Evaluation of

20 IS PLENTY

Summary Report

MARCH 2022

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Contents

What is "20 is Plenty?"

Across the United States and other countries, there is an emphasis on lowering speed limits in an effort to reduce the potential for serious injuries when crashes occur and to improve the livability of local streets. This initiative is commonly referred to as "20 is Plenty." In June 2020, the City of Boulder committed to "20 is Plenty." City Council passed an ordinance to lower the prima facie (also known as default or unposted) speed limit from 25 mph to 20 mph. Concurrent with the ordinance passage, staff changed a total of approximately 465 speed limit signs from 25 mph to 20 mph signs on local streets, where applicable, and updated the "Welcome to Boulder" gateway signs at the city limits to indicate the citywide 20 mph default speed limit.

The city views "20 is Plenty" as one aspect of its commitment to achieving Vision Zero, which is the city's goal to reduce the number of traffic-related fatalities and serious injuries to zero. As such, the new 20 mph speed limit signs include an orange outline and the words "Vision Zero" across the top of the sign to remind motorists of the connection of slower speeds to reduced severe crashes. Evidence suggests there is a greater chance for pedestrian and bicyclist survival when vehicles are traveling 20 mph compared to vehicles traveling at higher speeds. Slower travel speeds on locally-classified residential streets also increase the likelihood of people driving yielding to people walking and bicycling and contribute to a more comfortable environment for people to walk and bicycle.

Purpose, Goals, and Key Performance Indicators

Purpose

The purpose of this evaluation is to study whether lowering the speed limit and changing posted speeds from 25 mph to 20 mph on local streets resulted in reduced vehicle speeds. The evaluation also provides recommendations to introduce or modify speed management programs, procedures, and policies to align with the new 20 mph speed limit.

Goals

The evaluation had three main goals:

1. To study other cities who have implemented "20 is Plenty" to understand results achieved and impacts to projects and programs.
2. To evaluate the City of Boulder's implementation of "20 is Plenty," focusing on whether it has resulted in reduced vehicle speeds.
3. To understand how "20 is Plenty" has affected existing projects and programs in the city and formulate recommendations for changes or enhancements.

Key Performance Indicators

To measure the success of reducing the prima facie speed limit from 25 mph to 20mph on local streets, before and after vehicle speed data from 22 locations across the city was analyzed. This evaluation focused on the following key performance indicators:

- Percent and number of drivers traveling at or below 20 mph
- Percent change in mean (average) speed
- Percent change in median (50th percentile) speed
- Percent change and number of drivers traveling 10 mph over the (new) speed limit
- Percent change and number of drivers traveling 15 mph over the (new) speed limit
- Percent change in 85th percentile speed
- Percent change in 95th percentile speed

Evaluation Method and Results

The evaluation of "20 is Plenty" used vehicle speed data collected at 22 locations before and after the speed limit reduction, 10 additional locations with data collected only after the speed limit reduction, and 6 locations with photo speed van radar data collected before and after the speed limit reduction. In each case, the streets were two-way streets, so data was separated into two directions of travel. The analysis was organized into three parts: comparing key performance indicators, hypothesis testing, and linear regression.

Comparing Key Performance Indicators

Combining all 22 locations with before and after speed count data to create one citywide dataset created a dataset of 140,454 before datapoints and 101,459 after datapoints. Analyzing this dataset it was found that average speed increased slightly while, 50th percentile speed, 85th percentile speed, and 95th percentile speed all remained unchanged from before to after "20 is Plenty." There was a slight increase in the number and percent of vehicles traveling over 30 mph and 35 mph from before to after "20 is Plenty" (see Table 1).

Table 1. Comparison of Summary Statistics for Combined Dataset of Before and After Count Locations

	Before Average	After Average	Change (value)	Change (percent)
Average Speed (mph)	21.57	21.90	0.33	+1.54%
50th percentile speed (mph)	22	22	0	0%
85th percentile speed (mph)	27	27	0	0%
95th percentile speed (mph)	30	30	0	0%
Percent of Vehicles Traveling Below 20 mph	39.21%	33.33%	-5.88%	
Percent of Vehicles Traveling Above 30 mph	3.43%	5.42%	+1.99%	
Percent of Vehicles Traveling Above 35 mph	0.37%	0.83%	+0.46%	

The City found that, overall, vehicle speeds on local streets did not measurably change after implementing "20 is Plenty".

The City of Boulder also collected traffic count and speed data at ten additional locations only after "20 is Plenty." These ten additional locations add 45,429 datapoints to the dataset of 101,459 after counts in the before/after analysis to create a dataset with 146,888 datapoints. Combining these two datasets must consider that this removes a direct one-to-one correlation between before and after locations, however, increasing the sample size improves the robustness of the summary statistics and provides an additional reference point. Adding in the additional ten "after-only" locations only minimally changes the before/after results, showing a smaller increase in the percent of vehicles traveling above 30 mph and 35 mph compared to the before/after results (see Table 2).

Table 2. Comparison of Summary Statistics for Combined Dataset of Before and After Count Locations, including "After-Only" count locations

	Before Average	After Average	Change (value)	Change (percent)
Average Speed (mph)	21.57	21.92	0.35	1.62%
50th percentile speed (mph)	22	22	0	0%
85th percentile speed (mph)	27	27	0	0%
95th percentile speed (mph)	30	30	0	0%
Percent of Vehicles Traveling Below 20 mph	39.21%	33.15%	-6.06%	
Percent of Vehicles Traveling Above 30 mph	3.43%	4.91%	+1.48%	-
Percent of Vehicles Traveling Above 35 mph	0.37%	0.65%	+0.28%	-

The project team collected roadway characteristic information for each location studied. These characteristics included:

- Street Width
- Travel Lane Width
- Presence of Posted Speed Limit Sign
- Presence and Number of Parking Lanes
- Parking Lane Width
- Typical On-Street Parking Density
- Presence of Striped Centerline
- Presence and Type of Bicycle Facility (Neighborhood GreenStreet)
- Presence and Type of Sidewalk
- Average Number of Driveways and Access Points
- Approximate Level of Tree Canopy
- Street Segment Intersection Density
- Distance Between Traffic Control Devices
- Types of Traffic Control Devices
- Presence of Crosswalks
- Presence of Raised Crosswalks

Overall, although locations with before/after speed reductions did not point to strong connections to roadway characteristics, the existence of posted speed limit signs, striped street centerlines, and existing Neighborhood GreenStreet classifications were most frequently correlated with reductions in speeds from before and after "20 is Plenty" was put into effect.

Hypothesis Testing

Statistical hypothesis testing was conducted for each of the 22 before and after speed locations to see if the average speeds decreased (with 95% statistical confidence) after the speed limit was lowered from 25 mph to 20 mph. Though on average there were minimal changes in vehicle speeds from before to after "20 is Plenty," the results varied by location. After "20 is Plenty," average speed decreased in 17 directions and increased in 27 directions. More specifically, average speed decreased in both directions of travel at 4 locations, decreased in one direction of travel at 9 locations, increased in one direction of travel at 9 locations increased in both directions of travel at 9 locations and did not change in one direction of travel (see Table 3). These results, coupled with the minimal changes in average, 50th percentile, 85th percentile, and 95th percentile speeds, indicate small changes in speeds at individual locations but no substantial changes in vehicle speeds citywide.

Table 3. Compiled Summary Statistics for Before and After Count Locations

Summary Statistics		Decrease	Increase	No Change
Average Speed	Number of directional count locations	17	27	-
	Percentage	39%	61%	-
50th Percentile Speed	Number of directional count locations	20	24	-
	Percentage	45%	55%	-
85th Percentile Speed	Number of directional count locations	21	23	-
	Percentage	48%	52%	-
95th Percentile Speed	Number of directional count locations	21	22	1
	Percentage	48%	50%	2%
Drivers Traveling 10 mph Above Speed Limit	Number of directional count locations	13	20	-
	Percentage	39%	61%	-
Drivers Traveling 15 mph Above Speed Limit	Number of directional count locations	8	14	-
	Percentage	36%	64%	-

Linear Regression – After Data Only

A linear regression analysis was performed on the locations with after only data to determine to what extent various roadway characteristics could be attributed to reduced vehicle speeds. The after data only was used for this analysis since it was a larger set of data, and the intent was to relate how motorists were driving after the change to 20 mph

to roadway characteristics. The regression analysis determined whether any linear relationship existed between average speeds and roadway characteristics, such as street width, lane width, presence of striped centerline, presence of speed limit sign, parking density, etc. The results of the linear regression analysis suggest that narrower streets/lanes and the absence of a striped centerline correlate with lower average speeds.

The City found that local streets with lower vehicle speeds tend to have narrower widths, narrower lanes, and no striped centerline. Additionally, Neighborhood GreenStreets were more likely to have lower vehicle speeds.

Photo Radar Van Data Analysis

The city currently uses photo radar vans to enforce speed limits on local streets. The van is moved around to different locations with identified speeding issues. In the "20 is Plenty" evaluation, six directional locations of deployment of the photo radar van including 911 hours of before deployment and 699 hours of after deployment showed an average reduction of average vehicle speeds of 2.1 mph from 25.6 mph before "20 is Plenty" to 23.5 mph after "20 is Plenty." However, because the speed limit was reduced from 25 to 20 mph the number of violations per hour in these 6 locations went up from 2.5 per hour to 8.4 per hour (see Table 4).

Table 4. Photo Van Radar Before/After Summary Statistics

	Average of Average Overall Speed			Violations Per Hour		
Location	**Before**	**After**	**Change**	**Before**	**After**	**Change**
2400 9th St Northbound	22.6	22.2	-0.4	4.2	3.1	-1.1
3200 Aurora Ave Westbound	25.5	24.0	-1.5	2.0	9.1	+7.1
1200 Block Bear Mountain Dr Eastbound	25.6	22.3	-3.2	1.2	2.8	+1.7
1100 Block Bear Mountain Dr Eastbound	25.8	23.4	-2.4	1.0	6.6	+5.6
2200 Spruce St Westbound	27.1	24.5	-2.6	4.8	11.6	+6.9
2200 Spruce St Eastbound	27.2	24.9	-2.3	5.2	16.2	+11.1
Average of Before/After Locations	**25.6**	**23.5**	-2.1	**2.5**	**8.4**	+5.9

In two locations, after "20 is Plenty" pneumatic tube counter data was also collected – though on different months than the photo enforcement data. In these two instances the **average after speeds recorded by the photo radar van were 1 mph slower than the after speeds recorded by pneumatic counters**. The sample size of the pneumatic counter dataset was 8,991 vehicle counts while the sample size of the photo radar van dataset was 20,315 vehicle counts. Additionally, one of these locations included before "20 is Plenty" data which showed almost no difference (+0.01) between the pneumatic counter and photo radar van measured speeds (n=5,262 for pneumatic, n=43,813 for photo radar van).

Table 5. Comparison of Pneumatic Tube Data and Photo Radar Van Data Before and After "20 is Plenty"

	Pneumatic Tube Data				Photo Radar Van Data				Average Speed Comparison	
	Average of Average Overall Speed		Sample Size		Average of Average Overall Speed		Sample Size			
Location	**Before**	**After**	**Before**	**After**	**Before**	**After**	**Before**	**After**	**Before**	**After**
3200 Aurora Ave Westbound	25.49	25.03	5,262	3,420	25.50	23.98	43,813	6,538	+0.01	-1.05
1200 Eisenhower Dr Northbound	n/a	23.06	n/a	5,571	n/a	22.12	n/a	13,777	n/a	-0.94

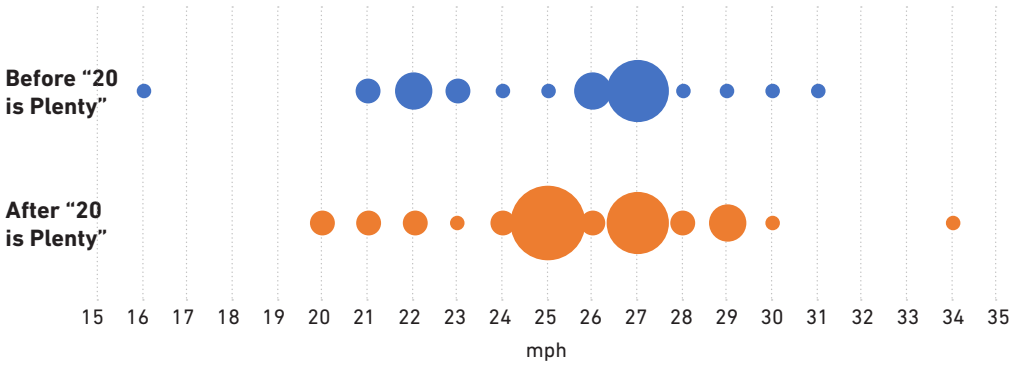
While this is a limited subset of the overall citywide dataset, **it suggests that the presence of the photo radar van may have influenced vehicle speeds more after "20 is Plenty" was enacted in Boulder than it did before "20 is Plenty"**, though further analysis in more locations would be needed to confirm this hypothesis.

Before and After 85th Percentile Speeds by Location

The before and after "20 is Plenty" 85th percentile speeds and change in 85th percentile speeds by count location are shown on the following pages in Figures 3-6. The before 85th percentile speeds ranged from 16 mph to 31 mph. The after 85th percentile speeds ranged from 20 mph to 34 mph (Figure 1). The change in 85th percentile speeds ranged from a reduction of 4 mph to an increase of 4 mph (Figure 2). The maps in Figures 3 through 6 show how results varied by location. Further study of individual locations could reveal insights into why speeds were reduced or increased.

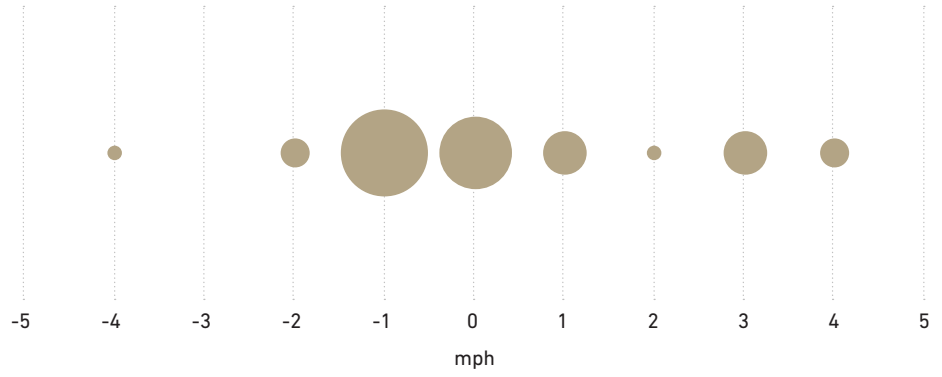
The 85th percentile speed is the speed at or below which 85 percent of vehicles drive, and it is a common metric for assessing speeds on streets.

Figure 1: 85th Percentile Speeds By Location



Nearly all streets studied in both the before and after conditions had 85th percentile vehicle speeds well over the 20 mph speed limit, and a substantial number more than 25 mph.

Figure 2: Change in 85th Percentile Speeds By Location



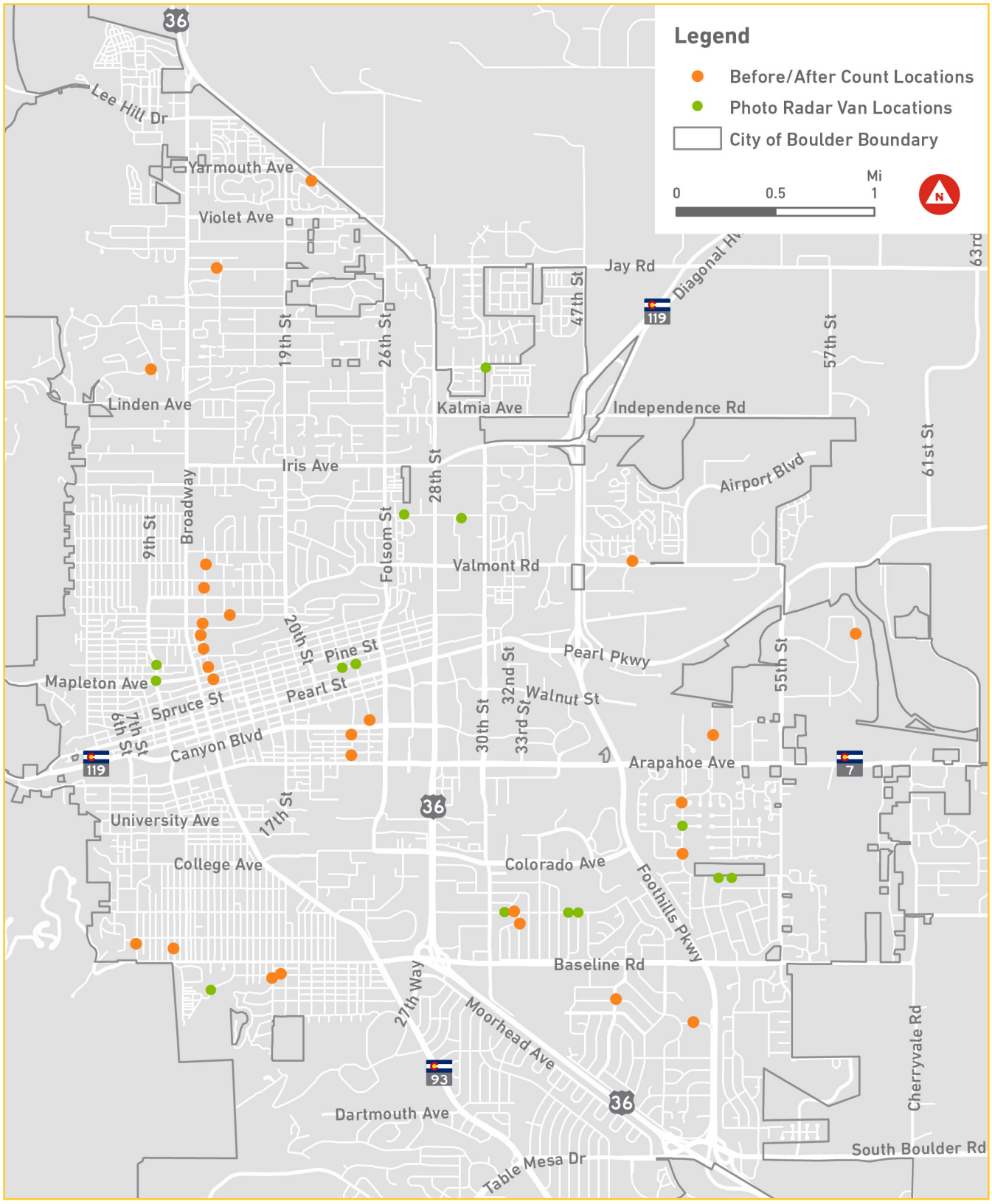


Figure 3: Locations of before and after traffic count data collection

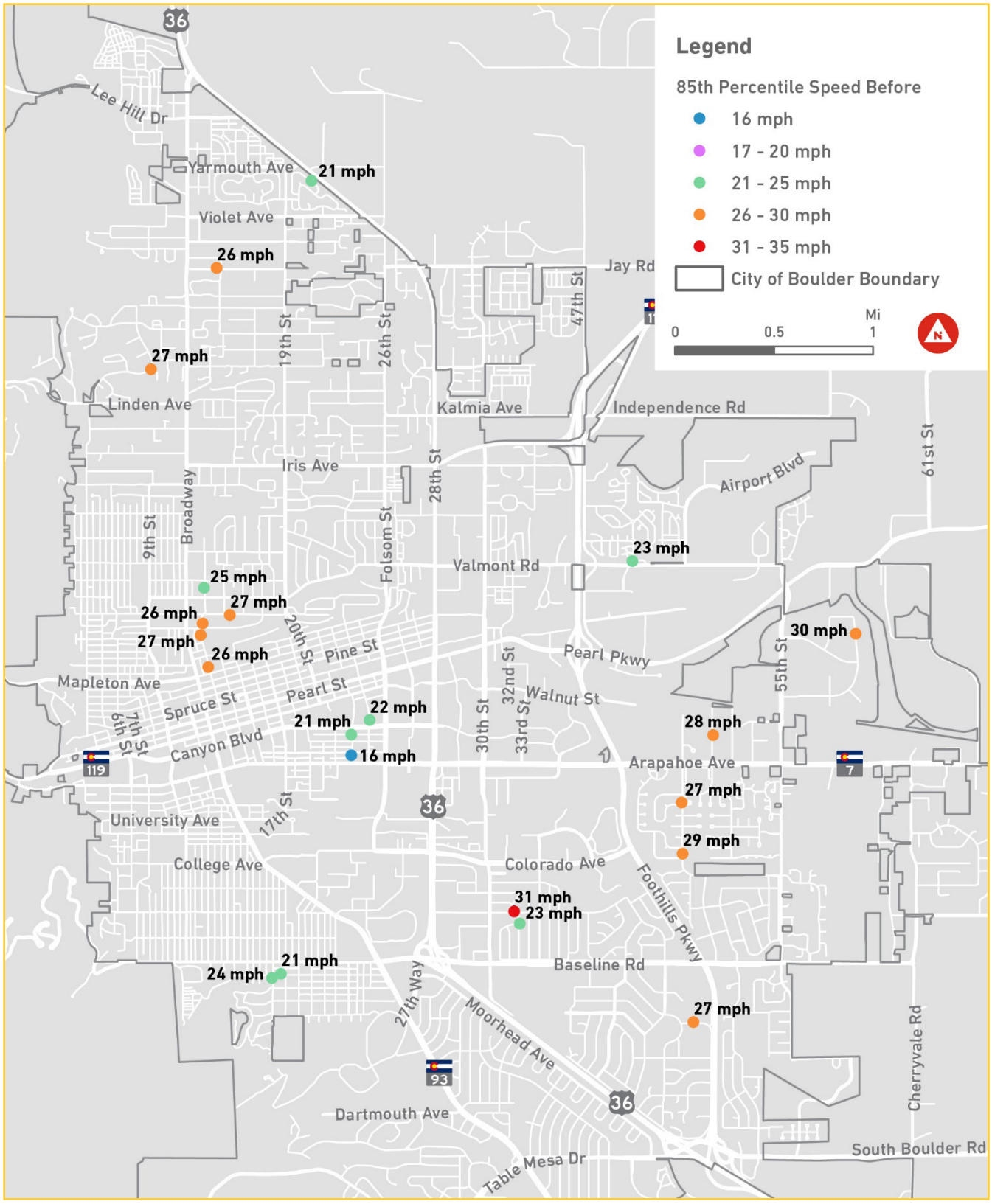


Figure 4: Average 85th Percentile Speed Before "20 is Plenty" Initiative

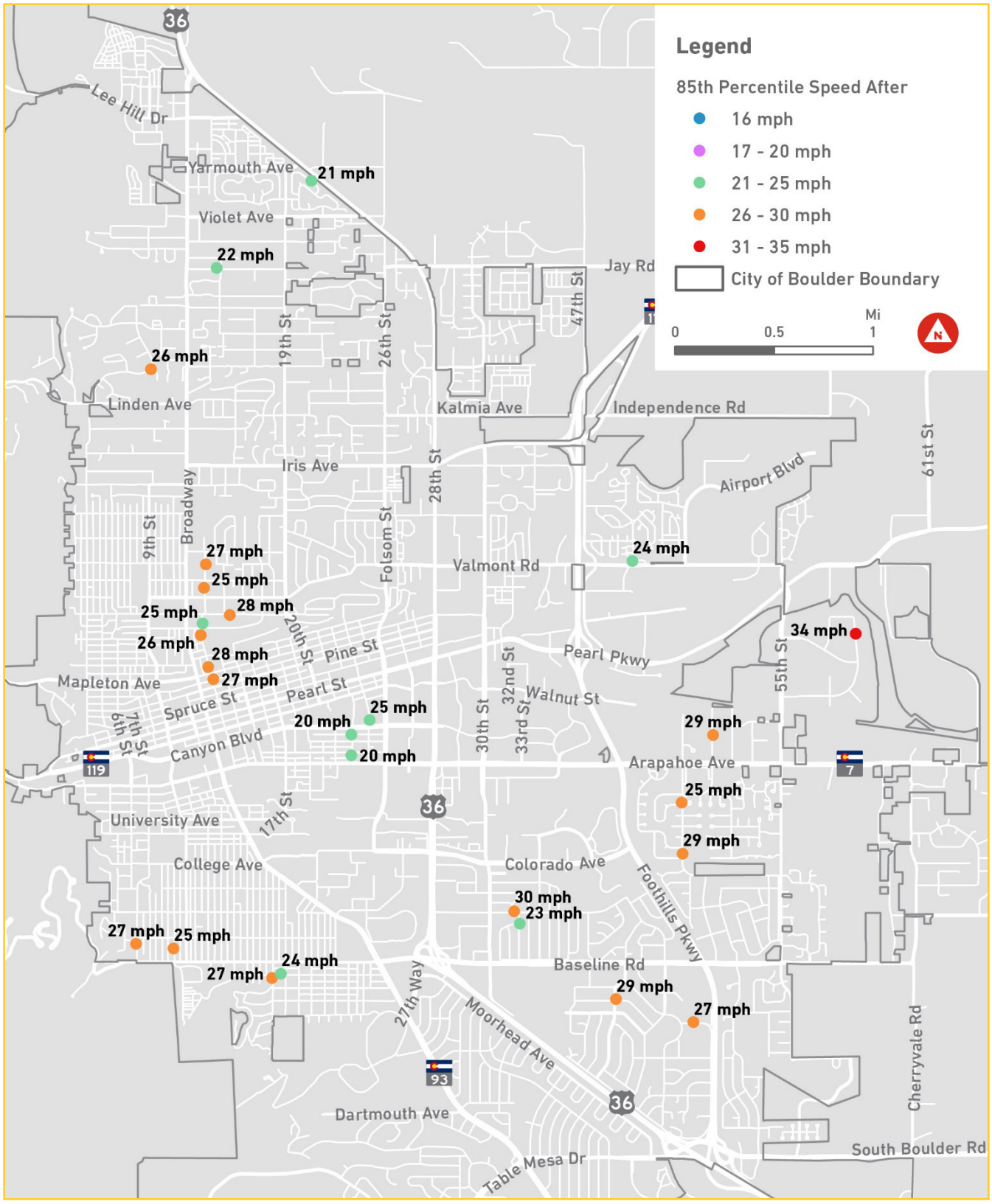


Figure 5: Average 85th Percentile Speed After "20 is Plenty" Initiative

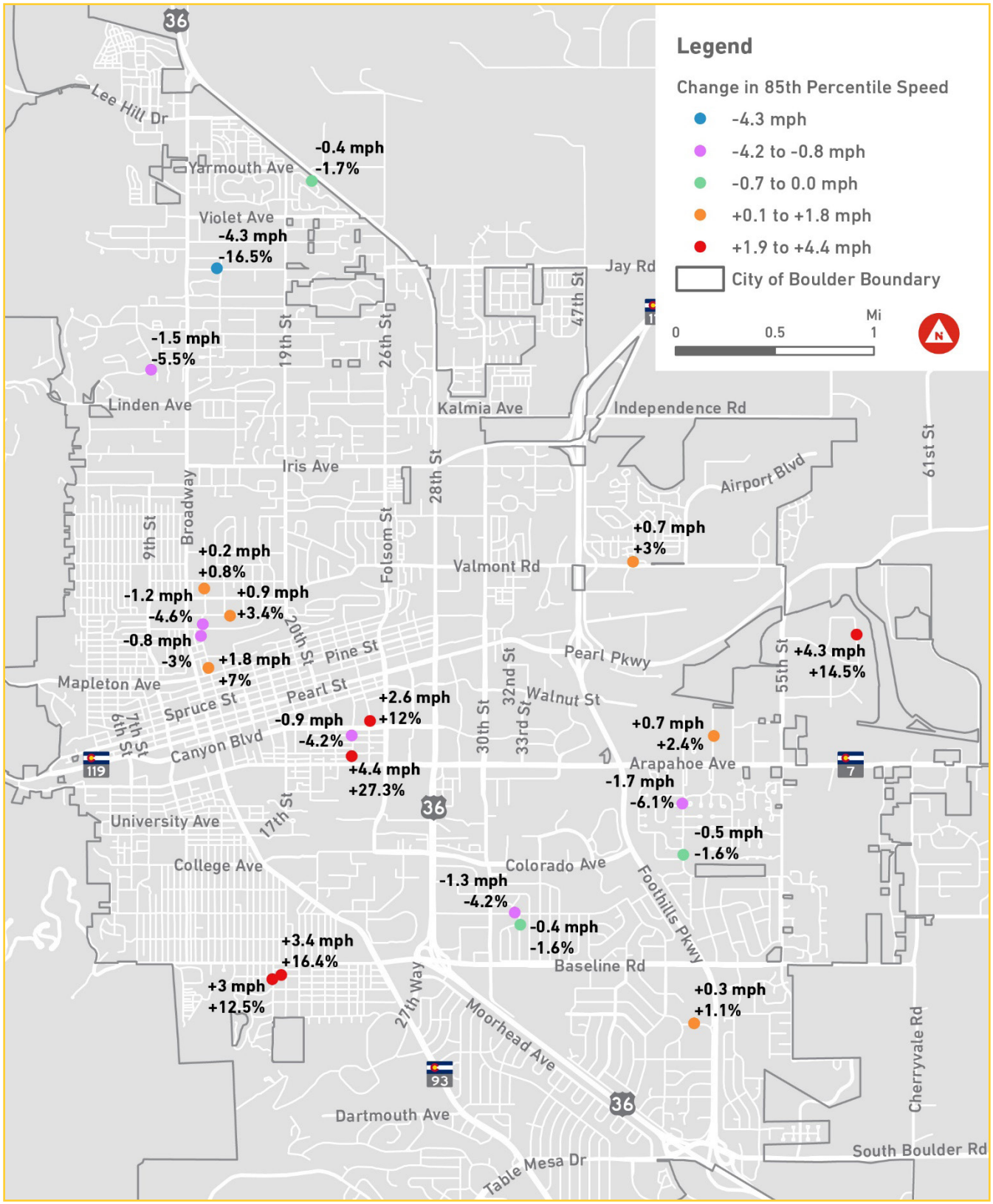


Figure 6: Change in 85th Percentile Speed from Before to After "20 is Plenty" Initiative

Relevant Guidance and Peer City Efforts

Literature Review

Relevant research and guidance documents on the topics of reducing local speeds and reducing speeding-related crashes were summarized to understand national and international best-practices in speed limit reduction. The following research and guidance reports were studied:

- NCHRP 966: Posted Speed Limit Setting Procedure and Tool: User Guide
- NTSB Reducing Speeding-Related Crashes Involving Passenger Vehicles
- FHWA Methods and Practices for Setting Speed Limits
- FHWA Speed Management Toolkit
- NACTO City Limits: Setting Safe Speed Limits on Urban Streets
- GHSA Speeding Away from Zero: Rethinking a Forgotten Traffic Safety Challenge
- Transport for London Achieving lower speeds: the toolkit

Results of these studies supported final recommendations and are important for better understanding the proven benefits of speed reductions and generating ideas for additional engineering, enforcement, and education strategies for reducing speeds.

Reducing Speeds to 20 mph

When drivers speed it increases the likelihood of a crash occurring and the severity of injuries that can result from a crash for all roadway users, but especially for vulnerable road users including people walking and bicycling. The National Transportation Safety Board (NTSB) *Reducing Speeding-Related Crashes Involving Passenger Vehicles* study concluded that 31% of all crashes resulting in fatalities within the study data were speeding-related.[1] 20 mph is considered the survivability speed for pedestrians and bicyclists when involved in a crash with a vehicle. In the event of a crash involving a pedestrian, the probability of that crash being fatal "increases from 5% at a vehicle impact speed of 20 mph, to 45% at 30 mph, and 85% at 40 mph."[2] The Federal Highway Administration (FHWA) *Methods and Practices for Setting Speed Limits* and the National Association of City Transportation Officials (NACTO) *City Limits: Setting Safe Speed Limits on Urban Streets* similarly conclude that minor streets with a mix of motor vehicles, pedestrians, and cyclists should be have 20 mph speed limits to "support safe movement and contextually appropriate design on the majority of city streets."[3]

Reducing speeds to 20 mph is a best practice for keeping vulnerable road users safe on local streets. Transport for London's *Achieving lower speeds: the toolkit* describes a similar "blanket" approach that Boulder has used to implement 20 mph speed limits on local streets. Transport for London found that setting a 20 mph prima facie speed limit enabled local government to implement 20 mph limits more easily and confidently on other higher classification streets outside of residential areas.

1 NTSB, *Reducing Speeding-Related Crashes Involving Passenger Vehicles*. 2017. P. ix.

2 NTSB, *Reducing Speeding-Related Crashes Involving Passenger Vehicles*. 2017

3 NACTO, Cairns et al. *City Limits: Setting Safe Speed Limits on Urban Streets*, 2020, p. 50

Successful Speed Management Programs

The FHWA *Speed Management Toolkit* and Governors Highway Safety Association (GHSA) *Speeding Away from Zero* report provide similar guidance for improving programs and policies to support speed reductions. To implement successful speed management projects, these two guidance documents advise local agencies to:

1. Build a platform and improve program management by assigning roles and responsibilities to state and local task forces or advisory committees and keeping leaders regularly updated.
2. Improve state and local policy by encouraging infrastructure and enforcement improvements and promoting Vision Zero principles.
3. Communicate with community members by using several types of media to deliver consistent messaging.
4. Identify and deploy a Culture Change Model that changes driver-perception that speeding is a low-risk activity by localizing messaging and building a coalition of supporters and partners.

Several strategies to improve active speed management programming found in reviewed literature align with strategies Boulder has already deployed or tools considered in this "20 is Plenty" evaluation. In the *Speeding Away from Zero* report, the GHSA recommends implementing speed management programs in conjunction with Vision Zero that focus on education, enforcement, and infrastructure. Emphasizing awareness, community partnerships, and culture change is also a relatively consistent theme across all literature. The City of Boulder is already implementing many of these strategies through robust, ongoing Vision Zero work.

Peer City Interview Key Findings

Interviews with staff from four peer cities were conducted to provide additional insights into recommendations for speed limit reductions in Boulder. The cities included Portland, Oregon; Eugene, Oregon; Cambridge, Massachusetts; and Seattle, Washington. Some similarities between the approach to speed limit reductions in these cities are:

- All cities interviewed have reduced speed limits on most or all local streets from 25 mph to 20 mph
- In additional to reducing speed limits on local streets, Portland, Cambridge, and Seattle have reduced speed limits on arterial streets (typically in 5 mph increments from before conditions of 25, 30, or 35 mph to after conditions of 20, 25, or 30 mph)
- In addition to reducing speed limits, Portland and Seattle also conducted evaluations of their speed limit reductions.

Below is a summary of key takeaways from the peer city interviews organized by topic.

Communication

All cities, excluding Seattle, performed some type and degree of marketing and advertising campaigns surrounding local street speed limit reduction. Press conferences, radio and print campaigns, and social media posts were most common. City staff agreed that the most consistent and successful method for communicating speed limit changes was the large-scale distribution of yard signs. Peer cities also raised awareness by collaborating with neighborhood groups, interested residents, and local organizations and programs including Safe Routes to School.

School Zones and Posted Signage

None of the peer cities interview have further reduced school zone speed limits to 15 mph after implementing speed limit reductions to 20 mph on local streets, largely because of the state government's level of control over speed limit setting in Oregon, Washington, and Massachusetts. The City of Seattle removed the majority of old advisory speed signs that conflicted with newly posted 20 and 25 mph signs. Multiple municipalities noted that speed limit reductions revealed the need for a higher frequency of posted signage, especially on local streets adjacent to higher-traffic streets, and the need to improve consistency in the placement of speed limit signs.

Evaluation Process

The City of Portland and the City of Seattle are the only interviewed cities that completed before and after data analysis of vehicle speeds. Of note, both cities' studies had constraints like Boulder's evaluation in that there was relatively limited before/after data on which conclusions could be drawn. In addition, it does not appear that these cities accounted for the error (typically ± 1 mph) of their traffic counters when presenting results.

Portland evaluated speeds before and after the reduction of the local street speed limit from 25 mph to 20 mph in 58 locations and found:

- **No change in median speed or 85th percentile speed**
- **Very small reductions** in the percent of **drivers traveling greater than 25** (-0.5%), 30 (-1.7%), **and 35** (-0.5%) **mph**

Seattle evaluated speeds before and after spot reductions of the speed limit on arterials in North Seattle from 30 mph to 25 mph and found:

- **Reductions in crashes** (-22% for total crashes, -18% for injury crashes)
- **Reductions in 50th percentile** (-9.9%), **85th percentile speeds** (-7.1%), and the percent of **drivers traveling 40 mph or greater** (-54.1%)

Updated Methods and Design Programs for Setting and Reinforcing Lower Speed Limits

While design standards and methods for setting speed limits were not significantly affected, cities found that implementing lower speed limits revealed a need to retrofit streets with traffic calming to reinforce the lower speed limits. Peer cities noted that the speed limit reductions led to a procedural shift where staff now design streets for target speeds rather than the 85th percentile speed, which studies have shown can lead to increases in vehicle speeds over time.[4] The speed limit reductions also led staff to revise speed management programs to be more context sensitive and increased the number of streets eligible for traffic calming projects.

Enforcement

The four cities use a combination of automated enforcement (fixed cameras and photo radar vans), speed feedback trailers, and fixed speed radar signs to encourage or enforce the speed limit. Many cities expressed that enforcement is typically a short-term solution when areas pop up as speeding hotspots either through resident complaints, staff speed studies and/or staff crash analysis. Cities favored an engineering approach that redesigns streets to bring speeds down permanently through traffic calming infrastructure changes rather than using enforcement on an ongoing basis.

4 NACTO, Cairns et al. *City Limits: Setting Safe Speed Limits on Urban Streets*, 2020, p. 18

Recommendations

Below are recommendations for introducing or modifying speed management programs, policies, procedures, and projects in the City of Boulder to align with "20 is Plenty."

Key:

 Engineering

 Evaluation

 Enforcement

 Education

Topic	Number	4E Approach Correlation	Recommendation	Justification
Neighborhood Speed Management Program	1		Update NSMP engineering toolkit to include the removal of striped centerline markings and treatments that provide a mix of horizontal and vertical deflection; review guidelines and industry best practices for speed hump placement along streets with 20 mph speed limits.	Streets with narrower curb to curb widths, narrower vehicle travel lanes, and no striped centerline are more likely to have lower speeds. Currently, the NSMP toolkit of engineering solutions does not include striped centerline removal or parklets as means to narrow street widths. While speed humps are included as a tool, speed hump frequency is not defined. The evaluation of "20 is Plenty" did not include locations with speed humps, but speed humps have been proven to lower maximum speeds if spaced appropriately.
	2		Launch data-driven speed management program focused solely on arterial streets, involving community engagement instead of accepting resident applications.	NSMP criteria allows for only local or collector streets to be submitted and considered for improvements, but 65% of severe crashes occur on arterial roads, 11% occur on collectors, and 11% occur on local streets in Boulder.
	3		Prioritize segments of local streets that adjoin arterial streets.	Alongside recommendation 2, Boulder would benefit from prioritizing traffic calming at arterial and residential street junctions and residential gateways adjoining arterial streets.

Topic	Number	4E Approach Correlation	Recommendation	Justification
Designing for Target Speeds	4		Revise the *Design and Construction Standards* to use a 20 mph target speed for local street design.	The City of Boulder's current engineering approach to designing streets includes looking at the speeds that 85% of motorists are driving (85th percentile speeds) and designing to accommodate these speeds. In contrast, cities using the safe system approach decide what speed is safest to travel on a given street and design the street so the majority of people will drive that target speed. Adjusting design standards to match target speeds (50th percentile speeds) has proven to be successful.
	5		Conduct a systematic evaluation of existing local street widths (and speed-related crashes) to identify segments of concern; prioritize segments of concern for inclusion in future traffic calming projects or programs such as the NSMP.	The standard cross-section for a residential street is a two-way street with 30 feet of space curb face to curb face with on-street parking permitted. With two on-street parking lanes of 8 feet each this equates to 14 feet of travelled way between parked cars. This standard is best practice for keeping speeds low, but some residential streets in Boulder exceed these widths.

Topic	Number	4E Approach Correlation	Recommendation	Justification
Functional Street Classifications	6		Identify street segments currently classified as local streets that function as higher classification roads.	Some streets currently classified as Local may be a better classified as a Collector or as somewhere between a Local and Collector as outlined in the next recommendation.
	7		Consider reclassifying select streets/street segments from local to collector where the access density, transit stop density, emergency response route, snowplow route, and other characteristics relate more closely to other streets with higher classifications.	There are some streets currently classified as Local streets that serve a higher volume of traffic, connect directly to more community destinations, and in many cases are wider and have a striped centerline. Oftentimes there is a school on these local streets. For these streets, it may be better to use a new street classification if the street is a key connection for area residents rather than a primarily residential street.
	8		Consider developing an Industrial Street and Business Park Street classification to better match streets providing access to industrial and business land uses.	Some streets currently classified as Local streets do not have any adjacent residences and serve light industrial or business uses. Because of this context they are designed more for large truck access. Rather than redesigning them with treatments more appropriate for residential streets, a reclassification may be a better approach – matching their classification to the existing design.
	9		Evaluate speed limit reductions along high-crash, high-speed arterial corridors using the speed limit setting framework that will be developed in the upcoming Community Mobility Planning and Implementation (CMPI) Speed Limit Setting and Signing Framework grant project.	Arterial streets comprise 17% street centerline miles in Boulder but account for 65% of severe crashes. Focusing speed reduction efforts on key arterial street segments will have a greater effect than focusing only on local and collector streets.

Topic	Number	4E Approach Correlation	Recommendation	Justification
Additional Speed Limit Reductions to Support Vision Zero	10		Prioritize arterial speed limit reductions on high-stress arterial corridors that also adjoin local streets where 20 mph speed limits have been introduced.	Some arterial streets may be better candidates for speed limit reductions if they are adjacent to primarily residential land uses where the speed limits have already been reduced.
Speed Limit Setting in School Zones	11		Consider reducing speed limits in select school zones from 20 mph to 15 mph based the school circulation patterns, sight distance, roadway width, nearby land uses and other various criteria.	The potential for a severe crash outcome for someone walking or bicycling is lower at 20 mph than at 30 or 40 mph, however, the risk is higher for children than adults. Therefore, in some school zone locations (especially near elementary schools) a 15 mph speed limit may be more appropriate to reduce the risk to children walking and bicycling.
	12		Working with partners at the Boulder Valley School District, identify potential locations where School Streets (shared streets in front of schools) could be implemented to best support speed reductions and encourage mode shift.	School Streets can help encourage walking and bicycling to school and reduce the complexity of interactions and potential conflicts between students and caregivers walking, bicycling, or driving in the street immediately adjacent to the school.
Standardizing Signage	13		Through the CMPI Speed Limit Setting and Signing Framework grant, develop a consistent practice for installing 20 mph speed limit signs on local streets and at additional key gateway locations throughout the city.	There was a slight correlation between streets with posted speed limit signs and speed reductions. Adding more speed limit signs systematically in key locations may assist in system-wide local street travel speed reductions.
Warning Signs/ Advisory Speeds	14		No Change Needed	N/A

Topic	Number	4E Approach Correlation	Recommendation	Justification
Photo Radar Van Program and Radar Speed Signs	15		Periodically re-evaluate the location of street segments on which to deploy the photo radar vans.	These locations are where average vehicle speeds were the highest and 95th percentile vehicle speeds (excessive speeding) increased the most in the evaluation. They may be good candidates for targeted enforcement as a short-term solution while street redesigns or other speed reduction measures are considered.
	16		Consider lobbying members of the Colorado General Assembly to allow automated enforcement on arterial streets.	Vehicle speeds are higher on arterial streets than on local streets, however, Colorado Revised Statutes currently only allow automated enforcement on streets in school zones, residential neighborhoods, within a maintenance, construction, or repair zone, and along streets that border a municipal park. While some of these conditions overlap arterial streets, many do not. Allowing automated enforcement on more arterial streets can assist the city in reducing speeds citywide in the short-term.
	17		Expand the use of both permanent and portable radar speed feedback signs along arterial streets.	NSMP projects focus on local and collector streets. Radar speed signs could also be effective in reducing speeds on arterial streets.
Pedestrian Crossing Treatment Installation Guidelines	18		No change needed	N/A

Topic	Number	4E Approach Correlation	Recommendation	Justification
Promotion and Engagement	19		Increase the presence of "20 is Plenty" yard signs and update messaging to incorporate statistics on speeding crashes, speed enforcement, and community disapproval of speeding.	Through ongoing review of data and coordination with the police department, target the expansion of photo radar van deployment to areas with highest speeds.
	20		Reintroduce other "20 is Plenty" advertising including media and online efforts to spread awareness of Vision Zero.	Better understanding of the new speed limit and reasons for reducing it could help more people driving comply with the speed limit.
	21		Develop a Culture Change Model approach that changes social perceptions of the risks of speeding.	Many communities conduct educational campaigns that humanize the victims of traffic crashes which helps communicate the negative consequences that can occur because of speeding.
	22		Communicate and collaborate with local organizations and existing programs like Safe Routes to School to create and promote campaigns specifically focused on drivers who speed	A multi-pronged communications approach describing different reasons why "20 is Plenty" is important will appeal to a broader audience.
	23		Extend speeding education to reach beyond NSMP project sites.	The NSMP has great existing promotional materials that could be expanded for use on other projects outside of NSMP streets.

Next Steps

Despite the results of the evaluation, local streets generally continue to not exhibit speed-related crash patterns, as indicated in the Draft Safe Streets Report, 4th Edition 2022. Thus, the recommendations presented will need to be balanced against priorities and implemented over time as part of a comprehensive Vision Zero strategy.