

Date: Jan. 6, 2016

# Folsom Street Living Lab

## Primary Evaluation Criteria



As part of the Living Laboratory Phase II Folsom Street project, data on vehicle and bicycle volumes, vehicle speed, vehicle travel time, collisions, and bicyclist demographics was collected before the installation of protected bicycle lanes, during weeks 1-14 after the installation, and will continue to be collected as part of the ongoing evaluation process. As of November 2015, data collection and reporting moved to a monthly basis.

Secondary evaluation data is also being collected as part of the evaluation process. This summary includes preliminary bicycle demographic data. Additional details about the secondary evaluation criteria and the collection time periods for each can be found at [www.BoulderLivingLab.net](http://www.BoulderLivingLab.net).

Before data collection time periods vary by criteria and are noted in the individual tables below. After data collection time frames are:

- **Weeks 1-2:** July 27 to Aug. 9, 2015
- **Week 3:** Aug. 10 to Aug. 16, 2015
- **Week 4:** Aug.17 to Aug. 23, 2015
- **Week 5:** Aug. 24 to Aug. 30, 2015
- **Week 6:** Aug.31 to Sept. 6, 2015
- **Week 7:** Sept. 7 to Sept. 13, 2015
- **Week 8:** Sept.14 to Sept. 20, 2015
- **Week 9:** Sept. 21 to Sept.27, 2015
- **Week 10:** Sept. 28 to Oct. 4, 2015
- **Week 11:** Oct.5 to Oct. 11, 2015
- **Week 12:** Oct. 12 to Oct. 18, 2015
- **Week 13:** Oct.19 to Oct. 25, 2015
- **Week 14:** Oct.26 to Nov. 1, 2015
- **Month 4:** November 2015
- **Month 5:** December 2015

### Vehicle Volume and Speed

The city has been collecting average weekday traffic volume and speed at two locations along Folsom Street, north of Bluff and north of Canyon. The data is recorded for a three-day period, and reported as the average of the three days, or average daily traffic (ADT). Note that Boulder Valley School District (BVSD), University of Colorado –Boulder (CU) and Naropa schools have been in session during some, but not all, of the before and after data collection periods (noted in the tables below). Week 11 after data may not be typical as work to return Folsom to a four-lane cross section between Spruce and Canyon began on Oct. 8.

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

<b>Evaluation Period</b>	<b>Date Collected</b>	<b>ADT-Weekday (vpd)</b>	<b>Average Speed (mph)</b>	<b>85th Percentile Speed (mph)</b>	<b>School In Session</b>
Before	4/27-5/1/15	15,780	35	39	Yes
After-Week 2	8/5-8/7/15	13,790	33	37	No
After-Week 3	8/12-8/14/15	13,930	33	37	No
After-Week 5	8/26-8/28/15	14,310	32	36	Yes
After-Week 6	9/2/15-9/4/15	14,100	32	36	Yes
After-Week 7	9/8/15-9/11/15	14,210	32	36	Yes
After-Week 8	9/15/15-9/17/15	13,570	33	36	Yes
After-Week 9	9/22/15-9/24/15	13,750	33	36	Yes
After-Week 10	9/29-15-10/1/15	14,170	33	36	Yes
After-Week 11	10/6/15-10/8/15	13,960	33	36	Yes
After-Week 12	N/A				
After-Week 13	N/A				
After-Week 14	10/27/15-10/29/15	14,350	33	37	Yes
After-Month 4	11/17/15-11/19/15	14,140	33	37	Yes
After-Month 5	12/8/15-12/10/15	14,650	33	36	Yes

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

<b>Evaluation Period</b>	<b>Date Collected</b>	<b>ADT-Weekday (vpd)</b>	<b>Average Speed (mph)</b>	<b>85th Percentile Speed (mph)</b>	<b>School in Session</b>
Before	6/30-7/2/15	18,970	29	34	No
After-Week 2	8/3-8/5/15	15,790	25	30	No
After-Week 3	8/10-8/12/15	16,480	24	29	No
After-Week 5	8/25-8/26/15	16,500	24	29	Yes
After-Week 6	9/2/15-9/4/15	15,960	24	29	Yes
After-Week 7	9/9/15-9/11/15	16,590	26	30	Yes
After-Week 8	9/16/15-9/17/15	16,200	26	30	Yes
After-Week 9	9/22/15-9/24/15	15,760	26	30	Yes
After-Week 10	9/29-15-10/1/15	16,520	25	30	Yes
After-Week 11	10/6/15-10/8/15	15,920	27	32	Yes
After-Week 12	N/A				
After-Week 13	N/A				
After-Week 14	10/27/15-10/29/15	17,780	30	35	Yes
After-Month 4	11/17/15-11/19/15	17,580	31	35	Yes
After-Month 5	12/8/15-12/10/15	18,200	30	35	Yes

- **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.

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

<b>Evaluation Period</b>	<b>PM Northbound</b>	<b>PM Southbound</b>
Before (Nov. 2014)	3:32	3:20
Modeled	4:47 <sup>1</sup>	4:30
Week 1-2	4:15	5:36
Week 3	4:02	4:41
Week 5	4:37	4:52
Week 6	4:13	5:19
Week 7	4:13	4:52
Week 8	3:05	4:36
Week 9	4:00	3:55
Week 10	3:24	4:21
Week 11	3:48	4:18
Weeks 12-13	N/A	
Week 14	3:38	3:35
Month 4	3:36	3:34
Month 5	3:33	3:45

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

<b>Evaluation Period</b>	<b>Average</b>	<b>High</b>	<b>Low</b>	<b>Variability</b>
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
Week 5	4:37	6:33	2:57	3:36
Week 6	4:13	6:47	2:38	4:07
Week 7	4:13	5:25	3:03	2:22
Week 8	3:05	5:01	2:40	2:39
Week 9	4:00	4:57	2:39	2:36
Week 10	3:24	4:41	2:37	2:04
Week 11	3:48	N/A		
Week 12-13	N/A			
Week 14	3:38	N/A		
Month 4	3:36	N/A		
Month 5	3:33	N/A		

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

<b>Evaluation Period</b>	<b>Average</b>	<b>High</b>	<b>Low</b>	<b>Variability</b>
Before	3:20	3:44	2:13	1:31
Week 1-2	5:36	8:14	3:53	4:21
Week 3	4:41	5:58	3:35	2:23
Week 5	4:52	6:15	3:53	2:22
Week 6	5:19	7:50	3:52	3:58
Week 7	4:52	7:31	3:43	4:12
Week 8	4:36	7:28	3:33	3:55
Week 9	3:55	5:29	2:08	3:21
Week 10	4:21	5:47	3:12	2:35
Week 11	4:18	N/A		
Weeks 12-13	N/A			
Week 14	3:35	N/A		
Month 4	3:34	N/A		
Month 5	3:45	N/A		

## Collisions

Collision data for the Folsom corridor from Valmont to Colorado is being compiled from police reports. The totals include all crashes at the intersections and in segments along the corridor. The following summarizes the average collision frequency (1.6 per week) from 2012 to 2014 for vehicle-vehicle, vehicle-bicycle, and vehicle-pedestrian collisions. The collisions reported 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	70.6	11.3	2.3	84.3

### **After 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
Week 4	1	1	0	2
Week 5	0	0	0	0
Week 6	0	0	0	0
Week 7	1	0	0	1
Week 8	1	1	0	2
Week 9	3	0	0	3
Week 10	2	0	0	2
Week 11	2	1	0	3
Week 12	1	1	0	2
Week 13	1	0	0	1
Week 14	1	1	0	2
Week 15	1	0	0	1
Week 16	1	1	0	2
Week 17	1	0	0	1
Week 18	0	0	0	0
Week 19	1	0	0	1
Week 20	1	0	0	1
Week 21	3	0	0	3
Week 22	1	0	0	1
<b>Total</b>	<b>24</b>	<b>7</b>	<b>0</b>	<b>31</b>

## **Bicycle Volume**

Daily bicycle volumes are being collected at three locations along Folsom using permanent 24-hour counters: Boulder Creek, South Street, and Pine Street. BVSD, CU and Naropa were not in session during the before data collection period. Before and after volumes at Boulder Creek were collected by a permanent 24-hour counter. The before volumes at South and Pine streets were collected from 6 a.m. to 9 p.m. on June 30, 2015, and after volumes are being collected by permanent 24-hour counters installed in late July 2015. The after data includes bicycle volumes while BVSD, CU and Naropa were both in and out of session. Note that the validation of the counters is currently in progress, and volumes may later be adjusted to account for potential variances.

Bicycle volumes at all three locations increased during Weeks 4 and 5 from before conditions and Week 3 volumes. As noted previously, BVSD classes started during Week 4 and CU and Naropa classes started during Week 5, likely influencing the bicycle volumes.

**Daily Weekday Average Bicycle Volumes Along Folsom Street at Pine Street**

<b>Evaluation Period</b>	<b>Northbound</b>	<b>Southbound</b>	<b>Total</b>	<b>School in Session</b>	<b>Inclement weather</b>
Before	437	440	877	No	
Week 1	620	655	1,275	No	
Week 2	551	625	1,176	No	
Week 3	554	616	1,170	No	
Week 4	603	651	1,254	No	
Week 5	705	766	1,471	Yes	
Week 6	684	748	1,432	Yes	
Week 7	754	766	1,520	Yes	
Week 8	681	713	1,393	Yes	
Week 9	676	713	1,389	Yes	
Week 10	643	681	1,324	Yes	
Week 11	546	568	1,113	Yes	
Week 12	581	639	1,220	Yes	
Week 13	279	292	571	Yes	X
Week 14	440	477	917	Yes	
Month 4	290	284	574	Yes	
Month 5	176	169	346	Yes	

**Daily Weekday Average Bicycle Volumes Along Folsom Street at South Street**

Evaluation Period	Northbound	Southbound	Total	School in Session	Inclement weather
Before	388	389	777	No	
Week 1	497	578	1,075	No	
Week 2	512	556	1,068	No	
Week 3	406	500	906	No	
Week 4	570	600	1,169	No	
Week 5	706	791	1,497	Yes	
Week 6	725	799	1,524	Yes	
Week 7	730	813	1,543	Yes	
Week 8	692	769	1,461	Yes	
Week 9	695	761	1,456	Yes	
Week 10	653	729	1,382	Yes	
Week 11	552	618	1,170	Yes	
Week 12	N/A				
Week 13	N/A				
Week 14	N/A				
Month 4	277	306	583	Yes	
Month 5	161	202	363	Yes	

**Daily Weekday Average Bicycle Volumes Along Folsom Street at Boulder Creek**

Evaluation Period	Northbound - Adjusted	Southbound - Adjusted	Total - Adjusted	School in Session	Inclement weather
Before	592	483	1,076	No	
Week 1	683	521	1,204	No	
Week 2	607	497	1,104	No	
Week 3	603	478	1,081	No	
Week 4	782	602	1,384	No	
Week 5	1,060	880	1,940	Yes	
Week 6	1,226	855	2,081	Yes	
Week 7	1,212	945	2,157	Yes	
Week 8	1,248	926	2,174	Yes	
Week 9	1,096	904	2,000	Yes	
Week 10	1,055	856	1,911	Yes	
Week 11	967	769	1,736	Yes	
Week 12	1002	816	1,819	Yes	
Week 13	547	429	976	Yes	X

Week 14	879	695	1573	Yes	
Month 4	444	370	814	Yes	
Month 5	263	203	466	Yes	

**Notes:**

- “Before” volumes at Pine and South were collected from 6 a.m. to 9 p.m. on June 30, 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 to 2014.
- “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.
- The increase in bike volume from Week 4 to Week 5 is attributed to school in session. The increases in this volume along this corridor so far are consistent with the increases the city typically sees when school is back in session.

**Bicycle Demographics**

Bicycle demographic data has been observed and recorded along the Folsom corridor before and after the installation of pilot project. The before data was collected on April 28, 2015, for two hours. Observations have been taken during weekday AM, noon, and PM rush hours. Observers record the total number of male and female bicycle riders on the roadways. In addition, the number of children and adults riding with children is recorded and comprises the “family” category (see table below).

**Bicycle Weekday Demographic Along Folsom Street**

Evaluation Period	Male	Female	Family
Before	72%	28%	4%
Week 1-2	78%	22%	6%
Week 3	67%	33%	5%
Week 5	66%	34%	4%
Week 6	66%	34%	4%
Week 7	67%	33%	2%
Week 8	70%	30%	1%
Week 9	69%	31%	2%
Week 10	70%	30%	2%
Week 11	73%	27%	1%
Week 12	66%	34%	0%
Week 13	72%	28%	1%
Week 14	65%	35%	0%
Month 4	66%	34%	1%
Month 5	89%	11%	0%

