Attachment II

CITY OF HAYWARD

SPEED MANAGEMENT PLAN

February 2026

DRAFT

HAYWARD
Vision Zero

Table of Contents

Appendices

Appendix A: Maps of Observed Speeds by Time Period

Appendix B: Detailed Speed Reduction Toolbox

List of Figures

List of Tables

Executive Summary

The City of Hayward adopted its Local Roadway Safety Plan (LRSP) in June 2023, making a commitment to achieving the goal of Vision Zero by 2050. Achieving this goal requires alignment with the Safe System Approach, which is a comprehensive framework for preventing roadway collisions and minimizing the risk of fatalities and severe injuries when collisions occur. Safer speeds are one of the six building blocks of the Safe System Approach.

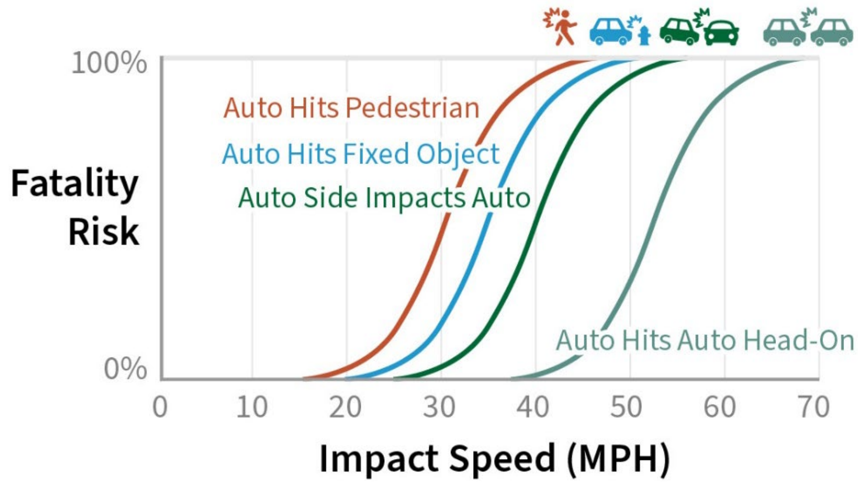
What is the Speed Management Plan?

The Speed Management Plan (SMP) is a comprehensive strategy to reduce speeds in the City of Hayward, thereby reducing the likelihood of speed-related collisions and the severity of all collisions. The SMP includes an assessment of existing speeds and collisions in Hayward to understand and demonstrate the relationship between speed and safety outcomes. This is followed by a Target Speed Framework that identifies ideal speeds for each street based on land use and roadway contexts and a speed reduction toolbox to reduce observed speeds to match target speeds. Finally, the SMP includes several priority actions that the City can implement to institutionalize safe speeds in Hayward.

Why is the Speed Management Plan needed?

Speeds play a significant role in determining the severity of all collisions. **Figure ES-1** shows that higher speeds lead to a much higher fatality risk for all collisions, especially those involving pedestrians. Reducing speeds is therefore crucial to reduce the likelihood of severe injuries and fatalities.

Figure ES-1. Fatality Risk based on Impact Speed for All Collision Types



Source: Caltrans, Making Strides Toward Saving Lives; Fehr & Peers.

Based on collisions reported in Hayward between 2017-2022, unsafe speed was the most commonly cited Primary Collision Factor (PCF), accounting for 21% of all collisions. Studies have shown that higher speeds dramatically increase the risk of fatalities and severe injuries, proving that unsafe vehicle speed is a significant factor influencing the severity of every collision, even if is not cited as the PCF.

Speeding is common in Hayward. While speeds vary throughout the day, several arterials and collectors experience speeds over 40 mph across all time periods, including Mission Boulevard, Hesperian Boulevard, Hayward Boulevard, Industrial Parkway, and Industrial Boulevard. About a quarter to a third of local streets, which primarily serve residential neighborhoods, experience speeds over 30 mph during most time periods. Collisions occurring at these speeds have a high chance of being fatal, especially for vulnerable road users such as pedestrians and bicyclists. This is supported by reported collision data in Hayward, which shows that over 70% of collisions that resulted in a fatality or severe injury occurred on roadways with speeds of 35 mph or more.

Defining a Target Speed Framework

Target speed is defined as the ideal speed at which vehicles should be operating on a roadway to support the safety of all users. This is different from posted speed or the speed limit, which is the maximum lawful speed for a roadway. To define an ideal target speed for each street segment, the SMP categorized each street segment in Hayward based on the primary purpose served by the segment. These categories, which are based on a combination of the segment's roadway classification and surrounding land uses are as follows:

1. **Connector Streets:** These streets are primarily movers of people and goods and are defined as arterials and collectors that are outside commercial areas.
2. **Core Streets**: These streets move all modes, while also serving as places where people go for work, school, and recreation. These include arterials and collectors that are within commercial areas (excluding Downtown) or along schools.
3. **Place Streets:** These streets are centers of community and business, with higher concentrations of people walking or biking. These include all streets that are within Downtown Hayward, as well as local streets within other commercial areas, such as along mixed-use development near Mission Boulevard.
4. **Neighborhood Streets:** These streets are primarily in residential neighborhoods where people live, walk to school, and exercise. These include all local streets that are outside commercial areas, which make up most of the City's roadway network.

A map of street types in Hayward is shown in **Figure ES-2** and target speeds for each of the four street types are shown in **Figure ES-3.**

Figure ES-2: Street Types in Hayward

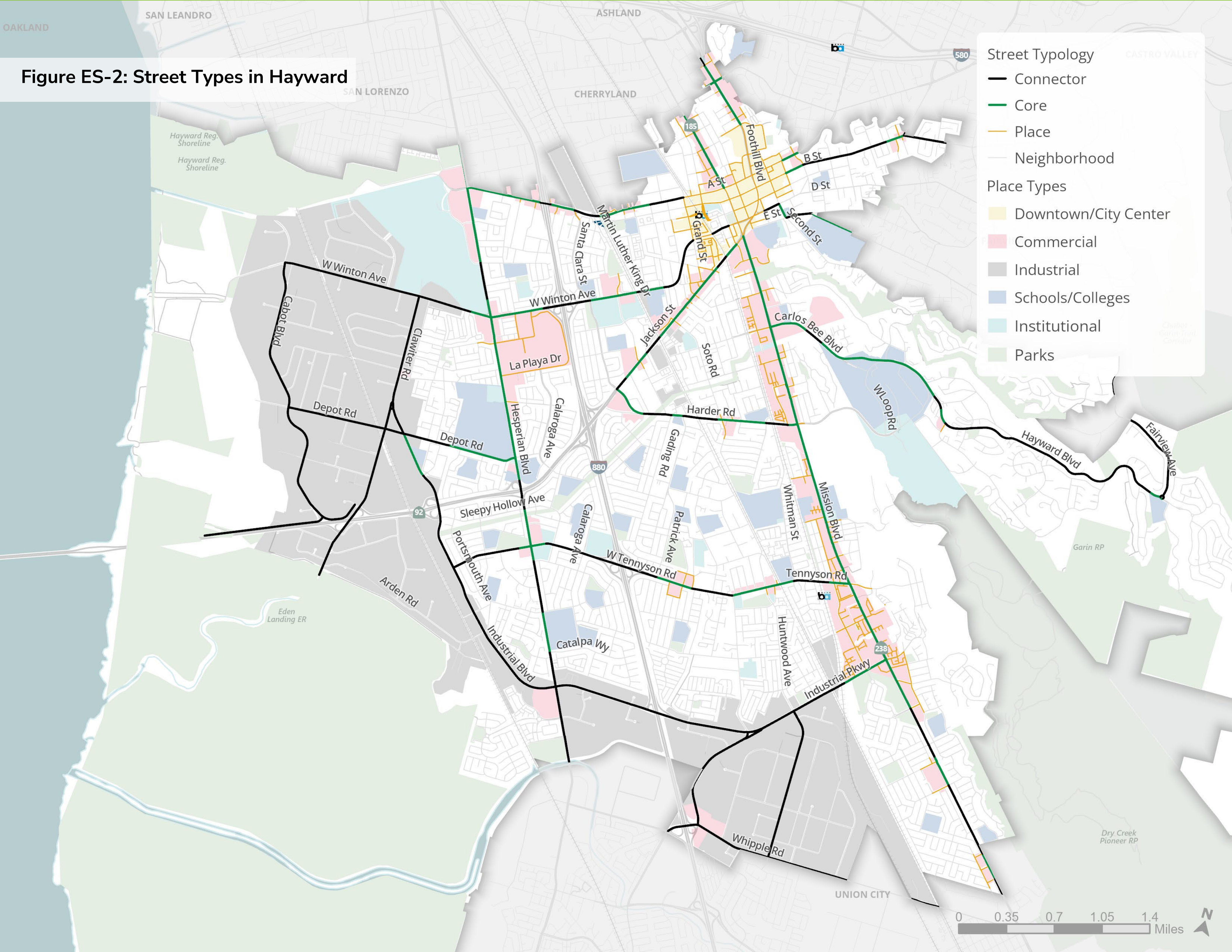
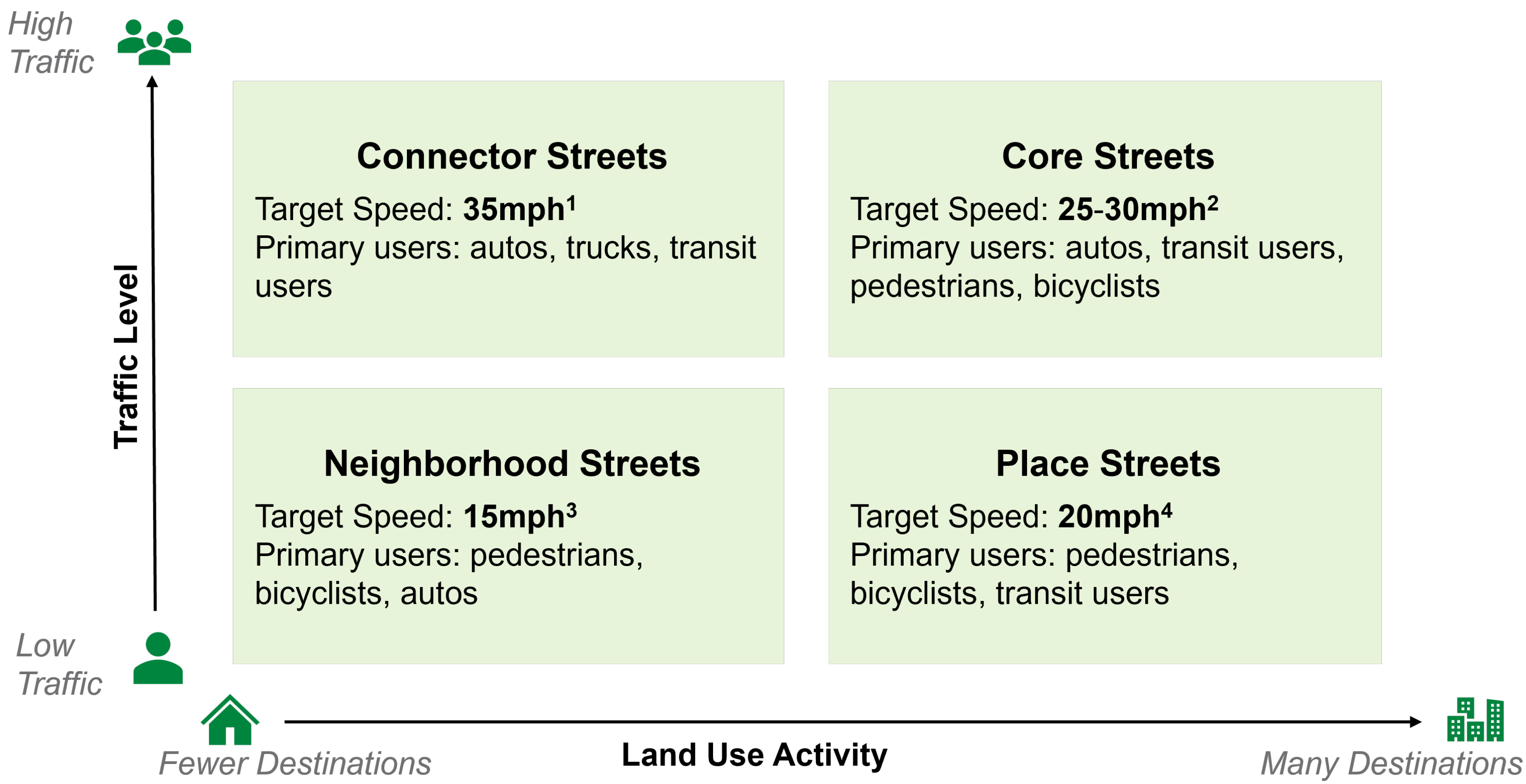


Figure ES-3: Target Speed Framework



[1]Target Speeds on residential-serving parts of Connector Streets: 25 mph
[2]Target Speeds on Core Streets along a school: 25mph
[3]Target Speeds on Neighborhood streets in industrial areas: 25mph
[4]Target Speeds on Foothill Boulevard: 25mph

Developing a Speed Reduction Toolbox

To reduce observed speed such that they are aligned with the target speeds, this Plan includes a Speed Reduction Toolbox with countermeasures that encourage slower speeds. These tools are organized into two categories: (1) at or through intersections and (2) along street segments. More details on each speed reduction tool, including a description and the types of streets where it may be most appropriate to implement is provided in **Appendix B**.

Applying Speed Reduction Tools to Priority Corridors

To provide examples for implementation of speed reduction tools to reduce observed speeds, the SMP includes recommendations for lowering speeds on five Priority Speed Reduction Corridors (PSRC). While speed reduction on all corridors where observed speeds are higher than target speeds is crucial, the PSRCs serve as a template for applying the Speed Reduction Toolbox. These corridors were identified based on the following two factors:

- **High Injury Network:** overlap with the City's High Injury Network (HIN) from the Local Roadway Safety Plan (LRSP)
- **High Need Areas:** serves a school or areas with a high percentage of Transportation Disadvantaged Population as identified in the LRSP

The resulting five PSRCs are as follows:

1. Hesperian Blvd between SR-92 ramp and Turner Ct
2. Industrial Blvd between W Tennyson Rd to Baumberg Ave
3. Huntwood Ave between Shafer Rd to W Tennyson Rd
4. Calaroga Ave between Peterman Ave to W Tennyson Rd
5. Santa Clara St between Winton Ave to W Jackson St

Defining Priority Actions to Institutionalize Safe Speeds

A benchmarking assessment of existing safety plans, policies and programs was conducted to assess alignment with industry best practices for speed management and identify opportunities to institutionalize safe speeds.

This benchmarking assessment shows that the City has made significant progress toward institutionalizing several best practices, especially through the adoption of the LRSP. However, while the City has codified several other best practices in an adopted standard or policy, their implementation status remains unclear. To address these gaps and support safe speeds, this Plan identifies six types of priority actions. Some examples of these priority actions are listed below:

1. **Stakeholder Collaboration:** includes convening a Safety Task Force

2. **Training & Education:** includes providing Safe System Trainings and piloting Safety Demonstration Projects
3. **Policies & Procedures:** includes updating Standard Details to ensure alignment with Safe System design and setting context-specific speed limits
4. **Enforcement:** includes deploying red light running cameras and automated speed cameras (once permitted by state legislation)
5. **Evaluation & Prioritization**: includes prioritizing PSRCs for future funding and developing a Safe System project evaluation framework
6. **Monitoring:** includes expanding speed data collection and reporting, and enhanced collision investigation and monitoring.

CHAPTER 1

Introduction

1.1 Hayward's Vision Zero Commitment

Vision Zero is a movement to eliminate all traffic-related fatalities and severe injuries. Vision Zero acknowledges that even one death on our public roadways is unacceptable and focuses on safe and equitable mobility for all road users. Achieving Vision Zero requires integrating layers of protection into the design of the transportation system to withstand human error. By adopting its Local Road Safety Plan in June of 2023, the City of Hayward committed to achieving the goal of Vision Zero by 2050.

Vision Zero Policy (June 2023)

City shall plan and design its transportation system with the goal of eliminating fatalities and serious injuries among all system users by 2050.

City staff are to prioritize safety when balancing needs and demands for space within the public right of way on the high injury network.

Vision Zero will be implemented in an equitable manner, accounting for historic inequities in transportation and safety investments across the Hayward Community.

Achieving Vision Zero requires the **Safe System Approach**, a comprehensive framework for preventing roadway collisions and minimizing the risk of fatal and severe injuries when collisions occur. It is based on the principles that humans inevitably make mistakes and that human bodies have physical limits to tolerate crash impacts. The Safe System Approach builds redundancy and shared responsibility through six building blocks of a safe transportation system, including safe speeds (**Figure 1**: Safe System Wheel).

Figure 1: Safe System Wheel

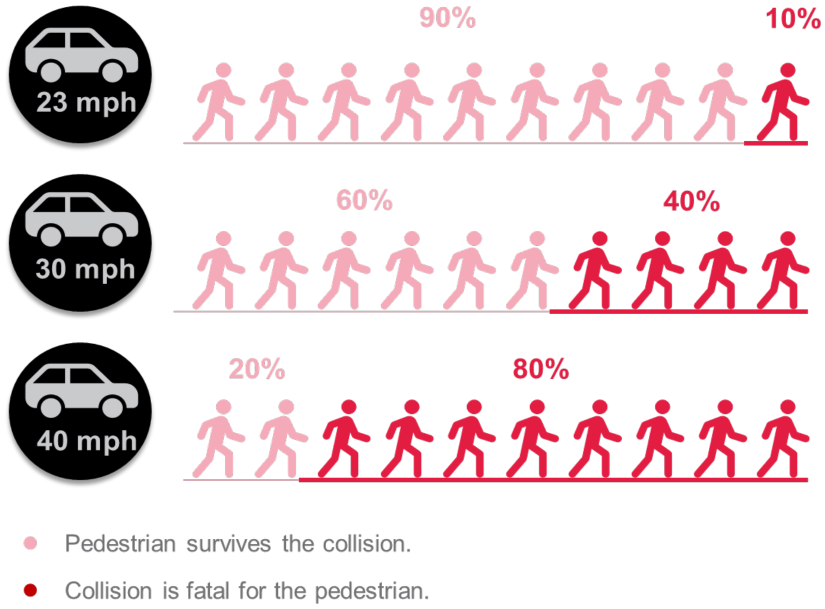
Source: Target Zero: Washington's Strategic Highway Safety Plan (2024).

1.2 The Importance of Managing Speeds

Slowing speeds is a core principle of Vision Zero. As vehicle speeds increase both the frequency and the severity of all collision types also increase. Humans are increasingly less likely to survive collisions where vehicles are traveling over 23 mph. This is particularly true for seniors, youth, and other vulnerable users. Drivers have less time to react as vehicle speed increases and the required stopping distances also become longer as vehicle speeds increase.

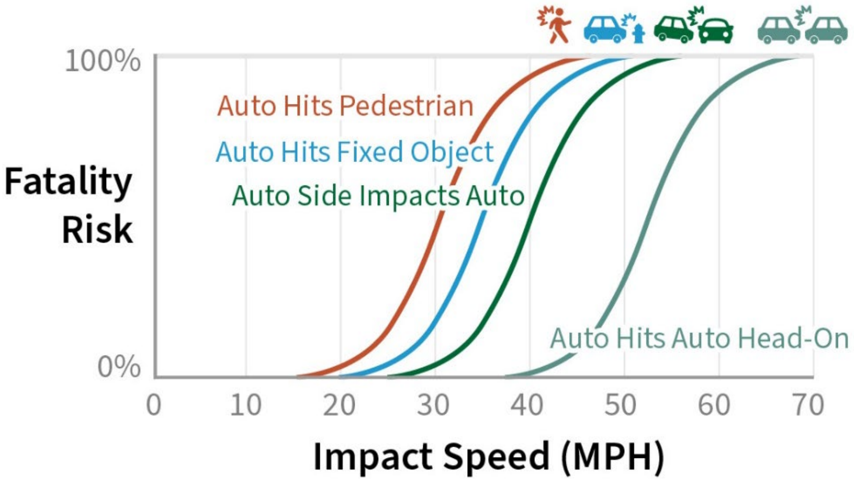
Studies have shown that the fatality risk for a pedestrian hit by a vehicle increases dramatically beyond 20 to 25 mph (**Figure 2**). Higher speeds increase the risk of fatalities for all collision types, including collisions involving other vehicles (**Figure 3**). Reducing speeds can accommodate human injury tolerances by reducing impact forces, providing additional time for drivers to stop, and improving visibility.

Figure 2: Likelihood of Pedestrian Fatality based on Impact Speed



Source: USDOT, Literature Reviewed on Vehicle Travel Speeds and Pedestrian Injuries. March 2000.

Figure 3. Fatality Risk based on Impact Speed for All Collision Types



Source: Caltrans, Making Strides Toward Saving Lives; Fehr & Peers.

1.3 About this Plan

The Speed Management Plan (SMP) sets out a comprehensive strategy to reduce speeds in the City of Hayward. The City is committed to taking a holistic approach to speed management and implementing street design improvements that encourage slower speeds and create safer streets for all users.

The development of the SMP involved four key steps: (1) determining desired speeds citywide based on the roadway and land use context, (2) developing a set of countermeasures to apply where existing speeds exceed desired speeds, (3) developing implementation plan for priority projects, and (4) identifying opportunities to institutionalize safe speeds. To ensure buy-in from key stakeholders, a Technical Advisory Committee (TAC) and a Stakeholder Advisory Committee (SAC) was convened to provide input on each step. The TAC included staff from City of Hayward, including the Police Fire, and Planning Departments. The SAC included residents and community stakeholders representing organizations such as Bike East Bay, Community Resources for Independent Living (CRIL), Cal State University Easy Bay, and Hayward Unified School District.

This SMP is organized into five additional chapters:

- **Chapter 2 Speeds in Hayward Today** summarizes observed speeds and speed-related collisions in Hayward.
- **Chapter 3 Target Speed Framework** lays out the framework used to categorize streets and define target speeds by street type.
- **Chapter 4 Speed Reduction Toolbox** outlines tools to manage speeds at intersections and on streets.
- **Chapter 5 Speed Reduction Corridors** establishes speed reduction corridors in the City for priority investments.
- **Chapter 6 Institutionalizing Safe Speeds** describes policy actions to codify speed management practices in Hayward.

CHAPTER 2

Speeds in Hayward Today

This chapter provides an overview of collisions and observed speeds in Hayward, as well as the relationship between locations and severity of collisions with higher observed speeds. As is shown in the following sections, speeding is common throughout the day and collisions with the most severe outcomes are concentrated on segments with higher observed speeds.

2.1 Speed-related Collisions in Hayward

Between 2017-2022, a total of 1,713 injury collisions occurred in Hayward, summarized in **Table 1**. Over 200 collisions resulted in a person being killed or severely injured (KSI) and 75 of those involved a pedestrian or a bicyclist. Vehicle speed is a significant factor influencing the severity of every collision in Hayward.

Table 1: Total Collisions in Hayward between 2017-2022

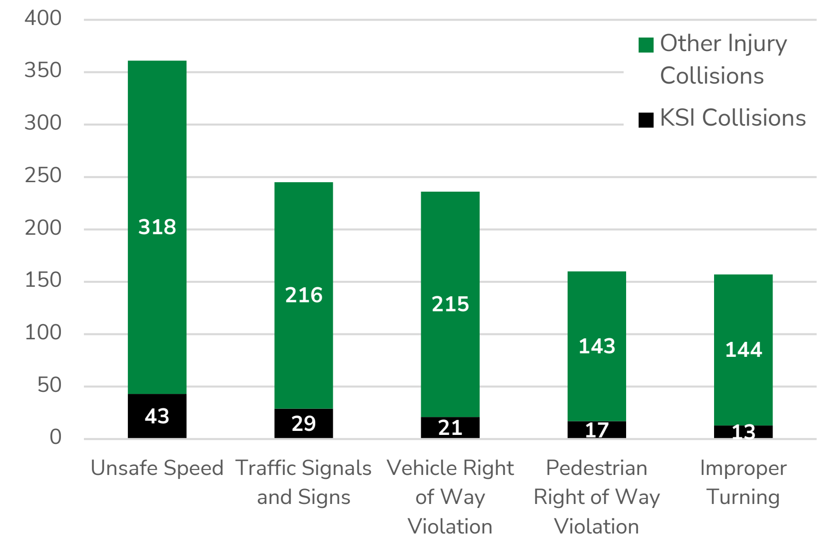
Collisions (2017-22)	All Injury Collisions	Fatal or Severe Injury Collisions
All Modes	1713	209
Pedestrian	286	60
Bicyclist	125	15

Source: Transportation Injury Mapping System (TIMS), 2017-22

Unsafe Speed is the most commonly cited contributing factor to collisions

While speed always affects the severity of a collision, this is supported by how officers report Primary Collision Factors (PCFs) in Hayward. Unsafe speed is the leading PCF for all injury and KSI collisions in Hayward, accounting for 361 collisions (21%) as shown in **Figure 4**. Unsafe speeds also make up the largest share (30%) of driver KSI collisions, accounting for 50 drivers being killed or severely injured. Regardless of the reported PCF, unsafe vehicle speed is a significant factor influencing the severity of every collision.

Figure 4: Top 5 Reported Primary Collision Factors (2017-22)



Source: TIMS (2017-22)

2.2 Observed Speeds in Hayward

Observed speeds (miles per hour (mph)) were analyzed using 85th percentile speed data from StreetLight, which provides aggregated GPS data.[1] This assessment is based on observed speeds during weekdays (Monday-Thursday) in October 2024. To understand variation in speeds throughout the day, observed speed data was assessed for five time periods as follows:

1. AM Peak (6AM – 10AM)
2. Midday (10AM – 3PM)
3. PM Peak (3PM – 7PM)
4. Late PM (7PM – 12AM)
5. Overnight (12AM – 6AM)

To compare speeds across streets with similar roadway characteristics, streets were grouped and assessed based on their functional classification (i.e. arterials, collectors, or local streets). Arterials are roadways that serve as the principal network for through-traffic flow, connecting Hayward to adjacent cities and places, while collectors channel traffic from local streets to the arterials. Observed speed data from StreetLight was available for all arterials and collectors and approximately 60% of local streets in Hayward.

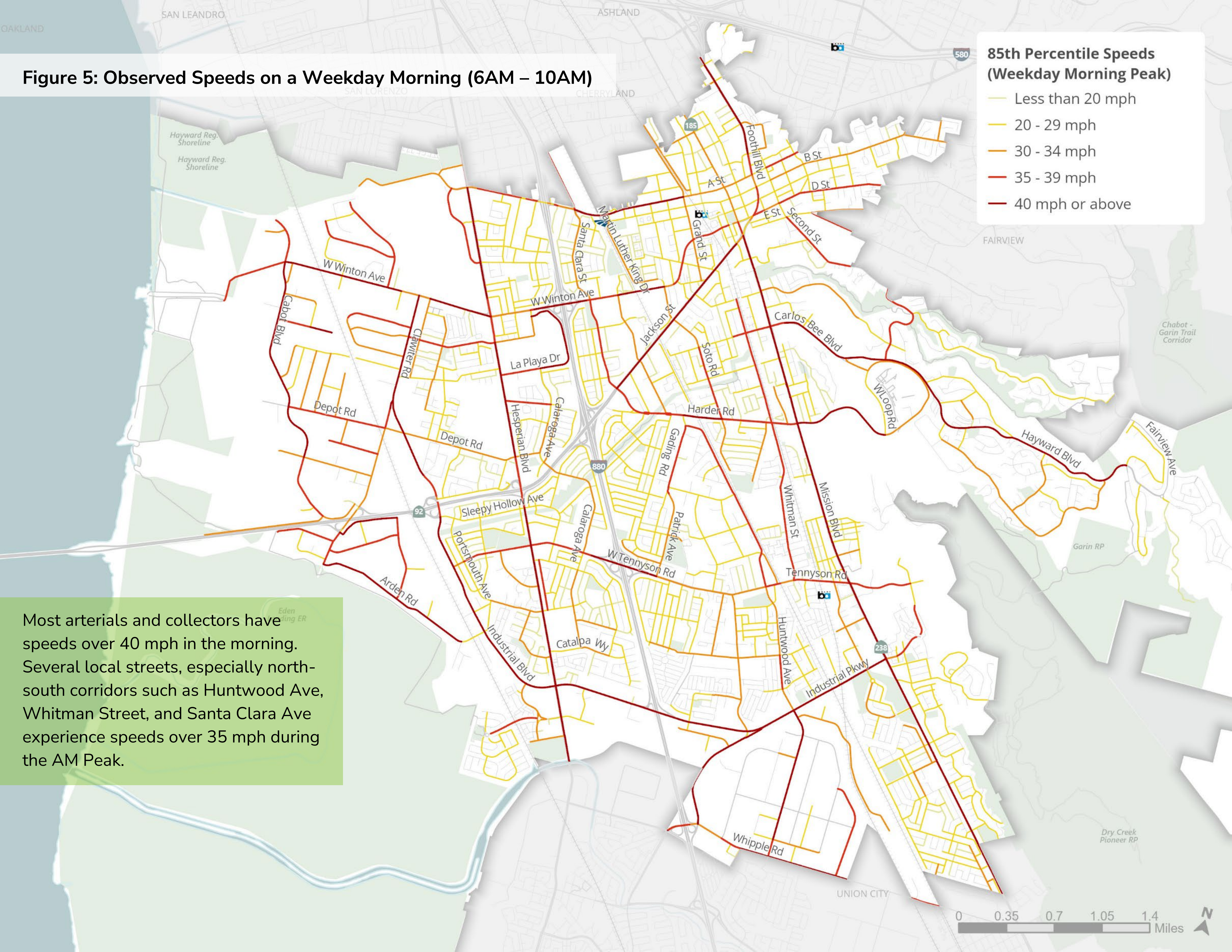
Speeds over 40 mph are common on major streets

Figure 5 shows observed speeds during the AM peak period, during which speeds are the highest outside of the overnight period. During the AM peak, most of the city's arterials and collectors experience speeds over 40 mph and most local streets see speeds between 20-29 mph. While speeds vary throughout the day, several major streets consistently exceed 40 mph across all time periods. Maps showing observed speeds across different time periods are included in Appendix A. The top 5 corridors with the most street miles that exceed 40 mph across all time periods include:

1. Mission Boulevard (3 miles)
2. Hesperian Boulevard (2 miles)
3. Hayward Boulevard (2 miles)
4. Industrial Parkway (2 miles)
5. Industrial Boulevard (2 miles)

[1] Speed data provided by StreetLight are based on a sampling of segments. StreetLight validates this data against speed data reported by state Department of Transportation (DOTs). Based on this validation, StreetLight reports that their speed data is more accurate for higher speed bins, since those segments tend to have higher volumes and a larger sample size.

Figure 5: Observed Speeds on a Weekday Morning (6AM – 10AM)

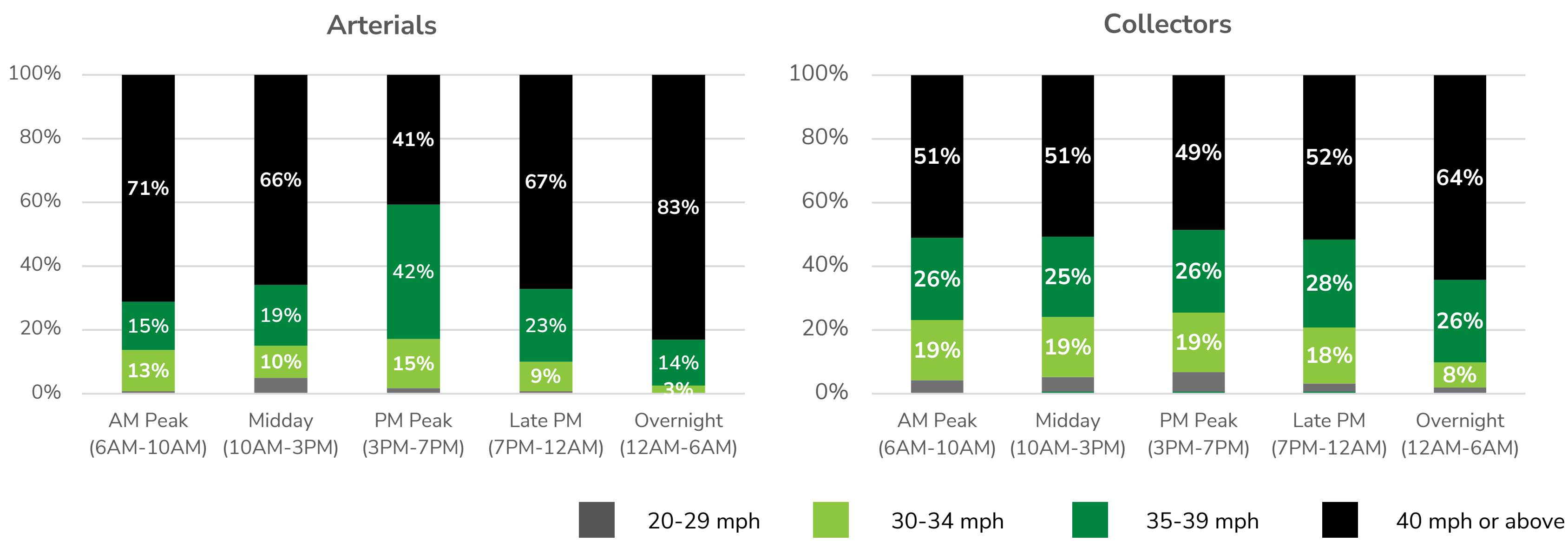


Most arterials and collectors have speeds over 40 mph in the morning. Several local streets, especially north-south corridors such as Huntwood Ave, Whitman Street, and Santa Clara Ave experience speeds over 35 mph during the AM Peak.

Figure 6 shows that most arterials and collectors have speeds over 40 mph during all time periods except during the PM peak period. While speeds over 40 mph are most common in the overnight period, the morning peak and late PM periods also have a large share of arterials and collectors operating at or above 40 mph.

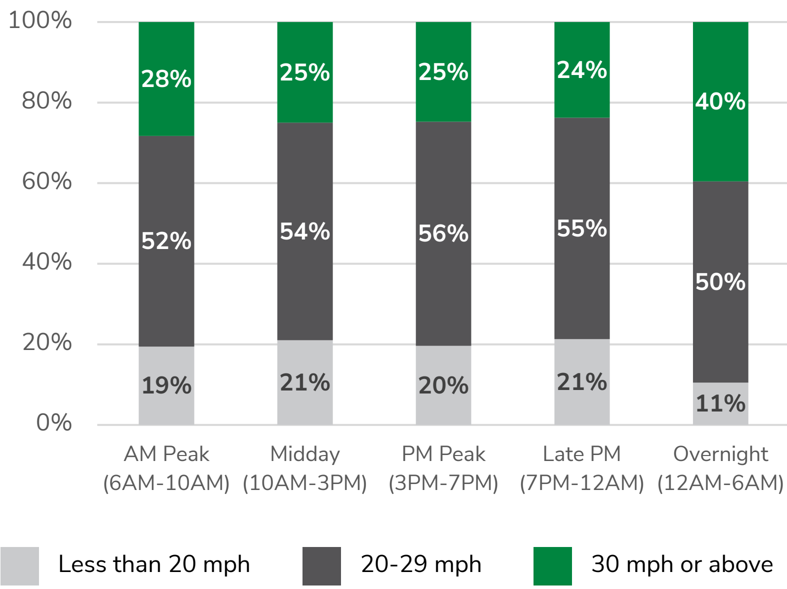
The majority of local streets have observed speeds below 30 mph across all time periods, as shown in **Figure 7**. However, about a quarter of local streets experience speeds over 30 mph during most time periods, and about 40% during the overnight period**.** Since these streets mostly serve residential areas, including schools and parks, speed management on the local street network is crucial.

Figure 6: Observed Speeds on Arterials and Collectors by Time Period



Source: StreetLight, Oct 2024

Figure 7: Observed Speeds on Local Streets by Time Period

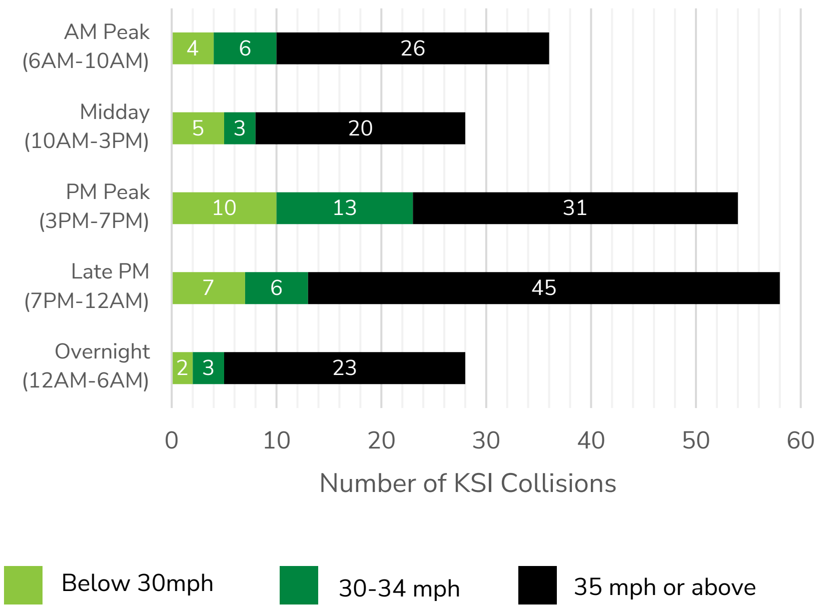


Source: StreetLight, Oct 2024

Severe and fatal collisions are concentrated on higher-speed roadways

To assess the relationship between observed speeds and collisions, each collision was overlayed with the observed speed at its location during the corresponding time period. Over 70% of KSI collisions (145 collisions) occurred on roadways with speeds of 35 mph or more. The distribution of KSI collisions across time periods and observed speeds, as shown in **Figure 8**, highlights that the late PM period makes up for the largest share (45 collisions) of KSI collisions occurring on roadways with speeds over 35 mph.

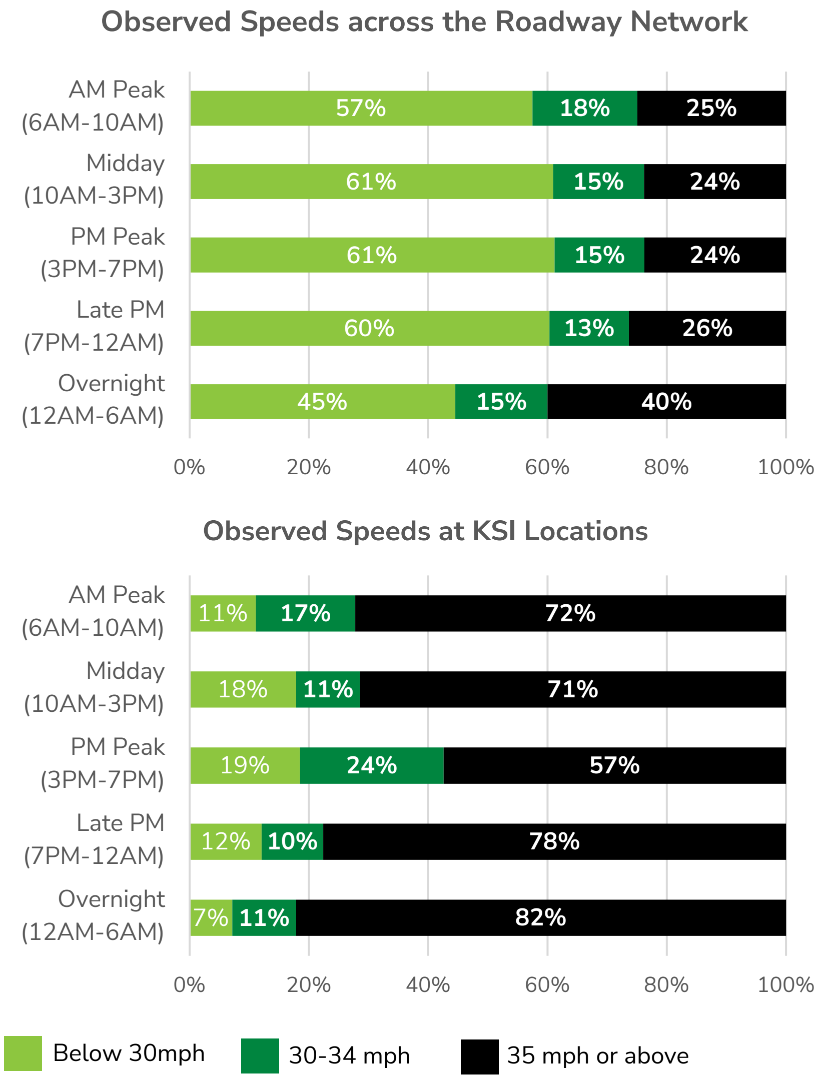
Figure 8: Distribution of KSI Collisions by Time Period and Observed Speeds



Source: TIMS (2017-22), StreetLight (Oct 2024)

While roadways with speeds over 35 mph make up for the majority of KSI collisions, they make up a much smaller share of the total roadway network, showing that the most severe collisions are disproportionately occurring on high-speed segments.

Figure 9: Distribution of Observed Speeds at KSI Locations vs. the Roadway Network



Source: TIMS (2017-22), StreetLight (Oct 2024)

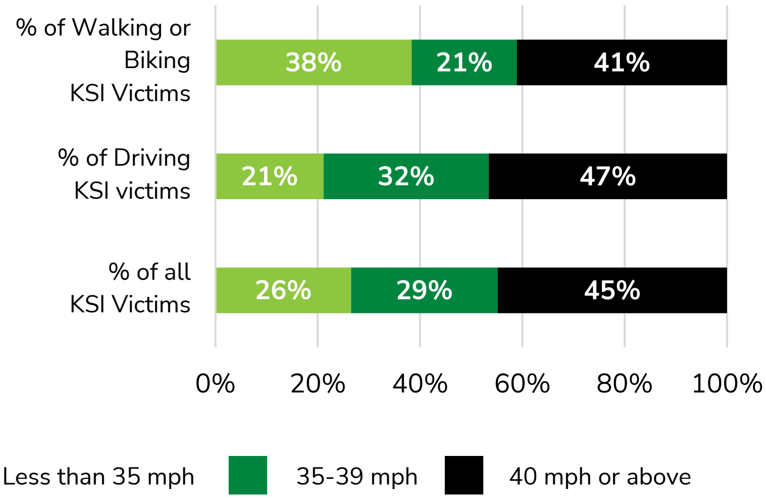
Figure 9 compares the distribution of observed speeds across the city's overall roadway network to the speeds at which KSI collisions have occurred. These charts show that while segments operating over 35 mph make up approximately 25-40% of the roadway network, they account for nearly 60-75% of all KSI collisions. During most time periods, the share of these high-speed segments among all KSI collisions is almost 3 times higher than the share of those segments in the overall roadway network. For example, 72% of KSI collisions occurring in the morning peak period occurred on segments with speeds over 35 mph, while only 25% of the roadway network operates at that speed during that time period.

During the late PM and overnight periods, segments with speeds over 35 mph make up over 3 times as many KSI collisions than those with speeds under 35 mph, further demonstrating the overrepresentation of KSI collisions on a small share of roadways and the opportunity to reduce likelihood of severe crashes by managing speeds.

People walking, biking, or rolling are disproportionately impacted by unsafe speeds

Compared to people in an automobile, pedestrians and bicyclists are vulnerable to death and severe injury collisions at lower speeds. **Figure 10** compares the observed speeds associated with walking or biking KSI collisions to speeds associated with an automobile-only KSI collision. The share of pedestrians and bicyclists that are killed or severely injured in collisions occurring where observed speeds are less than 35 mph is almost double the share of drivers/passengers that are killed or severely injured at the same speeds. This emphasizes the importance of managing speeds to a lower target at locations where people are expected to be walking or biking.

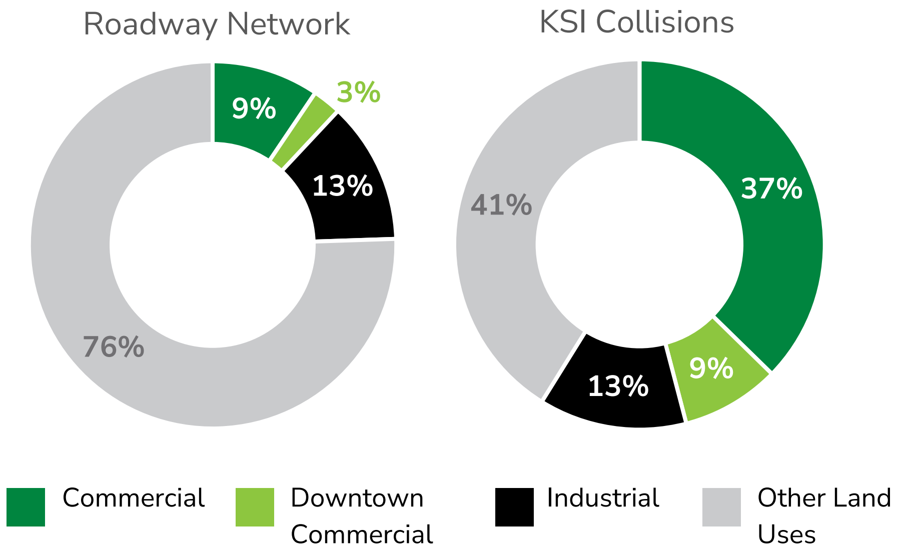
Figure 10: KSI Victims by Observed Speed at Collision Location



Source: TIMS (2017-22), StreetLight (Oct 2024)

Similarly, land uses that have higher pedestrian or multimodal activity are overrepresented in the total share of KSI collisions. As shown in **Figure 11**, commercial and downtown commercial land use account for only 12% of the total roadway network, but account for 46% of KSI collisions. These areas typically have higher multimodal activity, where people walking, biking, or taking transit are susceptible to severe injury and death if exposed to vehicles at high speeds.

Figure 11: Distribution of Roadways and KSI Collisions by Land Use



Source: TIMS (2017-22), City of Hayward

CHAPTER 3

Target Speed Framework

This section outlines the framework used to define citywide target speeds based on roadway and land use characteristics.

3.1 Defining Street Types

The SMP Target Speed Framework categorizes each street segment in Hayward based on the primary purpose served by the street. For example, some street segments primarily facilitate the movement of cars, trucks, and transit, whereas some segments primarily serve as places for pedestrians to shop, dine, or recreate. Identifying the primary purpose or the combination of purposes served by a street helps inform the target speed for that street.

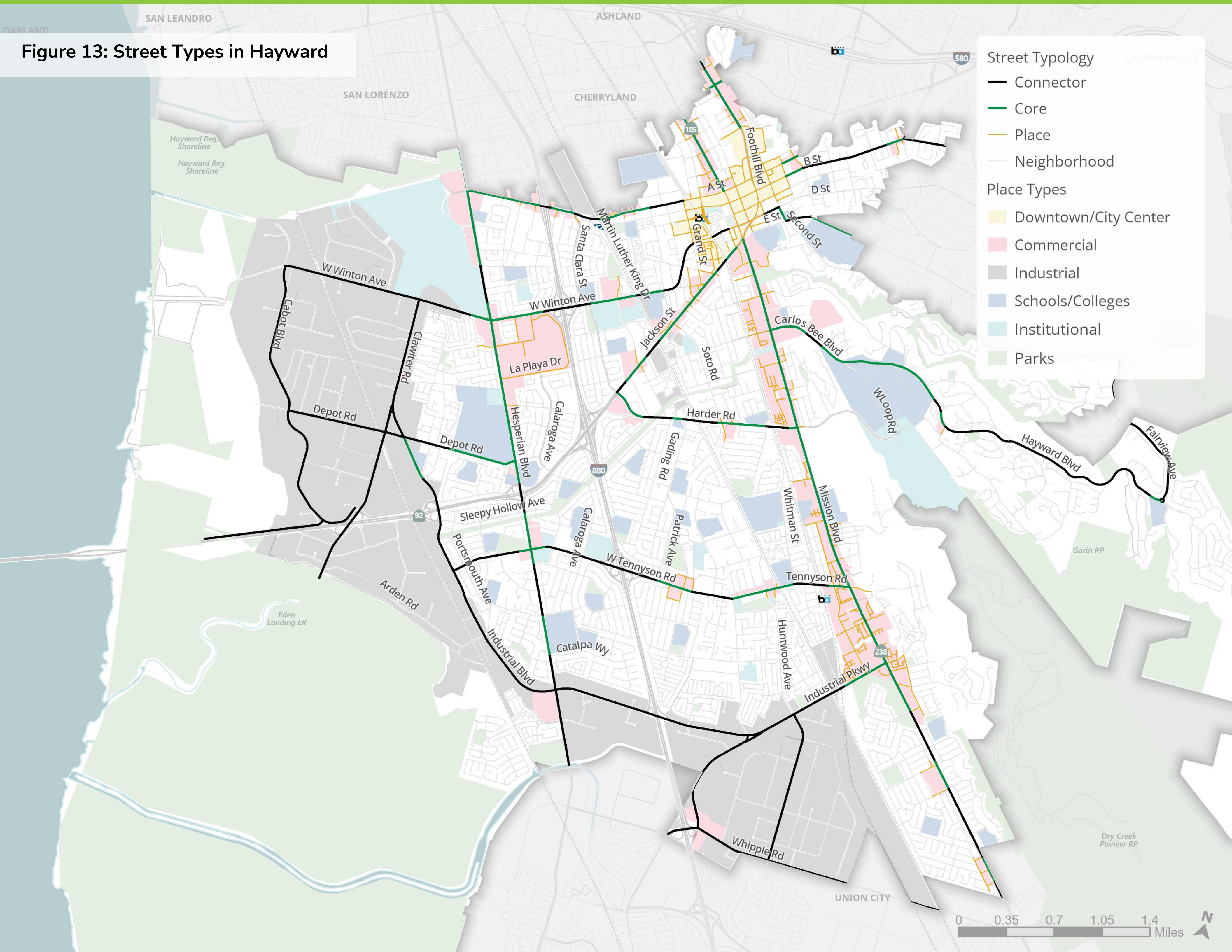
The target speed framework is primarily based on two factors: 1) roadway classification as an approximation of traffic level and 2) surrounding land use to assess activity level (**Figure 12**). Based on this framework, the roadway network in Hayward is categorized into the following four categories and mapped in **Figure 13**:

1. **Connector Streets:** These include arterials and collectors that are outside commercial areas. Connector Streets are movers of people and goods. They typically have limited active land uses, with intersections spaced further apart. Connector Streets are frequently within industrial areas, such as Industrial Parkway, Whipple Road, Clawiter Road, and Cabot Boulevard. Some Connector Streets also line residential areas, such as Hayward Boulevard.
2. **Core Streets:** These include arterials and collectors that are within commercial areas (excluding Downtown) or along schools. Core Streets connect to regional transit centers and move all modes, while also serving as places where people go for work, school, and recreation. Core Streets are mostly along key commercial areas, including Mission Boulevard, Hesperian Boulevard, Jackson Street, and A Street.
3. **Place Streets:** These include all streets that are within Downtown Hayward, as well as local streets within other commercial areas, such as along mixed-use development near Mission Boulevard. Place Streets are centers of community and business, and the blocks are typically shorter with frequent crossings. People often visit these streets on foot or bicycle, and the sidewalk and curbs are often used for dining, loading, and other business and community functions.
4. **Neighborhood Streets:** These include all local streets that are outside commercial areas. Neighborhood Streets are typically in residential areas where people live, walk to school, and exercise. Most of the City's roadway network are Neighborhood Streets, primarily serving residential areas.

Figure 12: Street Types Based on Traffic Level and Land Use Activity

The land use character can vary along a corridor, meaning some streets can have multiple street typologies,, such as A Street, Harder Rd, and Jackson St. Countermeasures on these corridors should be selected to ensure appropriate transition between target speeds. For example, the target speed can be set for the whole corridor based on connector street type, but additional countermeasures such as roundabout or chicanes can be used to further slow vehicles as appropriate for a core segment.

Figure 13: Street Types in Hayward



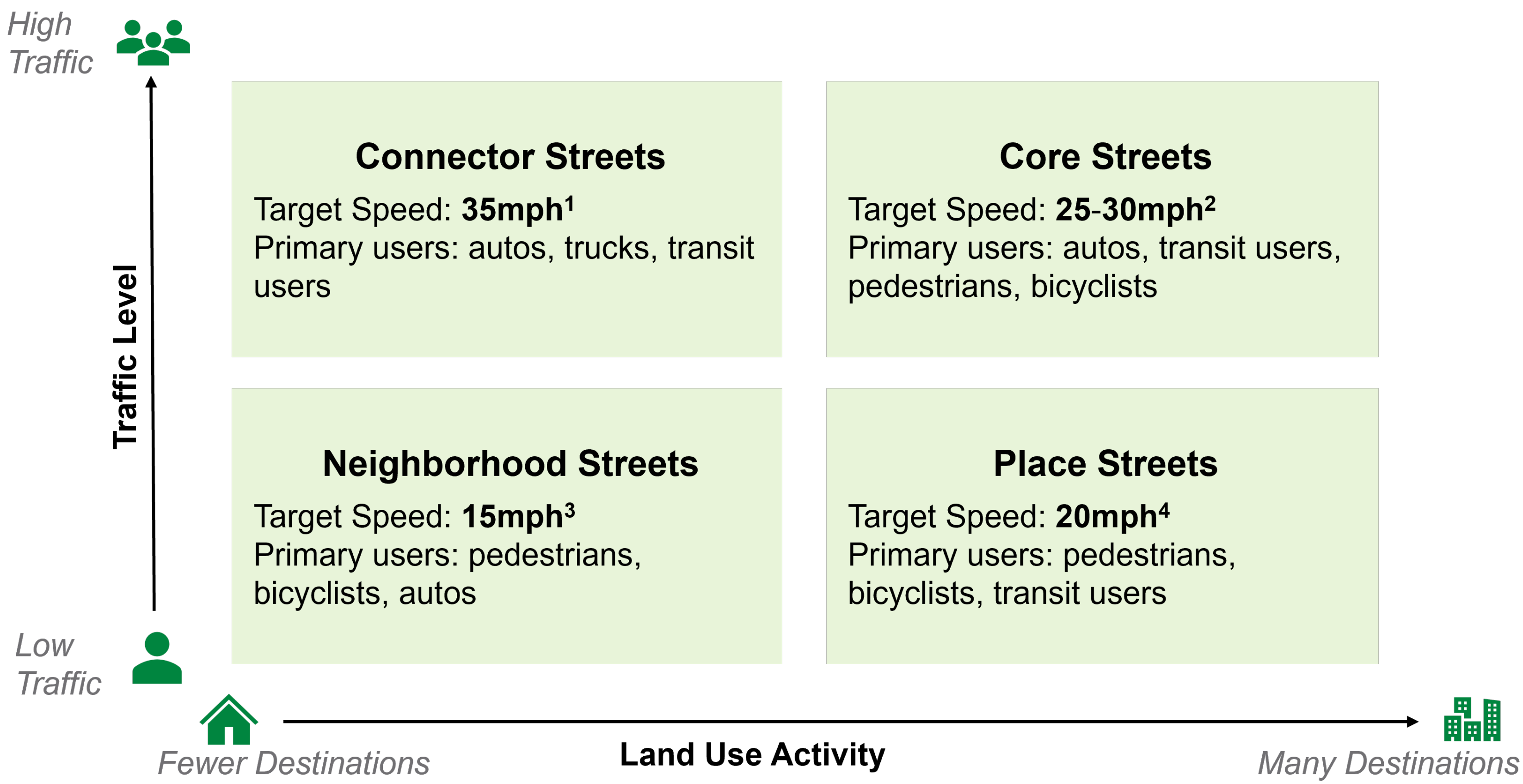
3.2 Setting Target Speeds

The Target Speed Framework lays out the highest speeds at which vehicles should operate on streets in Hayward to support the safety of all road users. Target speeds are different from posted speeds (or the speed limit). The posted speed is the maximum lawful speed for a roadway as displayed on a regulatory sign, whereas the target speed is the ideal vehicle speed for a roadway. While the City may be able to lower the posted speed to match the target speed in some cases, the SMP recommends safety treatments that aim to lower observed speeds to better match target speeds.

The target speeds are determined by the four street types, considering the typical mix of road users, land use context, and needs for movement and placemaking on each street type (**Figure 14**). The lowest target speed of 15 mph is recommended on Neighborhood Streets, where families live and kids go to school. This is followed by a target speed of 20 mph on Place Streets, where people gather and where pedestrians and bicyclists are primary users. The lowering of target speeds from 20 mph to 15 mph on Neighborhood Streets is needed to prioritize safety of the most vulnerable road users, such as children and seniors. State law allows setting 15 mph posted speeds near school zones, so by setting the same target speeds, the SMP provides strategies to bring actual speeds closer to the posted speed near schools. Additionally, since 15 mph is closer to biking speed, it reduces the likelihood of severe collisions involving bicyclists.

Speed reduction tools (**Chapter 4**) can be applied to align prevailing speeds with target speeds, such as lowering the posted speed limit and changing the roadway design.

Figure 14: Target Speed Framework



[1]Target Speeds on residential-serving parts of Connector Streets: 25 mph

[2]Target Speeds on Core Streets along a school: 25mph

[3]Target Speeds on Neighborhood streets in industrial areas: 25mph

[4]Target Speeds on Foothill Boulevard: 25mph

CHAPTER 4

Speed Reduction Toolbox

This chapter presents speed management tools that the City can use to encourage slower speeds and align prevailing vehicle speeds to target speeds. As these tools are implemented and observed speeds are lowered, the City will update speed limits to bring speed limits into closer alignment with target speeds.

The tools are organized into two locational categories: (1) at or through intersections, and (2) along street segments. A combination of these tools will need to be implemented along any given corridor (i.e., series of segments and intersections) to experience consistent speed reduction benefits. Some of the tools noted below are also effective at providing additional safety benefits.

Table 2 and **Table 3** below show the speed reduction toolboxes for intersections and streets. **Appendix B** provides greater detail on each speed reduction tool, including a description and the types of streets where it may be most appropriate to implement.

4.1 Speed Management at Intersections

Managing speed on the approach to an intersection, as well as managing vehicle speeds either traveling through or turning at an intersection, are critical for improved safety outcomes. Intersections are where most multimodal paths of travel cross at angles that increase the likelihood of a severe collision. Managing vehicle speeds by requiring vehicles to stop before turning or proceeding, to turn at slower speeds, and/or progress through an intersection at a slower speed all provide substantive safety benefits. In the context of a corridor, slowing vehicles at intersections also makes it easier to manage vehicle speeds between intersections on the street segments. **Table 2** summarizes tools that help slow vehicle speeds at intersections.

4.2 Speed Management along Street Segments

Higher vehicle speeds on street segments make it difficult, uncomfortable, and higher risk for people traveling by any mode to cross the street. Higher vehicle speeds along the street also create a loud and unappealing environment for people living along those streets as well as for walking, biking, and accessing transit along those streets.

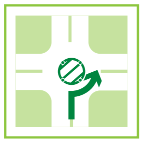
Table 4 summarizes countermeasures that help slow vehicle speeds along street segments.

Table 2. Intersection Strategies that Help Slow Vehicle Speeds

A. Intersection Control

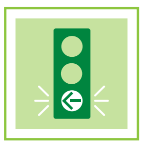

Roundabouts

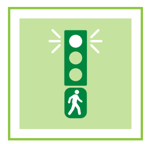
All-Way Stop Control Intersections


Neighborhood Traffic Circles

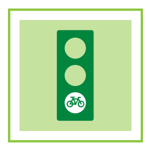
Traffic Signals with Slow Green Wave Progression

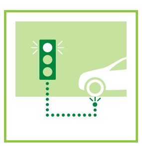
B. Traffic Signal Operations


Protected Left-Turn Phasing

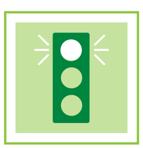

Leading Pedestrian Interval and Pedestrian Recall

Prohibit Right-Turn on Red


Separate Pedestrian and/or Bicycle Crossing Phases

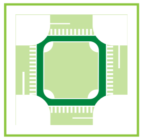

Rest in Red

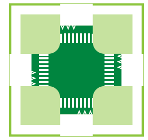

Red Light Running Cameras

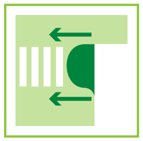

Flashing Red

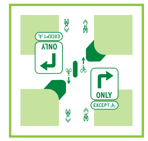

Shorter Cycle Length

C. Geometric Features at Intersections


Protected Intersection


Raised Intersection


Curb Extensions or Tighter Curb Radii


Diverters


Eliminating or Closing Slip Lanes for Turning Vehicles

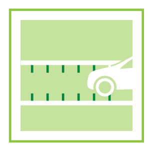

Raised Median or Splitter Island


Raised Crosswalks


Floating Transit Island or Bus Boarding Island

D. Pavement Markings at or on Approach to Intersections


Centerline Hardening


Painted Optical Speed Bars

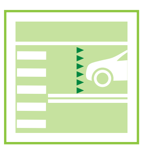
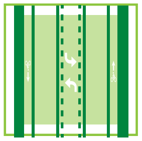
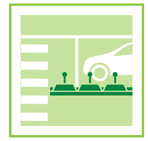
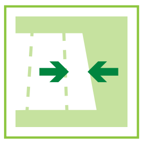
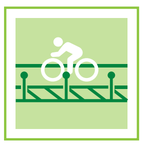
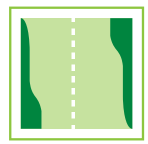
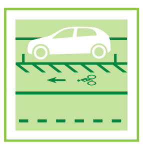
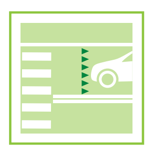

High Visibility Crosswalks with Advanced Yield Line or Stop Line

Table 3. Street Segment Strategies that Help Slow Vehicle Speeds

A. Physically or Visually Narrowing Vehicle Traveled Way			
	Road Diet		Centerline Hardening
	Vehicle Lane Narrowing		Landscaping Buffer
	Separated Bikeway		Chicane or Horizontal Deflection
	Buffered Bike Lanes and Door Zone Markings		Raised Median and/or Refuge Island
	Centerline and Edgeline Markings		Back-in Angled Parking
B. Other Treatments (Humps, Pavement Markings, Signs, and Beacons)			
	Speed Hump or Speed Table		High Visibility Crosswalks with Advanced Yield or Stop Markings and Warning Signs

Speed Feedback Sign	Transverse Rumble Strips
Pedestrian Hybrid Beacons	Painted Optical Speed Bars
Rectangular Rapid Flashing Beacon	Chevron Signs on Horizontal Curves

C. Ordinance or Enforcement Related

Speed Limit Reduction	In-Person Enforcement[2]
Speed Safety Cameras[1]	

D. Education

Traffic Safety Campaigns	Traffic Safety School for Violators

Parent-oriented Traffic Safety Trainings at schools

1. Installing Speed Safety Cameras is currently not legal in Hayward though is being trialed elsewhere in the state. California state legislation would need to change to allow for speed safety cameras to be used more broadly.
2. Effectiveness varies depending on the resources and officers available for enforcement.

CHAPTER 5

Speed Reduction Corridors

This chapter outlines the framework for identifying speed reduction corridors based on observed speeds and target speeds. It further provides examples on how to apply the speed reduction toolbox outlined in the previous chapter to a set of Priority Speed Reduction Corridors (PSRC).

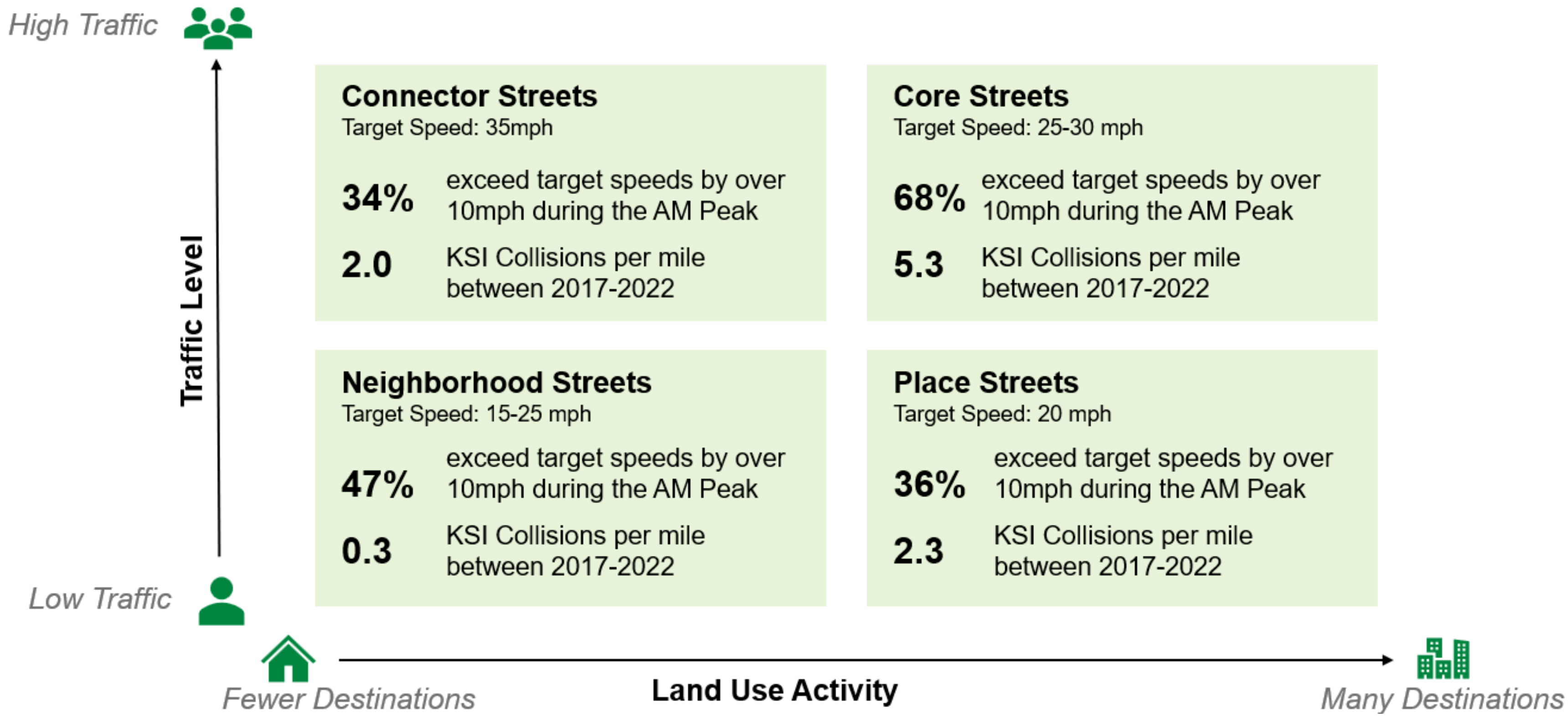
5.1 Defining Speed Reduction Corridors

Speed Reduction Corridors are corridors with a high discrepancy between observed speeds and target speeds, thereby demonstrating a high need for speed management.

Figure 15 shows a comparison between the observed speeds during the AM peak period, which sees the highest speeds outside of the overnight period, and the target speeds for each street type defined in **Chapter 3**. Across the four street types, Core Streets have the largest difference between target speeds and observed speeds with nearly 70% of Core Streets exceeding target speeds by over 10 mph in the AM peak. Core Streets also account for the highest number of KSI collisions per mile compared to other street types. Observed speeds on nearly 50% of Neighborhood streets also exceed target speeds by more than 10 mph, reinforcing the need for continued neighborhood traffic calming efforts.

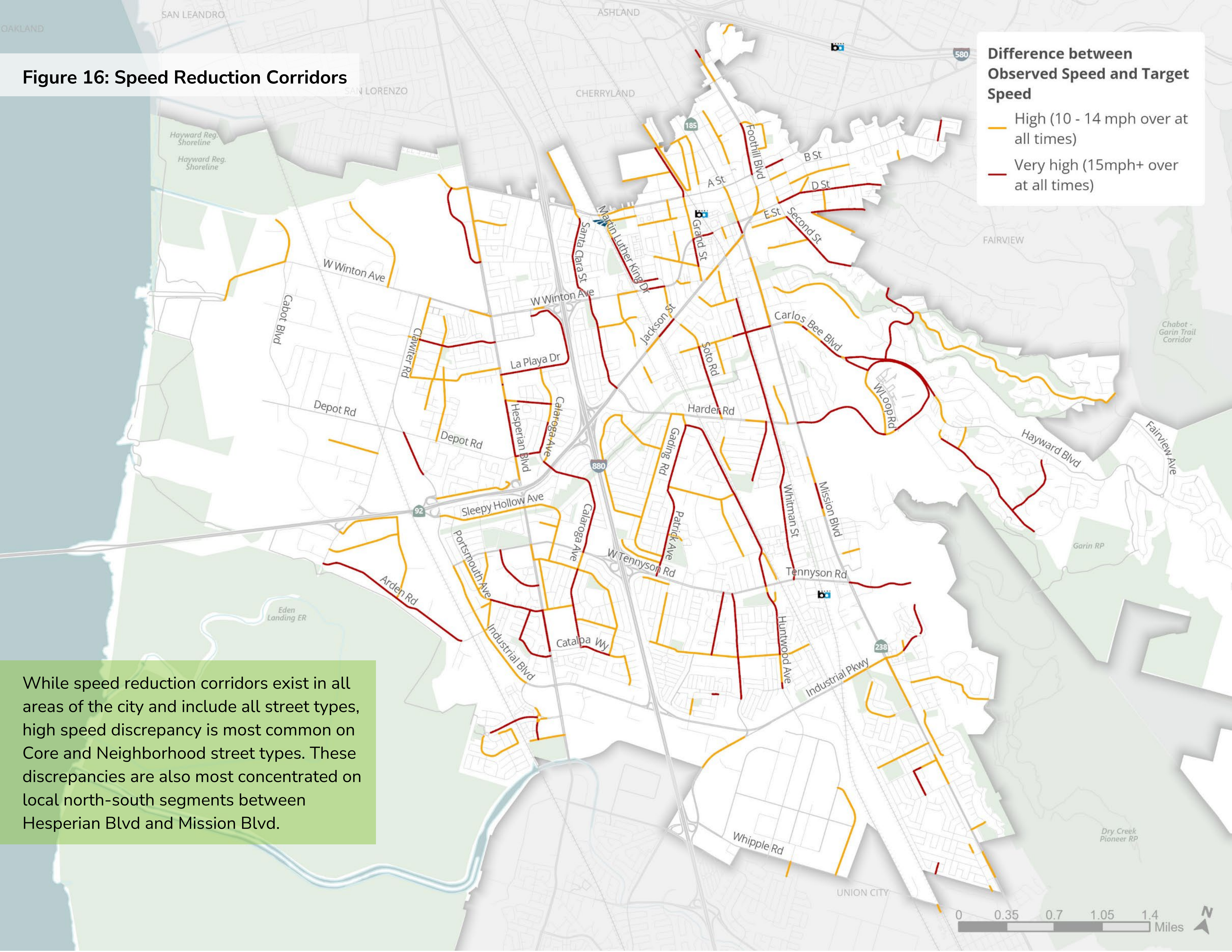
Since observed speeds vary across the day, with different corridors operating at their highest speeds during different time periods, this plan defines speed reduction corridors as segments where observed speeds exceed target speeds by 10 mph or more across all time periods, as shown in **Figure 16**. This network serves as a tool for the City to identify segments for speed management implementation.

Figure 15: Comparison between Target Speeds and Observed Speeds



Source: TIMS, 2017-2022; Streetlight, Oct 2024

Figure 16: Speed Reduction Corridors



While speed reduction corridors exist in all areas of the city and include all street types, high speed discrepancy is most common on Core and Neighborhood street types. These discrepancies are also most concentrated on local north-south segments between Hesperian Blvd and Mission Blvd.

5.2 Criteria for Priority Speed Reduction Corridors

While reducing speeds on all speed reduction corridors is crucial, a set of Priority Speed Reduction Corridors (PSRC) were identified to serve as a template for applying speed reduction tools. These PSRCs were identified based on high speed discrepancy and the following two factors:

- **High Injury Network:** overlap with the City's High Injury Network (HIN) from the LRSP
- **High Need Areas:** serves a school or areas with a high percentage of Transportation Disadvantaged Population as identified in the LRSP

Table 4 shows the five PSRCs selected, along with street type, target speed, and the three criteria. To demonstrate application of a variety of speed reduction tools in different roadway and land use contexts, this list includes PSRCs of different street types.

Criteria for Speed Reduction Corridors

High Speed Discrepancy

Streets where observed speeds exceed target speeds by 10mph or more throughout the day

Additional Criteria for **Priority** Speed Reduction Corridors

Priority locations from Local Roadway Safety Plan (LRSP)

This includes streets on the High Injury Network, streets along priority population zones, or along schools

Table 4: Priority Speed Reduction Corridors

Corridor	Street Type[1]	Target Speed	High Speed Discrepancy	Serves Priority Locations from LRSP
Hesperian Blvd between SR-92 ramp and Turner Ct	Core	30 mph	✓	✓
Industrial Blvd between W Tennyson Rd to Baumberg Ave	Connector	35 mph	✓	✓
Huntwood Ave between Shafer Rd to W Tennyson Rd	Neighborhood	15 mph	✓	✓
Calaroga Ave between Peterman Ave to W Tennyson Rd	Neighborhood	15 mph	✓	✓
Santa Clara St between Winton Ave to W Jackson St	Neighborhood	15 mph	✓	✓

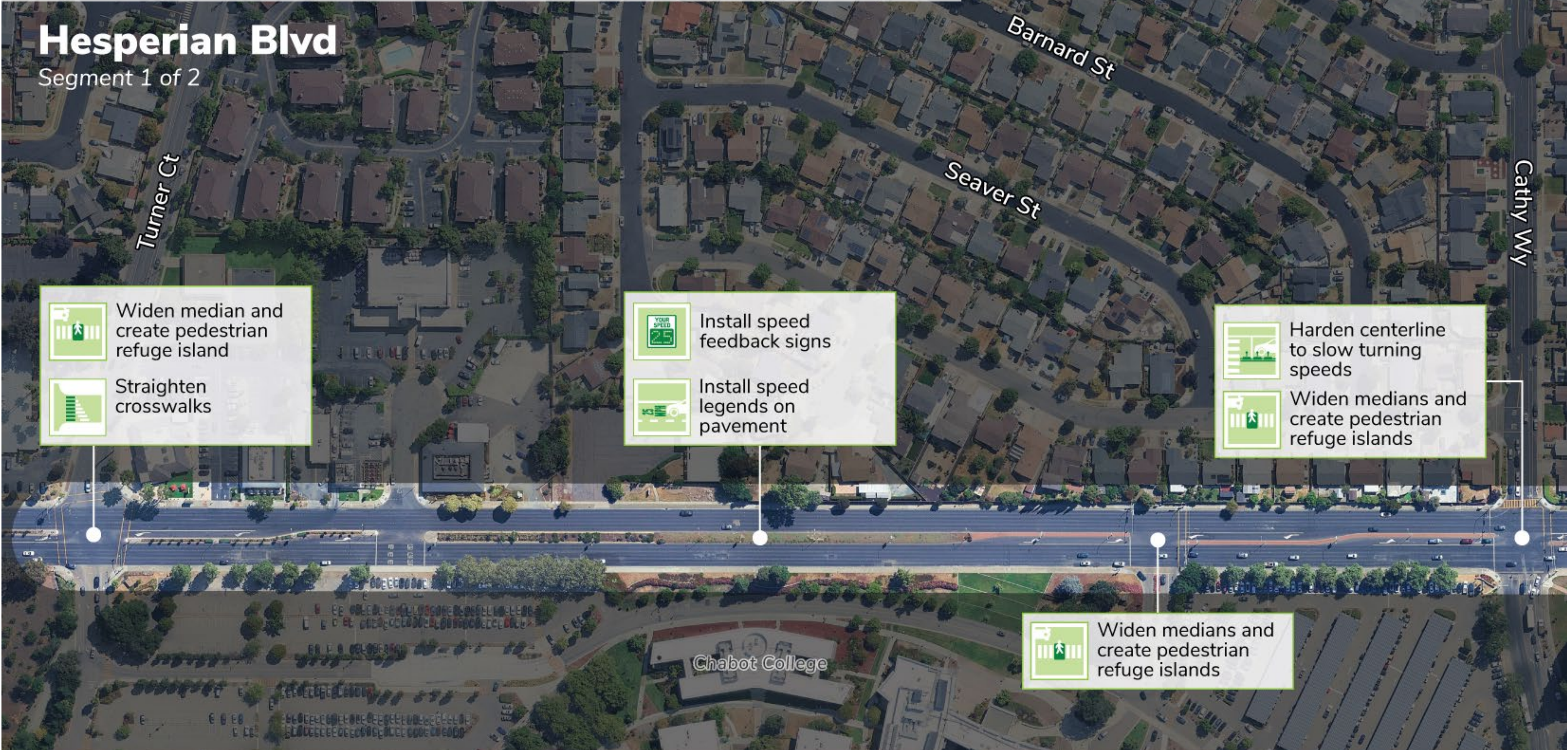
Notes:

1. A Place Street corridor is not included because the City is leading a separate study (Safe Streets Downtown) focused on improving safety along the Downtown Loop, which will serve as a template in applying speed reduction measures on these street types.

5.3 Applying Countermeasures to Priority Corridors

This section includes recommendations for applying speed reduction countermeasures to the five PSRCs. The plans shown below (**Figure 17** through **Figure 26**) serve as examples of using a variety of tools to bring observed speeds closer to target speeds and can be applied to other corridors with similar roadway and land use characteristics.

Figure 17: Recommendations for Hesperian Blvd between Turner Ct and Cathy Wy



Corridorwide Strategies

- Reduce the speed limit along the corridor to 30 mph
- Add high-visibility crosswalks where appropriate
- Tighten corner radii and provide bulbouts to slow turning speeds
- Install speed sensitive rest-in-red signals at all signalized intersections
- Install leading pedestrian intervals with accessible pedestrian signals at all signalized intersections where missing
- Prohibit right turn on red at appropriate signalized intersctions
- Evaluate road diet or lane narrowing (from seven lanes to five) and install separated bikeway per the Bike and Pedestrian Master Plan

Figure 18: Recommendations for Hesperian Blvd between Cathy Wy and Sleepy Hollow Ave

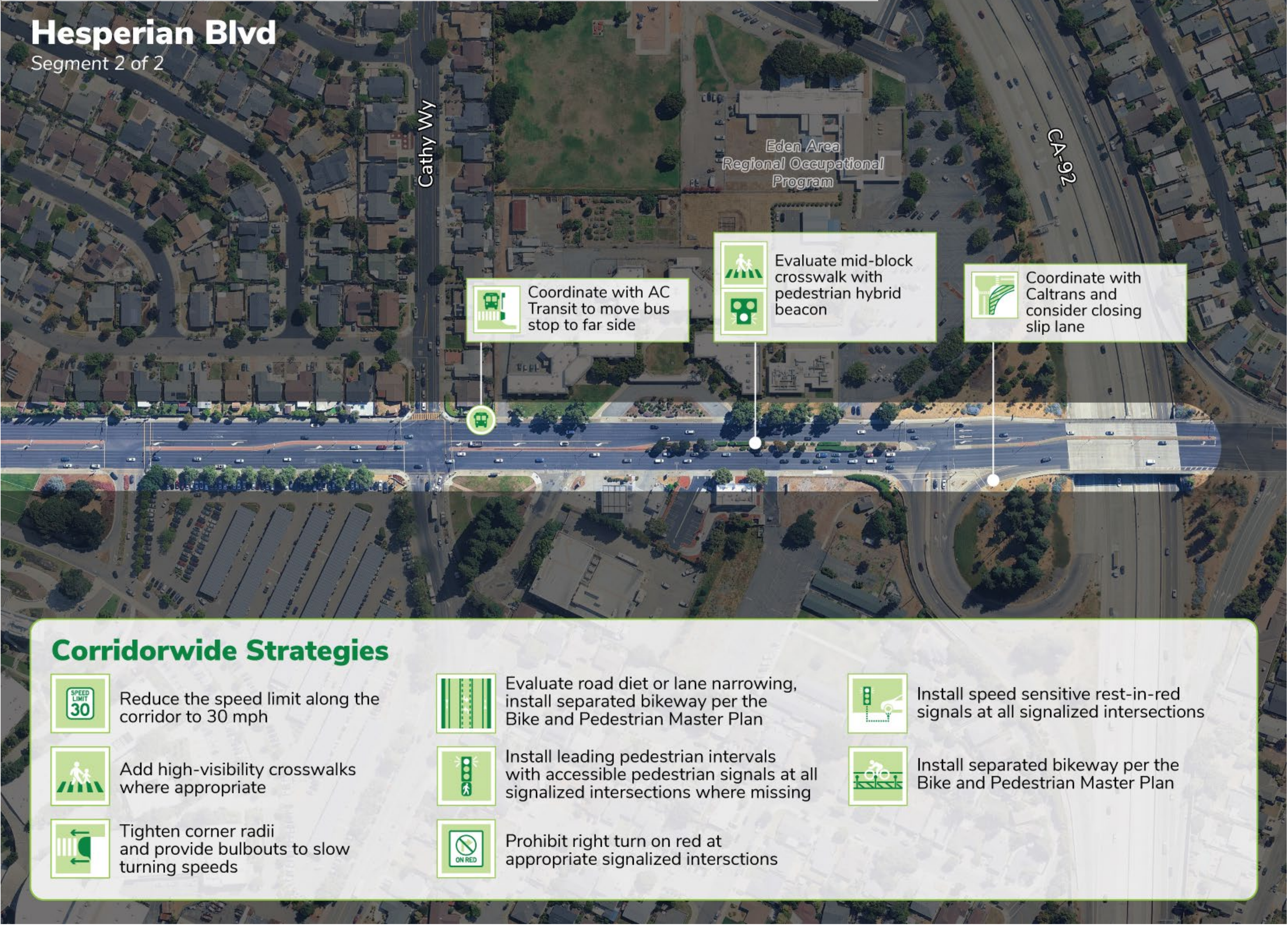


Figure 19: Recommendations for Industrial Blvd between Tennyson Rd and Arf Ave

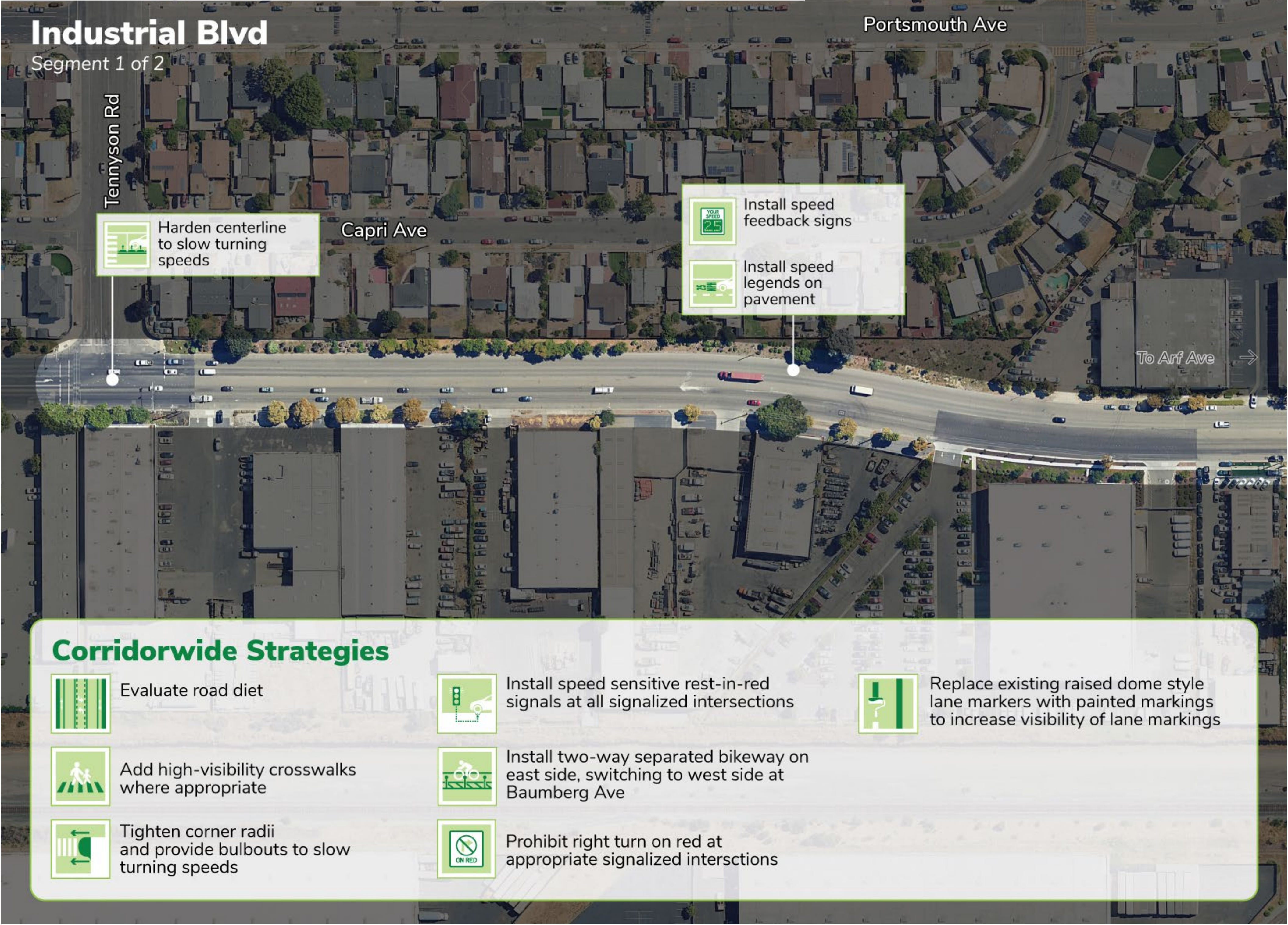


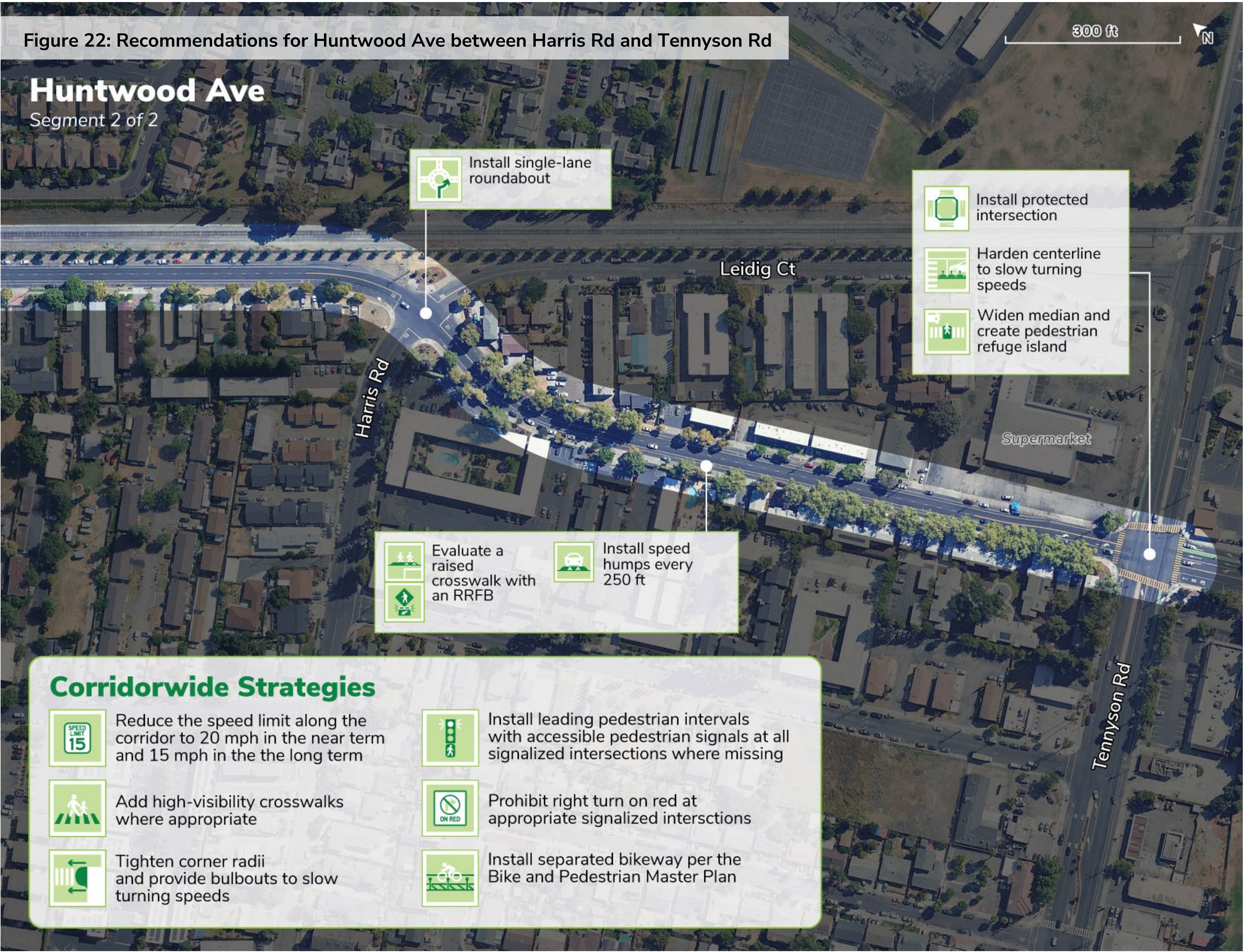
Figure 20: Recommendations for Industrial Blvd between Arf Ave and Baumberg Ave

Corridorwide Strategies

- Evaluate road diet
- Add high-visibility crosswalks where appropriate
- Tighten corner radii and provide bulbouts to slow turning speeds
- Install speed sensitive rest-in-red signals at all signalized intersections
- Install two-way separated bikeway on east side, switching to west side at Baumberg Ave
- Prohibit right turn on red at appropriate signalized intersctions
- Replace existing raised dome style lane markers with painted markings to increase visibility of lane markings

Figure 21: Recommendations for Huntwood Ave between Schafer Rd and Sierrawood Ave

Figure 22: Recommendations for Huntwood Ave between Harris Rd and Tennyson Rd



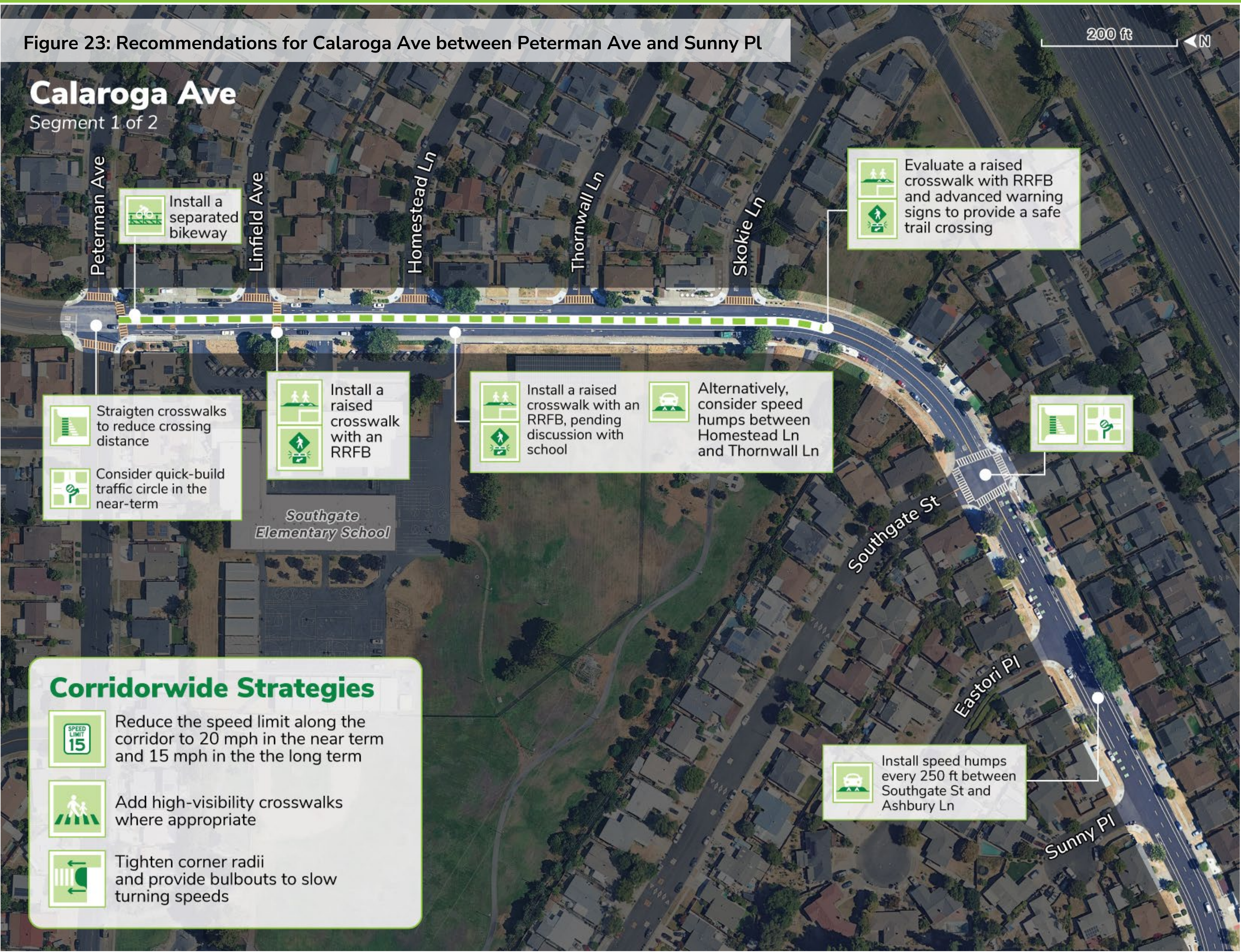


Figure 23: Recommendations for Calaroga Ave between Peterman Ave and Sunny Pl

Figure 24: Recommendations for Calaroga Ave between Sunny Pl and Tennyson Rd

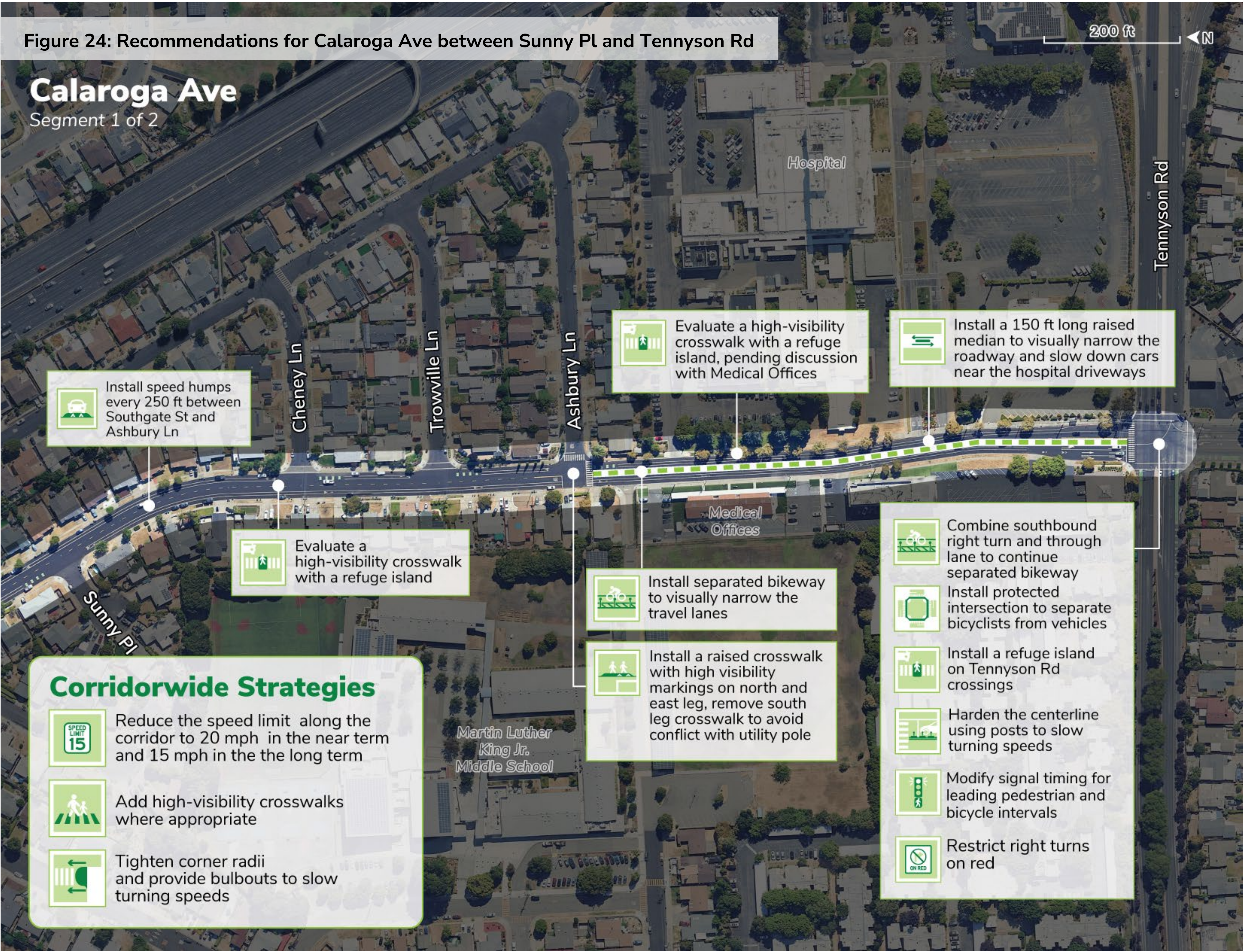


Figure 25: Recommendations for Santa Clara St between Winton Ave and Larchmont St

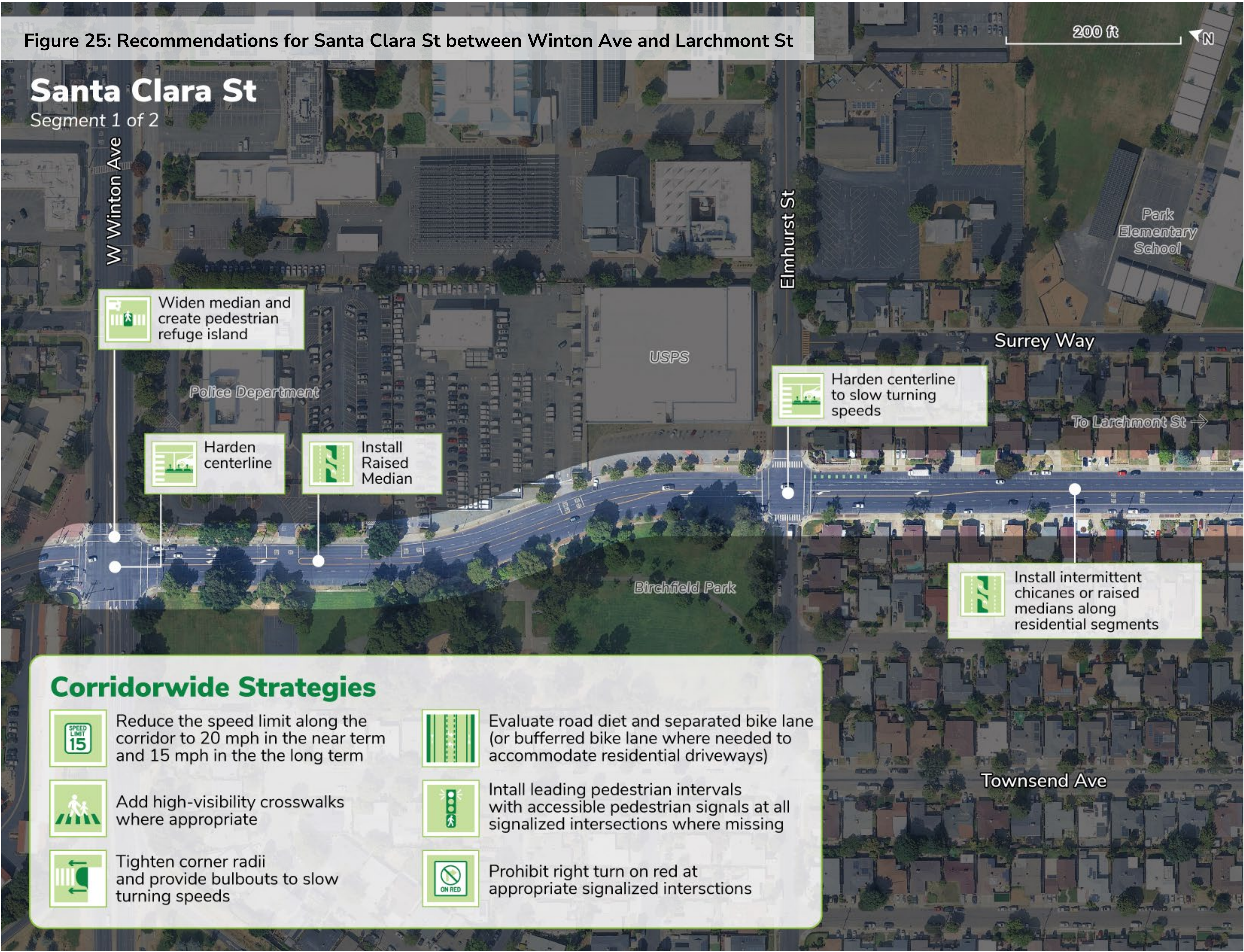
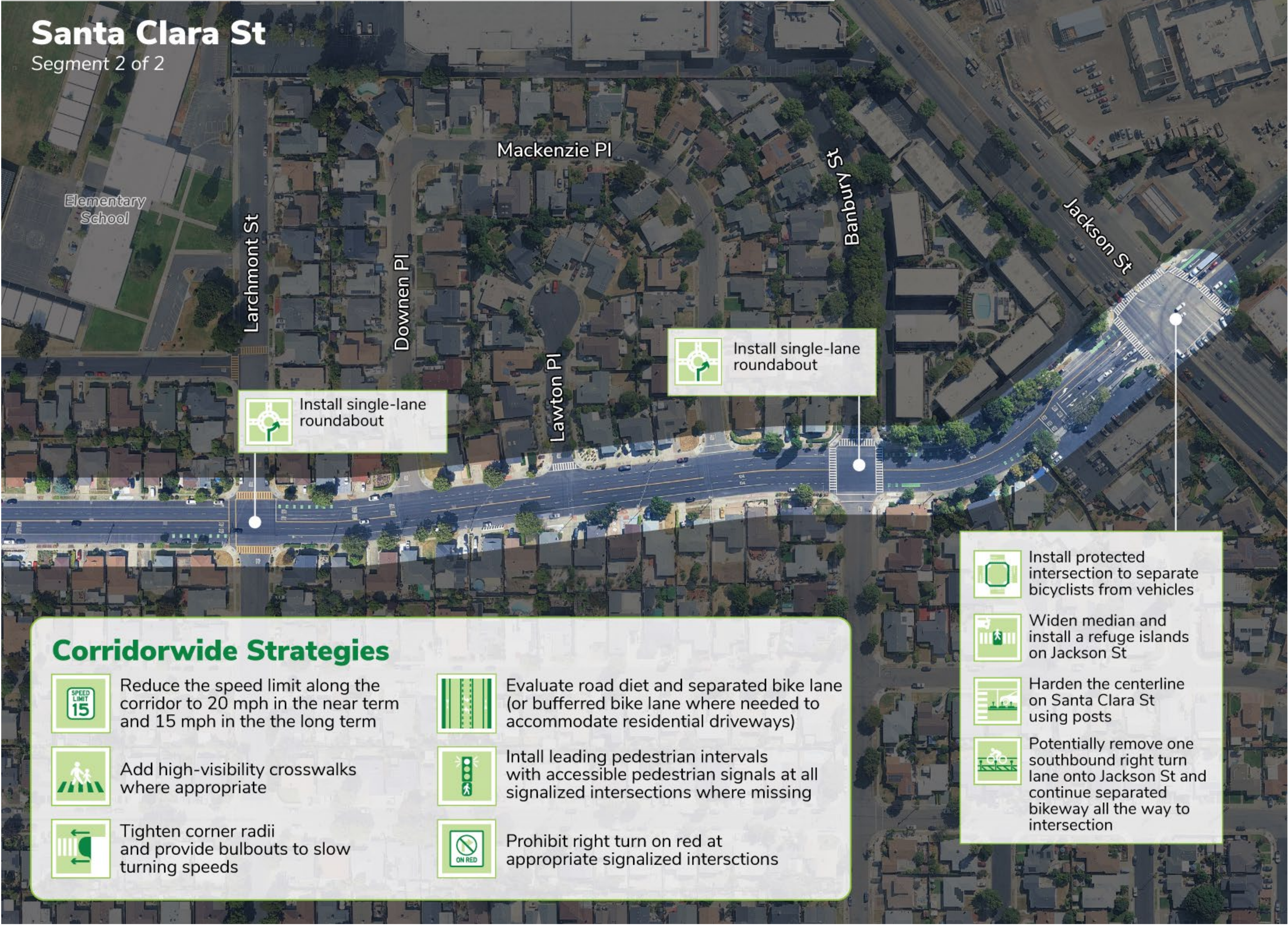


Figure 26: Recommendations for Santa Clara St between Larchmont St and Jackson St



CHAPTER 6

Institutionalizing Safe Speeds

This chapter outlines how speed management can be institutionalized in the City of Hayward. A benchmarking assessment of existing safety plans, policies, and programs was conducted to identify the state of current practice in Hayward as well as opportunities to institutionalize safe speeds.

6.1 Policy Review

Applying the Safe System approach, the following plans and programs were reviewed for alignment with industry best practices for speed management:

- Hayward Local Road Safety Plan (LRSP)
- Bicycle and Pedestrian Master Plan (BPMP)
- 2040 Hayward General Plan
- Safe Routes to School (SR2S) Program
- Safe Routes for Seniors (SR4S) Program
- Neighborhood Traffic Calming Program

Existing policies and programs were compared to benchmark safety policies to assess the level of implementation and institutionalization of speed management practices in Hayward. These benchmarks support the objectives of the Safe System approach, including Safety Planning and Culture, Safe Users, Safe Roadways, Safe Vehicles, Safe Speeds, and Post-Crash Care.

When compared to the state of the current practice, most benchmark approaches have been codified in a standard or policy adopted by the City, but the status of implementation remains unclear. With the adoption of the LRSP, the City has made significant progress toward institutionalizing several best practices, such as identifying causal factors for collisions, developing an implementation plan to achieve the Vision Zero goal, and prioritizing safety improvements that would have benefit vulnerable users such as children and seniors. Remaining opportunities are described in the next section.

6.2 Priority Actions for Speed Management

While the City has made advancements toward institutionalizing several best practices, the benchmarking assessment identified some gaps between current safety policies in Hayward and best practices for speed management. The priority actions in **Table 5** address these gaps and support safe speeds. The priority actions are organized into the following six categories:

1. Stakeholder Collaboration
2. Training & Education
3. Policies & Procedures
4. Enforcement
5. Evaluation & Prioritization
6. Monitoring

Each action is assigned to a lead department at the City for implementation. Some actions may require collaboration with other departments or stakeholders to ensure successful implementation of the action.

Table 5: Recommended Speed Management Actions

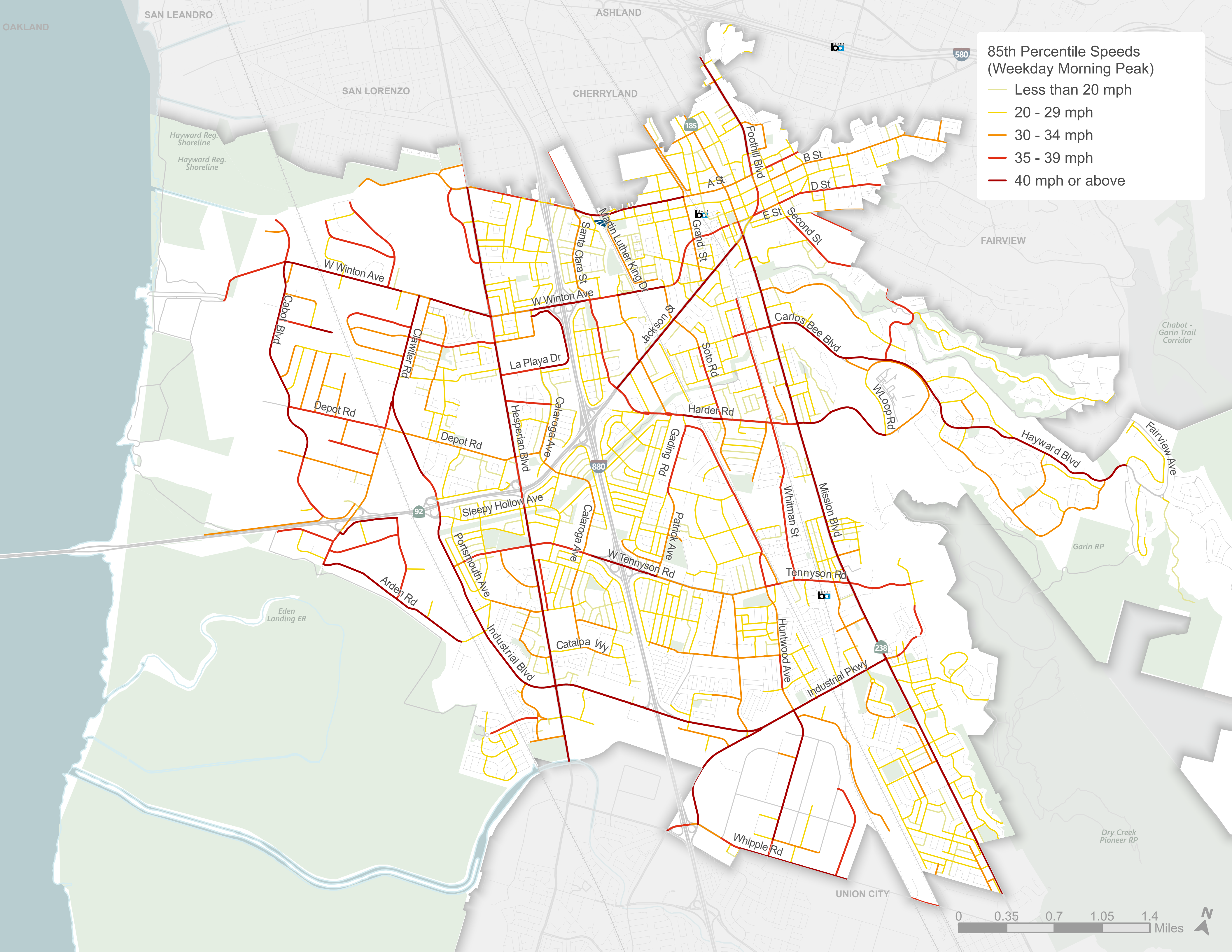
Action Category	Description	Lead Department
1. Stakeholder Collaboration		
Safety Task Force	Regularly convene a Safety Task Force of safety partners and stakeholders, including community groups, business organizations, emergency services, and school districts, to provide input on the implementation of the LRSP and SMP actions. The task force will consist of the same safety partners who have participated in stakeholder meetings for the SMP.	Public Works – Transportation Division
2. Training & Education		
Safe System Trainings	Provide annual Safe System training to City of Hayward staff, directors, and elected officials, focused on best practices for speed management and roadway design and the role of speed in fatal and severe injury collisions.	Public Works – Transportation Division
Safety Demonstration Projects	Use temporary pop-ups and project demonstrations to build support among stakeholders and the public for safety improvements and solicit feedback to further improve project design.	Public Works – Transportation Division
Traffic Collision Reports	Provide training to police officers on how to complete the field for race/ethnicity on traffic collision reports (Form 555) to ensure it is completed consistently and accurately in order to track the equity impacts of speed enforcement.	Police Department
3. Policies & Procedures		
By-Right Safety Projects	Determine which types of projects the City will implement given certain conditions to systematically implement speed management through operations and maintenance efforts (e.g., repaving).	Public Works – Transportation Division
Update Standard Details	Review and update the City of Hayward's Standard Details to ensure that standard designs and diagrams are aligned with Safe System design.	Public Works – Engineering Division

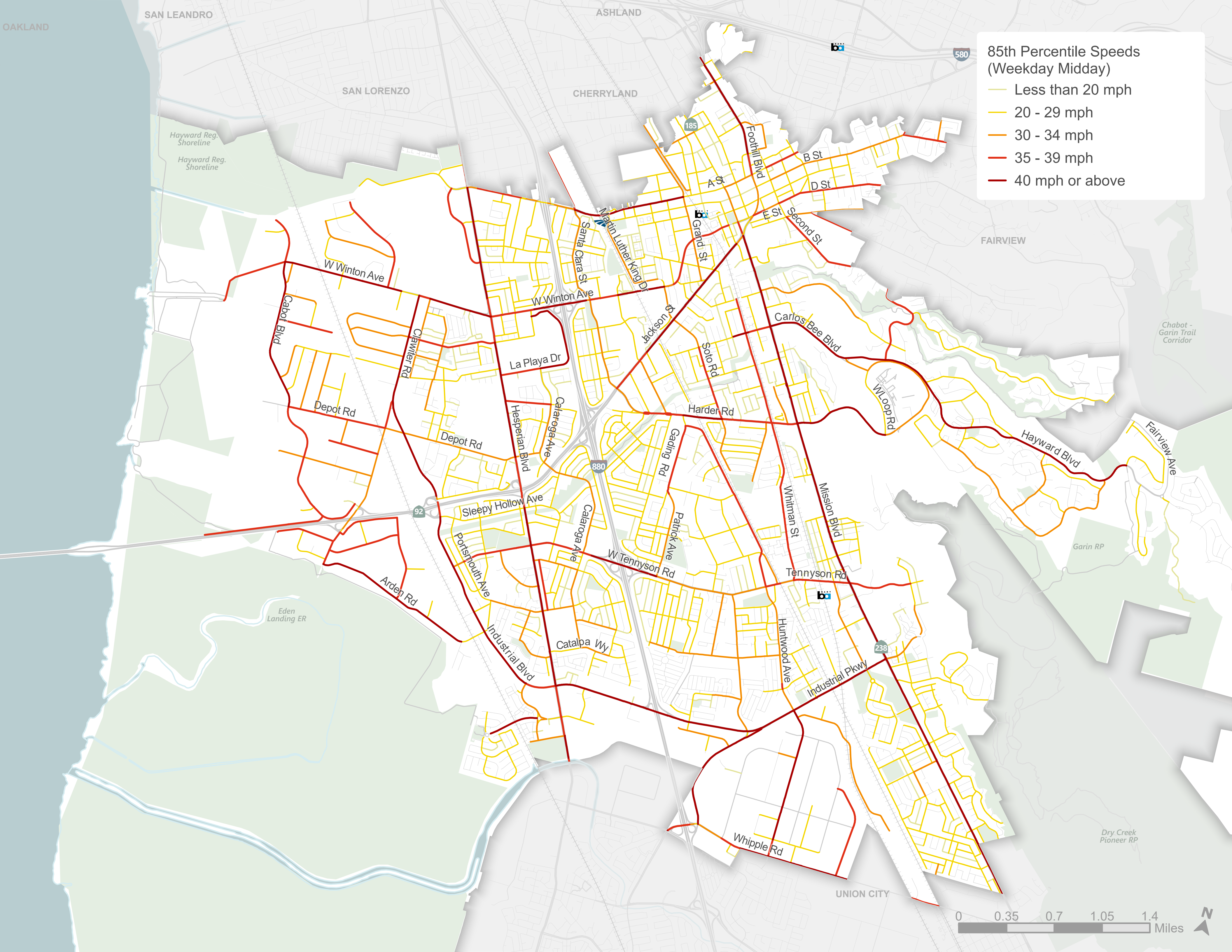
Action Category	Description	Lead Department
Objective Design Standards	Develop Objective Design Standards (ODS) for new developments to guide safety impact assessments and identify opportunities to incorporate speed management and Safe System design. As conditions of approval, the ODS must be met for the project to be approved.	Public Works – Transportation Division
Update City's General Plan	Remove Level of Service (LOS) standards from the requirements for all Transportation Impact Analysis (TIAs) and replace it with another measure of exposure, such as vehicle miles traveled (VMT). This would expand the City's previous General Plan amendment that removed LOS under CEQA.	Public Works – Transportation Division
Context-Specific Speed Limits	Use Assembly Bill 43, which allows flexibility in determining speed limits, to set speed limits that are based on the land use context, roadway characteristics, modal priorities, and presence of vulnerable road users.	Public Works – Transportation Division
Safety-Optimized Signal Timing	Use signal timing and phasing strategies to slow vehicle speeds and improve safety outcomes, particularly during off-peak time periods.	Public Works – Transportation Division
Update City Vehicle Procurement	Update the Fire Department's fleet procurement policies to ensure that new vehicles purchased by departments include safety features and are compatible with Safe System design.	City Manager
4. Enforcement		
Safe System-Aligned Enforcement	Target enforcement efforts on locations most linked to speeding and fatal and severe injury collisions.	Police Department
Automated Speed Cameras	Deploy speed safety cameras in Hayward once permitted by state legislation, particularly at locations with high rates of speeding and fatal and severe injury collisions.	Public Works – Transportation Division
Red Light Cameras	Deploy red light running cameras, particularly at locations with high rates of red light running and illegal right turns.	Public Works – Transportation Division

Action Category	Description	Lead Department
5. Evaluation & Prioritization		
Speed Reduction Corridors Prioritization	Prioritize the Speed Reduction Corridors for future funding, including grant funding applications.	Public Works – Transportation Division
Safe System Project Evaluation Framework	Develop a project evaluation framework for projects on the CIP list, that highlights opportunities to strengthen speed management design.	Public Works – Transportation Division
6. Monitoring		
Speed & Collision Data Collection & Reporting	Continue to use big data (e.g. StreetLight speed data, near-miss data) to track network-wide speed changes and collisions and develop a monitoring process to evaluate progress on key safety performance indicators, including reduction in speeds and fatal and severe injury collisions, on an annual basis.	Public Works – Transportation Division
Collision Investigation & Monitoring	Partner with emergency services to monitor the locations, frequency, and severity of collisions to evaluate progress, the effectiveness of speed management projects, and inform future project design.	Public Works – Transportation Division & Emergency Services

Appendix A:

Observed Speeds by Time Period


85th Percentile Speeds (Weekday Morning Peak)
Less than 20 mph
20 - 29 mph
30 - 34 mph
35 - 39 mph
40 mph or above
OAKLAND
SAN LEANDRO
ASHLAND
SAN LORENZO
CHERRYLAND
FAIRVIEW
UNION CITY
Hayward Reg. Shoreline
Eden Landing ER
Chabot - Garin Trail Corridor
Garin RP
Dry Creek Pioneer RP
W Winton Ave
Cabot Blvd
Clawiter Rd
Depot Rd
La Playa Dr
Hesperian Blvd
Calaroga Ave
Santa Clara St
Martin Luther King Dr
Grand St
Foothill Blvd
A St
B St
D St
E St
Second St
Jackson St
Soto Rd
Carlos Bee Blvd
W Loop Rd
Harder Rd
Hayward Blvd
Fairview Ave
Gading Rd
Sleepy Hollow Ave
Portsmouth Ave
Arden Rd
Patrick Ave
Whitman St
Mission Blvd
W Tennyson Rd
Tennyson Rd
Catalpa Wy
Industrial Blvd
Huntwood Ave
Industrial Pkwy
Whipple Rd
580
185
880
92
238
0
0.35
0.7
1.05
1.4
Miles
N


85th Percentile Speeds (Weekday Midday)
Less than 20 mph
20 - 29 mph
30 - 34 mph
35 - 39 mph
40 mph or above
OAKLAND
SAN LEANDRO
ASHLAND
SAN LORENZO
CHERRYLAND
FAIRVIEW
UNION CITY
Hayward Reg. Shoreline
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Garin RP
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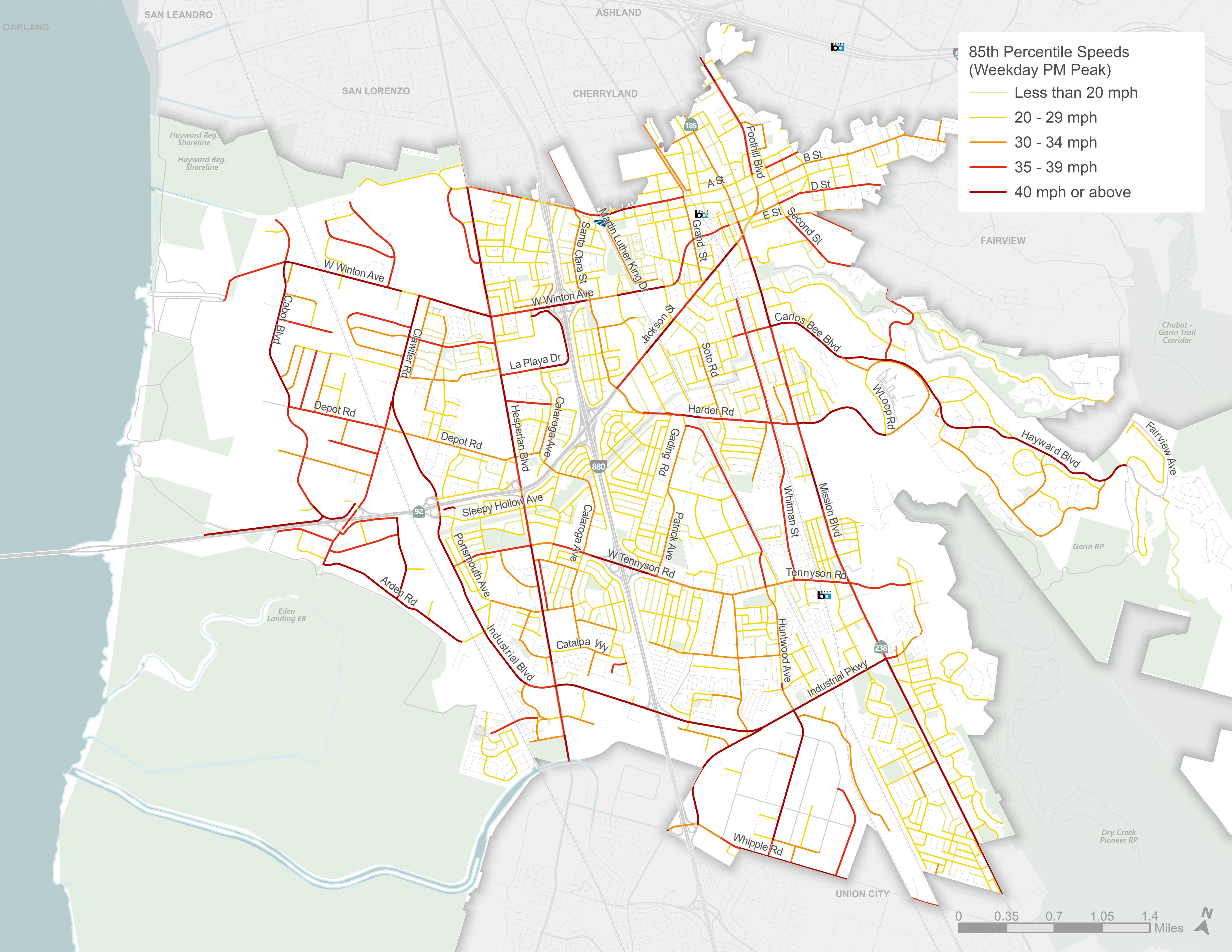
W Winton Ave
Cabot Blvd
Clawiter Rd
La Playa Dr
Depot Rd
Hesperian Blvd
Calaroga Ave
Sleepy Hollow Ave
Portsmouth Ave
Arden Rd
Industrial Blvd
Catalpa Wy
W Tennyson Rd
Tennyson Rd
Santa Clara St
Martin Luther King Dr
Grand St
Jackson St
Soto Rd
Harder Rd
Gading Rd
Patrick Ave
Whitman St
Mission Blvd
Huntwood Ave
Industrial Pkwy
Whipple Rd
Foothill Blvd
A St
B St
D St
E St
Second St
Carlos Bee Blvd
W Loop Rd
Hayward Blvd
Fairview Ave
0 0.35 0.7 1.05 1.4 Miles
N


85th Percentile Speeds
(Weekday PM Peak)
Less than 20 mph
20 - 29 mph
30 - 34 mph
35 - 39 mph
40 mph or above
OAKLAND
SAN LEANDRO
ASHLAND
SAN LORENZO
CHERRYLAND
FAIRVIEW
UNION CITY
Hayward Reg. Shoreline
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Garin RP
Chabot - Garin Trail Corridor
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W Winton Ave
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D St
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Second St
Jackson St
Carlos Bee Blvd
Soto Rd
Harder Rd
W Loop Rd
Hayward Blvd
Fairview Ave
Gading Rd
Patrick Ave
Whitman St
Mission Blvd
W Tennyson Rd
Tennyson Rd
Portsmouth Ave
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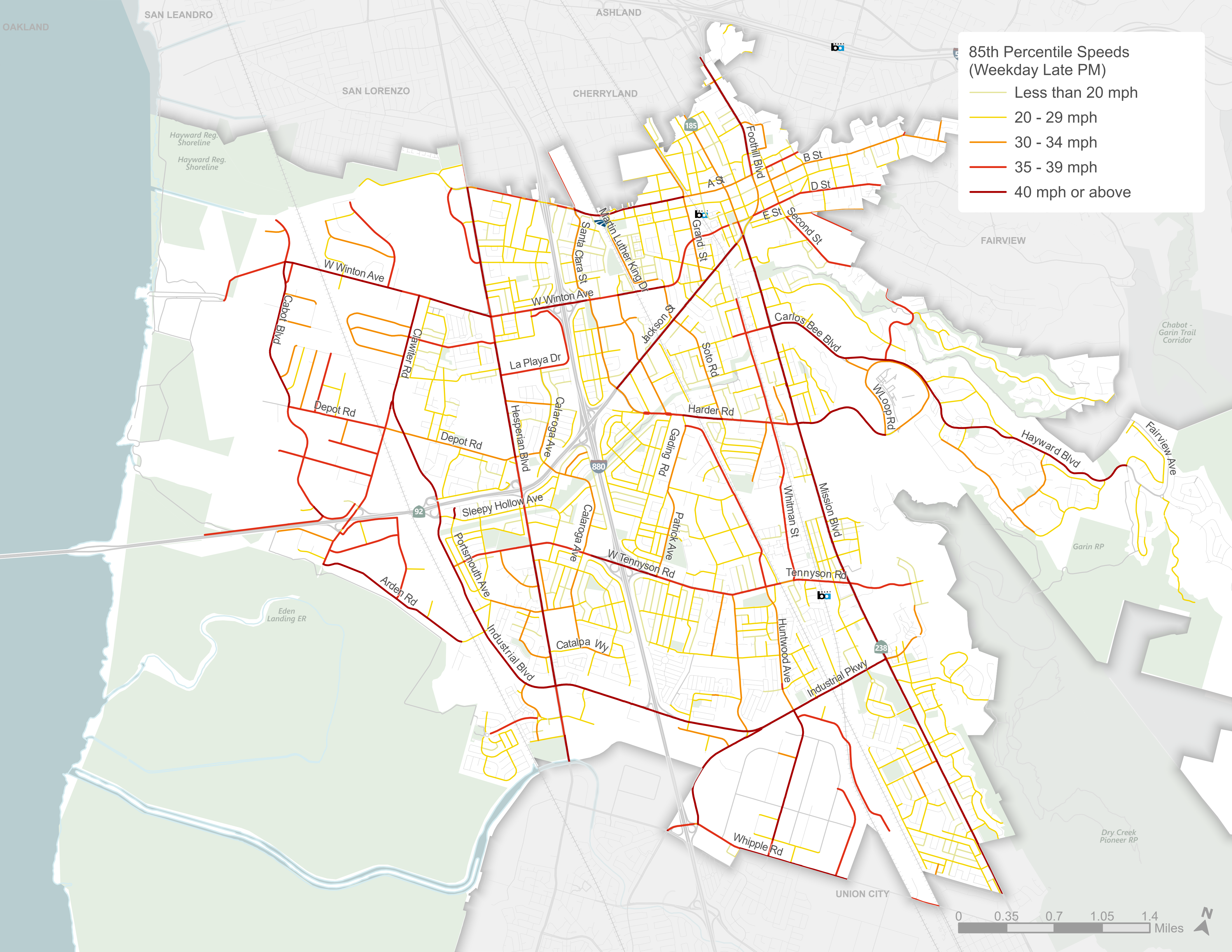
Miles
N



85th Percentile Speeds (Weekday Late PM)
Less than 20 mph
20 - 29 mph
30 - 34 mph
35 - 39 mph
40 mph or above
OAKLAND
SAN LEANDRO
ASHLAND
SAN LORENZO
CHERRYLAND
FAIRVIEW
UNION CITY
Hayward Reg. Shoreline
Eden Landing ER
Garin RP
Chabot - Garin Trail Corridor
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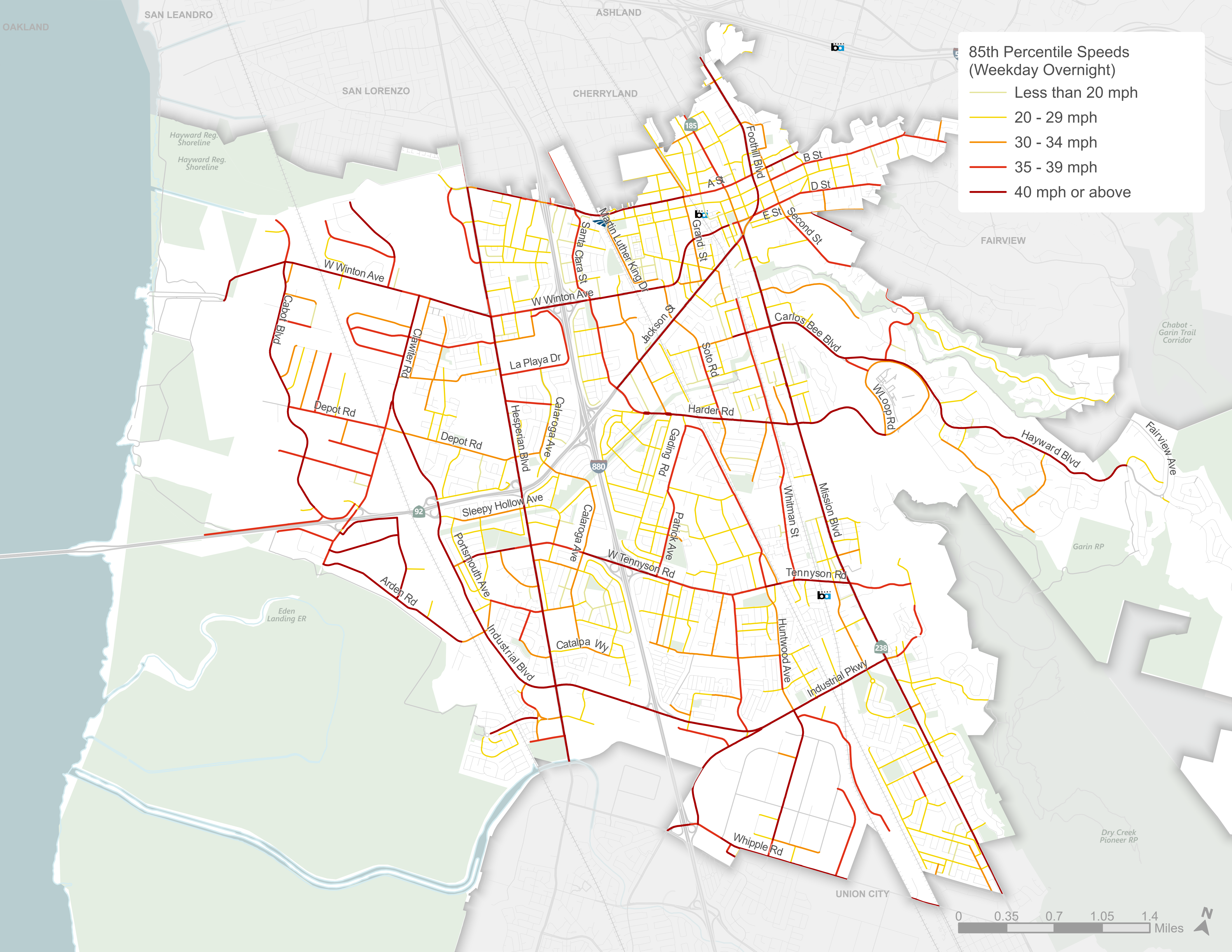
W Winton Ave
Cabot Blvd
Clawiter Rd
La Playa Dr
Depot Rd
Hesperian Blvd
Calaroga Ave
Santa Clara St
Martin Luther King Dr
Grand St
Foothill Blvd
A St
B St
D St
E St
Second St
Jackson St
Soto Rd
Carlos Bee Blvd
W Loop Rd
Harder Rd
Hayward Blvd
Fairview Ave
Gading Rd
Patrick Ave
Whitman St
Mission Blvd
Sleepy Hollow Ave
Portsmouth Ave
Arden Rd
W Tennyson Rd
Tennyson Rd
Industrial Blvd
Catalpa Wy
Huntwood Ave
Industrial Pkwy
Whipple Rd
0 0.35 0.7 1.05 1.4 Miles
N


85th Percentile Speeds
(Weekday Overnight)
Less than 20 mph
20 - 29 mph
30 - 34 mph
35 - 39 mph
40 mph or above
OAKLAND
SAN LEANDRO
ASHLAND
SAN LORENZO
CHERRYLAND
FAIRVIEW
UNION CITY
Hayward Reg. Shoreline
Hayward Reg. Shoreline
Eden Landing ER
Chabot - Garin Trail Corridor
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Dry Creek Pioneer RP
W Winton Ave
W Winton Ave
Cabot Blvd
Clawiter Rd
La Playa Dr
Depot Rd
Depot Rd
Hesperian Blvd
Calaroga Ave
Calaroga Ave
Sleepy Hollow Ave
Portsmouth Ave
Arden Rd
Industrial Blvd
Catalpa Wy
W Tennyson Rd
Tennyson Rd
Patrick Ave
Gading Rd
Harder Rd
Soto Rd
Jackson St
Santa Clara St
Martin Luther King Dr
Grand St
Foothill Blvd
A St
B St
D St
E St
Second St
Carlos Bee Blvd
W Loop Rd
Hayward Blvd
Fairview Ave
Whitman St
Mission Blvd
Huntwood Ave
Industrial Pkwy
Whipple Rd
185
880
92
238
0
0.35
0.7
1.05
1.4
Miles
N

APPENDIX B:

Detailed Speed Reduction Toolbox

Fehr & Peers

Memo

Date: July 2, 2025

To: Byron Tang and Lucas Woodward, City of Hayward

From: Manvi Nigam and Erin Ferguson, Fehr & Peers

Subject: Hayward Speed Management Plan: Countermeasures

The City of Hayward is developing a Speed Management Plan (SMP) to improve traffic safety outcomes on city streets. The SMP identifies targets speeds for each street in the city. The target speeds represent the desired vehicle speed based on existing and planned land uses as well as that street's role in the street network. Target speeds may be different than the current speed limit. Over time, the city will implement countermeasures to reduce prevailing vehicle speeds to align with the target speeds. As countermeasures are implemented and prevailing speeds reduced, the city will be able to update speed limits to bring them closer into alignment with the target speeds.

This memorandum presents countermeasures the city can use to help reduce vehicle speeds closer to target speeds. The countermeasures are organized into two locational categories: (1) at or through intersections; and (2) along street segments. A combination of these countermeasures will need to be implemented along any given corridor (i.e., series of segments and intersections) to experience consistent speed reduction benefits. Some of the countermeasures noted below are also effective at providing other safety benefits.

Accompanying this memorandum is a spreadsheet that provides greater detail on each countermeasure, including a description and the types of streets where it may be most relevant to apply.

Intersection Speed Management

Managing speed on the approach to an intersection, as well as managing vehicle speeds either traveling through or turning at an intersection, are critical for improved safety outcomes. Intersections are where most multimodal paths of travel cross at angles that increase the likelihood of a severe collision. Managing vehicle speeds by requiring vehicles to stop before turning or proceeding, to turn at lower rates of speeds, and/or progress through an intersection at a slower speed all provide substantive safety benefits. In the context of a corridor, slowing vehicles at intersections also makes it easier to manage vehicle speeds between intersections on the street segments. **Table 1** summarizes intersection countermeasures that help slow vehicle speeds.

Table 1. Intersection Countermeasures that Help Slow Vehicle Speeds

Countermeasure	Considerations
Intersection Control	
Roundabouts	Provides speed management as well as remove severe conflicts. Suitable for a variety of location types.
Neighborhood Traffic Circles	Provides speed management as well as remove severe conflicts. Suitable for Place Streets and Neighborhood Streets.
All-Way Stop Control Intersections	Need to be implemented in a manner consistent with CA MUTCD. If there are concerns about compliance, could be paired with raised crosswalks or central island (see neighborhood traffic circle).
Traffic Signals with Slow Green Wave Progression	New signals need to be implemented in a manner consistent with CA MUTCD. Appropriately spaced signals along a corridor can create opportunities to manage vehicle speeds through signal progression. Signals can be coordinated to progress vehicles at speeds aligned with target speeds regardless of existing speed limits.
Traffic Signal Operations	
Protected Left-Turn Phasing	Requires left-turning vehicles to stop and wait for assigned time to make left-turn movement. This creates slower turning speeds as well as improves management of severe conflicts.
Prohibit Right-Turn on Red	Requires right-turning vehicles to stop and wait for assigned time to make right-turn movement. This creates slower turning speeds and improves management of conflicts.
Rest in Red	In low volume periods of the day, requires approaching vehicles to slow and/or stop to wait for the signal to change.
Flashing Red	In low volume periods of the day, approaching vehicles are required to stop and treat the signal as an all-way stop controlled intersection. This is sometimes an easier to implement alternative to Rest in Red operations because Flashing Red does not require detection.
Leading Pedestrian Interval and Pedestrian Recall	Slows vehicle turning speeds and facilitates improved yielding behavior by motorists to people crossing in the crosswalk.
Separate Pedestrian and/or Bicycle Crossing Phases	Slows vehicle turning speeds at the intersection. Vehicles are required to wait for their unique green time.
Red Light Running Cameras	Discourages motorists approaching an intersection from attempting to accelerate through an intersection where the signal is in the yellow or red phase.
Shorter Cycle Length	Shorter cycle lengths for signals reduce the amount of continuous green time an intersection approach receives which, when used in combination with the Slow Green Wave Progression noted above, can help manage vehicle speeds.
Geometric Features at Intersections	
Protected Intersection	Provides separate space for people biking and walking through the intersection. Includes tightening curb radii for vehicles which slows vehicles turning. Also tends to reduce the space available for motorists, which creates general speed reduction.

Countermeasure	Considerations
Curb Extensions or Tighter Curb Radii	These require vehicles to turn at slower speeds.
Eliminating or Closing Slip Lanes for Turning Vehicles	Slip lanes or channelized right turn lanes often make it easier for vehicles to make the right-turn movement at a higher speed. Removing channelized turn lanes or "slip lanes", particularly those that are uncontrolled or yield controlled slows vehicle speeds.
Raised Crosswalks	These require vehicles to slow at the approach to and through the intersection. Suitable for streets with target speeds of 25mph or slower.
Raised Intersection	Raises the entire intersection for all approaches to it. Requires vehicles to slow at the approach to and through the intersection. Suitable for streets with target speeds of 25mph or slower.
Diverters	Prevents specific movements at an intersection. Can be implemented using raised concrete medians or with durable temporary materials. Helpful for managing speeds on streets designated as bike boulevards or bike routes. Useful to prevent continuous vehicle through movements on a Place Street or Neighborhood Street. Materials used can be designed to allow for emergency vehicle access, while general vehicle access is prevented.
Raised Median or Splitter Island	Visually and/or physically narrows the space provided for vehicles on approach to an intersection and as a result helps to slow vehicle speeds.
Floating Transit Island or Bus Boarding Island	Provides a raised median for people to wait for as well as board/de-board transit or buses. Allows for a bicycle facility to pass between the island and the sidewalk area to avoid bus-bike conflicts. The physical presence of the island as well as buses stopping in the vehicle lane to board and de-board passengers slows vehicle speeds.
Pavement Markings at or on Approach to Intersections	
Centerline Hardening	Uses materials to reinforce the presence of the centerline. When implemented at an intersection reinforces a turning vehicle's need to slow and complete a turn closer to 90-degrees.
High Visibility Crosswalks with Advanced Yield Line or Stop Line	Visual reminder and reinforcement of intersections and/or crossing where motorists may need to stop or yield. Can help manage vehicle speeds along with other intersection treatments noted (e.g., raised pedestrian refuge islands).
Painted Optical Speed Bars	Transverse pavement markings that can be used to help slow vehicle speeds on approach to an intersection.

Source: Fehr & Peers.

Street Segments Speed Management

Managing speeds on street segments is often the immediate condition people think about when considering how to intervene to slow vehicle speeds. Higher vehicle speeds on street segments make it difficult, uncomfortable, and higher risk for people, traveling by any mode, to cross the street.

Higher vehicle speeds along the street also create a loud and unappealing environment for people living along those streets as well as for walking, biking, and accessing transit along those streets. **Table 2** summarizes countermeasures that help slow vehicle speeds along street segments.

Table 2. Street Segments Countermeasures that Help Slow Vehicle Speeds

Countermeasure	Considerations
Physically or Visually Narrowing Vehicle Traveled Way	
Road Diet	Removing vehicle through lanes helps to slow vehicle speeds by reducing the amount of space allocated to vehicles along a roadway.
Vehicle Lane Narrowing	Marking vehicle lanes at a narrow width can help slow vehicle speeds by visually narrowing the space motorists are given.
Separated Bikeway	When implemented in combination of either a road diet and/or vehicle lane narrowing, both physically and visually narrows the space for vehicles and can help slow vehicle speeds.
Buffered Bike Lanes and Door Zone Markings	When implemented in combination of either a road diet and/or vehicle lane narrowing, buffered bike lanes and/or door zone markings can help slow vehicle speeds by further reinforcing the narrower space provided to motorists.
Centerline and Edgeline Markings	Adding centerline or edgeline markings to a street that is perceived as wide and unmarked, can help to visually narrow the space available to motorists and slow vehicle speeds.
Centerline Hardening	Use materials to reinforce the presence of the centerline. When implemented with vertical elements such as flex posts, visually narrows the vehicle lane and helps to slow vehicle speeds. Humans judge speed based on what they see or perceive in their peripheral version. Closely spaced vertical elements in the peripheral vision helps slow motorists' speeds.
Landscaping Buffer	Landscaping, particularly landscaping with vertical elements such as trees, placed between the back of curb and sidewalk, helps slow motorists' speed by increasing the frequency of vertical elements in their peripheral vision and making the street itself seem narrower.
Chicane or Horizontal Deflection	Creating horizontal deflections using curbs, landscaping, pavement markings, on-street parking, etc. forces vehicles to slow and maneuver around the chicane or horizontal deflection.
Raised Median and/or Refuge Island	These physically and visually narrow the travel lane and help slow down vehicles.
Back-in Angled Parking	When implemented in combination of either a road diet and/or vehicle lane narrowing, back-in angled parking both physically and visually narrows the space for vehicles and help slow vehicle speeds. Also increases the visibility of passing vehicles and bicycles while exiting a spot, reducing the likelihood conflict.
Other Treatments (Humps, Pavement Markings, Signs, and Beacons)	
Speed Hump or Speed Table	These provide vertical deflection, thereby encouraging vehicles to slow down. Suitable for Place and Neighborhood Streets where target speeds are 25 mph or slower.

Countermeasure	Considerations
Speed Feedback Sign	By notifying drivers of their speed as well as the posted speed limit, these provide a reminder to slow down and obey the speed limit.
Pedestrian Hybrid Beacons	Slows vehicle speeds and improves motorists' yielding behavior on multilane streets with midblock marked pedestrian crossings. More effective when paired with other countermeasures such as raised pedestrian refuge islands.
Rectangular Rapid Flashing Beacon	Slows vehicle speeds and improves motorists' yield behavior. More effective when implemented with road diets, raised pedestrian refuge islands, and other similar supporting treatments.
High Visibility Crosswalks with Advanced Yield or Stop Markings and Warning Signs	Visual reminder and reinforcement of crossings where motorists may need to stop or yield. Can help manage vehicle speeds along with other intersection treatments noted (e.g., raised pedestrian refuge islands, rectangular rapid flashing beacons).
Transverse Rumble Strips	Transverse rumble strips can be used to help slow vehicle speeds on approach to a horizontal curve to alert drivers to the need to slow down.
Painted Optical Speed Bars	Transverse pavement markings that can be used to help slow vehicle speeds on approach to a horizontal curve.
Chevron Signs on Horizontal Curves	Warning signs to advise motorists to slow their speeds on approach to tighter curves.
Ordinance or Enforcement Related	
Speed Limit Reduction	Lowering the posted speed limits has been found to lower average vehicle speeds.
Speed Safety Cameras[1]	Automating enforcement of posted speed limits helps improve compliance.
In-Person Enforcement[2]	Issuing tickets to drivers exceeding the speed limit can help improve compliance.

Notes:

1. Installing Speed Safety Cameras is currently not legal in Hayward, CA. California state legislation would need to change to allow for speed safety cameras to be used more broadly.
2. Lack of availability of officers can be a limitation to effective implementation.

Source: Fehr & Peers.

Countermeasure	Category	Description	Connector (High Movement - Low Place)	Core (High Movement - High Place)	Place (Low Movement - High Place)	Neighborhood (Low Movement - Low Place)	Pyramid Tier	CRF (if available)
All-Way Stop Control	Intersections & Roadways	An all-way stop-controlled intersection requires all vehicles to stop before crossing the intersection. An all-way stop-controlled intersection reduces the risk of severe conflicts as long as all road users see and obey the stop signs. The MUTCD (Manual on Uniform Traffic Control Devices) includes information on when and how to implement "All Way" Or "Multi-Way" stop control intersections.			Y	Y	2 - Latent Safety Measure	70%
Back-In Angled Parking	Other	Back-In Angled Parking requires motorists to back into an angled on-street parking spot and to drive forward when exiting a parking spot. Back-in angled parking increases the visibility of passing vehicles and bicycles while exiting a spot, particularly if large adjacent vehicles obstruct sight, and allows trunk unloading to happen on the curb instead of in the street.		Y	Y	Y	1 - Built Environment	
Buffered Bike Lane	Bikeways	Buffered Bike Lanes are standard bike lanes paired with a designated horizontal buffer space, separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane. This type of bikeway provides greater distance between vehicles and bicycles; provides space for bicyclists to pass each other; provides greater space for bicycling without making the bike lane appear so wide that it might be mistaken for a travel lane; and encourages bicycling by contributing to the perception of safety.	Y	Y	Y		1 - Built Environment	56%
Centerline and edge line pavement markings	Signing & Striping	Edge line pavement markings and painted center median can be used to reduce lane widths and/or reduce visual perception of the width of lane.	Y	Y	Y	Y	1 - Built Environment	
Centerline Hardening	Intersections & Roadways	Centerline hardening involves placing durable plastic bollards, flex posts, and/or rubber curbs along the centerline. When used at intersections, they can be effective at requiring motorists to make left-turn movements at a 90-degree angle, thereby slowing vehicle speeds and improving motorists' visibility of the crosswalks across which they travel when turning. When used along a roadway segment, they can be effective at generally slowing vehicle speeds and preventing undesirable left-turning and/or U-turns between intersections.		Y	Y		1 - Built Environment	
Chevron Signs on Horizontal Curves	Signing & Striping	Post-mounted chevrons are intended to warn drivers of an approaching curve and provide tracking information and guidance to the drivers.	Y			Y	3 - Active Measure	40%
Chicane or Horizontal deflection	Intersections & Roadways	Chicanes incorporate the use of pavement markings, planting strips, on-street parking, etc., to create a sequence of horizontal curves (i.e., horizontal deflections) intended to slow vehicles.			Y	Y	1 - Built Environment	

Countermeasure	Category	Description	Connector (High Movement - Low Place)	Core (High Movement - High Place)	Place (Low Movement - High Place)	Neighborhood (Low Movement - Low Place)	Pyramid Tier	CRF (if available)
Close Slip Lane	Intersections & Roadways	Modifies the corner of an intersection to remove the sweeping right turn lane for vehicles. Results in shorter crossings for pedestrians, reduced speed for turning vehicles, better sight lines, and space for landscaping and other amenities.	Y	Y	Y		1 - Built Environment	44%
Curb Extensions	Pedestrian Facilities	A curb extension is a traffic calming measure that widens the sidewalk for a short distance to enhance the pedestrian crossing. This reduces the crossing distance and allows pedestrians and drivers to see each other when parked vehicles would otherwise block visibility. Paint and plastic curb extensions are a low-cost/quick-build option.	Y	Y	Y	Y	1 - Built Environment	37%
Diverter	Intersections & Roadways	A traffic diverter breaks up the street grid while maintaining permeability for pedestrians and bicyclists.			Y	Y	1 - Built Environment	
Door Zone Markings	Bikeways	Pavement markings denoting door zone of parked vehicles to raise awareness of bicyclists and motorists of that conflict area where an open car door could obstruct the path of a passing bicyclist.	Y	Y	Y	Y	1 - Built Environment	
Fixed Time Operation, Minimum Recall, Maximum Recall and Ped Recall	Signals	Other traffic signal programming features can have the effect of reducing vehicle speeds, by inhibiting green phases that are longer than necessary to serve traffic. For example, “early return to green” on the main street occurs when a cross-street phase is not actuated and not served; but by instead setting the cross street phase to Ped Recall, Min Recall, or Max Recall, the early green on the main street will be eliminated or reduced.	Y	Y	Y		2 - Latent Safety Measure	
Flashing Red	Signals	In low volume periods of the day, signals can be set to operate in flashing red on all approaches. This requires motorists to treat the signal as an allway stop. This strategy is simpler to implement than Red Rest, because it does not rely on vehicle detection.	Y	Y	Y		2 - Latent Safety Measure	
Floating Transit Island or Bus Boarding Island	Bikeways	Transit boarding island that is designed to allow bicycles to pass between the sidewalk and island thereby avoiding a bus-bike conflict when the bus stops at the boarding island. Can be used in combination with a bike lane, bufferred bike lane, or separated bike lane. The treatment can also reduce vehicle speeds as the island itself visually narrows the roadway and can have a traffic calming effect.	Y	Y	Y	Y	1 - Built Environment	
High-Visibility Crosswalk	Pedestrian Facilities	A high-visibility crosswalk has a striped pattern with ladder markings made of high-visibility material, such as thermoplastic tape, instead of paint. A high-visibility crosswalk improves the visibility of marked crosswalks and provides motorists a cue to slow down and yield to pedestrians.	Y	Y	Y	Y	1 - Built Environment	40%
High Visibility Crosswalks with Advanced Yield or Stop Markings and Warning Signs	Pedestrian Facilities	A pedestrian crossing at an intersection or on a segment provides a formalized location for people to cross the street, reducing the risk of people crossing outside crosswalks where drivers are not expecting them. Crosswalk striping, signs, and other enhanced features alert drivers that there may be a pedestrian crossing.		Y	Y	Y	1 - Built Environment	35%

Countermeasure	Category	Description	Connector (High Movement - Low Place)	Core (High Movement - High Place)	Place (Low Movement - High Place)	Neighborhood (Low Movement - Low Place)	Pyramid Tier	CRF (if available)
Intersection Reconstruction and Tightening	Intersections & Roadways	Intersections that intersect at a skewed angle or angle notably different than 90-degrees have a greater likelihood of collisions. Squaring up the intersection helps reduce the likelihood of collisions. "Squaring up" an intersection as close to 90 degrees as possible involves intersection reconstruction and approach realignment to provide better visibility for all road users, also reducing high speed turns, reducing length exposure for vehicles and/or bikes passing through the intersection, and reducing pedestrian crossing length.	Y	Y	Y	Y	1 - Built Environment	
Landscape Buffer	Pedestrian Facilities	Separating drivers from bicyclists and pedestrians using landscaping provides more space between the modes and can produce a traffic calming effect by encouraging drivers to drive at slower speeds, lowering the risk of crashing.	Y	Y	Y		1 - Built Environment	
Lane Narrowing	Intersections & Roadways	Lane narrowing reduces the width of the marked vehicle lanes to encourage motorists to travel at slower speeds. Lane narrowing can also help reallocate existing roadway space to other road users.	Y	Y	Y	Y	1 - Built Environment	
Leading Pedestrian Interval and Pedestrian Recall	Pedestrian Facilities	At intersection locations that have a high volume of turning vehicles and have high pedestrian vs. vehicle crashes, a leading pedestrian interval gives pedestrians the opportunity to enter an intersection 3 - 7 seconds before vehicles are given a green indication. With this head start, pedestrians can better establish their presence in the crosswalk before vehicles have priority to turn left or right. Pedestrian recall is a traffic signal timing function that causes a pedestrian walk phase to activate automatically every cycle.		Y	Y	Y	2 - Latent Safety Measure	10%
Neighborhood Traffic Circle	Intersections & Roadways	Neighborhood traffic circles are circular intersections similar to roundabouts, but are stop controlled on the approach and intended for smaller intersections. Typically, they supplement existing stop-controlled intersections with a circular island in the center that is designed to slow traffic and eliminates severe conflict points (such as conflicting left-turn movements).			Y	Y	1 - Built Environment	
Painted Optical Speed Bars	Signing & Striping	Optical Speed Bars are transverse pavement markings placed with progressively reduced spacing on both edges of the traveled way to create the perception of increased speed. This illusion encourages drivers to slow down as they pass by the markings.	Y	Y	Y	Y	2 - Latent Safety Measure	
Pedestrian Hybrid Beacon	Signals	A pedestrian-hybrid beacon (PHB) is used at unsignalized intersections or mid-block crosswalks to notify oncoming motorists to stop with a series of red and yellow lights. Unlike a traffic signal, the PHB rests in dark until a pedestrian activates it via pushbutton or other form of detection.		Y	Y		2 - Latent Safety Measure	12%
Prohibit Turns During Pedestrian Phase	Signals	Restricts left or right turns during the pedestrian crossing phase at locations where a turning vehicle may conflict with pedestrians in the crosswalk. This restriction may be displayed with a blank-out sign.	Y	Y	Y		2 - Latent Safety Measure	

Countermeasure	Category	Description	Connector (High Movement - Low Place)	Core (High Movement - High Place)	Place (Low Movement - High Place)	Neighborhood (Low Movement - Low Place)	Pyramid Tier	CRF (if available)
Protected Intersection	Intersections & Roadways	Protected intersections use corner islands, curb extensions, and colored paint to delineate bicycle and pedestrian movements across an intersection. Slower driving speeds and shorter crossing distance increase safety for pedestrians. Separates bicycles from pedestrians as well as moving vehicles.	Y	Y	Y		1 - Built Environment	
Raised Crosswalk	Intersections & Roadways	A Raised Crosswalk is a pedestrian crosswalk that is typically elevated 3-6 inches above the road or at sidewalk level. A Raised Crosswalk improves increases crosswalk and pedestrian visibility and slows down motorists.			Y	Y	1 - Built Environment	36%
Raised Intersection	Intersections & Roadways	Elevates the intersection to bring vehicles to the sidewalk level. Serves as a traffic calming measure by extending the sidewalk context across the road.			Y	Y	1 - Built Environment	
Raised Median	Intersections & Roadways	Curbed sections in the center of the roadway that are physically separated from vehicular traffic. Raised medians can also help control access to and from side streets and driveways, reducing conflict points.	Y	Y			1 - Built Environment	71%
Rectangular Rapid Flashing Beacon	Signals	A rectangular rapid flashing beacon (RRFB) is a pedestrian-activated flashing light with additional signage to alert motorists of a pedestrian crossing. An RRFB increases the visibility of marked crosswalks and provides motorists a cue to slow down and yield to pedestrians.		Y	Y		2 - Latent Safety Measure	47%
Red Light Camera	Other	A red light camera enforces traffic signal compliance by capturing the image of a vehicle that has entered an intersection in spite of the traffic signal indicating red. The automatic photographic evidence is used by authorities to enforce traffic laws and issue traffic violation tickets.	Y	Y	Y		3 - Active Measure	20%
Refuge Island	Intersections & Roadways	A Raised Median, or Refuge Island, is a raised barrier in the center of the roadway that can restrict certain turning movements and provide a place for pedestrians to wait if they are unable to finish crossing the intersection. A Raised Median reduces the number of potential conflict points with designated zones for vehicles to turn, and a pedestrian refuge island reduces the exposure for pedestrians crossing the intersection. Pedestrian refuge areas constructed from paint and plastic may be implemented as part of a low-cost/quick build project.	Y	Y	Y		1 - Built Environment	28%
Road Diet	Intersections & Roadways	A Road Diet reduces roadway space dedicated to vehicle travel lanes to create room for bicycle facilities, wider sidewalks, or center turn lanes. A Road Diet reduces vehicle speeds and creates designated space for all road users.	Y	Y	Y	Y	1 - Built Environment	47%

Countermeasure	Category	Description	Connector (High Movement - Low Place)	Core (High Movement - High Place)	Place (Low Movement - High Place)	Neighborhood (Low Movement - Low Place)	Pyramid Tier	CRF (if available)
Roundabout	Intersections & Roadways	A roundabout is a type of circular intersection in which road traffic is permitted to flow in one direction around a central island, and priority is typically given to traffic already in the junction. The types of conflicts that occur at roundabouts are different from those occurring at conventional intersections; namely, severe conflicts from crossing and left-turn movements are not present in a roundabout. The geometry of a roundabout forces drivers to reduce speeds as they proceed through the intersection; the range of vehicle speeds is also narrowed, reducing the severity of crashes when they do occur. Pedestrians also only have to cross one direction of traffic at a time at roundabouts, thus reducing exposure to vehicle traffic.	Y	Y	Y		1 - Built Environment	51%
Rumble Strips	Intersections & Roadways	Rumble strips create noise and vibration inside the vehicle that alert a driver as they cross the centerline or edge line. Treatment can help with lane keeping instances where a driver is distracted or drowsy. Rumble strips also alert drivers to the lane limits when conditions such as rain, fog, snow, or dust reduce driver visibility.	Y	Y			1 - Built Environment	53%
Separated Bikeway	Bikeways	A separated bikeway, also called a cycletrack, provides dedicated street space, typically adjacent to outer vehicle travel lanes, with physical separation from vehicle traffic, designated lane markings, pavement legends, and signage. Physical separation may consist of plastic posts, parked vehicles, raised median, or a curb (if the separated bike lane is raised to sidewalk level). Separated bikeways reduce conflicts between people biking and motorists. They also provide more physical protection that further reduces the risk of severe conflicts between bicycles and vehicles on the road. Separated bike lanes can also help manage or reduce vehicle speeds as some of the design features can have a traffic calming effect.	Y	Y	Y		1 - Built Environment	41%
Shorten Cycle Length	Signals	Traffic signal cycle lengths have a significant impact on the quality of the urban realm and consequently, the opportunities for bicyclists, pedestrians, and transit vehicles to operate effectively along a corridor. Long signal cycles, compounded over multiple intersections, can make crossing a street or walking even a short distance prohibitive and frustrating. Short cycle lengths of 60–90 seconds are ideal for urban areas.	Y	Y	Y		2 - Latent Safety Measure	
Signal Interconnectivity and Coordination / Green Wave	Signals	The emphasis on improving signal coordination for this countermeasure is to provide an opportunity for slow-speed signal coordination. Traffic signals along a corridor are frequently coordinated to favor the corridor's posted speed limit, e.g. 30 mph. Signals can instead be retimed to favor a lower progression speed, which not only serves to manage speed but also favors bicycle travel. Coordinating signals to allow for bicyclist progression, also known as a 'green wave,' gives bicyclists and pedestrians more time to cross through the 'green wave' intersections. Similarly, signals can be timed to the posted speed limit, but with "breaks" in the progression at bus stops, in order to favor bus movement by accounting for expected dwell time at bus stops.	Y	Y	Y		2 - Latent Safety Measure	15%

Countermeasure	Category	Description	Connector (High Movement - Low Place)	Core (High Movement - High Place)	Place (Low Movement - High Place)	Neighborhood (Low Movement - Low Place)	Pyramid Tier	CRF (if available)
Speed Feedback Sign	Signing & Striping	A speed feedback sign notifies drivers of their current speed, usually followed by a reminder of the posted speed limit. A speed feedback sign provides a cue for drivers to check their speed and slow down, if necessary.	Y	Y	Y		3 - Active Measure	10%
Speed Hump or Speed Table	Intersections & Roadways	These traffic calming devices use vertical deflection to raise the entire wheelbase of a vehicle and encourage motorists to travel at slower speeds.			Y	Y	1 - Built Environment	
Speed Legends on Pavement	Signing & Striping	Speed legends are numerals painted on the roadway indicating the current speed limit in miles per hour. They are usually placed near speed limit signposts.			Y	Y	3 - Active Measure	
Speed Limit Reduction	Other	As an industry, there is a consistent movement away from setting speed limits solely based on 85th percentile vehicle speeds. Roadway characteristics, adjacent land use context, as well as the risk higher speeds create for all road users are now considered. Where separate space is not available for vulnerable road users and/or severe conflicts (e.g., crossing or turning conflicts) are present between motorvehicles speeds of 25 mph are preferable to reduce the risk of severe collisions. Where separated space is provided for vulnerable road users and severe conflicts between vehicles are managed, speed limits above 25 mph can be considered.	Y	Y	Y	Y	3 - Active Measure	Varies
Speed Sensitive Rest in Red Signal	Signals	At certain hours (e.g. late night) a signal remains red for all approaches or certain approaches until a vehicle arrives at the intersection. If the vehicle is going faster than the desired speed, the signal will not turn green until after vehicle stops. If the vehicle is going the desired speed the signal will change to green before the vehicle arrives. This signal timing provides operational benefit to drivers traveling at the desired speed limit. Can be paired with variable speed warning signs.	Y	Y			2 - Latent Safety Measure	30%
Splitter Island	Intersections & Roadways	A raised area that separates the two directions of travel on the minor street approach at an unsignalized intersection or roundabout. Helps channelize traffic in opposing directions of travel. Also helps improve the visibility of an intersection when approaching it. Provides a refuge for pedestrians.		Y	Y	Y	1 - Built Environment	40%
Speed Safety Cameras	Other	A speed safety camera can help automate enforcement of posted speed limits. The automatic photographic evidence can be used by authorities to issue traffic violation tickets. Note that this is not currently legal in Hayward.	Y	Y	Y		3 - Active Measure	
Law enforcement	Other	Issuing speeding violation tickets to drivers can help slow down speeds. The effectiveness of this is limited based on the availability of officers to ensure widespread and consistent enforcement.	Y	Y	Y	Y	3 - Active Measure	