Redesigning the Street

A Report on Right-Sizing Projects in Austin, TX 1999-2014

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Updated May 2015

EXECUTIVE SUMMARY

A street right-sizing is a technique that changes the number of lanes on a street in order to improve the safety and operations of the route for all roadway users. Right-sizings are nationally recognized as a best-practice tool for maintaining motor vehicle capacity while reducing high-risk speeding and addressing other safety concerns for people walking, people bicycling and people in motor vehicles.

In the City of Austin, a total of 37 right-sizing projects have been installed since 1999. Most of these projects involved a typical four to three reconfiguration which consists of converting a roadway with two lanes in each direction to a roadway with one lane in each direction and a center turn lane. This reconfiguration also results in unused street space which can provide an opportunity to install bicycle lanes.

This report describes these projects as well as the selection, analysis, public outreach, and impacts on safety and capacity that right-sizings have had on the transportation system in the City of Austin. These projects are typically installed in coordination with routine street maintenance which enables the City to implement right-sizings at roughly a tenth of the cost of uncoordinated projects. As demonstrated by local data, right-sizings in the City of Austin have resulted in improved safety for all users with minimal or no impact to motor vehicle level of service.

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BACKGROUND

The City of Austin Transportation Department (ATD) routinely analyzes the City's streets for opportunities to improve safety and mobility for all users of the roadway. With a goal of creating safe and complete networks for everyone, and acknowledging the reality that large scale expansions of streets is not financially feasible, ATD makes data-driven decisions about the City's existing roadway assets and uses right-sizings to rebalance underutilized space and improve the efficiency of Austin's streets.

WIDE NODES, NARROW LINKS

The efficacy of right-sizings is built on the concept of wide nodes and narrow links. This concept refers to the fact that a street's capacity is predominantly determined by the operations at its stop-controlled and signalized intersections (the nodes), not the number of lanes on a street between those intersections (the links). Because the majority of Austin's roadway network was built with nodes and links of the same width, ATD is able to reallocate excess capacity in mid-block sections for other uses while maintaining or improving operations at intersections in order to avoid decreasing the street's overall capacity.

The most common type of right-sizing is referred to as the 4 to 3 reconfiguration (other names for these treatments include lane conversions, rechannelizations, and road diets). The typical 4 to 3 reconfiguration removes a travel lane from each direction of a 4-lane road and then uses that space to instead include a center turn lane and bicycle lanes (image below).

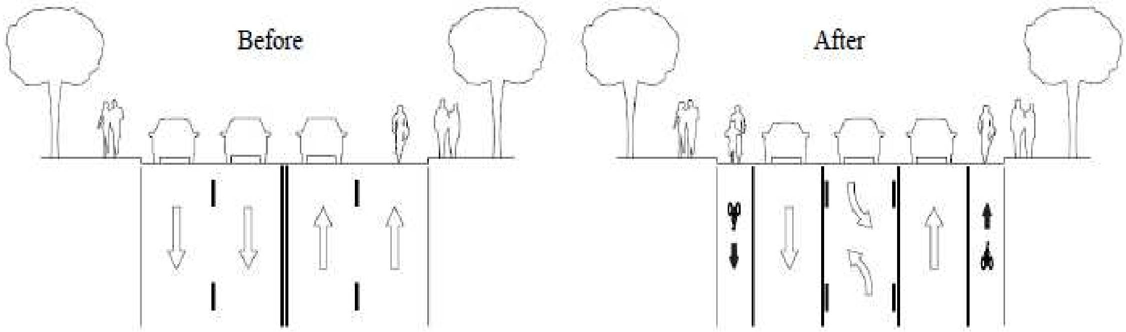


Figure 1: Typical 4 to 3 Reconfiguration.

EVIDENCE BASE

The Federal Highway Administration (FHWA), a U.S. Department of Transportation agency responsible for ensuring the nation's roadways remain as safe and technologically progressive as possible, strongly encourages the use of right-sizings. A FHWA informational guide published in 2014 notes that nationwide right-sizing studies typically observe between 19% and 47% reductions in overall crashes (Knapp et al., 2014).

In 2008, the City of Austin hired an external consultant to perform an in-depth before/after analysis for a right-sizing on Steck Avenue from Burnet Road to west of Shoal Creek Boulevard. This right-sizing, which was implemented in 2009, resulted in significant increases in bicycle and pedestrian traffic, comparable motor vehicle volumes and travel times, and increased safety for all users. This analysis, which will be discussed in more detail throughout this report, confirmed that these projects result in the same benefits as projects studied in other parts of the country.

Figure 2: Steck Avenue Following a Right-sizing Project in 2009.

PROJECT SELECTION / INITIATION

Potential right-sizing projects are selected for analysis for a number of different reasons. Some of Austin's projects were chosen for analysis because of high rates of motor vehicle crashes (e.g. Cameron Road between 53rd Street and Highway 290). Often, Austin citizens or neighborhood associations will request right-sizings in order to improve safety on their neighborhood streets (e.g. Balcones/Parkcrest Drive between Hancock Drive and Northland Drive). Additionally, ATD routinely analyzes street safety and operations in coordination with routine street maintenance. These street resurfacings provide a convenient method for updating street striping with little to no additional capital cost (e.g. Payton Gin Road between North Lamar Boulevard and Highway 183).

PROJECT ANALYSIS

Right-sizing project analyses involve study of intersection operations and motor vehicle volumes as well as existing crash histories and safety characteristics.

INTERSECTION OPERATIONS

As noted previously, the capacity of a street is determined by the operations at its stop-controlled and signalized intersections. The typical rule of thumb for the capacity of a single mid-block travel lane is 1,800 vehicles per hour. The capacity of a single travel lane through a signalized intersection is largely dependent on the time allocated in the signal cycle, but is typically only 600 vehicles per hour. Reasons for this reduced capacity at a signalized intersection include delays waiting at a red light while vehicles on the intersecting street have a green light, delays from vehicles slowing down or waiting to make turns, and delays from vehicles accelerating from a stop. Unless a street has three times as many lanes at the intersections as it has mid-block, the intersections will be the limiting factor in terms of capacity. By carefully analyzing and maintaining operations at intersections it is possible to reduce the number of lanes mid-block on a street without increasing delay for motor vehicle traffic.

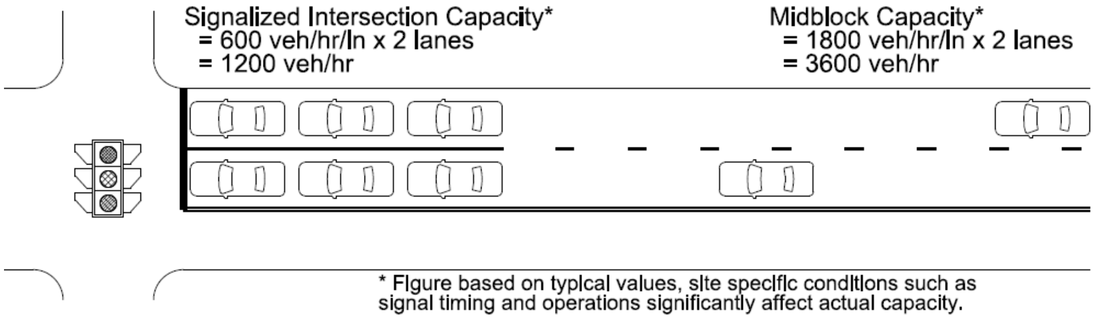


Figure 3: Comparison of Midblock and Signalized Intersection Capacity

One example of improved signal phasing is the removal of "split phase." Split phase operation means that, for example, the northbound and southbound movements of a street cannot both have a green light at the same time due to geometric constraints or conflicting turning movements. Split phase is often used because, without a left turn lane, left turning vehicles would block any through movement vehicles behind them while attempting to find a gap to turn across two oncoming lanes of traffic. Additionally, those left turning vehicles are positioned so that they have limited visibility of the opposing lanes, which increases the risk of a crash if northbound and southbound movements operate simultaneously (see Figure 3). When left turn lanes are added and the split phase is removed several safety and mobility benefits result, including (1) left turning vehicles no longer block through vehicles, (2) left turning vehicles are located in a more optimal location for sight distance, and (3) through movement vehicles receive significantly more green time because northbound and southbound movements can operate at the same time. In short, there is one less lane for through movements, but left turning cars no longer impede flow and the light stays green much longer for through movements in both directions.

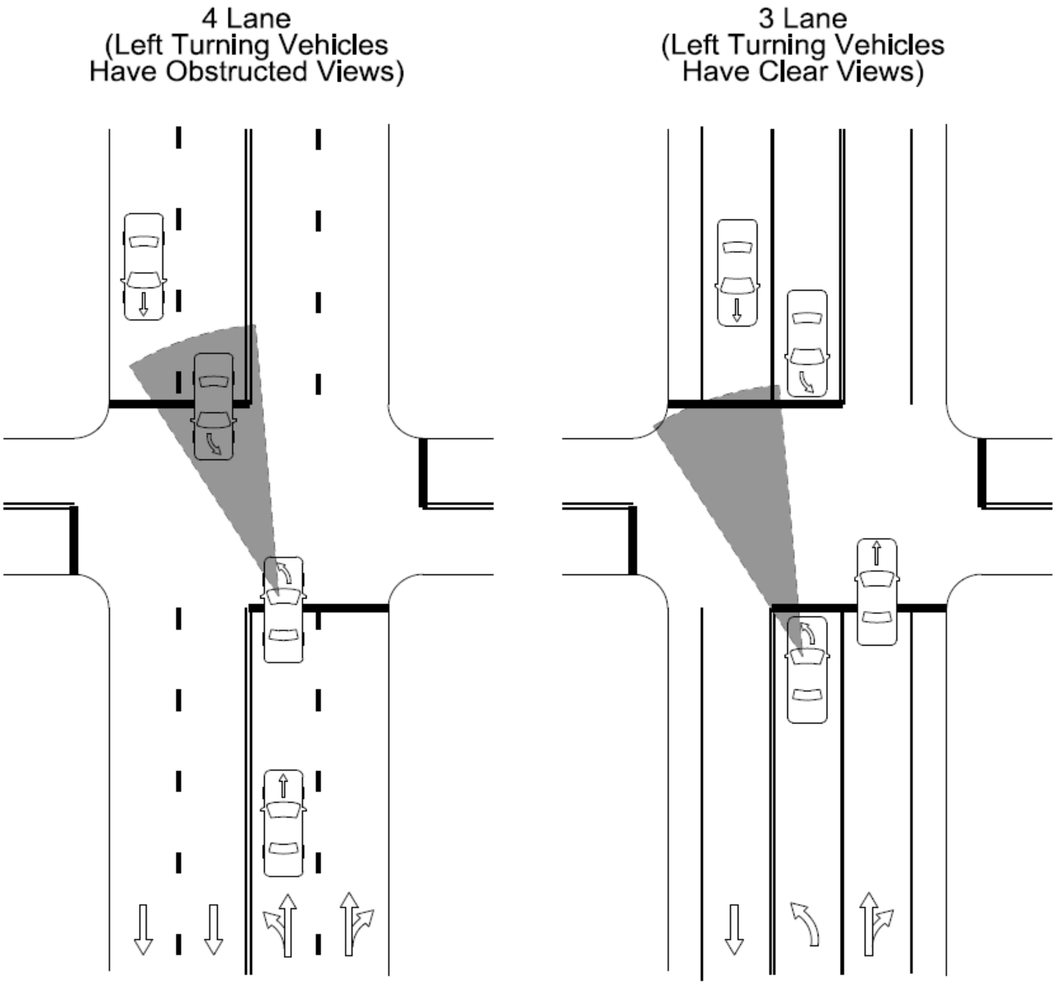
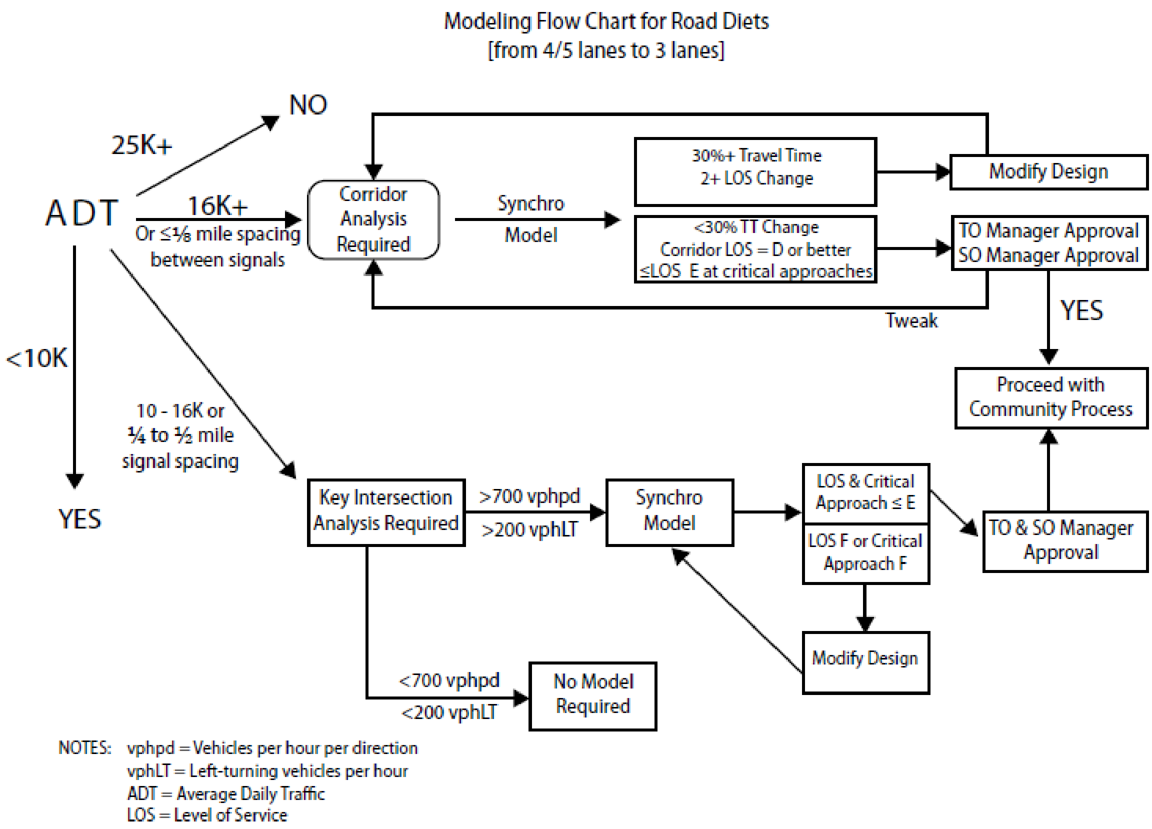


Figure 4: Left turn Lanes Provide Improved Views of Oncoming Traffic.

TRAFFIC VOLUME ANALYSIS

Average Daily Traffic (ADT) is a commonly referenced indicator of traffic volume and refers to the number of vehicles per day that travel a particular corridor. The FHWA notes that “Roadways with Average Daily Traffic (ADT) of 20,000 or less may be good candidates for a road diet and should be evaluated for feasibility.” (FHWA , 2012) They also indicate that roads greater than 15,000 ADT should be carefully analyzed to ensure acceptable operations.

The Seattle Department of Transportation (SDOT), which has successfully completed 38 right-sizing projects with a total length of 35.1 miles and is often recognized as a pioneer and leader in the field, utilizes the following diagram for determining feasibility (B. Dougherty, personal communication, March 9, 2015). This diagram acknowledges that higher volume projects require more thorough analysis and evaluation, while lower volume projects are typically installed without impact.



NOTE: vphpd is vehicle per hour per direction ADT is average daily traffic

Figure 5: City of Seattle Flow Chart for Determining Right-Sizing Feasibility (B. Dougherty, personal communication, March 9th, 2015)

Of the 37 total right-sizing projects done in Austin since 1999, 32 were on roads with well under 15,000 ADT. Using Seattle's feasibility determinations, the majority of Austin's completed right-sizing projects either fall within the category "No Model Required" or proceed straight to "Yes." However, ATD completes Synchro traffic simulation models for the majority of Austin's projects to ensure that they can still accommodate the demands of motor vehicle traffic. These traffic simulations utilize up-to-date turning movement counts taken during peak traffic volume times to compare before and after scenarios. The *Impacts* section of this report goes into greater detail on the before and after studies of safety and operational impacts on City of Austin right-sizing projects.

If a project's traffic simulation indicates that an intersection would be negatively impacted by a right-sizing, staff investigate alternate solutions that will maintain motor vehicle capacity. As an example, see the aerial imagery below showing Dean Keeton Street at Red River Street. Westbound traffic on Dean Keeton maintains three travel lanes through the intersection to accommodate motor vehicle capacity and then merges to two travel lanes in order to accommodate parking demands. Similarly, eastbound traffic has two lanes approaching Red River Street and then adds both a left turn bay and a right turn/I-35 entrance lane.

Figure 6: Dean Keaton Street at Red River Street after a right-sizing project.

The following page contains the flowchart that Austin uses to determine typical traffic modeling requirements as well as public outreach for right-sizing projects. This process was developed to include components that are similar to the Seattle process, but is in general more conservative than their process. It is important to note that Austin's process does allow for small increases in delay, particularly if an intersection is already operating with very low delay, but ATD is typically able to implement projects with little or no change in delay. The public outreach components of this process will be discussed further in the next section of this report.

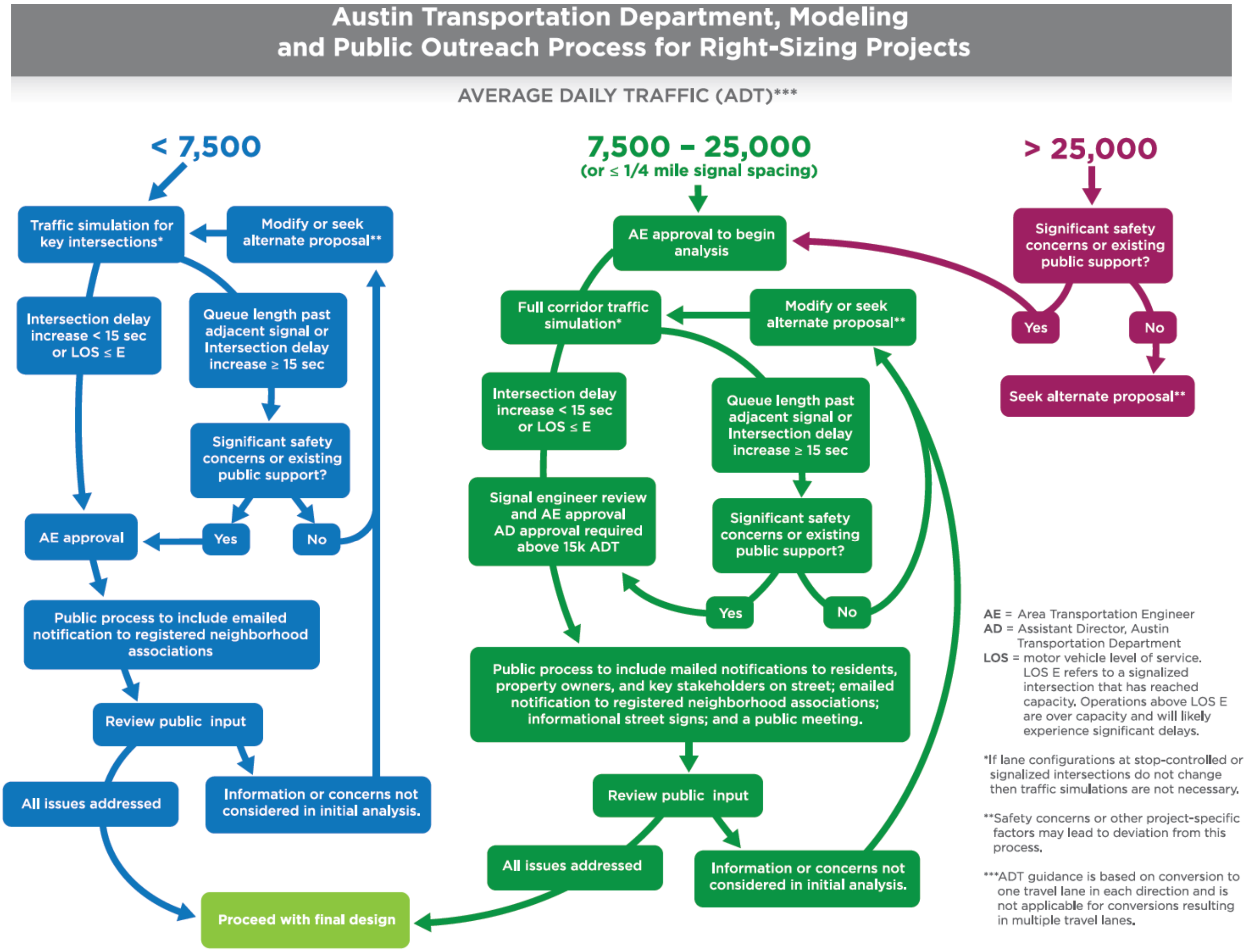


Figure 7: Austin Transportation Department, Typical Modeling and Public Outreach Process for Right-Sizing Projects

PUBLIC OUTREACH

Right-sizing projects from previous years did not always include a public outreach component. However, ATD now regularly includes public outreach in recognition of the value gained from engaging and gathering input from Austinites who use these streets on a daily basis. ATD may forego or perform a shortened public outreach process for streets with low traffic volumes, time-sensitive safety concerns, or other context specific factors.

Before finalizing proposals, ATD will initiate a process to seek public input through a variety of means. This process begins by mailing paper notifications with project details to property owners and tenants whose property is directly adjacent to the project area. ATD will also mail paper and email notifications to neighborhood associations and other stakeholders from the City's Community Registry whose borders overlap the project limits. These notifications provide basic project information and advertise the time and location of a public meeting where attendees can learn more about the potential project, ask questions, and provide feedback about the project. ATD will also install informational signs along the project that read "New Lane Configuration Proposed - Call 311 For Info."

Figure 8: Informational sign along proposed project route.

This multi-pronged public input process is an attempt to ensure the proposed design does not overlook any important considerations by gathering feedback and responding to questions or concerns from citizens. Whenever possible and feasible, ATD incorporates ideas and feedback and make changes to initial project proposals.

Figure 9: Improvements at Balcones and Parkcrest Drive.

This typical public outreach process is occasionally customized to be more or less involved depending on the volume and complexity of the street in question. As an example, the participants in the public meeting regarding Balcones/Parkcrest Drive between Hancock Drive and Northland Drive provided valuable insight and raised questions that led staff to update the original proposal and hold an additional public meeting to discuss the improvements.

AFTER IMPLEMENTATION ANALYSIS

After implementation of a right-sizing project, ATD observes traffic operations and responds to citizen phone calls and 311 requests to ensure successful implementation. Often, projects include new timing plans at signalized intersections which may involve several days of observations and adjustments after the street configuration has been changed before optimal operation is achieved.

RIGHT-SIZING PROJECTS

The table and map shown below provide a comprehensive list of all of Austin's right-sizing projects including average daily traffic (ADT) information and installation dates. These projects total 26.4 miles in length and span all 10 of Austin's City Council Districts.

Street	From	To	ADT	Date
Walsh Tarlton	Pinnacle	Tamarron	12,000	3/12/1999
Manor	Dean Keeton	Airport	11,000	8/25/2001
Hancock/North Loop	Lamar	Bull Creek	10,000	6/1/2002
North Loop/53rd	Guadalupe	Bruning	6,000	6/1/2002
Duval Rd	West Cow Path	Aspendale	17,500	6/1/2007
Pleasant Valley	Webberville	12th	8,000	10/1/2007
Steck	Burnet	Shoal Creek	10,500	3/25/2009
Dean Keeton	San Jacinto	French Pl	13,500	8/12/2009
Amherst	Duval	Parmer	10,000	8/20/2009
Kramer	Lamar	Braker	12,000	7/12/2010
Manor	Theo	51st	8,000	11/22/2010
Victory	Prather	Ben White	7,000	8/29/2011
Red River	41st	45th	13,000	9/23/2011
Kramer	Braker	Burnet	7,000	9/24/2011
Cameron	53rd	HW 290	16,500	10/5/2011
11th Street	Trinity	Sabine	12,000	10/28/2011
Springdale	MLK	51st	14,000	10/31/2011
Gaston Place	Berkman	Westminster	6,500	11/1/2011
Shoal Creek	Steck	183	7,500	3/19/2012
Rio Grande	MLK	24th	5,000	4/23/2012
Payton Gin	Lamar	183	12,500	11/19/2012
Harris Ridge	Parmer	Howard	6,000	12/20/2012
North Loop	Guadalupe	McCandless	8,000	7/16/2013
Grove	Hogan	Riverside	10,000	8/29/2013
St Johns	Cameron	Berkman	3,500	8/30/2013
Hancock	Bull Creek	Francis Pl	7,000	9/5/2013
51st Street	Berkman	Manor	17,000	9/23/2013
Medical Pkwy	34th	38th	5,000	9/28/2013
Pack Saddle Pass	Ben White	Western Trails	6,000	6/2/2014
Balcones Dr	Hancock	Northland	16,000	7/30/2014
Parkcrest	Balcones	Northland	11,500	7/30/2014
Manor	51st	Springdale	10,000	9/8/2014
Mesa	Steck	Spicewood Springs	13,000	9/17/2014
St Johns	Lamar	Cameron	10,000	9/23/2014
38th	Duval	38th 1/2	15,000	9/29/2014
St Elmo	I-35	Todd	11,000	11/26/2014
Rutherford	Cameron	Anderson	10,500	12/17/2014

Table 1: List of Completed Right-Sizing Projects in Austin, TX since 1999.

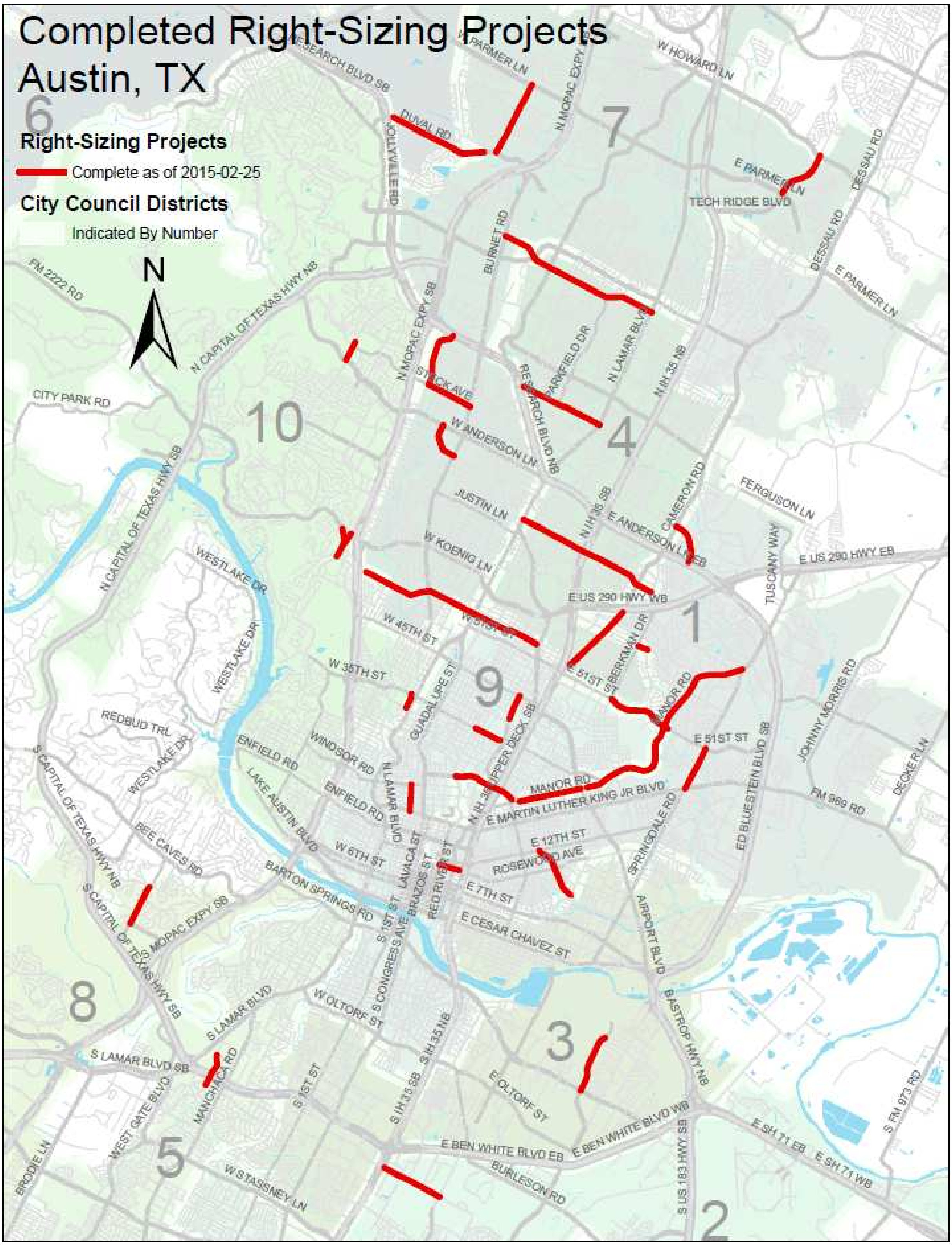


Figure 10: Map of Completed Right-Sizing Projects in Austin, TX since 1999.

IMPACTS

Right-sizing projects are implemented in order to improve safety and operations. Before and after observations and studies are completed to ensure these impacts are realized. All projects do not receive the same amount of analysis. Instead, this analysis is adjusted as necessary to ensure acceptable performance. Areas of study include traffic volumes, travel times, peak hour operations, motor vehicle speeds, and crash histories.

TRAFFIC OPERATIONS

Traffic operations may be understood in terms of motor vehicle volumes, travel time and peak hour observations. Based on before and after studies, all of Austin's completed right-sizing projects have had little to no negative impact on motor vehicle operations.

MOTOR VEHICLE VOLUMES

ADT provides a before and after comparison of traffic volumes for a right-sizing project. The Steck Avenue study concluded that "...traffic volumes are comparable before and after the reconfiguration…" and "the reconfiguration has not resulted in vehicles being diverted away from Steck Avenue to other roadways…."

Similarly, an analysis of 24-hour traffic volumes for the right-sizing project on 51st Street between Berkman Drive and Manor Road demonstrates comparable total volumes before and after this right-sizing project.

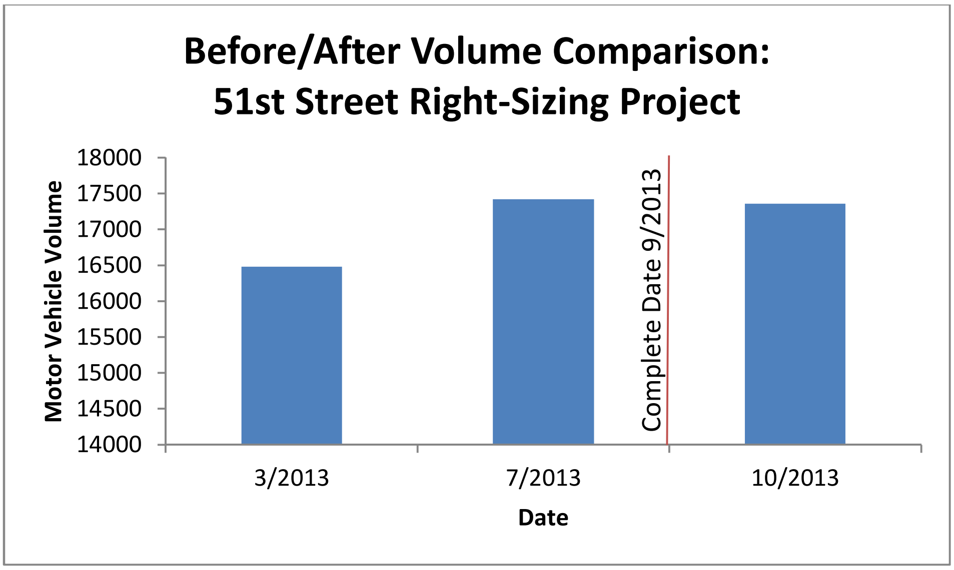


Figure 11: Before and After Traffic Volume on 51st Street between Berkman Drive and Manor Road.

TRAVEL TIME

Tables 2 and 3 below compare motor vehicle travel times along the Steck Avenue corridor before and after implementation of a right-sizing. Westbound travel times experienced a very slight increase, while eastbound travel times reduced during all observed peak periods.

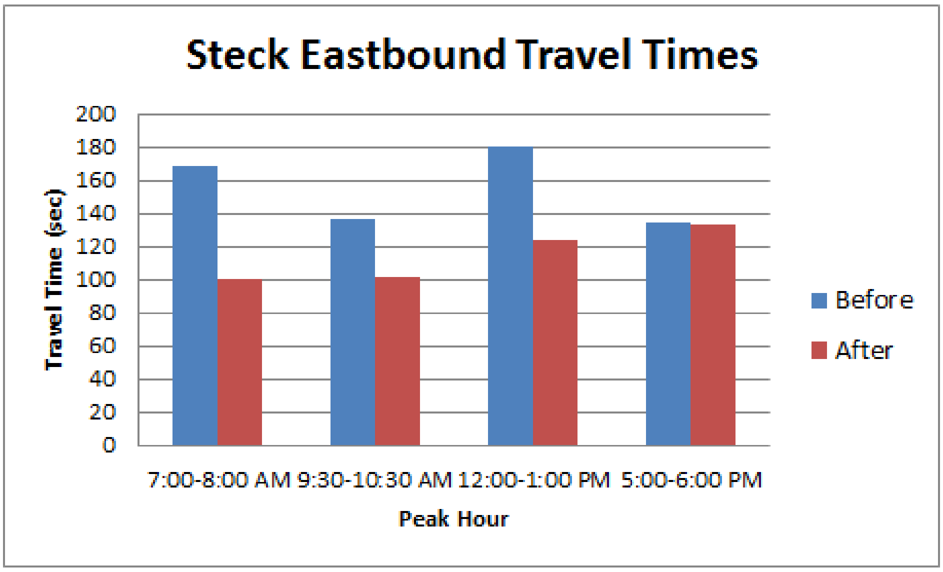


Figure 12: Before and After Eastbound Travel Times on Steck Avenue

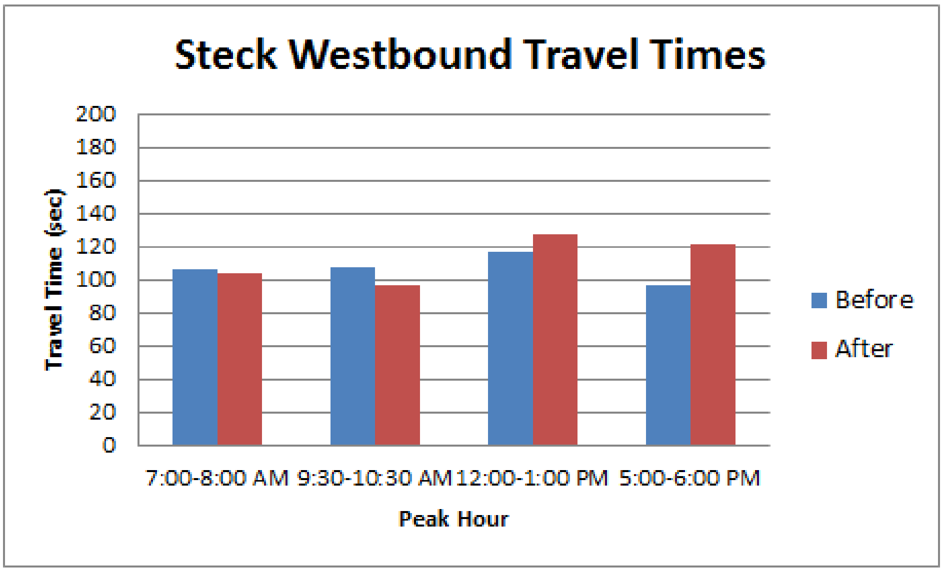


Figure 13: Before and After Westbound Travel Times on Steck Avenue

PEAK HOUR TRAFFIC OPERATIONS

In addition to 24 hour traffic volumes, peak hour traffic volumes are particularly informative for a corridor's operations. The right-sizing project on 11th Street between Trinity Street and Sabine Street experienced its highest traffic volumes during the PM peak hour. Table 5 contains peak hour traffic volumes through the intersection of 11th Street and Red River Street, both before and after project implementation, that are indicative of operations along this corridor. The intersection of 11th Street and the I-35 frontage road is the primary volume constraint for this area of 11th Street. As such, the approach to I-35 maintains two motor vehicle lanes in each direction to accommodate the peak hour traffic volumes. The intersection at Red River Street is the first signal west of that I-35 constraint and the figure below confirms that, even during the PM peak hour, the traffic volumes through the updated lane assignments at this intersection were comparable before and after the project.

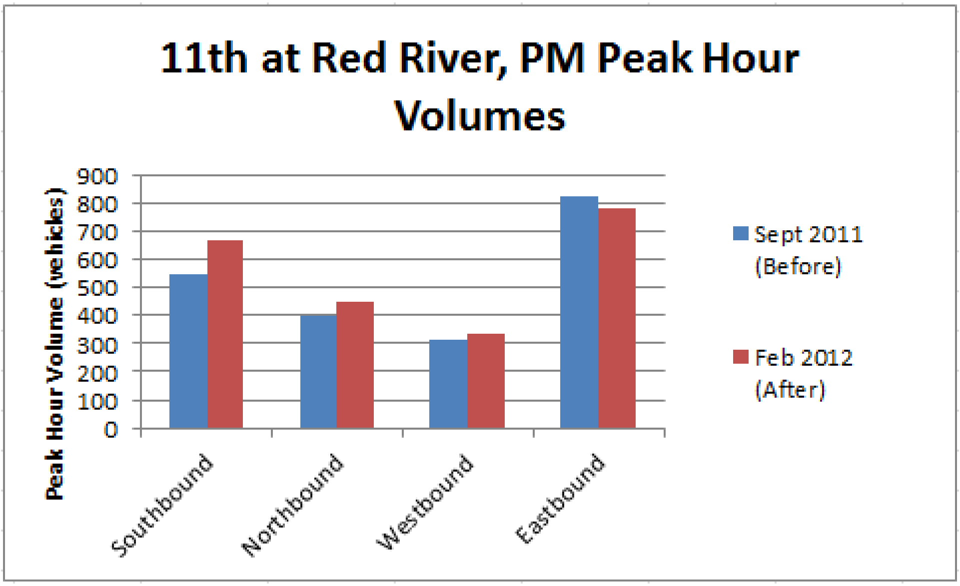


Figure 14: Before and After Peak Hour Traffic Volumes on 11th Street at Red River

BICYCLE VOLUMES

ATD does not always gather before and after bicycle use data because substantial changes in bicycle use typically result from complete network changes rather than individual segments. However, all of Austin's right-sizing projects with available before and after data show significant increases in bicycle use. These increases allow a roadway to transport more people without adding to motor vehicle congestion. Currently, 5.6% of commuters in the central city use a bicycle to get to work and an estimated 4% of all trips bound to the downtown, capital, and university area are made by bicycle (American Community Survey, Journey to Work, 5-Year Aggregate data 2009-2013 and CAMPO Origin-Destination Travel Data). These percentages are expected to continue to grow with implementation of a network of bicycle facilities.

The Steck Avenue study noted that “Bicycle traffic along the Steck Avenue corridor doubled, tripled, or quadrupled after reconfiguration, during all recorded peak periods. Additionally, pedestrian traffic either doubled or tripled after reconfiguration, during all peak periods.”

Other 24-hour before and after bicycle counts include a 180% increase (from 54 to 151) on Manor Road between Theo Drive and 51st Street, an 88% increase (from 136 to 256) on Cameron Road between 53rd Street and Highway 290, and a 178% increase (from 283 to 786) on Rio Grande Street between Martin Luther King Junior Boulevard and 24th Street. Based on trends observed in Austin, these bicycle volumes are expected to continue to increase. The right-sizing project on Manor Road between Dean Keeton Street and Airport Boulevard, which was implemented in 2001, illustrates this continued growth. The 2001 Manor Road project has bicycle volumes that are more than triple the bicycle volumes on the adjacent Manor right-sizing installed in 2010.

SAFETY OBSERVATIONS

National studies indicate that right-sizing projects typically result in 19% to 47% reductions in crashes for all modes of transportation (Knapp et al., 2014). Before and after crash analyses for right-sizing projects in Austin have shown similar results. These projects also result in decreases in the severity of crashes when they do occur, primarily due to a reduction in excessive speeds.

The examples below display safety improvements as demonstrated by reductions in high-risk speeding and reductions in total crashes.

MOTOR VEHICLE SPEEDS

The fact that motor vehicle speeds during a crash directly relate to injury severity is widely documented and logically intuitive. This relationship is true for crashes involving all modes of transportation but is most pronounced for crashes involving pedestrians. The chart below illustrates an empirical analysis of crash data which analyzes the likelihood of a fatality or incapacitating injury resulting from a crash involving a person walking and a motor vehicle traveling at various speeds.

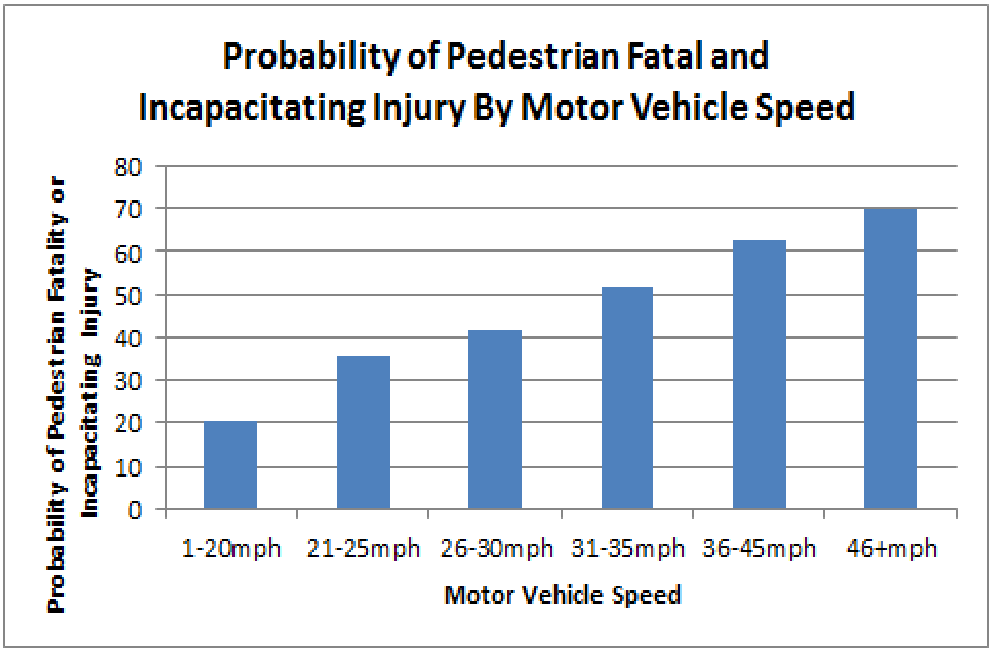


Figure 15: Relationship Between Motor Vehicle Speed and Probability of Fatality (NHTSA 1999).

A typical 4 to 3 reconfiguration project removes the ability for people in cars to easily pass other vehicles that are traveling at or below the speed limit which results in much lower variability in speeds. Increased speed limit compliance and increased uniformity among vehicle speeds result in improved safety on a street.

Data on Cameron Road between 53rd Street and Highway 290 indicate that motor vehicle traffic is still able to travel at or close to the speed limit through the corridor, but high-risk speeding has been significantly reduced. This project was initiated in response to high numbers of crashes which have resulted in many injuries and the death of a person walking along the corridor. Cameron Road has a posted speed limit of 35 miles per hour (mph) on the north half of the project and 30mph on the south half of the project. Speed data before and after the project indicate an average speed reduction of only 3.5mph, but the number of vehicles travelling faster than 45mph in a 24 hour period dropped from 175 vehicles before the project to only 22 vehicles after the project. Additionally, the number of vehicles travelling faster than 55mph in a 24 hour period dropped from 23 vehicles before the project to 0 vehicles after the project.

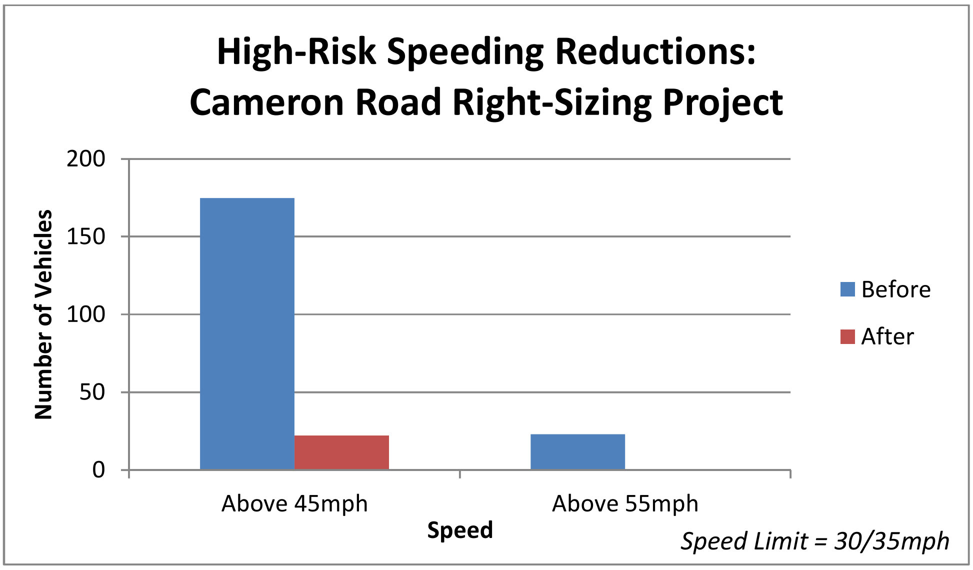


Figure 16: Motor Vehicle Speeds on Cameron Road Before and After Right-Sizing

As another example, the right-sizing project on 51st Street between Berkman Drive and Manor Road resulted in similar speeding trends. 51st Street has a 40mph speed limit on the western portion of the project and a 35mph speed limit on the eastern portion. Crashes on 51st Street between Berkman Drive and Manor Road have resulted in numerous injuries, a fatal crash in 2007, and two fatal crashes in 2009. The right-sizing projected reduced average motor vehicle speeds by 4.5mph and the figure below displays the substantial reduction in the number of motor vehicles travelling above 45mph and above 55mph.

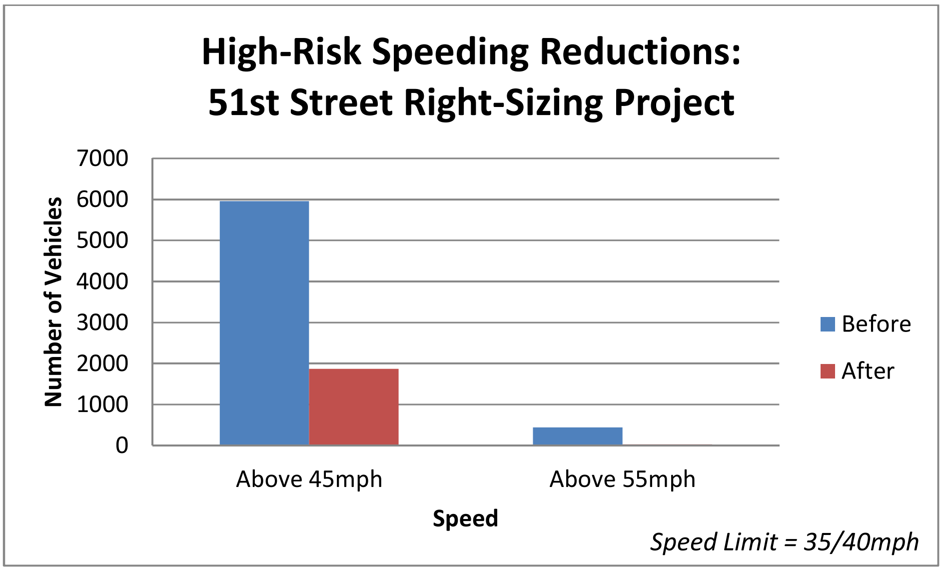
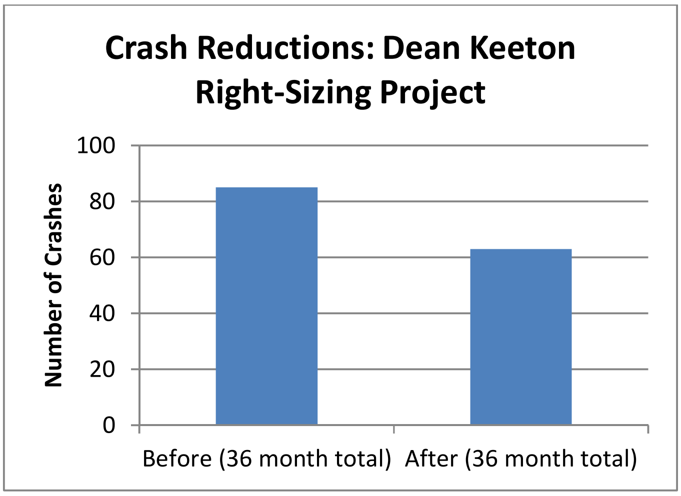


Figure 17: Motor Vehicle Speeds on 51st Street Before and After Right-sizing.

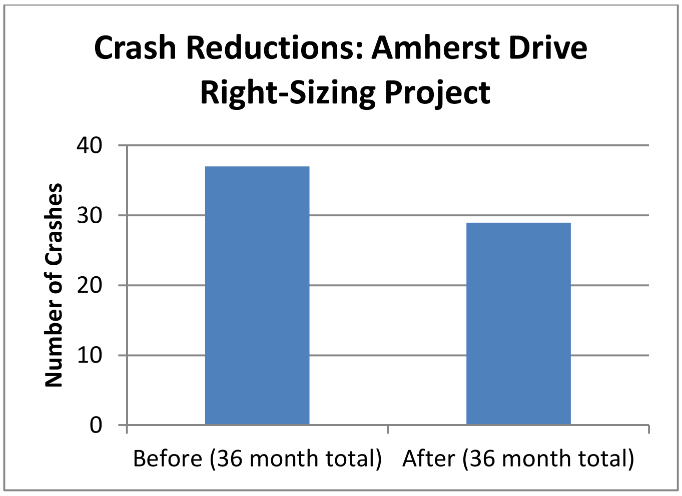
Before-after comparisons of crash histories ideally use multiple years of crash data both before and after project implementation. The following examples show crash analyses on every right-sizing project that 1) was implemented within the last five years, 2) has at least two years of after crash data readily available, and 3) is greater than ¾ mile in length. As the majority of Austin's right-sizing projects were installed within the last few years, ATD will continue to gather and process updated crash data and will periodically update this report to contain more recent projects.

Note that these comparisons show raw before-after data which do not adjust for increases in traffic volumes (which will typically result in an increased frequency of crashes) and do not utilize more rigorous statistical tools such as the Empirical Bayes method (which can account for regression to the mean effects).



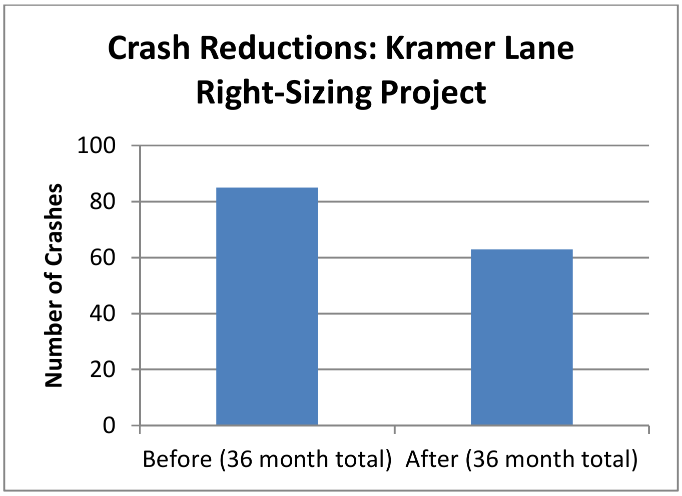
29% crash reduction

Figure 18: Dean Keeton (San Jacinto to French Place) Before and After Crash Data



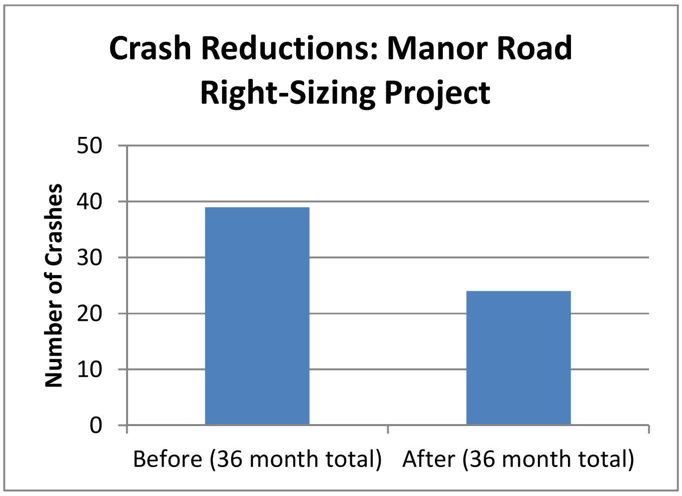
22% crash reduction

Figure 19: Amherst (Duval to Parmer) Before and After Crash Data



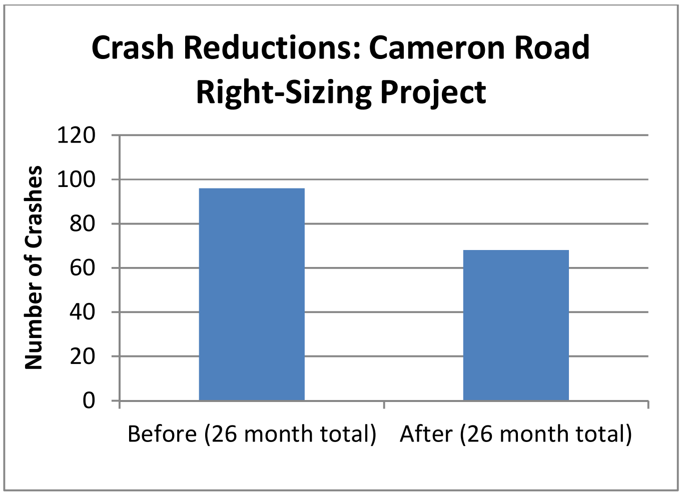
26% crash reduction

Figure 20: Kramer (Lamar to Braker) Before and After Crash Data



38% crash reduction

Figure 21: Manor (Theo to 51st) Before and After Crash Data



29% crash reduction

Figure 22: Cameron (53rd to 290) Before and After Crash Data

PROJECT DELIVERY AND PUBLIC PERCEPTION

Right-sizing projects produce a wide variety of reactions from roadway users ranging from enthusiastic support to vocal opposition. The wide nodes and narrow roads concept is not always immediately intuitive to the traveling public and, upon first learning about a right-sizing project, it is common for people to assume that a decrease in the number of motor vehicle lanes will result in increased delays. While public outreach provides an opportunity to educate and dispel those assumptions, this outreach does not reach all users.

Project delivery also has a large influence on public perception. Initial project implementation can result in real delays before the corridor's signal retiming and optimization is complete. As an example, the right-sizing on 51st Street between Berkman Drive and Manor Road was restriped but remained in split phase operation for approximately one week before the new signal timing was applied. The initial delays on 51st Street not only created negative perceptions of the project, but also caused real inconveniences for people driving on the corridor. To prevent similar scenarios in the future, ATD has improved coordination and expanded signal engineering staff in order to be more responsive and ensure successful project delivery.

Despite data showing that travel time through a corridor has not significantly increased, a right-sizing project can still appear to result in increased congestion. The presence of long queues in fewer lanes, even if those same queues were present before a project, can naturally lead to conclusions of increased delay. The right-sizing project on Springdale Road between Martin Luther King Junior Boulevard and 51st Street is one example of this type of perception. Because of existing delays and long queues, particularly in the southbound direction of the PM peak, this project's design maintained the existing number of southbound approach lanes for approximately a quarter of a mile approaching the intersection at Martin Luther King Junior Boulevard (none of the other approaches were altered). Observations before and after this project's implementation confirmed that delays and queues, while still long, were not increased. However, feedback from citizens in the area continues to indicate a belief that the changes to the travel lanes midblock created increased delays at this intersection.

Figure 23 Right-Sizing on Kramer Lane

As traffic demands change over time, Austin's corridors, including those that have had right-sizings, require continued operational monitoring and improvements and ATD staff regularly respond to citizen feedback about increased delays at signals. As an example, ATD recently responded to concerns about delays at the intersection of Victory Drive and the Ben White Boulevard Frontage Road. Signal adjustments led to significant signal timing improvements and decreased queues. ATD staff are also currently investigating potential improvements to the intersection of Springdale at Martin Luther King Junior Boulevard. Staff have again concluded that the midblock changes are not affecting the operations at this intersection, but believe there may be other geometric or signal phasing improvement options. Continued improvement to public outreach and education campaigns, increased coordination during project implementation, and regular operational monitoring will lead to transparent and successful projects.

Following successful right-sizing project implementation, users of all modes of transportation generally report increased comfort. People walking find it easier to cross the street due to the reduced number of motor vehicle lanes and enjoy the additional buffer provided by the bicycle lanes to separate fast-moving motor vehicle traffic from the sidewalk. People on bicycles feel significantly more comfortable riding in a painted bicycle lane as opposed to sharing a lane with motor vehicles. People driving in motor vehicles find left turns and general roadway operations to be less stressful. These increases in comfort and safety without negative impacts to traffic operations have resulted in a national trend of increased right-sizing implementations.

CONCLUSION

Local experience has repeatedly demonstrated that right-sizing projects can accommodate the same motor vehicle volumes, avoid increases in travel time, reduce high-risk speeding, and reduce total crashes. These projects require careful analysis and public outreach, but can be implemented for extremely low costs.

This reports serves as documentation for the implementation process and observed benefits from past right-sizing projects. ATD should continue to monitor these past projects while also updating analysis and public outreach methodology in order to ensure successful implementation for future projects.

PEER REVIEW

May 26, 2015

The "right sizing" concepts described in this report are precisely what I attempt to teach in my undergraduate and graduate level traffic engineering classes at the University of Texas at Austin. I totally support these concepts and their application as long as implementation occurs only after the thorough analysis described in the report. Indeed, per lane capacity of signal or stop controlled intersections is much less than per lane mid-block capacity, therefore, balancing intersection and mid-block capacities is appropriate.

The crash data examples cited in the report indicate reductions in crash experiences for the streets that have been re-designed. For the four lanes to three lanes modification, I hypothesize that the reduction in crashes is largely due to more uniform speeds since, as the report notes, passing and lane changing are not legally possible and the speed becomes that of the slowest vehicle in the traffic stream. There has been significant European experience with variable speed limits on freeways that has shown abilities to maintain stable flows through greater traffic volumes due to more uniform speeds, that is, only a fraction of all drivers must obey the reduced speed limit to cause a more uniform lower traffic stream speed.

Overall, I support the efforts describe in the report. Please continue to do the thorough site selection and analysis process described since these techniques are very appropriate for many streets but certainly not for all. I plan to adopt this report as a reference for my undergraduate and graduate level classes.

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