CITY OF PHOENIX SPEED LIMIT SETTING STUDY

City of Phoenix | Street Transportation Department
Supported by the U.S. Department of Transportation's Safe Streets and Roads for All Grant
Consultant Team: Y2K Engineering, LLC.

MARCH 2026

ATTACHMENTS

INTRODUCTION

Acknowledgments

This study was made possible through the leadership of the Phoenix Mayor and City Council, the dedication of the Phoenix Streets Department, and the active participation of community members who shared their voices through the Citywide Speed Limit Survey.

We also acknowledge the U.S. Department of Transportation for awarding the City of Phoenix a Safe Streets and Roads for All (SS4A) grant to fund this effort, Robert Wunderlich, PE, for providing technical expertise, and the consultant team at Y2K Engineering.

Introduction

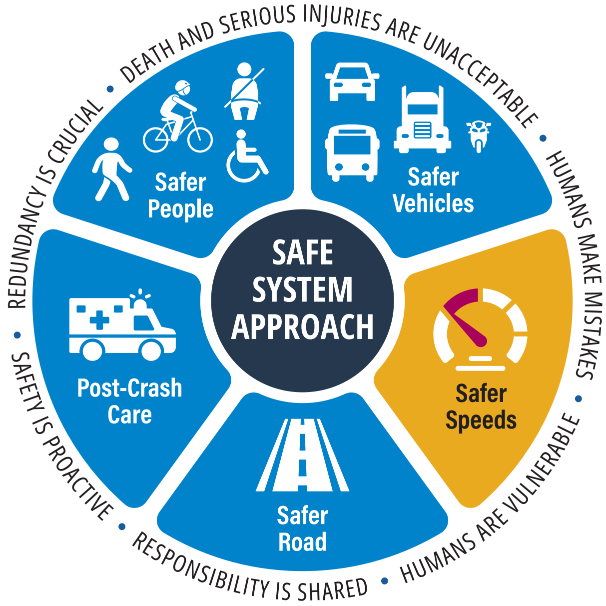
This Speed Limit Setting Study is a supplemental planning effort, funded by a 2022 SS4A grant. It builds upon the City's Vision Zero Road Safety Action Plan (RSAP), adopted by City Council in 2022, which commits to eliminating fatal and serious injury crashes by 2050.

When creating the RSAP, Phoenix worked to develop a plan that went beyond traditional road safety measures by incorporating best practices and Federal guidance. The Federal Highway Administration's (FHWA) Safe System Approach (SSA) places safety at the center of transportation investment. It is based on the principle that the human body has physical limits for tolerating crash forces before death or serious injury occurs, which requires designing and operating a transportation system that manages impact energy through **Safer Speeds**.

The purpose of this study is to create a **Speed Limit Setting Procedure** that is consistent, transparent, and context-sensitive. The study focuses on arterial and collector roadways, where motor vehicle speed is a significant factor in the severity of crashes.

This report summarizes:

- Why speed matters and how Phoenix is shifting its approach
- What the community thinks about speed limits and safety
- The methodology for determining Target Speeds
- Next steps for implementation



SECTION 1

WHY SPEED MATTERS

Speed and Risk: Why Every Mile Per Hour Counts

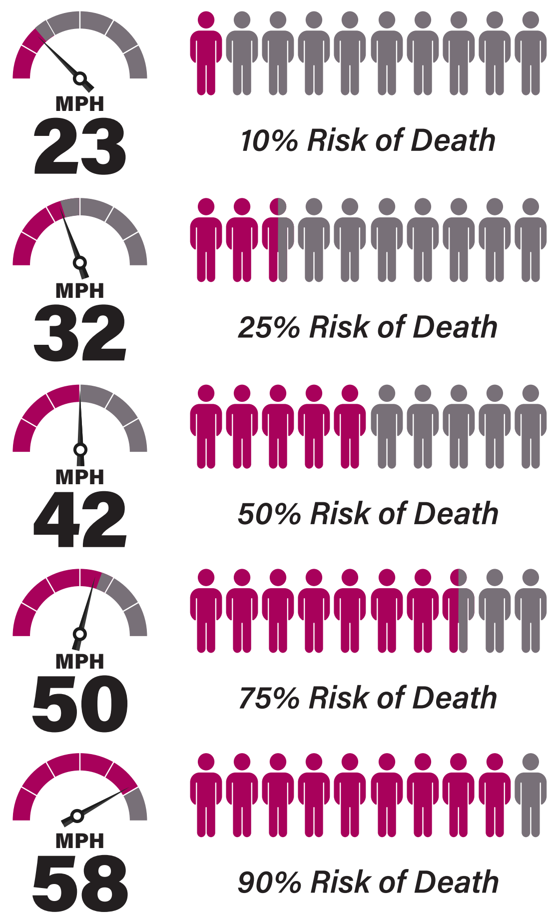
Speed is one of the strongest predictors of crash outcomes because as speeds increase, both the *likelihood* of a crash occurring and the ***severity*** of its consequences rise sharply.

Crash severity is closely tied to physics. Kinetic energy multiplies as speed rises, growing at the rate of the speed squared. This means that doubling speed from 20 to 40 miles per hour produces four times the crash energy. The average risk of death for a pedestrian struck by a vehicle reaches 10% at an impact speed of 23 mph, 25% at 32 mph, 50% at 42 mph, 75% at 50 mph, and 90% at 58 mph. The average risk of death for a pedestrian is illustrated in the graphic to the right.

During the period of 2019-2023, there were 4,220 crashes in Phoenix that resulted in serious injury or fatality. The most common collision types resulting in serious injury or fatality are Pedestrian (29%), Angle (22%), and Left-Turn (13%) crashes. Vulnerable road users— pedestrians, motorcyclists, and bicyclists— were involved in 65% of the city's fatal crashes.

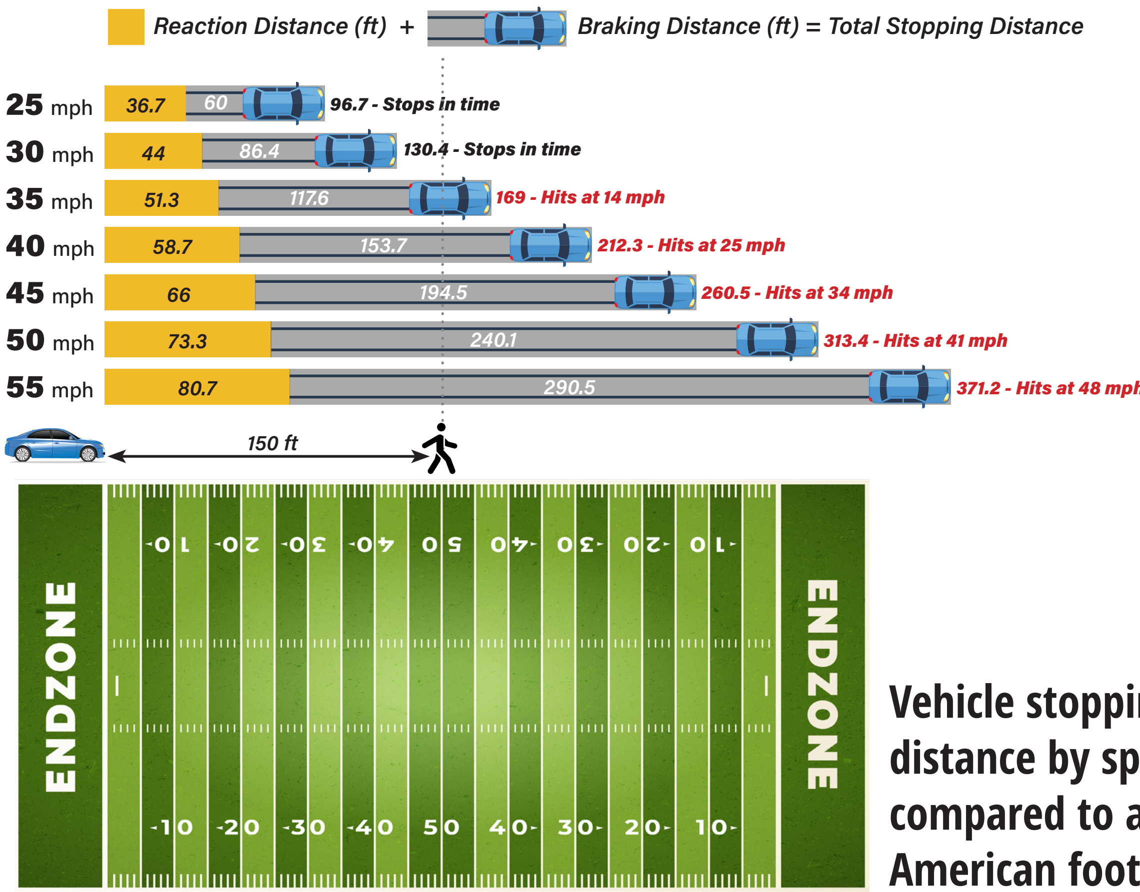
Research from international studies shows that even small changes in driving speed make a big difference for safety. A widely used safety model, known as the Power Model, found that lowering the average speed on a road by just 10% can reduce overall injury crashes by about 19%, cut serious and fatal crashes by 27%, and lower fatal crashes by 34% (*OECD/ITF Speed and Crash Risk, 2018*).

Approximate survival rate if hit by a vehicle at the following speeds.



Source: *AAA Foundation for Traffic Safety, Impact Speed and a Pedestrian's Risk of Severe Injury or Death*

Speed also affects reaction time and stopping distance. A driver going 30 mph needs about 130 feet to stop, assuming one second to react, level grade, and 11.2 ft/s^2 braking deceleration. At 45 mph, the distance doubles to 260 feet. On Phoenix's wide arterials, this leaves little margin for error when a person crosses the street or another driver stops suddenly.



Vehicle stopping distance by speed compared to an American football field.

Phoenix's Challenge

Phoenix's roadway network was designed during decades when moving cars quickly across long distances was the top priority. Wide and straight arterials, good visibility, long blocks, and limited "friction", such as buildings with short setbacks or street trees, encourage faster driving.

This design legacy contributes to today's safety challenge. Over the past several years, speeding has been a factor in approximately 22% of crashes that caused death or serious injury in Phoenix, as reported on crash forms. Enforcement has also been limited: staffing challenges, negative public attitudes toward police, and the burdens of the adjudication process have reduced the role of police enforcement in curbing speeding. Compounding this, the sheer geographic size of Phoenix (more than 500 square miles) makes it difficult to cover all parts of the city with traditional enforcement alone.

Unlike vehicle counts, data on people walking and biking are not consistently or widely measured, making exposure harder to quantify. Still, Phoenix streets serve many pedestrians

and bicyclists because of the city's transit network and favorable climate that supports year-round activity. Mild winters and little rain mean more people in the roadway environment than traffic counts alone might indicate.

The effects of the pandemic have added another layer to this challenge. With more people working remotely, traffic volumes fell and congestion eased across the city. Phoenix, as a major employment center, saw its roadways shift toward more consistent free-flow conditions. Today, many corridors remain underutilized relative to their original design, creating environments where higher speeds feel comfortable to drivers.

At the same time, the vehicles themselves are working against safer outcomes. The average weight of vehicles has increased significantly with the popularity of SUVs, trucks, and electric vehicles, which generate more force in crashes and heighten the risk to vulnerable road users. Modern vehicles are also quieter, smoother, and more insulated from road noise and vibration, which can give drivers a false sense of control and comfort at higher speeds. While some newer vehicles do include features that improve safety for both occupants and people outside the vehicle, these advances have not kept pace with the risks introduced by heavier, faster, and quieter vehicles. Ultimately, even as drivers feel safer inside the vehicle, the consequences of a crash for everyone involved remain severe.

Why Past Approaches No Longer Work

Traditional approaches to speed limit setting in the U.S. have leaned heavily on the 85th percentile speed—the speed at or below which 85% of drivers travel. Phoenix, like many cities, has relied on this in the past, but the method is not suited to today's urban streets. This methodology is based on the theory that the majority of drivers select a safe speed to drive at, leaving the fastest 15% of drivers to be traveling illegally and eligible for enforcement. This approach is driver centric, and does not adequately incorporate the safety of other roadway users as habits and enforcement trends have changed over time. **Attachment A, the Technical Foundations Memorandum**, outlines the historical context of speed limit setting, driver behavior in Phoenix, and summarizes relevant national best practices, and highlights approaches used by peer agencies.

In Phoenix, where many drivers already travel faster than posted limits, relying on this method would mean raising speed limits on nearly every road studied. That would move the City further from its Vision Zero goal of eliminating traffic deaths and serious injuries by 2050. Even other methods, such as the expert-based USLIMITS2 tool, falls short in Phoenix because they depend heavily on the 50th and 85th percentile operating speeds. On many corridors with gross non-compliance, both of these measures are already higher than the posted speed limit, leading the tool to recommend speed limits that are out of step with community safety needs.

Emerging best practices instead recommend setting speed limits based on the context of the road—such as surrounding land use, pedestrian activity, and roadway design—rather than simply observed operating speeds. Setting appropriate speed limits is an FHWA Proven Safety Countermeasure and is fundamental to the SSA and to making roadways safer for all road users.

This is why Phoenix is shifting to a Target Speed approach—one that starts with context and safety outcomes, not just how fast drivers are traveling.

A New Approach: Target Speed

Phoenix is adopting a Target Speed approach, recommended by the Federal Highway Administration (FHWA) and the Institute of Transportation Engineers (ITE).

- **Target Speed** – the intended operating speed based on land use, travel activity, and street design.
- **Posted Speed** – the legal speed shown on signs and enforceable by law.
- **Operating Speed** – the actual speeds drivers travel, measured at the 50th and 85th percentiles.

The goal of setting a target speed is to bring posted, operating, and target speeds into alignment. In practice, this means the posted speed reflects the target speed, and the street's design and operations encourage drivers to travel at that speed.

Why Design, Not Just Signs, Matters

Changing posted speed signs alone rarely results in large reductions in speed. Drivers respond most to their environment: wide spaces, long sight lines, and limited activity encourage faster driving.

That's why the target speed approach links street design and operations with posted limits. Features like gateway treatments, pedestrian hybrid beacons (aka HAWKs), protected bike lanes, raised crosswalks, and curb extensions all help reinforce the target speed. Signal timing strategies can reduce the opportunity for speeding. Enforcement and education remain important, but they are most effective when combined with design and operations.

Legal Authority and Federal Alignment

Under **Arizona Revised Statute §28-702**, Phoenix has the authority to adjust speed limits if supported by a traffic engineering study.

This Speed Limit Setting Study provides that engineering foundation and ensures Phoenix's approach is consistent, transparent, and defensible. It also aligns with the **FHWA Target Speed Policy (2025)**, which defines target speed as *"the highest desired operating speed given land-use contexts, multimodal activity, and vehicular mobility".*

Why It Matters for Phoenix

Phoenix is taking steps to make streets safer and more predictable for everyone.

- Speed influences whether crashes result in serious injury or can be walked away from.
- Target speed provides a framework to better match speed limits with how streets are used, not just how fast drivers go today.
- This is not about changing signs overnight. Reaching target speeds will take time, design changes, operational changes, enforcement, education, and long-term investment.

SECTION 2

COMMUNITY PERSPECTIVES

To guide this study, the City conducted a Community Attitude Survey in May 2025. More than 1,000 residents responded, sharing their perspectives on speed limits, roadway safety, and potential solutions.

Travel Context

Most respondents experience Phoenix primarily as drivers, with nearly 70% driving every day or most days. However, walking is also common, with more than 40% reporting they walk at least a few times a week. By contrast, over half said they never bike, scooter, or roll, and more than 60% said they never use transit. This context is important because most answers came from people who rely on driving, but a significant share also interacts with Phoenix streets as pedestrians.

Perceptions of Speed and Safety

When asked about the risks of speed, residents demonstrated a strong understanding that higher speeds mean more severe crashes. Nearly 90% agreed that a crash at 45 mph is much more severe than one at 35 mph. At the same time, more than half of respondents expressed skepticism that lowering posted speed limits alone would reduce driver speeds. This suggests that while people recognize the danger of speed, they also believe that signs by themselves will not change driver behavior.

Support for Lowering Speed Limits

Survey responses show mixed support for lowering limits, with differences in how people believe it would affect their travel choices:

- Slightly more than half support reducing limits
    - From those who rely exclusively on driving, only 37% support reducing speed limits
    - From those who are multi-modal users, 57% support reducing speed limits

- About one-third oppose
- 14% are unsure
- 30% say they would walk, bike, or roll more if limits were lower
- Nearly two-thirds say they would drive more slowly if limits were lower

Overall, the survey points to some benefits of lower limits, though people recognize the change would not affect all drivers or streets in the same way.

What Residents Said in Their Own Words

Open-ended comments provide more detail on community perspectives. Supporters of lower limits most often said that enforcement is needed alongside reductions, and that high speeds are incompatible with walking, biking, or transit. Many also stressed that design changes are essential for slowing drivers.

- 64% of supportive comments called for roadway design changes, such as narrower lanes, medians, or traffic calming
- Speed humps were mentioned frequently, especially in neighborhoods

Other concerns also surfaced, even when not directly tied to speed:

- Distracted driving was cited as one of the most common and dangerous problems on Phoenix streets
- Reckless driving behaviors were often mentioned as threats to safety
- Red light running was frequently raised as a major community concern

Solutions Residents Support

Residents expressed support for a balanced mix of approaches, showing a preference for roadway design and enforcement strategies over speed limits alone:

- 57% support physical roadway design improvements
- 52% support more traffic enforcement officers
- 52% support speed cameras in school zones

- 46% support speed cameras at intersections
- 53% support red light running cameras

Views on Speeding and Citations

Community members expressed clear views about enforcement thresholds. Most do not favor citing drivers who are only slightly above the speed limit, but support grows strongly as speeds increase.

- Little support for citing drivers 5 mph over the limit
- Much stronger support for citations at 10 mph or more over
- Strong support for citing drivers at all levels of speeding in school zones

General Takeaway

The survey results indicate that Phoenix residents understand the risks of speeding and support a balanced approach that combines speed limits with roadway design, enforcement, and education.

SECTION 3

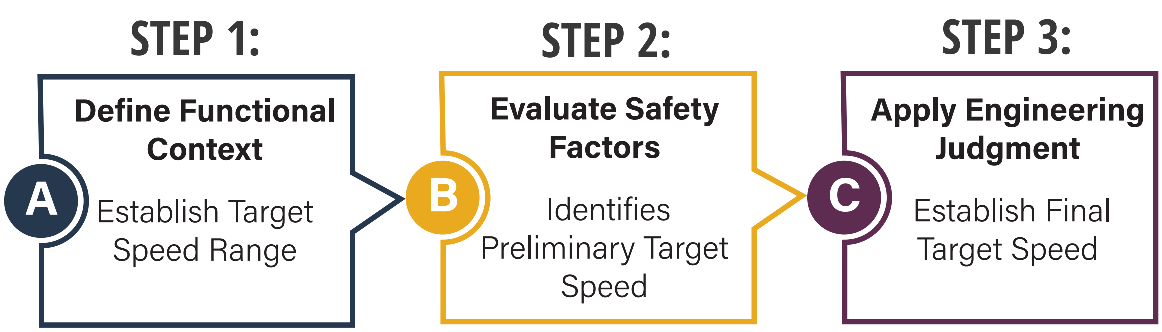
DEFINING TARGET SPEEDS IN PHOENIX

Building on the safety foundation and best practices, the City of Phoenix has adopted a target speed approach. Unlike traditional methods that rely on how fast drivers are traveling today, this approach starts with the speed that is safer and appropriate for each street's role, surrounding land uses, and the people who use it.

This chapter reviews the methodology developed for the City of Phoenix to identify the appropriate target speed for roadway segments. The process follows a three-step framework:

1. Define the roadway's functional context
2. Evaluate safety factors
3. Apply engineering judgment to confirm a final target speed.

As introduced in Section 1: Why Speed Matters, target speed is the foundation of this approach. This chapter explains how that concept is applied in practice—through a structured three-step process that produces clear, context-specific target speeds.



Step 1: Define Functional Context

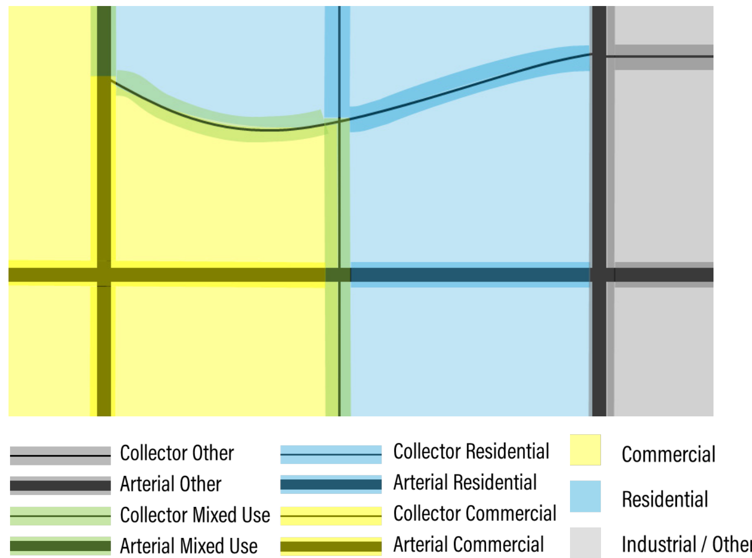
The first step in the process is to understand the role of a roadway in the network and the activities around it. This is called the functional context. Two key variables inform the functional context of a roadway:

Roadway function: Is the street an arterial that moves traffic across the city, or a collector that connects neighborhoods?

Land use context: Does the street primarily serve homes, businesses, mixed-use areas, or other land uses?

By combining these two pieces, each street segment can be assigned a functional context, such as "Arterial Commercial" or "Collector Residential"

The figure below provides a schematic illustrating how a roadway's functional classification (arterial or collector) combines with surrounding land use (residential, commercial, mixed-use, or other) to define a roadway's functional context.



The functional context defines the target speed range for each roadway. These ranges represent appropriate speeds for streets with similar roles and surrounding land uses, creating a consistent standard across the City of Phoenix. All existing arterial roads in Phoenix are posted in 5 mph increments in the range of 30 mph to 50 mph. All existing collector roads in Phoenix are posted in 5 mph increments in the range of 25 mph to 35 mph.

Table 1 defines target speed ranges by functional context for the City of Phoenix. For example, residential collectors—smaller neighborhood streets that connect homes, schools, and parks—have the lowest ranges (25–30 mph). In contrast, arterial streets that serve commercial or mixed-use areas support higher ranges, reflecting their role in moving larger volumes of traffic.

<table>
<tr><th>Functional Context Types</th><th>Lower Bound Speed Limit (mph)</th><th colspan="2">Mid Speed Limit (mph)</th><th>Higher Bound Speed Limit (mph)</th><th># of Outpost</th></tr>
<tr><td>Arterial Commercial</td><td>30</td><td>35</td><td>40</td><td>45</td><td>4</td></tr>
<tr><td>Arterial Mixed Use</td><td>35</td><td colspan="2">40</td><td>45</td><td>3</td></tr>
<tr><td>Arterial Other</td><td>35</td><td>40</td><td>45</td><td>50</td><td>4</td></tr>
<tr><td>Arterial Residential</td><td>35</td><td colspan="2">40</td><td>45</td><td>3</td></tr>
<tr><td>Collector Commercial</td><td>25</td><td colspan="2">30</td><td>35</td><td>3</td></tr>
<tr><td>Collector Mixed Use</td><td>25</td><td colspan="2">30</td><td>35</td><td>3</td></tr>
<tr><td>Collector Residential</td><td colspan="2">25</td><td colspan="2">30</td><td>2</td></tr>
</table>

Table 1. Target Speed Ranges by Functional Context

These ranges establish the starting point for the methodology. The following steps—evaluating safety factors and applying engineering judgment—determine whether a specific roadway segment should be set at the lower, middle, or higher end of its range.

Step 1 identifies the roadway's context—its role in the network and the land uses around it—and assigns an appropriate target speed range for that type of street.

Step 2: Evaluate Safety Factors

Once each roadway's context and speed range are set in Step 1, the next question is: where in that range should the speed limit fall based on risks that exist due to its design and use?

Phoenix's approach starts from the higher end of the range and adjusts downward if certain risk factors are evident, justifying lower speeds to improve safety and reflect how the street is used. These factors include:

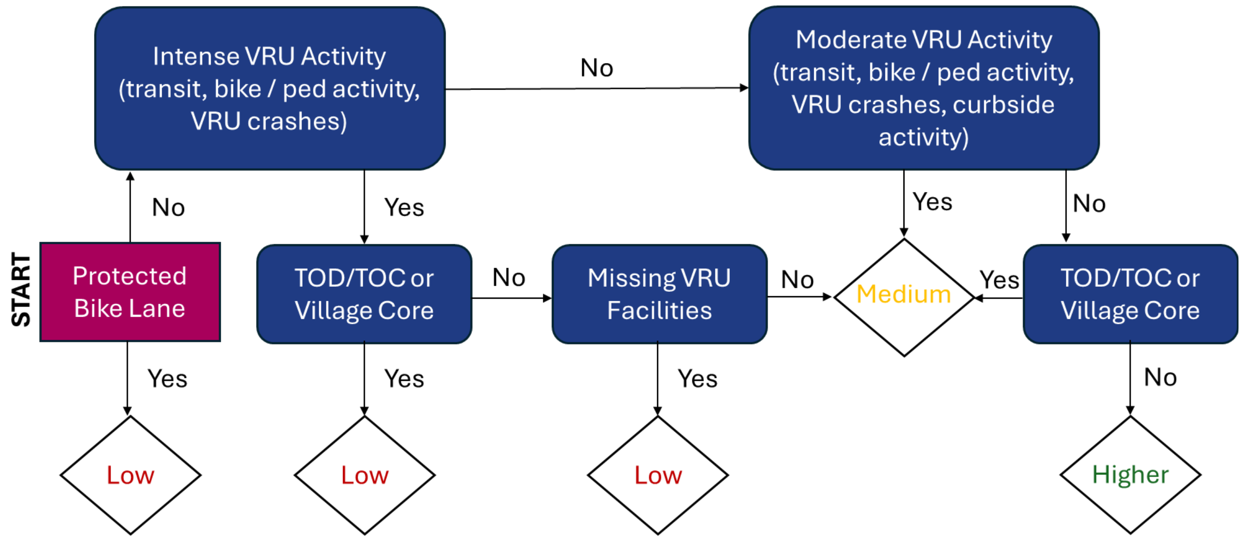
- **People walking, biking, and taking transit.** Streets with higher activity from vulnerable road users—including those with a history of crashes involving people walking, biking, or riding transit—are strong candidates for lower target speeds.
- **Street design and spacing.** Frequent driveways, intersections, or front-facing homes increase the number of potential conflict points. Slower speeds on these high friction roads are safer because drivers have more time to react and slow down or maneuver their vehicle to avoid the collision.

In addition, some areas automatically lean toward lower speeds because of their role in the community. Streets located in Village Cores or near Transit-Oriented Development (TOD/TOC) areas are designed to support more intense levels of walking, biking, and transit use. The presence of protected bike lanes or enhanced crosswalks indicate that more people walking or bicycling exist in that area. The presence of gaps and missing facilities is an indication that the road space may need to be shared or that the road was built decades ago to legacy design standards.

To guide decisions consistently, Phoenix developed a two-tiered flowchart:

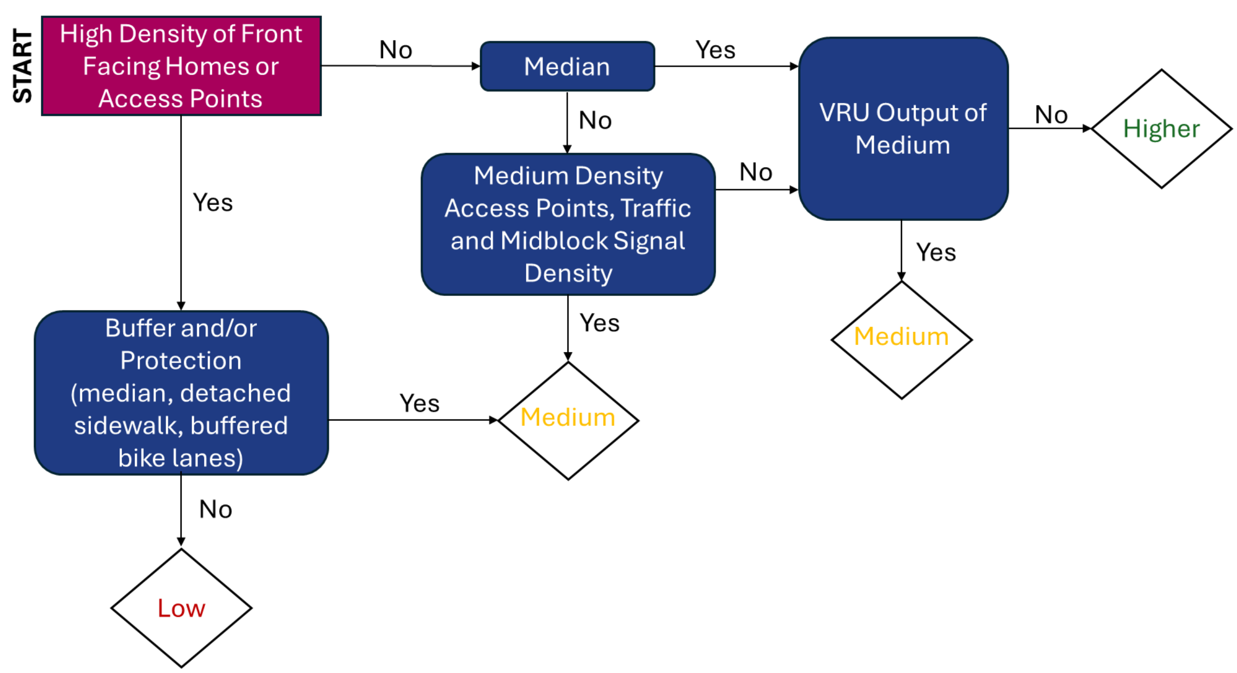
Tier 1 focuses on people. Transit ridership, pedestrian and bicycle counts, crash history, and nearby destinations like schools, parks, or shopping centers are used to measure activity. Segments with high VRU activity are assigned the lower end of the target range; medium activity points to the middle; and segments with little or no activity move to Tier 2 for further review.

Tier 1 – Vulnerable Road User Considerations Flowchart



Tier 2 focuses on conflicts. This includes driveway density, traffic signal spacing and median openings. Segments with more conflict points and less buffer are shifted to the lower or middle of the target speed range.

Tier 2 – Spacing and Conflict Points Flowchart



The result is a preliminary target speed—low, medium, or high within the Step 1 range—that is then carried into Step 3 for engineering judgment and final confirmation.

Step 3: Apply Engineering Judgment

Step 3 is a final check. Engineers review the preliminary target speed to make sure it makes sense for the street and its surroundings. They review additional considerations like crash history, nearby land uses, past studies, and how speeds align or transition to adjacent segments. This step fine-tunes the target speed so it is practical and appropriate. The final target speed is not the recommended posted speed limit. The posted speed limit recommendation comes later, during the City's implementation process discussed in Section 4.

Final Check Considerations:

Crash Experience: Review how often crashes occur and how severe they are. Streets with a history of serious or fatal crashes may justify lower target speeds.

Current Road Use: Make sure the land use shown in the City's plan matches what's actually on the ground today. Planned uses that aren't yet built may not reflect real conditions.

Road Geometry: Look at curves, grades, and sight lines. If drivers can't see far ahead, lower speeds or other safety treatments may be needed.

Consistency: Check how speeds compare to nearby segments. Big changes without obvious visual cues confuse drivers and reduce compliance.

Planned Capital Improvements: Consider upcoming projects. If a street will be rebuilt with medians, bike lanes, or other calming features, the speed may be adjusted to match the new design.

The outcome of Step 3 is a confirmed target speed for the roadway—an evidence-based value that balances safety, context, and consistency across the network.

Together, Steps 1–3 define a context-sensitive target speed for each roadway. These targets are later reviewed alongside posted limits, operating speeds, and planned improvements during implementation.

SECTION 4

IMPLEMENTATION: FROM TARGET SPEED TO POSTED SPEED

The City of Phoenix's new Speed Limit Setting process identifies target speeds—the safe and appropriate operating speeds for a roadway based on its land use, design, and multimodal activity. But identifying a target speed is just one step. The next question is: How does that target speed become the posted speed drivers see on the street?

This chapter explains how Phoenix will move from data-driven analysis to implementation—how target speeds are reviewed, adopted, and ultimately turned into enforceable speed limits. The process ensures that every posted speed limit in the city is:

- Technically defensible, grounded in the adopted methodology;
- Operationally feasible, coordinated with design, enforcement, and maintenance;
- Context-sensitive, responsive to surrounding land uses and community needs; and
- Transparent, so decisions are well-documented and publicly understandable.

Target Speed vs. Posted Speed

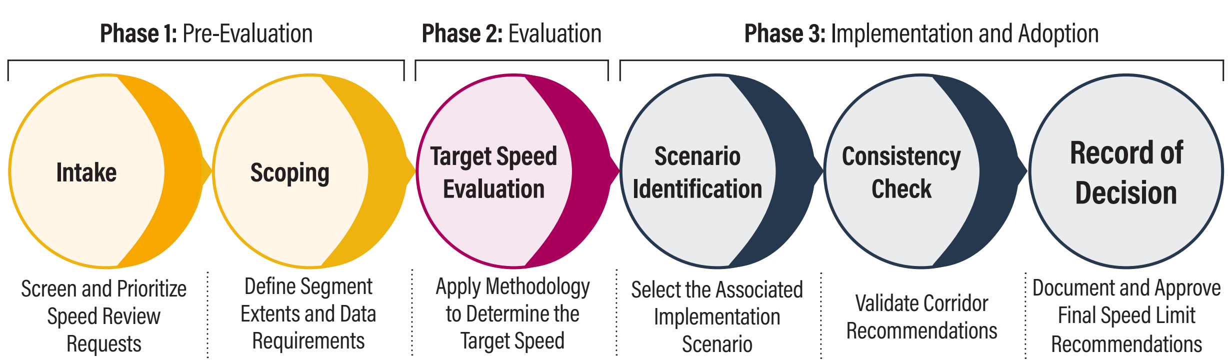
Target speed represents the safer, context-sensitive operating speed.

Posted speed is the legally enforceable value displayed on street signs.

Aligning the two requires both **engineering analysis** and **implementation planning.**

Implementation Framework

Phoenix's speed limit evaluation and implementation process follows a structured framework with three phases and six steps. Each phase builds on the previous one, ensuring consistent, transparent decisions across all corridors.



01

PHASE 1

Pre-Evaluation

Identifies and scopes corridors for review. Determines where changes are most needed and what data are required.

02

PHASE 2

Evaluation

Applies the City's three-step methodology (functional context, factor evaluation, engineering judgment) to identify each roadway's context-appropriate target speed.

03

PHASE 3

Implementation and Adoption

Compares target, posted, and operating speeds to decide how and when to adjust speed limits.

Coordinates design, enforcement, and communication steps to ensure credible implementation.

How the City Decides When and Where to Change Speeds

The City of Phoenix uses a transparent intake and screening process to determine when and where speed limits are evaluated and, where feasible, adjusted. Because the City does not have a standalone program or dedicated funding source for speed limit evaluations or speed management treatments, changes are prioritized when they align with existing programs and planned work.

Priority locations include:

- **Corridors on the High Injury Network (HIN)**, which are addressed through the Vision Zero Road Safety Program and may also overlap with programmed Capital Improvement Program (CIP) projects.
- **Streets within Village Cores or Transit-Oriented Development (TOD) areas**, which are typically addressed through the Active Transportation Program and may also overlap with CIP projects.
- **Areas experiencing redevelopment or significant land use change**, where changes in activity and access may affect target speeds; these locations may be addressed through the Active Transportation Program or through coordination with private development.
- **Corridors scheduled for capital improvement projects**, where speed changes can be coordinated with roadway design updates and construction.

Prioritizing Where It Matters Most

Speed reviews focus first on corridors where small changes can deliver big safety gains—places with high crash rates, redevelopment, or multimodal activity.

The City's Speed Hump and Cushion Program provides an additional implementation pathway but is limited to collector streets in residential areas with average daily traffic below 10,000 vehicles per day.

Requests from residents, elected officials, or City staff may also initiate a posted speed limit review; however, any changes must align with one of the City's existing programs to advance. Proposed changes that do not align with current program eligibility, funding, or planned projects are documented and deferred until an appropriate implementation pathway becomes available.

As a matter of procedure, the Street Transportation Department should not increase or decrease an existing posted speed limit by more than 5 mph without approval from the Director or designated leadership. Exceptions may be considered only when major roadway changes occur, such as through roadway reconstruction or substantial geometric redesign.

Translating Target Speeds into Posted Speeds

Once the target speed has been determined, staff compare it to the roadway's existing posted speed and operating speed (how fast people actually drive). This comparison shows how closely the target, posted, and operating speeds align, and helps determine the right next step—and whether additional changes or roadway updates are needed to bring speeds into alignment.

Phoenix uses six implementation scenarios (A–F) to guide how target speed findings translate into action. Each scenario defines a clear pathway for aligning posted and operating speeds with what's safe. This framework allows the City to tailor solutions to each corridor—balancing enforcement, design, and communication to achieve credible, sustainable speed changes.

As described in Section 3, the City tested and refined the speed limit setting approach using roadway segments selected to represent a broad cross-section of Phoenix. More than 80% of these test segments produced a target speed within 5 mph of the existing posted limit. The bigger gap is between what's posted and how people actually drive—operating speeds often exceed both the posted and target limits.

Implementation Scenarios: Comparing Target, Posted, and Operating Speeds

Target Speed vs. Posted Speed	Operating Speed is Close to Target	Operating Speed is 5–10 mph Above Target	Operating Speed is More Than 10 mph Above Target
Target ≥ Posted (posted speed is already at or below the target speed)	**A – Maintain** Speeds aligned — no action needed.	**C – Fine-Tune** Add minor roadway or operational changes.	**E – Intervene** Focus on design and enforcement to reduce operating speeds.
Target < Posted (posted speed is higher than the target speed)	**B – Match Lower** Change posted speed limit to match target; no design change needed.	**D – Reduce & Support** Lower posted speed limit and add supporting roadway, operational, and enforcement strategies.	**F – Step-Down** Phase in lower posted speed limit with physical improvements to incrementally reduce operating speeds.

Supporting Changes Through Design and Coordination

For corridors in scenarios C–F that need design or operational changes, a menu of complementary strategies can be applied to help bring operating speeds in line with the target speed. A supporting toolkit—provided in **Attachment B**—illustrates the types of improvements that may be applied. Each treatment is matched to corridor context and scale, ensuring consistency across the network and maximizing safety benefits. These may include:

Operational changes:

Adjusting signal timing, shortening cycle lengths, or optimizing coordination to reinforce target speeds.

Driver feedback tools:

Speed feedback signs, temporary "gateway" signs, or pilot treatments to increase awareness.

Design treatments:

Narrowing travel lanes, adding raised medians or pedestrian refuges, and introducing curb extensions or raised crosswalks.

Enforcement and education:

Targeted enforcement by Phoenix Police and community awareness campaigns.

Building Consistency and Credibility

Before any speed limit change moves forward, the City performs a Corridor Consistency Check.

This check ensures posted limits make sense along the full corridor—avoiding abrupt changes that confuse drivers or create "speed traps." Changes should only be made where there's a clear, visible difference in context (for example, entering a Village Core or school area).

Looking Ahead: A System for Safer Streets

This implementation framework establishes a clear and repeatable system for how Phoenix evaluates and manages speed while recognizing practical constraints related to funding, program eligibility, and implementation capacity. Speed management is treated as part of a coordinated process tied to safety priorities and existing programs, rather than as a one-time action or a response to isolated requests.

The target speed methodology developed through this study is designed to be scalable and transferable to other communities. While it reflects Phoenix's roadway network, programs, and policy context, the framework can be applied by other jurisdictions when local factors such as land use, crash patterns, multimodal activity, statutory requirements, and funding structures are considered.

Over time, as corridors are rebuilt, redesigned, or improved through existing City programs, this framework supports consistent and context-sensitive speed limit setting decisions. The result is a more predictable system that aligns with Vision Zero principles and supports safer travel for everyone, regardless of how they move.

ATTACHMENT A

TECHNICAL FOUNDATIONS MEMORANDUM

MEMORANDUM

Date	September 29, 2025
To	Reed Henry, PE PTOE Roadway Safety Engineer City of Phoenix Streets Department
From	Rae Stephani, PE, PTOE, RSP$_1$ Y2K Engineering, LLC
Subject	Speed Limit Setting Technical Foundations (Revision #1)

INTRODUCTION

Cities across the world are reconsidering how they set speed limits to improve safety, reduce severe crashes, and support streets designed for all users, not just drivers. In Phoenix, high vehicle speeds, especially on urban arterials and mixed-use streets, contribute significantly to severe and fatal crashes. The 2022 Phoenix Road Safety Action Plan (RSAP) established a data-driven foundation for reducing serious injuries and fatalities citywide and identified speeding as a contributing factor in 21 percent of crashes that resulted in serious injury or death. These findings underscore the need for a new speed limit setting system that better responds to local street conditions, land use, and safety goals.

Traditionally, the posted speed limit has been determined using the 85th percentile speed. While this approach aligns with driver behavior, it does not consider contextual factors such as adjacent land use, street design, and the presence of vulnerable users. In cities like Phoenix, where roads are designed for high-speed travel but serve a variety of users, relying solely on existing driver speeds can result in operating conditions that increase the likelihood or severity of crashes – making it more difficult to achieve citywide safety goals.

To support the development of a more context-sensitive speed limit setting system, Phoenix received supplemental Safe Streets and Roads for All (SS4A) funding to develop a Citywide Speed Limit Evaluation. This effort supports Phoenix's Vision Zero commitments by focusing on safer, more context-sensitive speed management practices.

This memorandum provides the technical foundation for this methodology to set speed limits in the City of Phoenix. It outlines the historical context of speed limit setting, driver behavior in phoenix, and summarizes relevant national best practices, and highlights approaches used by peer agencies. This information will guide the development of a consistent and data-driven methodology for establishing speed limits that support safety, mobility, and community goals.

TERMINOLOGY USED IN THIS MEMORANDUM

Throughout this memorandum, the following terms are used to describe speed. For consistency and clarity, each is defined below:

- Posted Speed: The legal speed shown on signs and enforceable by law.
- Operating Speed: The actual speeds drivers travel, commonly measured as:
  - 85th Percentile Speed: The speed at or below which 85% of vehicles are observed to travel.
  - 50th Percentile Speed (Median Speed): The speed at which half of drivers are going slower, and half are going faster.
  - Pace Speed: The pace is the 10-mph range that contains the highest number of observed speeds. Vehicles within this range are generally moving at similar speeds, which can reduce conflicts compared to those traveling much faster or slower.
- Average (mean) Speed: The speed calculated by adding up all driver speeds and dividing by the number of drivers. It can be pulled higher or lower by extreme values (like a few very fast or very slow drivers).
- Target Speed: The intended operating speed based on land use, travel activity, and street design.

HISTORICAL CONTEXT

Historical Approach

For decades, U.S. speed limits have been set using the 85th percentile speed, a method that aligns limits with typical driver behavior. By definition, this means only 15% of drivers are classified as speeding, compared to 50% if the limit were set at the average speed. While once viewed as a practical threshold for enforcement, this approach emerged in the mid-20th century on rural highways and reflects a motorist-first philosophy that prioritized driver comfort, vehicle flow, and travel time. The underlying assumption—that driver behavior is the best indicator of safe speeds—does not account for roadway context, land use, or the presence of vulnerable road users, and can embed unsafe driving patterns into the speed limit itself.

This approach was reinforced by AASHTO's design speed criteria, which became the industry standard for roadway design. Design speed guided the selection of geometric elements such as curve radii and lane widths, resulting in roadways that encourage higher travel speeds. In more urban environments, this design philosophy can present challenges in balancing safety, access, and multimodal needs. This approach focuses solely on how fast drivers are currently traveling and does not account for street context, land use, and the presence of people walking, biking, or using transit. This method also does not reflect how street design influences travel speeds. In Phoenix, many arterial streets are characterized by wide lanes, long block lengths, and few visual cues to slow down. On these facilities, a percentile-based approach often produces higher posted speeds because drivers experience little of the friction that would otherwise encourage lower operating speeds.

National guidance from organizations like NACTO, Federal Highway Administration (FHWA), and ITE increasingly recommends context-based approaches, recognizing that urban streets require a different framework than rural highways. Moving away from driver behavior as the primary input allows cities to set limits that reflect safety priorities, land use, and multimodal needs.

Legal Framework and Current Speed Limit Setting Process

Arizona Revised Statute (ARS) §28-703 gives the City of Phoenix authority to establish speed limits that differ from statewide defaults, provided they are supported by an engineering and traffic investigation. Under ARS §28-701, the statewide prima facie speed limits are:

- 15 mph approaching a school crossing
- 25 mph in a business or residential district
- 65 mph in other locations

These limits can be modified through engineering studies as authorized in §§28-702 and 28-703. Criminal speeding (ARS §28-701.02) is defined as exceeding a posted or statutory limit by more than 20 mph (or by traveling 35 mph or more approaching a school crossing).

Phoenix's Traffic Operations Handbook – Speed Limit Procedures (August 2015) outlines how the city establishes and revises speed limits to minimize speed variance, support enforceability, and promote safety.

Under the current process, on major and collector streets, speed limits are typically based on:

- Radar speed studies (minimum 100 vehicles per direction)
- 85th percentile speed and pace speed
- Roadway context including access, adjacent limits, crash history, and side friction

Speed limits are generally set at the first 5-mph increment below the 85th percentile or pace speed, and not more than 7 mph below the 85th percentile. Adjacent zones are kept within 10 mph of each other for consistency. On local residential streets, the statutory 25 mph limit is considered appropriate and generally left unposted unless unusual conditions exist.

Speed limit changes require City Council approval, though the Phoenix Streets department may authorize temporary postings for up to 100 days before Council action. A master speed limit map tracks all approved and proposed changes.

SPEED IMPACT ON CRASH FREQUENCY AND SEVERITY

Crashes in the City of Phoenix

From 2019 to 2023, there were 4,220 crashes in Phoenix that resulted in a serious injury or fatality. The most common crash types were Pedestrian (29%), Angle (22%), and Left-Turn (13%) collisions. Vulnerable road users—pedestrians, motorcyclists, and bicyclists—were involved in 65% of fatal crashes. Speed is identified as a contributing factor when a violation is recorded as either "too fast for conditions" or "exceeded lawful speed." This classification does not capture every instance where a driver was traveling faster than the posted speed limit, but it was still cited in 22% of severe crashes—underscoring the significant role speed plays in serious outcomes. The City's most recent crash statistics are available on the RSAP website.

Kinetic Energy and Force

Although speeding was formally cited in 22% of cases, speed is a factor in every crash because the severity of injury is determined by the energy released during the collision. Higher travel speeds produce more kinetic energy, which increases the force on the human body and the likelihood of a fatal outcome.

The relationship between vehicle speed and crash severity is grounded in physics. The kinetic energy of a moving vehicle is determined by its mass (weight) and speed, expressed by the formula:

$$Kinetic\ Energy = \frac{1}{2} * mass * speed^2$$

Because kinetic energy increases with the square of speed, small increases in speed produce disproportionately larger increases in crash energy. For example, a vehicle traveling at 40 mph has four times the crash energy of one going 20 mph. A heavier vehicle also generates more kinetic energy, but that effect is linear—twice the weight equals twice the energy—whereas doubling speed quadruples the energy. Figure 1 illustrates how crash energy rises more steeply with speed than with vehicle weight.

Recent shifts in the vehicle fleet—particularly the growth of heavier, taller SUVs, trucks, and electric vehicles—further amplify this risk. Because kinetic energy scales with vehicle mass, these trends compound the severity effects of higher speeds.

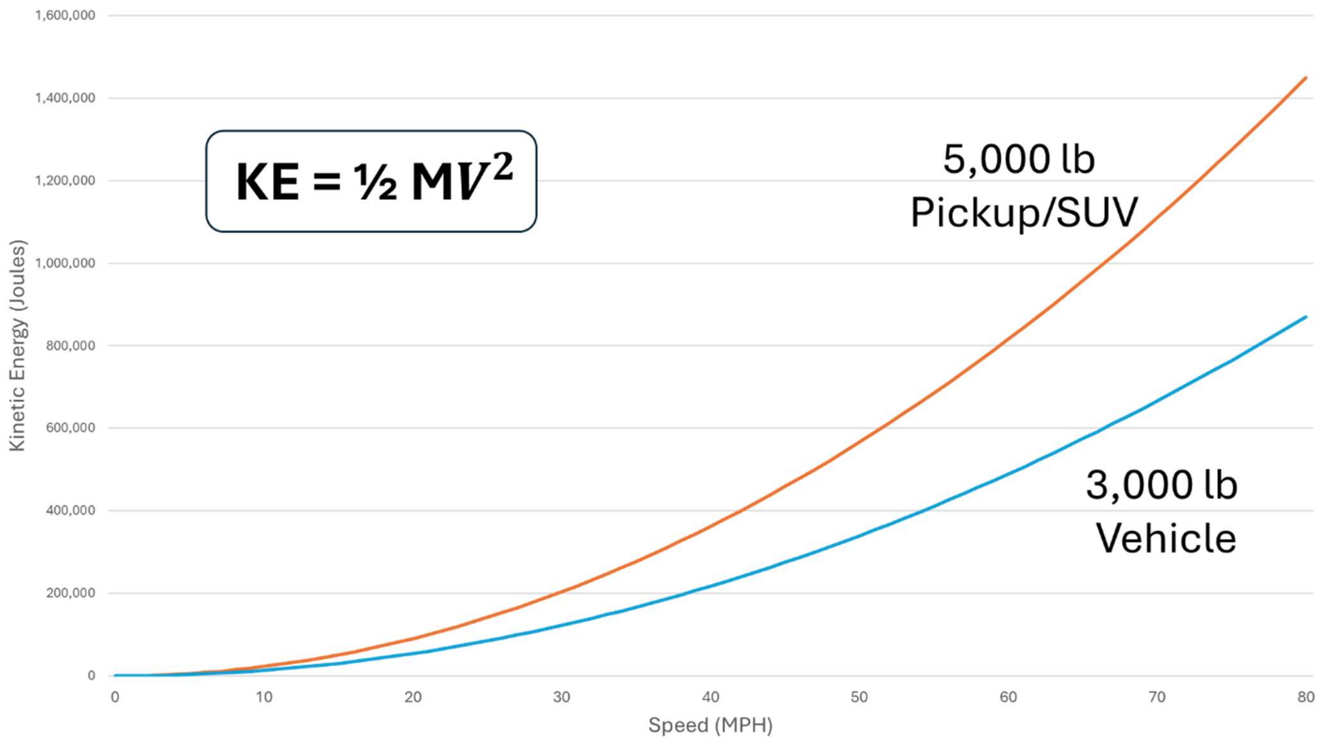


Figure 1: Speed Impact on Kinetic Energy

International research reinforces this relationship. The Organisation for Economic Co-operation and Development (OECD) and International Transport Forum (ITF) note that higher speeds increase both crash frequency and severity disproportionately. Nilsson's widely cited *Power Model* shows that a 1% increase in average speed results in roughly a 2% increase in injury crashes, a 3% increase in severe crashes, and a 4% increase in fatal crashes—while small reductions in average speed produce meaningful safety gains.

Because of the higher kinetic energy at greater speeds, the forces exerted on the human body in a collision can exceed what the body can withstand, leading to severe or fatal injuries. This is especially critical for vulnerable road users—pedestrians, bicyclists, and motorcyclists—who remain exposed even when using helmets or other protective gear. While proper use of seat belts, helmets, and child restraints can reduce injury risk, managing speeds is essential to prevent severe outcomes.

For example, research shows that a pedestrian struck at 23 mph has about a 10% chance of death; at 32 mph, the risk rises to roughly 25%; and at 42 mph, it rises to 50%. Even vehicle occupants face elevated risk at higher speeds, despite improvements in airbags, seatbelts, and crashworthy vehicle designs.

Researchers have also found that even small speed changes lead to much larger differences in crash outcomes. Lowering average speed from 50 mph to 45 mph—a 10% reduction—can reduce fatalities by roughly 27% and serious injuries by about 19%. This reflects the exponential nature of crash severity: doubling your speed roughly quadruples the chance of a serious injury crash and increases the chance of a fatal crash by a factor of eight:

$$\frac{Fatal\ Crashes\ Before}{Fatal\ Crashes\ After} = \left(\frac{Speed\ Before}{Speed\ After}\right)^3$$

$$\frac{Serious\ Injury\ Crashes\ Before}{Serious\ Injury\ Crashes\ After} = \left(\frac{Speed\ Before}{Speed\ After}\right)^2$$

Even modest speed reductions can make a significant difference, particularly when targeting drivers only slightly over the limit. Australian research modeling has suggested that reducing driver speeds by just 0.5 to 3 mph could prevent a substantial share of fatal and serious crashes[1].

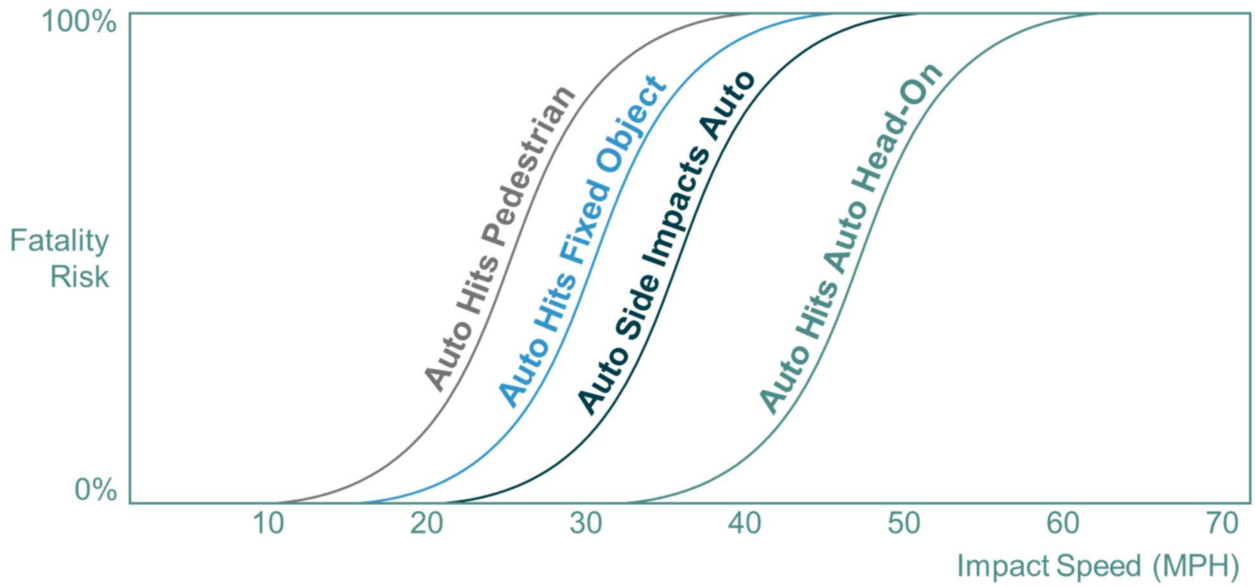


Figure 2: Impact Speed and Fatality Risk

Reaction Time

Higher speeds also reduce the time drivers have to react and increase the distance needed to stop. This stopping sight distance includes both the distance traveled during driver reaction time and the braking distance. At 30 mph, a vehicle needs roughly 130 feet to stop; at 45 mph, the stopping distance is doubled to over 260 feet. This makes it harder for drivers to avoid a collision when faced with obstacles, pedestrians, or sudden traffic changes.

[1] Doecke, 2011

$$Stopping\ Sight\ Distance = 1.47 * V * t + \frac{1.075 * V^2}{30 * a}$$

$$V = Velocity\ (Speed)\ in\ miles\ per\ hour$$

$$t = reaction\ time, usually\ assumed\ to\ be\ 2.5\ seconds$$

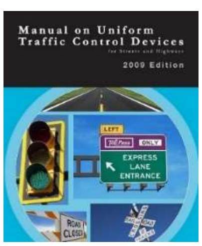
$$a = deceleration\ rate\ in\ feet\ per\ second^2. In\ dry\ conditions, this\ is\ usually\ assumed\ to\ be\ 11.2\ ft/\sec^2$$

Lowering operating speeds is therefore one of the most effective tools for improving road safety—both by reducing crash frequency and by reducing the severity of injuries when crashes do occur.

BEST PRACTICES

Industry

Eight industry best practices documents and resources were reviewed by the project team: the Manual of Uniform Traffic Control Devices (MUTCD) from 2009 and 2023, FHWA's Noteworthy Speed Management Practices, the National Association of City Transportation Officials (NACTO) City Limits Document, FHWA's USLimits2, the National Cooperative Highway Research Program Posted Speed Limit Setting Procedure Tool, the FHWA Speed Limit Setting Handbook and the FHWA Methods and Practices for Setting Speed Limits.



The Manual on Uniform Traffic Control Devices (MUTCD, 2009)[2] is the national guideline for traffic controls. It states that "Speed limits must be set by a speed study that includes the analysis of current speed distribution of free-flowing vehicles" and "When a speed limit is to be posted, it should be within 10 km/h or 5 mph of the 85th-percentile speed of free-flowing traffic."

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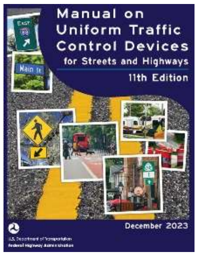
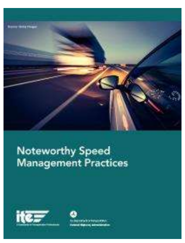
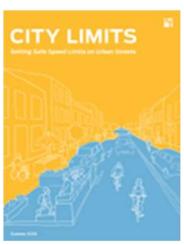
[2] https://mutcd.fhwa.dot.gov/pdfs/2009/mutcd2009edition.pdf



The updated 11 th Edition of the MUTCD [3], published December 2023 during this project, lists six factors to take into consideration in establishing speed limits; roadway environment, roadway characteristics, geographic context, reported crashes, speed distribution of free-flow vehicles including pace, median (50th-percentile), and 85th-percentile speeds, and a review of past studies. Specifically, the guidance states "on urban and suburban arterials, the 85th -percentile speed should not be used to set speed limits without consideration of all factors" (listed above). While the 2023 edition provides updated guidance, it has not yet been fully adopted in all jurisdictions. As a result, it remains important to consider both the 2023 and 2009 versions to understand current practices as well as the direction of evolving national standards.



The Noteworthy Speed Management Practices (FHWA-SA-20-047, 2020)[4] is a compilation of case studies from a variety of agencies. It acknowledges that credible speed limits start with engineering and successful implementation of speed limit changes incorporates multiple 'Es' of traffic safety. The compilation references New Zealand's 2022 Road to Zero Guide, which exemplifies these principles by integrating safety, land use, and street function to set speeds that minimize serious injuries while supporting community health and access.



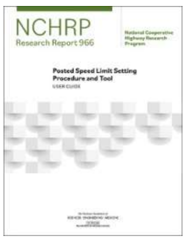
The National Association of City Transportation Officials (NACTO) City Limits (2020)[5] outlines a detailed, context-sensitive approach to setting speed limits. It defines a citywide approach through a three-step process that includes setting statutory speed limits and designating slow zones. Corridor speed limits are based on collected data including existing speeds, conflict points, and crash history, among others.

[3] https://mutcd.fhwa.dot.gov/kno_11th_Edition.htm

[4] https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa20047/index.cfm

[5] https://nacto.org/safespeeds/

The Federal Highway Administration (FHWA) USLIMITS2 Tool (2017)[6] is a web-based tool available to agencies to assist in engineering decisions to set credible and enforceable speeds. It considers all major factors used by engineers and planners, such as crash history and road context. It is adopted as the methodology of multiple peer agencies. The primary recommendations are the 50th or 85th percentile speeds.



The National Cooperative Highway Research Program (NCHRP) – Posted Speed Limit Setting Procedure & Tool [7] is a spreadsheet-based tool. Users input roadway characteristic information, and a list of nearly 20 factors, and the tool outputs the recommended speed limit. The primary recommendations are the 50th and 85th percentile speeds.

The FHWA Speed Limit Setting Handbook [8] was published in 2025 and encourages transportation agencies to adopt a target speed approach that aligns speed limits with the surrounding roadway context, land use, and presence of vulnerable road users. Rather than relying on operating speeds, the handbook promotes selecting a target speed—the appropriate speed for a given setting—based on safety, multimodal activity, and street function. This guidance supports the Safe System philosophy, which prioritizes reducing the likelihood and severity of crashes for all road users, not just drivers. By recommending a flexible, context-based framework for speed setting, the handbook helps agencies better align speed limits with local safety goals and street conditions.

FHWA Methods and Practices for Setting Speed Limits

This document identified five methods for establishing speed limits: Operating Speed, Road Class and Context, Expert System, Optimal Speed, and Injury Minimization. While each of these methods has merit, the U.S. primarily relies on the operating speed approach, the road class and context-based approach, or a combination of the two—where the output is either an existing percentile speed (e.g., 50th or 85th

[6] https://safety.fhwa.dot.gov/uslimits/

[7] https://nap.nationalacademies.org/read/26216/chapter/1

[8] https://highways.dot.gov/sites/fhwa.dot.gov/files/Speed-Limit-Setting-Handbook.pdf

percentile) in the case of operating speed, or a target speed based on roadway context, independent of actual driver behavior.

The operating speed method is the traditional approach to setting speed limits and recommends setting posted speed limits to align with actual driver behavior—typically selecting a percentile speed such as the 85th percentile—as it assumes most drivers choose speeds they perceive as safe based on roadway and traffic conditions, though this approach can overlook safety impacts on other users and contribute to gradually rising speed limits over time.

The road class and context method set speed limits according to the functional classification and surrounding land use context of a roadway, using predetermined values or a decision matrix informed by factors such as road geometry, traffic volumes, crash history, and presence of pedestrian and bicycle activity—ensuring speed limits reflect roadway risk rather than driver behavior.

The expert system approach is also worth noting, as it reflects tools like USLIMITS2—developed by FHWA based on earlier work by the Australian Road Research Board—which use computer algorithms to replicate expert decision-making and provide consistent, data-driven speed limit recommendations.

PEER CITIES BEST PRACTICES

As the relationship between speed and crash severity becomes better understood, agencies around the world are reexamining how speed limits are set. Many are moving beyond traditional percentile-based approaches and adopting policies that prioritize context and the safety of all users. To help shape a system that works for Phoenix, this project reviewed several peer cities that have taken innovative steps in speed limit policy. These examples highlight practical lessons and emerging best practices that can inform a safer, more adaptable framework for Phoenix.

The cities reviewed for this study were Boulder, Colorado, Philadelphia, Pennsylvania, as well as the policies set by the governments of a few municipalities of California and New Zealand. These locations were chosen due to successful and innovative techniques they have used to set speed limits within their jurisdiction. While this report focuses primarily on methodology, each agency is taking a different approach to implementation—some pairing lower speed limits with targeted design changes, enforcement strategies, and public education campaigns to reinforce the new limits.

Boulder, Colorado

Boulder established a reference table that defines acceptable speed limit ranges based on roadway classification and adjacent land use. The city's methodology uses this table to ensure selected speed limits are consistent, context-sensitive, and aligned with safety goals. To determine the recommended speed limit output, determined by selecting the appropriate operating speed percentile, Boulder assigns each roadway segment to a tier based on a scoring system that evaluates 16 factors. These include crash history, pedestrian and bicycle activity, roadway design elements such as lane widths or presence of medians, and proximity to trip generators like schools, parks, and transit stops. Segments with higher point totals reflect a greater need for speed reduction.

Once the segment's tier is identified, an output table is used to select a target speed percentile (50^{th} or 85^{th} percentile rounded up or down), depending on land use and road type. This selected percentile is then checked against the speed limit range table to confirm that the recommended posted speed falls within the acceptable range for the corridor context. On streets included in Boulder's High-Risk Network, which are identified in the city's Vision Zero analysis, speeds are generally set using the rounded-down 50th percentile speed to reinforce safety and consistency.

The final step involves engineering judgment, where staff review speed limit recommendations to ensure logical transitions along corridors, especially near jurisdictional boundaries or where significant design changes occur. Boulder's policy does not permit increasing speed limits and instead focuses on credible, risk-informed reductions. While the approach incorporates operating speeds, it is fundamentally grounded in context and safety, making it a hybrid of traditional percentile methods and modern context-based frameworks.

Philadelphia, Pennsylvania

Philadelphia developed a data-driven arterial typology and speed management framework to improve safety outcomes across both local and state-owned roadways, specifically by guiding how speed limits should be set. The Philadelphia framework moves beyond traditional functional classification by establishing new arterial typologies that better reflect the city's unique roadway characteristics, land use patterns, and circulation needs. This allows the city to more effectively apply appropriate and context-sensitive speed limit decisions, as well as physical speed mitigation installations.

The methodology supports the use of lower speed limits by aligning with national design guidance and emphasizes the importance of local data in determining what is appropriate for safety. It enables the city to recommend speed reductions even on state-owned arterials where previous guidance limited the use of certain speed management strategies.

Philadelphia's process also encourages piloting speed-related changes using temporary materials and collecting before-and-after data to evaluate outcomes. The typology framework is designed to evolve over time with changes in land use and roadway function, allowing for flexible and responsive speed limit setting. This approach illustrates how cities can work within state regulatory structures to prioritize safety and advance Vision Zero goals through more tailored and data-informed speed limit policies.

California

In 2022, California passed the California Assembly Bill 43, which gives cities flexibility to set lower speed limits beyond the traditional 85th percentile approach. This allows the municipalities to set context-specific speed limits, reflecting a road class and context approach. Specifically, the law allows what they call reduced "prima facie" limits in the following specific zones:

- Business Districts: 25 mph
- Business Activity Districts: 20–25 mph
- Senior Zones: 25 mph
- School Zones: Time-specific 25 mph, or 15 mph within 500 ft on two-lane roads
- Near Playgrounds: Time-restricted 25 mph

It also allows lowering limits by an additional 5 mph below engineering study recommendations in areas with high pedestrian/bicycle activity or designated safety corridors.

New Zealand

New Zealand has developed a national framework that integrates safety, land use, and street function into its approach to setting safe and appropriate speed limits. The 2022 Speed Management Guide, called the Road to Zero edition, outlines principles that prioritize minimizing the risk of fatal and serious injuries, supporting community health and access, and aligning speed limits with the function and character of each road. This system uses the One Network Framework, which classifies roads by their function and context roles, essentially describing how they balance mobility and local access, and assigns speed ranges that fit the context. The function is determined by the road's primary purpose – such as whether they primarily serve main goal is to move traffic efficiently versus providing local access or a mix of both. The context of the road is determined through the characteristics of the areas around the road, such as land use, population density, and pedestrian activity. Final speed limits are selected based on these specific roadway characteristics. This reflects a road class and context approach.

Since the implementation of the 2022 guide, speed limit policy in New Zealand continues to evolve in response to political, economic, and public pressures. This underscores a key takeaway for other cities, that effective speed policy requires not only data and design expertise, but also thoughtful communication and community engagement to align safety goals with community values.

Broader Trends in Speed Limit Setting

Beyond the featured peer agencies above, there's a growing national and international shift toward context-based speed management:

U.S. Cities Leading the Way

- Seattle, WA — Implemented citywide context-sensitive speed limit reductions using traffic calming and roadway changes. Studies show a 20% drop in injury crashes on arterials downtown after reducing default speed limits.
- Portland, OR - Adopted a Safe System-aligned approach that recommends setting urban speed limits based on street classification and land use and supports implementation through roadway redesigns like lane reductions, traffic calming, and synchronized signal timing.
- Louisville, KY — Released a Speed Management Plan aligning limits with crash data, land use, and context classifications to support safe limits.

State-Level Innovations

- MassDOT and Virginia DOT now allow local agencies to set speed limits based on context—establishing approaches beyond the 85th percentile—offering more flexibility for safety-oriented policymaking.

International Vision Zero Principles

- Countries such as Sweden, Norway, and the Netherlands embed safe speed principles within Vision Zero programs, prioritizing road function and human safety over historical driver behavior patterns.

Many of these agencies have documented how they are approaching speed management, offering policies, frameworks, and early implementation results that can serve as useful references. These examples show how other cities are beginning to modernize speed limit setting, and provide practical insights that Phoenix can adapt to fit its local context.

LESSONS LEARNED

The peer city and industry best practices review highlighted several important insights for effective speed limit setting.

Across jurisdictions like California and New Zealand, successful programs prioritize context-sensitive approaches that account for roadway functionality, land use, safety risks, and community needs rather than relying on the output being related to the existing speed (e.g., 50^{th} or 85^{th} percentile speed). In California, municipalities have the flexibility to set lower limits in areas such as schools, senior zones, and business districts, while New Zealand's national framework integrates road function, pedestrian activity, and safety principles, though recent updates emphasize balancing these goals with political and economic considerations.

Cities like Boulder and Philadelphia have implemented robust, data-driven methodologies. Boulder uses a layered system that combines crash data, multimodal use, and local conditions to support Vision Zero, while Philadelphia's arterial typology allows the city to apply context-sensitive speed limits on both city and state-owned roads, allowing speed management decisions to reflect land use, roadway function, and local circulation needs.

At the national level, the updated 2023 MUTCD reflects a shift away from a strict 85th percentile approach, encouraging agencies to incorporate factors like roadway context, crash history, and median (50th percentile) speeds when setting limits. FHWA's USLIMITS2 and tools developed through NCHRP consider contextual factors to recommend speed limits—typically resulting in an output based on the 50th or 85th percentile speed. However, these outputs are still largely influenced by the existing speeds that drivers are already traveling.

Supporting resources, such as ITE's Speed Management Hub and NACTO's City Limits, reinforce the need to combine engineering, safety data, and engagement to develop credible and effective speed management strategies. FHWA's recently developed Speed Limit Setting Handbook introduces the concept of target speeds tied to roadway typologies and outlines contextual factors that may support setting lower speed limits.

Key Finding: Many current approaches recommend setting speed limits based on roadway typologies that reflect both functional classification (e.g., arterial, collector) and land use context. Within each typology, target speed ranges are established, and contextual factors—such as roadway characteristics, pedestrian and bicyclist activity, and the surrounding environment—are used to determine an appropriate posted speed within that range.

CULTURAL AND BEHAVIORAL CONTEXT OF SPEED

The broader American car culture, especially prominent in western cities like Phoenix, places heavy emphasis on speed, convenience, and personal freedom behind the wheel. For decades, transportation systems in the United States have been designed with faster vehicle movement as the primary goal. This mindset has shaped not only the physical design of roads but also public expectations and political decision-making.

In Phoenix, driver behavior presents specific challenges for percentile-based speed setting. High operating speeds, often well above posted limits, distort percentile calculations by embedding unsafe behavior into the reference point for setting limits. On wide, multilane roads with few visual cues or elements that signal risk —such as narrow travel lanes, roadside activity, landscaping, or horizontal/vertical deflection—drivers often perceive the environment as safe to travel faster, even when crash risk remains high. In this way, design can influence speed choice by shaping how drivers interpret the level of risk, emphasizing the importance of setting speed limits based on safety outcomes rather than observed behavior alone.

Pandemic-era travel pattern shifts further reinforced these conditions. With more remote work and lower congestion, many corridors operated in more consistent free-flow, making higher speeds feel comfortable even without changes to posted limits. Several of these patterns have persisted, sustaining elevated operating speeds on key arterials.

As part of this project, speed data was collected at 60 locations across Phoenix. At 37 of these locations, the 50th percentile speed — the speed at which half of drivers are going slower, and half are going faster—was higher than the posted speed limit. On average, the 50th percentile speed was 1.4 miles per hour above the speed limit, while the 85th percentile speed was 7.3 miles per hour higher. The largest difference was on Pinnacle Peak Road between 35th Avenue and 29th Avenue, where the average speed was 57.4 mph—12.4 mph over the posted limit—and the 85th percentile speed was 26.3 mph above the limit.

This data shows that if speed limits were set based on how fast drivers are currently traveling, the limits would be expected to significantly increase—57 out of 60 locations have 85th percentile speeds higher than the posted speed. However, just because drivers are going faster does not mean those speeds are safe. Raising speed limits in response could lead to even higher speeds and greater safety risks.

This creates challenges for speed compliance. When limits are set too high based on existing behavior, it becomes harder to reduce speeds through enforcement or education alone. Relying solely on police enforcement or public campaigns has a limited long-term impact if the underlying system reinforces fast driving. While enforcement and education remain important, they are resource-intensive and their effects diminish without supportive street design. Given Phoenix's size and competing demands on public safety resources, relying on enforcement alone cannot sustainably manage speeds. A system-level approach, including speed limits matched to street context and land use, is needed to address the root causes of unsafe speeds.

In Phoenix, wide arterial streets, long blocks, and minimal friction reflect a roadway system built to move people quickly with cars. As a result, efforts to manage speeds or introduce context sensitive speed limits often face public and political resistance, with concerns focused on driver delay or inconvenience rather than safety for all road users. This car-first orientation reinforces high operating speeds and influences policy discussions, making it essential to address cultural attitudes alongside policy and technical design when creating safer, multimodal streets.

Studies show that roadway design has a stronger influence on how fast people drive than posted speed limits or enforcement alone[9]. Drivers tend to travel at speeds that feel comfortable based on their surroundings. Factors like lane width, intersection spacing, pedestrian activity, and roadside development all shape those perceptions. But comfort doesn't always equal safety.

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[9] Transportation Research Board. (2003). *NCHRP Report 504: Design speed, operating speed, and posted speed practices*. Washington, DC: National Cooperative Highway Research Program. Retrieved from https://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_504.pdf

That's why a safety-centered approach to speed management must go beyond simply changing posted limits. Aligning speed limits with the street's design and context—and then reinforcing them through physical and operational measures—creates an environment where the safe speed feels natural to drivers. Treatments such as narrower effective lane widths, median islands, speed feedback signs, and pedestrian hybrid beacons, along with operational strategies like signal coordination, shorter cycle lengths, and limited uncontrolled crossing distances, help drivers self-select target speeds. Together, these measures make operating speeds more consistent with posted and target speeds, improving predictability and safety for everyone.

CONCLUSION

This report has provided a history of speed limit setting, the impact of speed related to crash frequency and severity and a review of best practices, peer agency approaches, and emerging methodologies for setting safe and context-sensitive speed limits. The review highlights a growing recognition across agencies and jurisdictions that traditional speed setting methods, often based solely on percentile speeds, are no longer sufficient to meet safety goals or to protect vulnerable road users. Instead, agencies are moving toward data-driven, context-aware frameworks that consider roadway function, land use, user needs, and broader Vision Zero objectives.

The methodologies examined in this report offer valuable insights into how a structured, transparent, and evidence-based process can improve speed management outcomes. These approaches demonstrate how collaboration between agencies and the integration of evolving research can ensure that speed setting practices remain responsive to local needs while aligning with national safety goals.

For the City of Phoenix, peer practices and research findings have been adapted to form the foundation of a new Speed Limit Setting Methodology. Given that current operating speeds (50th and 85th percentile) are significantly higher than existing posted limits, a road class and context-based approach—one that defines target speeds independent of existing operating speeds—is recommended.

ATTACHMENT B

TOOLKIT ON SPEED COMPLIANCE MEMORANDUM

MEMORANDUM

Date	October 24, 2025
To	Reed Henry Roadway Safety Engineer City of Phoenix Streets Department
From	Rae Stephani, PE, PTOE, RSP[1] Y2K Engineering, LLC
Subject	Speed Compliance Toolkit
CC	

INTRODUCTION

This document presents strategies to improve speed compliance on roadways, supporting implementation of practices that enhance safety and consistency for all users. It provides clear explanations, references to proven approaches, and resources that allow agencies to move forward with confidence. The strategies align with national best practices and regional safety goals, ensuring practical and context-sensitive outcomes.

SPEED COMPLIANCE STRATEGIES

The strategies for improving speed compliance include enforcement, signal coordination, and targeted infrastructure improvements. Each approach influences driver behavior differently, and while no single measure is likely to resolve speeding concerns on its own, combining strategies can deliver stronger, more sustainable outcomes. A table is provided below that outlines the strategies with relevant resources and links. The triangle symbol (▲) specifies that the strategy is compatible with arterial roadways, while the circle symbol (●) indicates that the strategy is compatible with collector roadways. Further details on each strategy are provided in the following sections.

Table 1: Strategies and Accompanying Resources

Strategy	Resource(s)
Enforcement	
Targeted Enforcement ▲●	Federal Highway Administration (FHWA) Speed Limit Setting Handbook – Section 5.1.4 NCHRP Report 500: A Guide for Reducing Speeding-Related Crashes NHTSA High-Visibility Enforcement NHTSA Speed Safety Camera Enforcement
Traffic Control	
Gateway treatments (various) ▲●	FHWA Factors Influencing Operating Speeds and Safety on Rural and Suburban Roads – APPENDIX B
Speed Feedback Signs ▲●	National Highway Traffic Safety Administration (NHTSA) – Speeding and Speed Management
Signal Coordination Using Target Speed ▲	National Association of City Transportation Officials (NACTO) – Signalization Principles Federal Highway Administration (FHWA) Traffic Signal Timing Manual – Chapter 6: Coordination
Shorter Signal Cycle Lengths ▲	National Association of City Transportation Officials (NACTO) – Signal Cycle Lengths
High-Visibility Crosswalks with RRFBs or HAWKs ▲●	Federal Highway Administration (FHWA) Proven Safety Countermeasures – Crosswalk Visibility Enhancements Federal Highway Administration (FHWA) Proven Safety Countermeasures – Pedestrian Hybrid Beacons Federal Highway Administration (FHWA) Proven Safety Countermeasures – Rectangular Rapid Flashing Beacons (RRFB)
Crosswalk Gateway Treatment with In-Street Pedestrian Crossing Signs ●	Federal Highway Administration (FHWA) Proven Safety Countermeasures – Crosswalk Visibility Enhancements Arterial Typology and Speed Management Decision-Making Framework for the City of Philadelphia

Physical Narrowing Treatments	
Travel Lane Width Narrowing ▲●	National Association of Transportation Officials (NACTO) – Lane Width Arterial Typology and Speed Management Decision-Making Framework for the City of Philadelphia Johns Hopkins – Narrow Lanes Save Lives
Lane Removal to Repurpose Space ▲●	Federal Highway Administration (FHWA) Proven Safety Countermeasures – Road Diets (Road Configuration)
Horizontal Deflection / Measures to Narrow the Apparent Width	
Curb Extension / Bulb-out ▲●	Federal Highway Administration (FHWA) Speed Limit Setting Handbook – Appendix Arterial Typology and Speed Management Decision-Making Framework for the City of Philadelphia
Chicane / Lateral Shift ●	PEDSAFE Pedestrian Safety Guide and Countermeasure Selection System – Chicane Federal Highway Administration (FHWA) Traffic Calming ePrimer – Module 3: Toolbox of Individual Traffic Calming Measures Part 1
Raised Median Island / Pedestrian Refuge ▲●	PEDSAFE Pedestrian Safety Guide and Countermeasure Selection System – Raised Medians Federal Highway Administration (FHWA) Proven Safety Countermeasures – Medians and Pedestrian Refuge Islands in Urban and Suburban Areas
Roundabout ▲●	PEDSAFE Pedestrian Safety Guide and Countermeasure Selection System – Roundabouts Federal Highway Administration (FHWA) Proven Safety Countermeasures – Roundabouts

Vertical Deflection (Highest Effectiveness)*	
Speed Hump / Cushion ●	PEDSAFE Pedestrian Safety Guide and Countermeasure Selection System – Speed Humps Arterial Typology and Speed Management Decision-Making Framework for the City of Philadelphia
Raised Crosswalk ●	PEDSAFE Pedestrian Safety Guide and Countermeasure Selection System – Raised Pedestrian Crossings Arterial Typology and Speed Management Decision-Making Framework for the City of Philadelphia Federal Highway Administration (FHWA) Speed Limit Setting Handbook – Section 5.1.3
Raised Intersection ●	Arterial Typology and Speed Management Decision-Making Framework for the City of Philadelphia
Corridor Reconstruction	
Corridor Reconstruction to Align Design Speed with Target Speed ▲●	Arterial Typology and Speed Management Decision-Making Framework for the City of Philadelphia Vision Zero Louisville Speed Management Plan Federal Highway Administration (FHWA) Speed Limit Setting Handbook

* Note: Traffic calming devices with vertical deflection are permitted on Phoenix streets where average daily traffic (ADT) is below 10,000 vehicles per day and where the speed limit is at or below 30 mph. Applicability of raised crosswalks or intersections is dependent on the context or setting.

Targeted Enforcement ▲●

Targeted speed enforcement involves focused efforts to reduce speeding by strategically deploying enforcement resources in areas where speeding is most prevalent. This approach leverages several methods to influence driver behavior and increase speed compliance. Police officers are deployed at high-speed locations where visible patrols act as a deterrent to speeding vehicles. Mobile speed cameras can be temporarily implemented at locations with recurring speed issues to provide automated enforcement without the need for on-site personnel. Mobile cameras can be relocated as needed, depending on where speeding is most prevalent. Similarly, fixed speed cameras can be implemented to provide the same kind of automated enforcement while being permanently installed.

Resource(s):

Federal Highway Administration (FHWA) Speed Limit Setting Handbook – Section 5.1.4

NCHRP Report 500: A Guide for Reducing Speeding-Related Crashes

NHTSA High-Visibility Enforcement

NHTSA Speed Safety Camera Enforcement

Gateway Treatments ▲●

Gateway treatments visually and physically cue drivers that they are entering a different roadway context—typically a lower-speed environment such as a residential, commercial, or activity center corridor. These treatments signal a change in expected operating speed and help reinforce posted speed limit changes through roadway design rather than signage alone.

Gateway treatments can include a combination of:

- Lane drops or narrowing to reduce perceived roadway width

Google Maps

- Landscaping and street trees to increase visual friction and enclosure

Google Maps

- Monuments, signage, or archways that clearly mark entry points

Weitz

- Textured or colored pavement that signals a transition zone
- Speed limit pavement stencils for visual emphasis

Iowa State University

- Enhanced or illuminated signage to draw driver attention

Texas Transportation Institute

Note: Colored border is not MUTCD compliant and requires FHWA experimental permission.

- Pedestrian-level lighting to improve nighttime visibility
- Optical speed bars or transverse markings that create a visual sense of acceleration or deceleration

Optical Speed Bars Transverse Markings
Source: Virginia Center for Transportation Innovation and Research

These design elements encourage drivers to slow down naturally by changing the physical and visual character of the roadway. Gateway treatments are most effective when they are applied consistently across multiple entry points and paired with speed limit reductions, transitions between land use types, or the start of activity centers.

Resource(s):

FHWA Factors Influencing Operating Speeds and Safety on Rural and Suburban Roads – APPENDIX B. CATALOG OF TRAFFIC ENGINEERING TREATMENTS

Speed Feedback Signs ▲●

Speed feedback signs are electronic signs that display a driver's speed. These signs are often displayed alongside speed limit signs and are used to discourage speeding while maintaining a smooth traffic flow. The signs, which can be portable or permanently installed, can also suggest to drivers that they are being monitored, which may influence drivers to slow down. Speed feedback signs also provide an automated method of obtaining speed data on high-speed corridors. Studies show that these signs are effective in slowing down speeds where installed.

Resource(s):

[National Highway Traffic Safety Administration (NHTSA) – Speeding and Speed Management]

Signal Coordination Using Target Speed ▲

Coordinating traffic signals along a corridor based on the target speed discourages drivers from accelerating between intersections. When signals are timed to progress smoothly within the speed limit, then drivers are rewarded for traveling at compliant speeds. Drivers exceeding the target speed are more likely to encounter red lights at intersections in this case. Overall, this reduces speeding opportunities across a coordinated corridor while maintaining a smooth traffic flow without a significant impact to travel times.

Resource(s):

National Association of City Transportation Officials (NACTO) – Signalization Principles

Federal Highway Administration (FHWA) Traffic Signal Timing Manual – Chapter 6: Coordination

Speed limit signs set for 30 miles per hour are posted along Kennedy Boulevard in Tampa. [BOYZELL HOSEY | BOYZELL HOSEY | Times]

Shorter Signal Cycle Lengths ▲

The cycle length of a traffic signal is the total time it takes to complete on full rotation of phases, from the start of green for one direction until the next start of green for that same direction. The cycle includes all green, yellow, and red light for every approach, along with pedestrian signals. Traffic demand determines the length of the cycle, with it being longer during peak traffic times. Shorter cycle lengths can be implemented to control speed progression along a corridor better when compared to long cycle lengths. As part of a coordinated traffic signal timing plan, short cycle lengths can contribute to lower speeds and better speed compliance. Longer cycle lengths can result in a wider variability of speeds.

Resource(s):

National Association of City Transportation Officials (NACTO) – Signal Cycle Lengths

High-Visibility Crosswalks with HAWKs or RRFBs ▲●

High-visibility crosswalks use prominent pavement markings that are more noticeable in order to increase driver awareness of pedestrian crossings. The crosswalk design can also be made more noticeable with multiple wide bars in ladder patterns. Combining high-visibility crosswalks with pedestrian signals such as HAWKs or RRFBs can increase noticeability to speeding drivers. HAWKs refer to High-Intensity Activated CrossWalk signals, that are pedestrian-activated and help pedestrians cross streets. RRFBs refer to Rectangular Rapid Flashing Beacons that is a pedestrian-activated warning device that uses flashing lights to alert drivers to crossing pedestrians. Together, high-visibility crosswalks and pedestrian-activated signals can increase speed compliance by causing drivers to slow down for crossing pedestrians.

Resource(s):

Federal Highway Administration (FHWA) Proven Safety Countermeasures – Crosswalk Visibility Enhancements

Federal Highway Administration (FHWA) Proven Safety Countermeasures – Pedestrian Hybrid Beacons

Federal Highway Administration (FHWA) Proven Safety Countermeasures – Rectangular Rapid Flashing Beacons (RRFB)

Crosswalk Gateway Treatment with In-Street Pedestrian Crossing Signs ●

A crosswalk gateway treatment refers to a set of countermeasures that signal to drivers that they are approaching a pedestrian crossing. These countermeasures can include high-visibility crosswalk, lane narrowing, and curb extensions. Together, the countermeasures create a "gateway" effect, which makes drivers more aware of the crossing and more likely to slow down. The gateway treatment is further reinforced with in-street pedestrian crossing signs to make it even more visible to drivers. These signs are usually placed in the travel lanes directly in the driver's line of sight, so they cannot be missed. Altogether, this treatment makes it very obvious to drivers that there is a pedestrian crossing, and that vehicles should slow down.

Resource(s):

[Federal Highway Administration (FHWA) Proven Safety Countermeasures – Crosswalk Visibility Enhancements]

[Arterial Typology and Speed Management Decision-Making Framework for the City of Philadelphia]

Travel Lane Width Narrowing ▲●

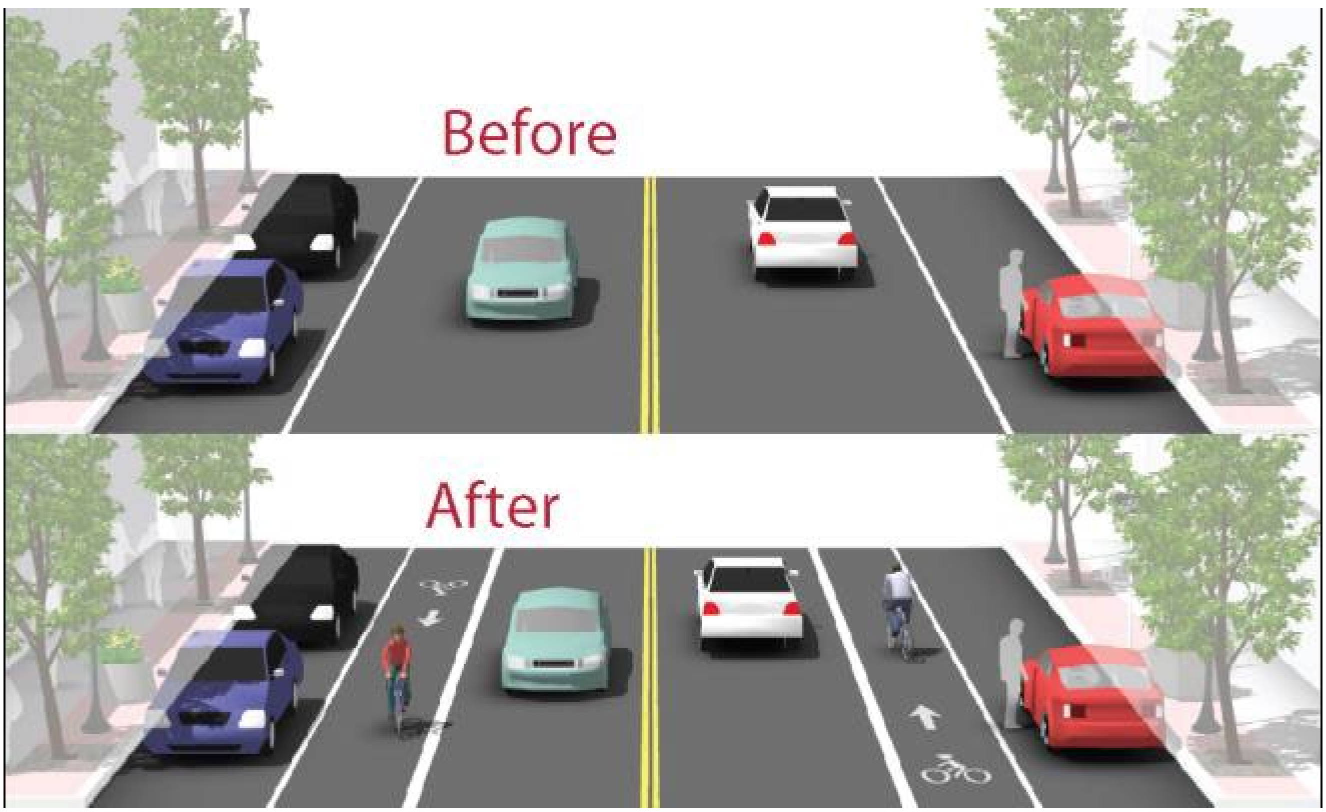
Narrowing the width of travel lanes can include restriping efforts or physical narrowing such as adding center medians, curb bulb-outs, or chicanes. Narrowing travel lanes creates a feeling of constraint for drivers, which can influence them to drive at slower speeds. The narrower lanes also causes drivers to behave more cautiously, and contribute to less severe crashes due to reduced speed and better driver behavior.

Resource(s):

National Association of Transportation Officials (NACTO) – Lane Width

Arterial Typology and Speed Management Decision-Making Framework for the City of Philadelphia

Johns Hopkins – Narrow Lanes Save Lives

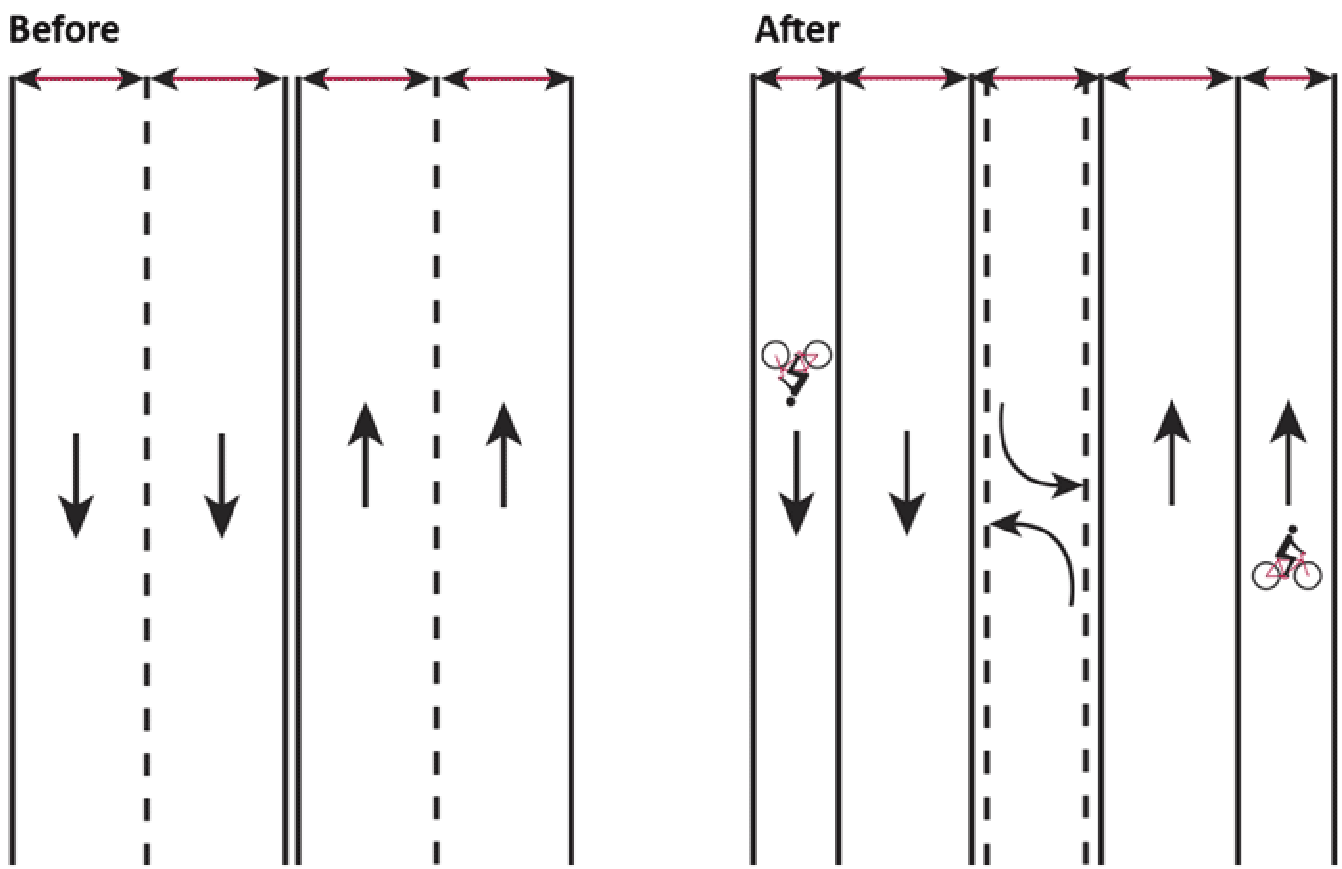


Lane Removal to Repurpose Space ▲●

Lane removal, also referred to as a road diet, involves reducing the number of travel lanes in order to reallocate space for other uses like bike lanes, on-street parking, medians, and more. This treatment is suitable for underutilized roads where Average Daily Traffic (ADT) divided by the reduced number of travel lanes is less than or equal to 7,500 vehicles per lane and is possibly suitable if less than or equal to 10,000 vehicles per lane. Fewer lanes create a sense of confinement for drivers, causing them to drive slower and be more cautious of their surroundings. Repurposing space for pedestrian and bike facilities can increase the mobility and safety of vulnerable road users and make them more visible to drivers. Overall, removal of a lane or a road diet contributes to traffic calming and more consistent speeds along a corridor.

Resource(s):

[Federal Highway Administration (FHWA) Proven Safety Countermeasures – Road Diets (Road Configuration)]



Source: FHWA

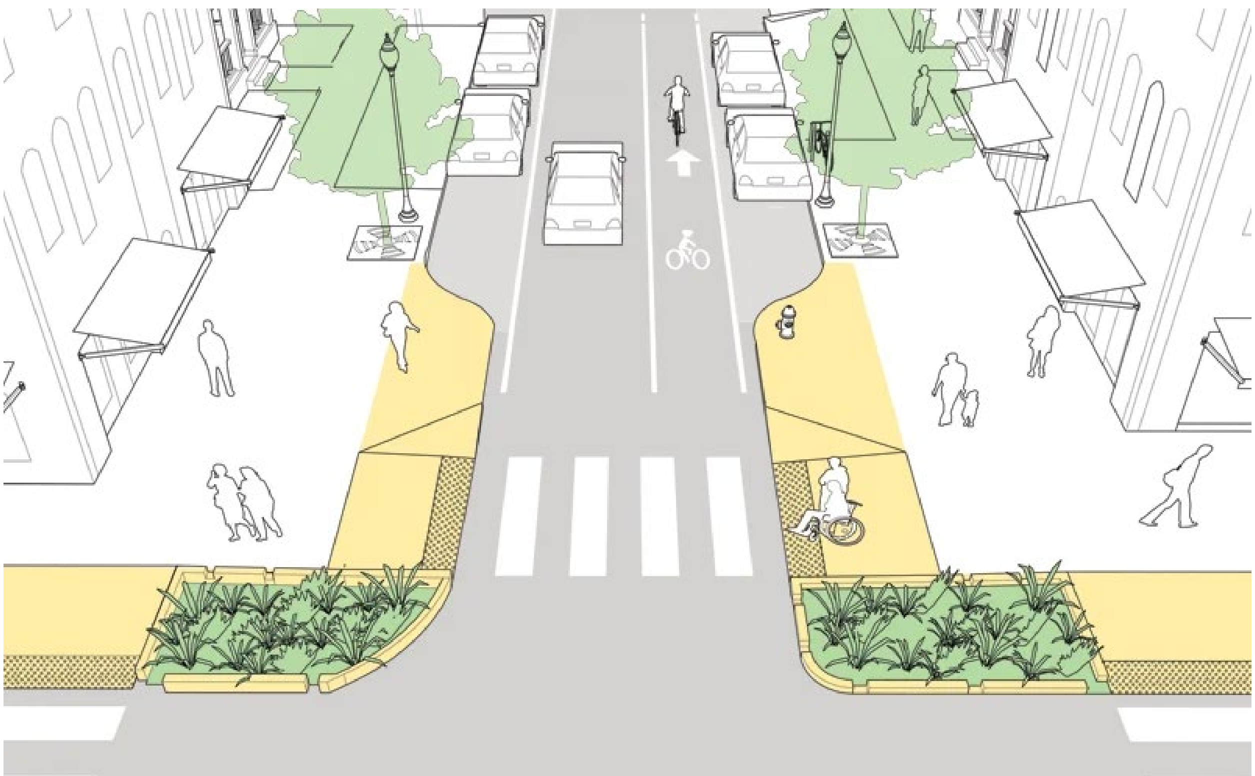
Curb Extension / Bulb-out ▲●

Curb extensions, also known as bulb-outs, are traffic calming measures that extend the sidewalk into the roadway at intersections or mid-block crossings. Their installation is often complementary with on-street parking. They narrow the roadway and provide additional pedestrian space and visibility to drivers. The narrower section of the roadway causes drivers to slow down and encourages more cautious driver behavior. Additionally, curb extensions reduce the turning radii at intersection corners, requiring drivers to slow down to make the turn comfortably. The shortened pedestrian crossing distance made by the extensions also reduces pedestrian exposure to traffic and encourages better speed compliance.

Resource(s):

[Federal Highway Administration (FHWA) Speed Limit Setting Handbook – Appendix]

[Arterial Typology and Speed Management Decision-Making Framework for the City of Philadelphia]



Chicane / Lateral Shift ●

Chicanes are curves introduced into a roadway to create horizontal deflection. They are typically made by staggered curb extensions or islands that force vehicles to navigate a winding lane. Lateral shifts are similar as they involve realigning an otherwise straight street, causing travel lanes to shift in another direction. This can be achieved through median islands or pavement markings. Both chicanes and lateral shifts cause vehicles to slow down and navigating a curving path. The horizontal deflection made by these countermeasures interrupts the driver's momentum, leading to a natural decrease in speed.

Resource(s):

PEDSAFE Pedestrian Safety Guide and Countermeasure Selection System – Chicane

Federal Highway Administration (FHWA) Traffic Calming ePrimer – Module 3: Toolbox of Individual Traffic Calming Measures Part 1

Raised Median Island / Pedestrian Refuge ▲●

Raised median islands are constructed in the middle of the roadway between travel lane directions. They can provide increased safety for vehicles and vulnerable road users. They provide a crossing area for pedestrians that is physically separated from the path of travel of vehicles. At pedestrian crossings, raised medians can be extended into the crosswalk to provide a pedestrian refuge. Raised medians and pedestrian refuges are most useful on high-volume, high-speed roadways, as they provide safety for pedestrians and encourage slower vehicle speeds. They can facilitate safer pedestrian crossings, improve visibility to drivers, and slow vehicle speeds.

Resource(s):

PEDSAFE Pedestrian Safety Guide and Countermeasure Selection System – Raised Medians

Federal Highway Administration (FHWA) Proven Safety Countermeasures – Medians and Pedestrian Refuge Islands in Urban and Suburban Areas

Roundabout ▲●

Roundabouts are intersections with circular forms and raised central islands. The design requires drivers to navigate curves around the center island, and naturally slows vehicles as they approach and travel through the intersection. All vehicles that approach a roundabout must yield to traffic already navigating the curves. Therefore, a through bound vehicle that would normally just travel directly through an intersection must slow down and yield before navigating through a roundabout. The yield control and continuous flow of a roundabout makes vehicles slow down while also contributing to smoother traffic movements.

Resource(s):

PEDSAFE Pedestrian Safety Guide and Countermeasure Selection System – Roundabouts

Federal Highway Administration (FHWA) Proven Safety Countermeasures – Roundabouts

Speed Hump/Cushion ●

Speed humps or cushions are paved areas of a roadway are typically 3 to 4 inches high at their center. They extend the full width of the roadway with height tapering near the edges to allow for unimpeded bicycle travel. Speed humps can be designed specifically for the type of vehicle using the roadway or the desired speed. Longer humps are much more gentle for larger vehicles. Speed humps increase speed compliance by providing direct obstacles in the roadway that must be navigated carefully. It is important to design speed humps for specific roadways and locations.

Resource(s):

PEDSAFE Pedestrian Safety Guide and Countermeasure Selection System – Speed Humps

Arterial Typology and Speed Management Decision-Making Framework for the City of Philadelphia

Raised Crosswalk ●

Raised crosswalks are ramped speed tables that span the width of the roadway and allow for pedestrians to cross. The raised crossing is set at the same height as connected sidewalks, which makes pedestrians that are crossing the roadway easier to see for drivers. The raised structure of the crosswalk also provides a physical deterrent for speeding vehicles, even when pedestrians are not present. Raised crosswalks provide a more comfortable crossing for pedestrians as there is no need for curb ramps due to the consistent height. The heightened presence of the crosswalk encourages drivers to slow down and yield for crossing pedestrians, and drive at slower speed even when the crosswalk is not being used.

Resource(s):

PEDSAFE Pedestrian Safety Guide and Countermeasure Selection System – Raised Pedestrian Crossings

Arterial Typology and Speed Management Decision-Making Framework for the City of Philadelphia

Federal Highway Administration (FHWA) Speed Limit Setting Handbook – Section 5.1.3

Raised Intersection ●

A raised intersection is a traffic calming treatment where the entire intersection is built slightly higher than the surrounding roadway. The construction resembles a large, flat-topped speed hump that spans the entire intersection. The roadway is set at the same height as the sidewalks and crosswalks and is often built with colored concrete or pavers to highlight the area. The approaches to the intersection are ramped to allow a smooth transition from the street to the raised intersection. The vertical deflection of the ramps force drivers to slow down as they enter the intersection. The design of the raised intersection increases driver awareness and, in turn, increases pedestrians as they are made more visible to drivers.

Resource(s):

[Arterial Typology and Speed Management Decision-Making Framework for the City of Philadelphia]

Corridor Reconstruction to Align Design Speed with Target Speed ▲●

The reconstruction of a corridor to align with the target speed is a large project that requires a lot of effort. Reconstruction efforts can include a wide combinations of countermeasures such as narrowing travel lanes, curb extensions, chicanes, raised intersections and crosswalks, road diets, roundabouts, gateway treatments, signal coordination and timing, and more. The idea is to reconstruct a roadway so it encourages drivers to drive at the target speed. For example, if the roadway looks like a 25 mph street, then drivers will drive 25 mph without the need for constant police enforcement.

Resource(s):

Arterial Typology and Speed Management Decision-Making Framework for the City of Philadelphia

Vision Zero Louisville Speed Management Plan

Federal Highway Administration (FHWA) Speed Limit Setting Handbook

Source: WERK | urban design