 10 years. The sharp decrease in travel times on 28th Street between 2006 and 2008 was most likely a result of improvements at the Iris Avenue intersection.

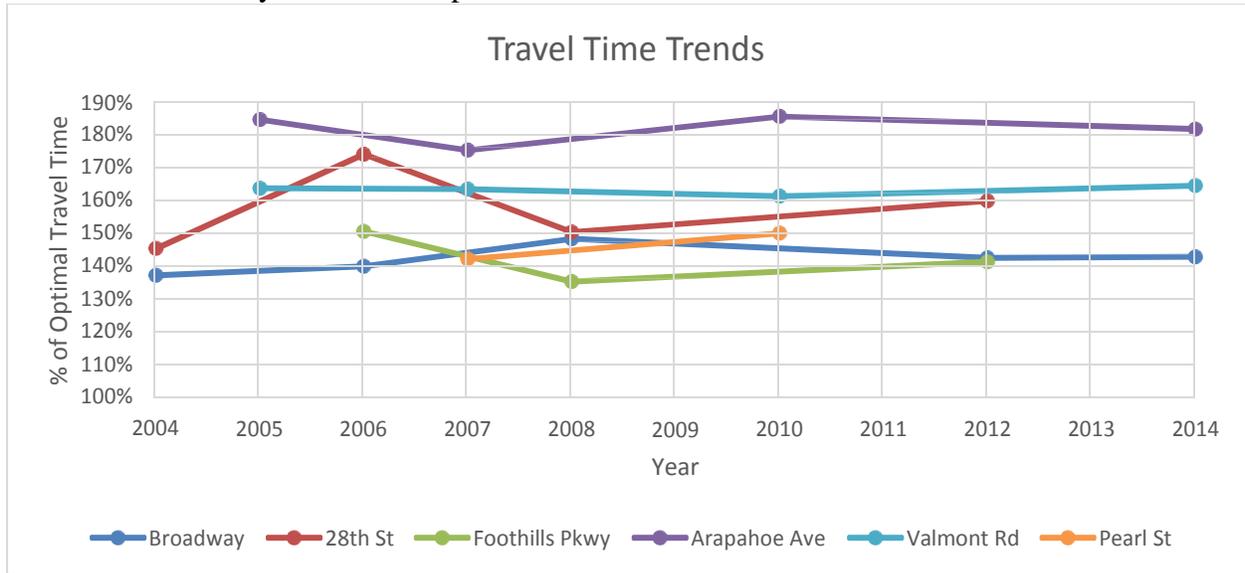


Figure 2. Travel Time Trends on Major Corridors

Bike Counts

Downtown Bike Parking

Since 2007 bicycle parking data has been collected and analyzed for downtown Boulder. Data is collected by a team of volunteers and staff on four different times on four different days intended to reflect times of high bike demand. All bikes on the 41 blocks of the downtown are counted, including those in alleys and accessible garages, as well as the type of parking involved. During the period of the Downtown bike parking counts, bike parking has gone up significantly between 2007 and 2014. This increase has largely been accommodated through almost an 80 percent increase in bike parking racks. However, the increase in bikes downtown has flattened since 2009, potentially reflecting a lack of available racks or poor placement of the existing racks. The Downtown bike parking analysis has identified blocks where exiting racks to not meet demand and blocks where rack placement seems to limit use of those racks.

Automated Bike Counts

Following the 1996 TMP, the city began installing a set of automated bike count stations. Including several stations operated by the Colorado Department of Transportation, there are

currently 25 bike count locations in the Boulder Valley, include three on-street stations and 22 counters on bike path locations. The most recent addition to the count program was the installation of the EcoCounter real time display on the 13th Street bike lane. This station both provides highly sensitive bike detection and a running daily total of bike activity on 13th Street as part of the Broadway bike route. While these count stations do not capture all bike activity, researchers have stated that this is the most comprehensive set of bike data in the country. The city’s automated bike count data has been the subject of several academic research projects, including an effort to predict annual bike ridership from limited data and a study of weather factors affecting bike ridership. This research has shown that bike ridership is strongly affected by weather, particularly temperature and precipitation. Bike ridership follows a consistent pattern of peaking during the warm summer months and reaching minimums in mid-winter. Precipitation will then significantly reduce bike usage at any time of the year.



Over the period of automated bike counts, there has not been a significant increase in bike counts. This is not consistent with the increase in resident bike mode share shown in the Boulder Valley Employee Survey, where bike mode share has increased from 13 percent in 2001 to 18 percent in 2014. This might reflect the location of the count stations, which might be counting older parts of the bike system while recent improvements have made other routes or corridors more attractive. A notable example would be the completion of the 30th Street corridor which does not have any count stations.

Surveys

With the 1989 TMP’s call for a better understanding of travel in the Boulder Valley, two primary surveys were created to measure travel: the travel diary survey to measure how Boulder residents travel and the *Boulder Valley Employee Survey (BVES)* to measure travel by both resident and non-resident employees in the Boulder Valley. As more than half of Boulder employees commute in from outside the Boulder Valley, trips by non-residents are a large share of the travel puzzle. For 2014, comparable surveys were conducted for University of Colorado (CU) faculty and staff, Boulder Valley School District faculty and staff, and City of Boulder employees. Results for all five groups are included in the comparison report available on the city’s [Transportation Use Measurements](#) webpage.

Figure 3. Eco Counter on 13th Street

Boulder Valley Employee Survey

The 2015 BVES show continued progress in reducing the single-occupancy vehicle (SOV) mode share of the work commute. As shown in **Figure 3** below, from 1991 to 2014, SOV mode share for Boulder Valley employees commute trips declined from 73 percent to 67.8 percent.

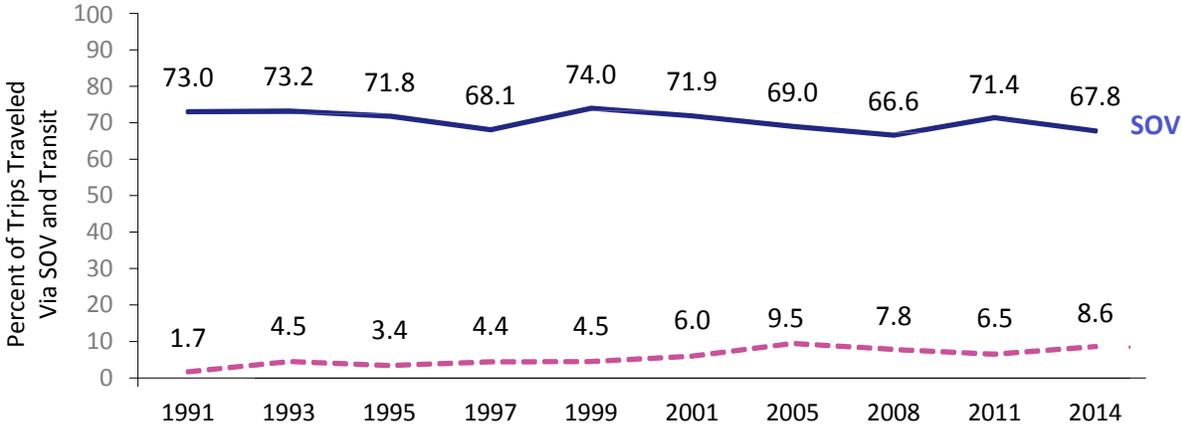


Figure 3. Work Trip Mode share of Boulder Valley Employees

While the SOV work trip mode share of non-resident employees has remained relatively constant, the SOV commute mode share for Boulder residents has shown a significant reduction from 65 percent to 47 percent. This reduction is shown in **Figure 4**, and a comparison of the two figures show that the mode change in Boulder Valley employees is almost entirely driven by

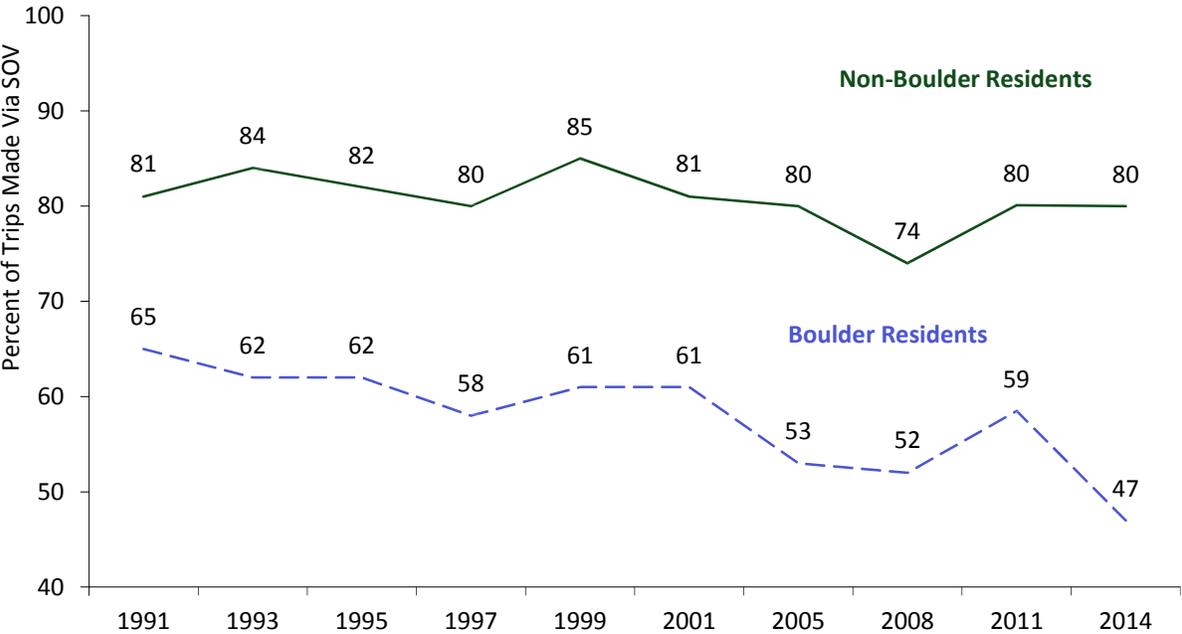


Figure 4. Work Trip Mode share of Resident and Non-Resident Boulder Valley Employees

Boulder resident mode change. The 2014 BVES also shows that Eco Pass procession continues to increase for Boulder Valley employees, with 42 percent of all employees having an Eco Pass for an increase of 6 percent from 2011. Car sharing has continued to drop and is less than half of its previous high, reflecting national trends. And the distance of the work commute continues to increase, with 20.2 percent of employees traveling more than 20 miles to work, up from 12.4 percent in 1991. The proportion of the employees who ever telework has increased significantly, rising from about 28 percent in 2011 to 38 percent in 2014 for all respondents and from about 42 percent to 48 percent for online respondents for the same year.

Downtown Boulder Employee Transportation Survey

For the Downtown, the low point for the drive-alone mode share was 34 percent in 2008, reflecting high gasoline prices. SOV mode share for the day of the survey was 43 percent in 2014, unchanged from 2011. These changes in SOV commuting are reflected in an overall change in transit commute mode share as shown in **Figure 5**, which peaked in 2008 at 34 percent and was 23 percent in 2014. Mode shares for a “typical” week were very similar to those for the day of the survey.

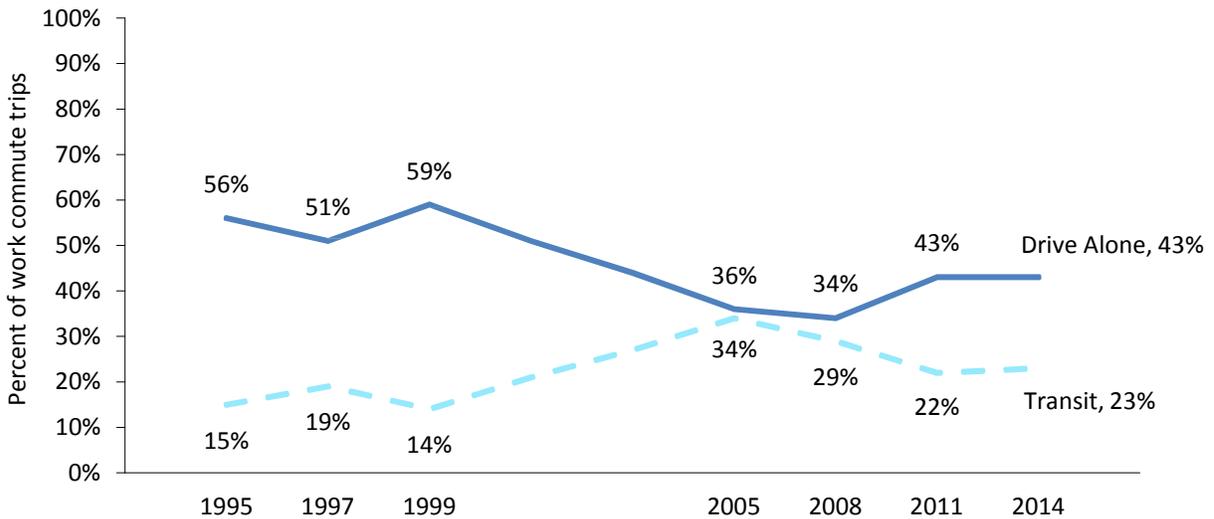


Figure 5. Work Trip SOV and Transit Mode Share of Downtown Employees

Eco Pass procession reached a new high, with 84 percent of Downtown employees having an Eco Pass. Telecommuting also increased significantly, with about 16% of all online respondents in 2014 reported telecommuting once a week or more, nearly double the 8% who reported doing so in 2011. Both Boulder B-Cycle and eGo CarShare memberships increased, with eGo CarShare memberships doubling from 2 percent to 4 percent.