



Annual Evaluation of Traffic Flow Follow-up Study

Summary of Results

Staff has completed a follow-up study of the traffic flow improvements implemented in 2007 (based on recommendations from the Evaluation of Traffic Flow Study through Broomfield). The below results are compared between years 2014, 2015, and 2017. An evaluation was not completed in 2016. Information is based upon the before, and after analysis of eight major (non-Colorado Department of Transportation (CDOT) highways) corridors in Broomfield. Weekend travel conditions were not evaluated. Below is a summary:

- Traffic volumes continue to increase on Broomfield roadways. Between the years of 2015 and 2017, traffic volumes rose by 0.97%.
- The 85th percentile speed decreased slightly (1 to 5 mph) on 13 out of the total 31 street locations examined. However, speeds increased (1 to 5 mph) on 6 roadways. On 12 corridors, speeds remain the same. The 85th percentile speed has decreased on a number of roadways this could be attributed to more construction activities and congestion on roadways.
- The travel-time and speed data provide a good means to measure the impact of traffic control changes that were implemented in 2007 as the result of speed limit changes. The comparison of the 2015 and 2017 data indicates a minimal increase of less than 1% in travel time. This is a good indication that Broomfield has exceeded their goal of better traffic flow after implementing the adaptive signal system, and improved signal timing on all the corridors, even with increased volumes on roadways. Most of the corridors where an increase in travel time occurred, also had an increase in traffic volumes (Midway Boulevard and Sheridan Boulevard). Additionally, the slight increase in travel time can be directly attributed to construction activities on the main corridors (120th Avenue and on Lowell Boulevard), and continued capacity concerns (144th Avenue and Midway Boulevard).
- The overall number of accidents has increased approximately 23% over the two year period (2015-2017). Largest increases in accidents occurred at state highway intersections; SH 7 and Huron Street, US 287 and Midway Boulevard, SH 7 and Sheridan Parkway, and SH 7 and Lowell Boulevard. Most of the intersections experienced a high number of rear end accidents and a few additional left turn collisions.
- Staff will continue to pursue possible funding through CDOT's hazardous elimination program (HSIP) for CDOT maintained intersections, when available.
- Additional roadway projects are planned on 144th Avenue, where the roadway will be widened to a four lane facility. With the widening we anticipate that there will be a reduction in the overall number of accidents and the amount of travel time for motorists.

BACKGROUND

The purpose of this memorandum is to document the results of a follow-up study to the Evaluation of Traffic Flow through Broomfield implemented in August 2007 with speed limit changes, and after studies completed in 2014, 2015, and 2017.

For the major Broomfield corridors listed below:

1. Flatiron Crossing Drive

2. Midway Boulevard
3. 136th Avenue
4. 144th Avenue
5. Main Street
6. Sheridan Boulevard
7. Lowell Boulevard
8. Zuni Street

Speed limits, accident data, intersection operations, and traffic signal timing were reviewed to determine appropriate changes that would improve the overall traffic flow through Broomfield. As a result of the Evaluation of Traffic Flow Study in 2007, speed limits were increased by 5 mph along portions of 6 of the 8 Broomfield-controlled corridors (speed limits remained unchanged along Flatiron Crossing Drive and along Main Street). Based on accident history and the change in classification, Rural Arterial (RA) to NonRural Arterial (NRA), a recommendation to decrease the speed by 10 mph along SH 7 (65 mph to 55 mph) was presented and accepted by CDOT. CDOT has jurisdiction over SH 7 in Broomfield.

The follow-up study included a “before-after” analysis of traffic accidents, travel time, average daily traffic volume, and speed data to estimate the impact of traffic flow improvements that were implemented in 2007, reviewed in 2014, 2015, and 2017.

Prior to commencing the Evaluation of Traffic Flow Study, Broomfield staff established a goal of improving traffic flow on primary corridors by 5 percent. The performance measures evaluated peak period travel-time in the before and after conditions as a means to compare against the stated goal of 5 percent improvement. This goal of 5 percent reduction was achieved within the 2008 to 2015 time frame where the data indicated an overall reduction of 9.2% in travel time.

A minimal increase in traffic flow in the last two years indicates Broomfield has exceeded their goal of better traffic flow after implementing the adaptive signal system, and improved signal timing on all the corridors, even with increased volumes on roadways.

Accident Investigation

The below table summarizes accident investigations over the last three time periods since implementing the speed limit changes 2007. The below information indicates that the overall number of accidents have increased approximately 23% over the two year period (2015-2017). Largest increases in accidents occurred at state highway intersections; SH 7 and Huron Street, US 287 and Midway Boulevard, SH 7 and Sheridan Parkway, and SH 7 and Lowell Boulevard. Most of the intersections experienced a high number of rear end accidents and a few additional left turn collisions. Staff will continue to pursue future funding opportunities through CDOT’s hazardous elimination funding program (HSIP)

Total Accidents - 2014, 2015, and 2017

Street Name	Limits	2014	2015	2017
Midway Blvd	Hoyt St. to E-O Alter St.	5	5	6
Midway Blvd	SH 287 to Kohl St.	33	28	59
Midway Blvd	E-O Kohl St. to Main St.	11	13	20
Midway Blvd	E-O Main St. to Ash St.	6	4	6
Midway Blvd	E-O Ash St to W-O Sheridan Blvd	4	2	7
Midway Blvd	Sheridan Blvd. to W-O Davis St.	17	18	28
Midway Blvd	Davis St. to Lowell Blvd.	11	2	10
Midway Blvd	E-O Lowell Blvd. to Zuni St.	21	26	24
Kohl St.	Miramonte Blvd. to Daphne St	7	5	4
Lowell Blvd.	120th Ave to 124th Ave	3	3	2
Lowell Blvd.	124th Ave to Midway Blvd.	5	4	1
Lowell Blvd.	Midway Blvd. to 136th Ave	6	10	4
Lowell Blvd.	144th Ave to Sheridan Pkwy	8*	14	15
Lowell Blvd.	160th Ave to SH 7	8	5	16
Sheridan Blvd.	1st Ave to Midway Blvd.	18	17	19
Sheridan Blvd.	Aspen Creek Dr. to 144th Ave	7	5	1
136th Ave	Aspen St. to Main St	2	7	4
136th Ave	Sheridan Blvd. to Lowell Blvd	4	9	9
136th Ave	Lowell Blvd. to Westlake Dr.	10	11	21
144th Ave/Dillon Rd.	120th St to Aspen St.	9	13	14
144th Ave/Dillon Rd.	Aspen St. to Sheridan Blvd.	9	27	20
144th Ave/Dillon Rd.	Lowell Blvd. to Zuni St	13	29	20
Zuni St.	Midway Blvd. to 136th Ave	18	16	23

Zuni St.	136th Ave to 144th Ave	2	3	4
Zuni St.	144th Ave to 152nd Ave	0	0	0
Main St.	1st Ave to Midway Blvd.	8	13	14
Main St.	Eagle Way to 136th Ave	4	8	6
Interlocken Blvd.	SH 128 to Interlocken Pkwy	0	2	5
Interlocken Blvd.	Interlocken Pkwy to Eldorado	4	8	2
SH 7	Broomfield limits to Lowell	10	4	0
SH 7	Sheridan Blvd to Huron Street	13	19	41
Total Accidents		276	330	405

Speed limits and Average Daily Traffic

The below table summarizes the average daily traffic volume (ADT), and the 85th percentile speed limit comparisons over the last two years. A review of traffic speeds indicate the 85th percentile speed decreased slightly (1 to 5 mph) on 13 out of the total 31 street locations examined. A slight increase (1 to 5 mph) in speed has occurred on 6 roadways, and on 12 roadways the speed remained the same. Traffic volumes continue to increase on Broomfield roadways. Between the years of 2015 and 2017 traffic volumes rose by 0.97%.

Speed Limit and Average Daily Traffic Comparisons

Street Name	Limits	Speed Limit	2014 85% Speed	2015 85% Speed	2017 85% Speed	2014 ADT	2015 ADT	2017 ADT
Midway Blvd	Hoyt St. to SH 287	35 mph	41 mph	39 mph	37 mph	4,114	4,571	6,405
Midway Blvd	SH 287 to Kohl St.	30 mph	37 mph	37 mph	34 mph	13,739	14,577	18,634
Midway Blvd	Kohl St. to Main St.	30 mph	34 mph	35 mph	38 mph	13,723	14,958	17,870
Midway Blvd	Main St. to Ash St.	30 mph	35 mph	34 mph	37 mph	11,835	11,355	13,370

Midway Blvd	Ash St. to Sheridan Blvd.	30 mph	34 mph	35 mph	36 mph	10,543*	13,935	15,136
Midway Blvd	Sheridan Blvd. to Davis St.	35 mph	40 mph	39 mph	44 mph	15,916	15,531	13,370
Midway Blvd	Davis St. to Lowell Blvd.	35 mph	43 mph	45 mph	45 mph	16,027	16,842	13,872
Midway Blvd	Lowell Blvd. to Zuni St.	40 mph	44 mph	46 mph	45 mph	14,832	14,417	16,086
Kohl St.	Miramonte Blvd. to Daphne St.	25 mph	34 mph	36 mph	34 mph	7,360	6,792	7,520
Lowell Blvd.	120th Ave to 124th Ave	45 mph	Const.	Const.	48 mph	13,171*	13,171 **	9,309
Lowell Blvd.	124th Ave to Midway Blvd.	40 mph	Const.	Const.	44 mph	13,223*	13,223 **	10,004
Lowell Blvd.	Midway Blvd. to 136th Ave	40 mph	44 mph	43 mph	43 mph	11,650	10,450	9,966
Lowell Blvd.	144th Ave to Sheridan Blvd.	40 mph	48 mph	48 mph	46 mph	5,074	5,553	5,467
Lowell Blvd.	160th Ave to SH 7	40 mph	47 mph	47 mph	45 mph	7,283	8,350	9,148
Sheridan Blvd.	120th Ave to Midway Blvd.	40 mph	44 mph	45 mph	45 mph	17,345	20,267	22,423
Sheridan Blvd.	Aspen Creek Dr. to 144th Ave	40 mph	41 mph	48 mph	46 mph	12,614	13,440	16,241
136th Ave	Aspen St. to Main St	35 mph	41 mph	40 mph	39 mph	9,475	9,851	10,910
136th Ave	Sheridan Blvd. to Lowell	35 mph	40 mph	41 mph	41 mph	9,023	10,450	9,977

136th Ave	Lowell Blvd to Westlake	35 mph	41 mph	43 mph	40 mph	13,056	13,255	12,755
144th Ave/Dillon Rd.	120th St to Aspen St.	40 mph	48 mph	44 mph	43 mph	19,920	21,199	21,966
144th Ave/Dillon Rd.	Aspen St. to Sheridan Blvd.	40 mph	43 mph	46 mph	44 mph	19,147	18,921	20,728
144th Ave/Dillon Rd.	Lowell Blvd. to Zuni St	45 mph	46 mph	50 mph	45 mph	18,070	19,613	20,289
Zuni St.	Midway Blvd. to 136th Ave	40 mph	45 mph	45 mph	47 mph	11,498	12,050	9,422
Zuni St.	136th Ave to 144th Ave	35 mph	41 mph	41 mph	41 mph	7,293	7,296	8,736
Zuni St.	144th Ave to 152nd Ave	40 mph	49 mph	44 mph	41 mph	1,447	1,708	5,179
Main St.	1st Ave to Midway Blvd.	30 mph	34 mph	37 mph	37 mph	13,538	12,385	12,440
Main St.	Eagle Way to 136th Ave	40 mph	40 mph	42 mph	42 mph	10,715	8,071	8,143
Interlocken Blvd.	SH 128 to Interlocken Pkwy	40 mph	46 mph	44 mph	44 mph	6,099	6,555	5,964
Interlocken Blvd.	Interlocken Pkwy to Eldorado	40 mph	44 mph	44 mph	44 mph	6,907	6,287	5,958
SH 7	Broomfield limits to Lowell	65 mph	55 mph	54 mph	54 mph	20,405	21,341 ***	21,341 ***
SH 7	Sheridan Blvd to Huron St.	65 mph	56 mph	54 mph	54 mph	22,665	22,774 ***	22,774 ***
	Year Total					377,707	389,188	401,404

* Note that this count was not available in 2014, used same 2012 count data

**Note that this count was not available in 2015, used same 2014 count data

*** Note that this count was not available in 2017, used same 2015 count data

Peak Period Travel-time Results

Travel-time data was collected during the am and pm peak hours during a typical weekday. A number of travel-time runs per direction per time period were collected for each corridor. The data was analyzed in terms of average travel-time, travel speed, delays, and stops. Data was collected on a Tuesday, Wednesday or Thursday excluding holiday time periods. The peak period travel-time increase (am and pm) for the city maintained corridors combined, revealed an increase of less than 1% between years 2015 and 2017. Most of the corridors, where an increase in travel time occurred, also had an increase in traffic volumes (Midway Boulevard and Sheridan Boulevard). Additionally, the slight increase in travel time can be directly attributed to construction activities on the main corridors (120th Avenue and on Lowell Boulevard), and capacity concerns (144th Avenue and Midway Boulevard). Below is a summary of the travel time comparisons:

Travel Time Comparisons

Corridor	Period	Direction	Year 2014 (Minutes)	Year 2015 (Minutes)	Year 2017 (Minutes)
Midway Avenue (US 287 - Zuni)	AM	EB	8.6	9.1	10.2
		WB	8.7	11.7	11.9
	PM	EB	12.1	12.1	10.5
		WB	9.0	8.4	8.3
136th Avenue (Main - Huron)	AM	EB	6.7	8.6	8.7
		WB	8.1	9.2	9.3
	PM	EB	7.0	8.8	8.8
		WB	5.9	9.3	9.9
144th Avenue (Wadsworth - Zuni)	AM	EB	5.7	7.1	7.2
		WB	10.6	8.5	8.7
	PM	EB	7.4	10.0	10.4
		WB	7	6.4	6.4
Coalton/Flatiron Cir (Tyler-Midway)	AM	EB	2.2	2.3	2.4
		WB	2	2.0	2.5
	PM	EB	2.1	2.5	2.6
		WB	2.3	3.8	3.1
Main Street	AM	NB	5.4	7.9	7.6

(112th - 136th)		SB	5.9	7.5	7.6
	PM	NB	6	7.5	7.8
		SB	6.9	6.9	7.2
Sheridan (120th - SH 7)	AM	NB	11.1	11.1	12.8
		SB	11.6	11.6	12.
	PM	NB	11.2	12.7	11.7
		SB	11.4	12.6	13.9
Lowell Blvd (120th - Sh 7)	AM	NB	9.9	9.9*	9.9*
		SB	11.1	11.1*	11.1*
	PM	NB	9.8	9.8*	9.8*
		SB	11.6	11.6*	11.6*
Zuni St (Midway Blvd - 144th)	AM	NB	3.5	4.2	3.6
		SB	3.6	3.7	3.6
	PM	NB	3.5	4.4	3.5
		SB	3.6	4.3	4.2
Total Travel Time (Minutes)			231.5	256.6	258.8

* Note Construction in 2015 & 2017 used 2014 travel time

Results

- Traffic volumes continue to increase on Broomfield roadways. Between the years of 2015 and 2017 traffic volumes rose by 0.97%.
- The overall number of accidents has increased by approximately 23% over the last two year period (2015-2017). Largest increases in accidents occurred at state highway intersections; SH 7 and Huron Street, US 287 and Midway Boulevard, SH 7 and Sheridan Parkway, and SH 7 and Lowell Boulevard. Most of the intersections experienced a high number of rear end accidents and a few additional left turn collisions.
- The 85th percentile speed decreased slightly (1 to 5 mph) on 13 out of the total 31 street locations examined. The number of roadways that experienced a slight increase in speed, were 6 roadways. On 12 roadways, the speed remained the same.
- The peak period travel-time increase (am and pm) for the city corridors combined was determined to be less than 1% between years 2015 and 2017.