



LOCAL ROAD SAFETY PLAN



JUNE 2023

CONTENTS

Introduction	1
Safer Streets for Everyone	1
Local Roads are the Key	2
Transitioning Traffic Safety Culture	2
What's in the Plan	7
Hayward's Safety Emphasis Areas	9
Vision & Goals	11
Plan Vision	11
Plan Goals.....	12
Committed to Safety.....	12
Plan Development	13
The LRSP Drafting Process	13
Working Together.....	14
Safety Steps Hayward Already Takes.....	16
Community Outreach	18
Existing Conditions.....	25
Hayward Safety Today	25
About the Data.....	25
Knowing Where to Help.....	27
High Injury Network.....	34
Emphasis Areas.....	43

Recommendations.....	46
Implementing Enforcement.....	50
Prioritizing Safety & Equity.....	51
Priority Locations	53
Engineering Countermeasures.....	58
Project Ideas.....	65
Implementation	68
Evaluation	74
Performance Measures.....	75
Updating the Plan	78
Appendix A: Countermeasure Toolbox.....	79
Appendix B: Project Concepts.....	80
Appendix C: Prioritization Memo.....	81
Appendix D: Funding.....	82
Federal Funding	83
State Funding	86

FIGURES & TABLES

Figure 1: Safe System Approach Principles and Elements ...	3	Table 1. Existing City Safety Efforts	16
Figure 2. Frequently Used Travel Modes	22	Table 2: Road Users and Crash Severity, 2017–2021	30
Figure 3. First-Ranked Priority Areas to Improve Safety, Based on Travel Mode Frequency	23	Table 3: Fatal and Severe Injury Crashes by Primary Collision Factor	33
Figure 4. First-Ranked Priority Locations to Improve Safety, Based on Travel Mode	24	Table 4. High Injury Network Intersections	37
Figure 5. Pedestrian Crashes by Pedestrian Action, 2017– 2021	29	Table 5: Priority Roadway Segments	39
Figure 6. High Injury Network	36	Table 6. Recommendations by Safe System Category and Emphasis Area	47
Figure 7. Top 20 Priority Intersections and Roadways with Test Scenario	56	Table 7. Top 20 Priority Locations with Test Scenario	54
Figure 8. Disadvantaged Population Scores Used for Social Equity Input	57	Table 8. Intersection Safety Treatments	59
		Table 9. Roadway Safety Treatments	61
		Table 10. Pedestrian Safety Treatments	62
		Table 11. Bicycle Safety Treatments	64
		Table 12. Three-Year and Five-Year Crash Averages by Emphasis Area	76
		Table 13: Project and Program Implementation	77

INTRODUCTION

Safer Streets for Everyone

Everyone deserves to get home safely. To help Hayward residents and visitors reach their destinations, this Local Road Safety Plan, or LRSP, identifies and analyzes safety on City-owned roadways and prioritizes improvements for areas with the greatest safety challenges.

Local roads are a critical part of the Hayward community. Despite being less traveled than State highways, local roads see a higher rate of fatal and severe injury crashes.¹ LRSPs can help eliminate fatal and severe injury crashes on local roads by identifying where and why crashes happen.

¹ Anderson et al. *Noteworthy Practices: Addressing Safety on Locally-Owned and Maintained Roads A Domestic Scan*, FHWA-SA-09-019, (2010).

PLAN VISION

Identify safety improvements, strategies, and programs using the Safe System approach to eliminate fatalities and severe injuries.

Local Roads are the Key

An LRSP assesses and identifies locations and strategies to improve local road safety. LRSPs take an interdisciplinary approach to traffic safety and rely on interagency and community collaboration to implement recommendations.

A Federal Highway Administration (FHWA) [proven safety countermeasure](#), LRSPs provide crosscutting efforts to prioritize investments.² FHWA provides more than \$2 billion each year in Highway Safety Improvement Program (HSIP) funds for States to address road safety challenges on all public roads.

In California, to pursue HSIP grant funds (estimated at \$210 million for Cycle 11 in 2022), a local agency must have an LRSP or equivalent planning document. This LRSP helps Hayward qualify for HSIP funds and gets the city one step closer to eliminating traffic deaths and severe injuries on its roads.

Because every community has unique safety challenges, this LRSP recommends a set of proven strategies and countermeasures tailored to Hayward's specific needs. A living document, this LRSP is designed to be flexible and responsive to evolving community needs. The City will revisit and update this LRSP at least every five years.

² FHWA maintains a list of Proven safety countermeasures with documented effectiveness in reducing roadway fatalities and severe injuries (totaling 28 at present).

Transitioning Traffic Safety Culture

Vision Zero—a movement to eliminate all traffic-related deaths and severe injuries—and the Safe System approach—a systems-based approach that can help put Vision Zero into practice—are at the core of this LRSP and align with larger statewide and national efforts to reduce fatal and severe injury crashes.

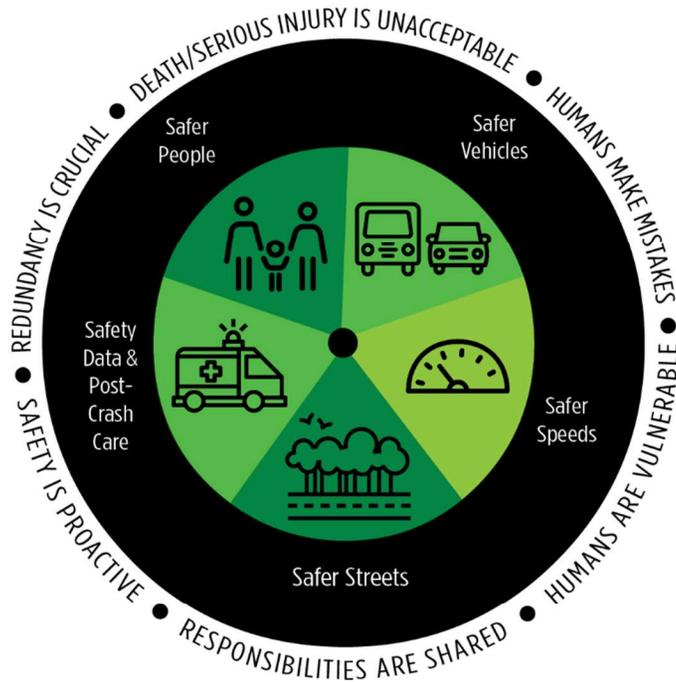
The Safe System Approach

A [Safe System approach](#) works toward eliminating roadway deaths based on six key principles (see Figure 1).

- Deaths and severe injuries are unacceptable.
- Humans make mistakes.
- Humans are vulnerable.
- Responsibility is shared.
- Safety is proactive.
- Redundancy is critical.

More information is available online at <https://highways.dot.gov/safety/proven-safety-countermeasures>.

Figure 1: Safe System Approach Principles and Elements



A Safe System has five elements, or layers (see Figure 1):

- **Safe Road Users**—All road users, including bicyclists, pedestrians, and transit-riders, should be able to travel safely.
- **Safe Vehicles**—Vehicles should be designed and regulated to reduce the frequency and severity of crashes.
- **Safe Speeds**—The faster a vehicle is travelling, the greater its risk to human life. Safe speeds are speeds that reduce impact forces, improve stopping time, and improve visibility.
- **Safe Roads**—Road design can accommodate human mistakes and improve injury tolerances through strategies such as physically separating those travelling different speeds or using signage to alert drivers of hazards.
- **Post-Crash Care**—If a crash does occur, first responders must assess, stabilize, and transport those who were injured. Forensic investigation or incident management teams are also important parts of post-crash care.

The United States Department of Transportation adopted the Safe System approach as its core strategy in January 2022.³ The following month, Caltrans released Director's Policy 36, which commits the state to the Safe System approach to achieve its vision of no fatalities and severe injuries on California's roadways by 2050 and safer outcomes for all communities.⁴ These efforts build from the FHWA's promotion of the Safe System approach as a strategy to eliminate all traffic deaths.

A Safe System approach helps this LRSP identify ways that Hayward and its partners can create layers and redundancies in its local road network.

Together, Hayward and identified partners can

- ▶ Establish a vision, goals, and partnerships to help implement the plan.
- ▶ Identify systemic engineering countermeasures and use them proactively rather than reactively.
- ▶ Provide educational materials to communicate key roadway safety information to residents and visitors.
- ▶ Review policies, guidelines, and standards to prioritize safety.
- ▶ Overlap roadway stakeholder efforts to create a culture of traffic safety.
- ▶ Identify potential funding and coordination sources for project implementation.
- ▶ Evaluate what is working to achieve established vision and goals on an on-going basis.

It is important to understand that the City only has direct control over some Safe System elements. For example, the City cannot directly affect safe vehicle design and regulation. For a robust Safe System, state and federal policy—like legislation to allow automated speed enforcement and continued regulation of vehicle safety standards—will be essential to build a system that is truly safe.

³ National Roadway Safety Strategy, United States Department of Transportation, January 2022 <https://www.transportation.gov/sites/dot.gov/files/2022-02/USDOT-National-Roadway-Safety-Strategy.pdf>

⁴ California Department of Transportation Director's Policy 36, February 15 2022 https://dot.ca.gov/-/media/dot-media/programs/safety-programs/documents/policy/dp_36-a11y.pdf

Vision Zero

Vision Zero is a local, national, and international movement to eliminate all traffic-related deaths and severe injuries. The traditional approach to traffic safety views deaths and severe injuries as the cost of getting around. Now, instead of assuming crashes as inevitable, we understand that death and severe injuries are preventable. By integrating layers of protection into its transportation system, a community can protect all roadway users—even when they make mistakes.

This plan has been designed with the ultimate goal of eliminating traffic deaths and severe injuries on the City's roadways by 2050. A Vision Zero-focused LRSP prioritizes collaboration, accountability, and equity in the planning and design process. One of the key elements of a Vision Zero approach is using data to drive analysis and strategy selection. This LRSP brings together data from crash history, roadway features, public engagement efforts, and demographic data to prioritize solutions and locations. Such robust data will help Hayward to be proactive rather than reactive, working to stop fatal and severe injury crashes *before* they happen.

The Metropolitan Transportation Commission (MTC) passed a Vision Zero policy in 2020 that identified actions to support cities like Hayward pursue Vision Zero goals.

By affirming a commitment to Vision Zero, the City is committing to working to prioritize street safety and eliminate traffic deaths in Hayward. It is an acknowledgment that traffic deaths are preventable and that even one is too many. The commitment means building a safer transportation system and creating and sustaining a culture where residents, workers, and visitors prioritize traffic safety to ensure mistakes that happen on our streets do not result in death or severe injury. This plan will be implemented through coordination with identified safety partners comprised of both city agencies and external parties.

The City of Hayward is committed to working to prioritize street safety and eliminate traffic deaths on our roadways.

Aligning with the Strategic Highway Safety Plan (SHSP)

The [2020–2024 California Strategic Highway Safety Plan](#) (SHSP) sets out California’s vision, goals, and objectives for reducing fatal and severe injury crashes on public roads (local roads and state highways). To draw this roadmap, the California Department of Transportation (Caltrans) led efforts to analyze crash data and collaborate with traffic safety partners across the state. As a result, the SHSP identified 16 challenge areas, or areas with the most potential to improve roadway safety. Of the challenge areas, six were identified as high priority areas, or areas with the greatest opportunity to reduce death and severe injury.

Historically, the SHSP has used the five Es (education, enforcement, engineering, emergency response, and emerging technologies) to organize strategies. In 2021, state transportation officials shifted focus and adopted guiding principles that integrate social equity, take a Safe System approach, and encourage proven countermeasures and emerging technologies. This plan is aligned with the SHSP guidance.

SHSP CHALLENGE AREAS

- ▶ Aging Drivers (65 and older)
- ! Bicyclists
- ▶ Commercial Vehicles
- ▶ Distracted Driving
- ! Impaired Driving
- ! Intersections
- ! Lane Departures
- ▶ Motorcyclists
- ▶ Occupant Protection
- ! Pedestrians
- ! Speed Management/Aggressive Driving
- ▶ Work Zones
- ▶ Young Drivers (15–20 years old)

! *high priority challenge area*

What's in the Plan

Using historical crash data, this LRSP assesses Hayward's existing roadway conditions and local context; identifies areas for improvement; and recommends actions and an implementation plan for the City and its safety partners.

This LRSP is organized into five sections:

Vision & Goals—Affirms the City of Hayward's larger vision for transportation safety and sets goals for how to get there.

Plan Development—Describes the collaborative and data-driven process for creating the plan.

Existing Conditions—Analyzes counts, locations, and causal factors for crashes in Hayward.

Recommendations—Presents specific strategies and proven countermeasures for Hayward and its partners to implement.

Implementation—Prioritizes strategies and actions and sets performance measures to evaluate the City's progress toward its goals.

Evaluation—Presents actions the City of Hayward can take to measure implementation progress and success on the road to zero traffic deaths.

ABOUT THE DATA

This plan analyzed publicly reported crash data from 2017–2021 and used that data to determine crash totals and trends. Although reported crash data is imperfect and has reporting gaps, particularly when assigning injury level, these data are the best available for this type of analysis.



Hayward's Safety Emphasis Areas

After assessing the city's historical crash data trends, the LRSP project team identified seven emphasis areas. These areas guided the plan's development and determined which actions and implementation strategies would be most effective at reducing deaths and severe injuries on local roads:



Pedestrian Safety

Citywide, 30 percent of the city's fatal and severe injury crashes involved pedestrians; 53 people were killed or severely injured while walking on Hayward roads. When pedestrians are hit in Hayward, they are most often hit crossing in a crosswalk at intersections by drivers continuing straight rather than turning. Tennyson Road, Mission Boulevard and A Street have the highest incidence of pedestrian crashes.

Objective: Reduce the number and severity of pedestrian crashes.



Bicyclist Safety

More than 90 percent of crashes that involve bicyclists result in death or some level of injury. Ten bicyclists (6 percent of citywide fatal and severe injury crashes) were killed or severely injured in crashes on Hayward roads.

Objective: Reduce the number of fatal and severe injury bicyclist crashes.



Signalized and Unsignalized Intersections

Citywide, 87 percent of reported crashes and of fatal and severe injury crashes occurred at intersections. Hesperian Boulevard, Tennyson Road and Foothill Boulevard have the most high-injury intersections.

Objective: Reduce the number and severity of crashes occurring at signalized and unsignalized intersections.



Speeding and Aggressive Driving

Unsafe speeds were associated with 20 percent of Hayward’s fatal and severe injury crashes. Seventy (70) percent of total reported unsafe speeding crashes involved two motor vehicles, and 23 percent involved a single motor vehicle and a fixed object, like a tree or utility pole. Speeding is one of the most frequently cited contributing factors to the city’s fatal and severe injury hit-object and head-on crashes.

Objective: Reduce the number and severity of crashes due to unsafe speeding.



Broadside Crashes

Almost one quarter of Hayward’s reported crashes were broadside, where the front of one vehicle hits the side of another. Most frequently, broadside crashes are associated with drivers violating traffic signals and signs or automobile right of way. Mission Boulevard, Hesperian Boulevard and D Street see a high number of these types of crashes.

Objective: Reduce the number and severity of broadside crashes occurring due to automobile right of way and traffic signals and signs related violations.



DUI Crashes

More than 35 percent of Hayward’s reported crashes and nearly a quarter of its fatal and severe injury crashes involved driving under the influence (DUI) of alcohol or drugs. In about 65 percent of these crashes, the driver hit another motor vehicle, and in 32 percent of these crashes, the driver hit a fixed object. Mission Boulevard, Hesperian Boulevard and Tennyson Road see the highest number of DUI crashes.

Objective: Reduce the number and severity of crashes occurring due to driving under the influence of alcohol or drugs using the recommendations in this plan.



Roadway and Lane Departure Crashes

About 37 percent of Hayward’s high-injury network crashes involved a vehicle leaving its roadway or lane as part of a head-on, hit-object, or sideswipe crash. About half of these crashes occurred in the dark or low lighting conditions. Mission Boulevard, Hesperian Boulevard and Foothill Boulevard see a high number of these crash types.

Objective: Reduce the number and severity of roadway/lane departure crashes.

VISION & GOALS

Plan Vision

The City of Hayward has centered this LRSP around a Vision Zero approach, which aims to eliminate all fatal and severe injury crashes.

This LRSP has established the following vision to achieve Vision Zero:

Identify safety improvements, strategies, and programs using the Safe System approach to eliminate fatalities and severe



Plan Goals

- ▶ Identify emphasis areas contributing to fatal and severe injury crashes to prioritize investments in countermeasures and strategies.
- ▶ Define priority locations for safety improvements for all modes of travel.
- ▶ Identify cost-effective countermeasures and safety improvements that can be applied systemically.
- ▶ Identify transportation safety programs and strategies using the Safe System Approach and work collaboratively with agencies and safety partners toward implementation.
- ▶ Monitor and evaluate emphasis areas and overall safety performance of the City's transportation network.
- ▶ Identify locations that directly benefit the following populations or users: children, older adults (65 and over), equity priority communities, disadvantaged populations, and transit users (consistent with the Guiding Vision of the City's *Racial Equity Action Plan* and the National Safety Council's *Road to Zero Coalition*).

Committed to Safety

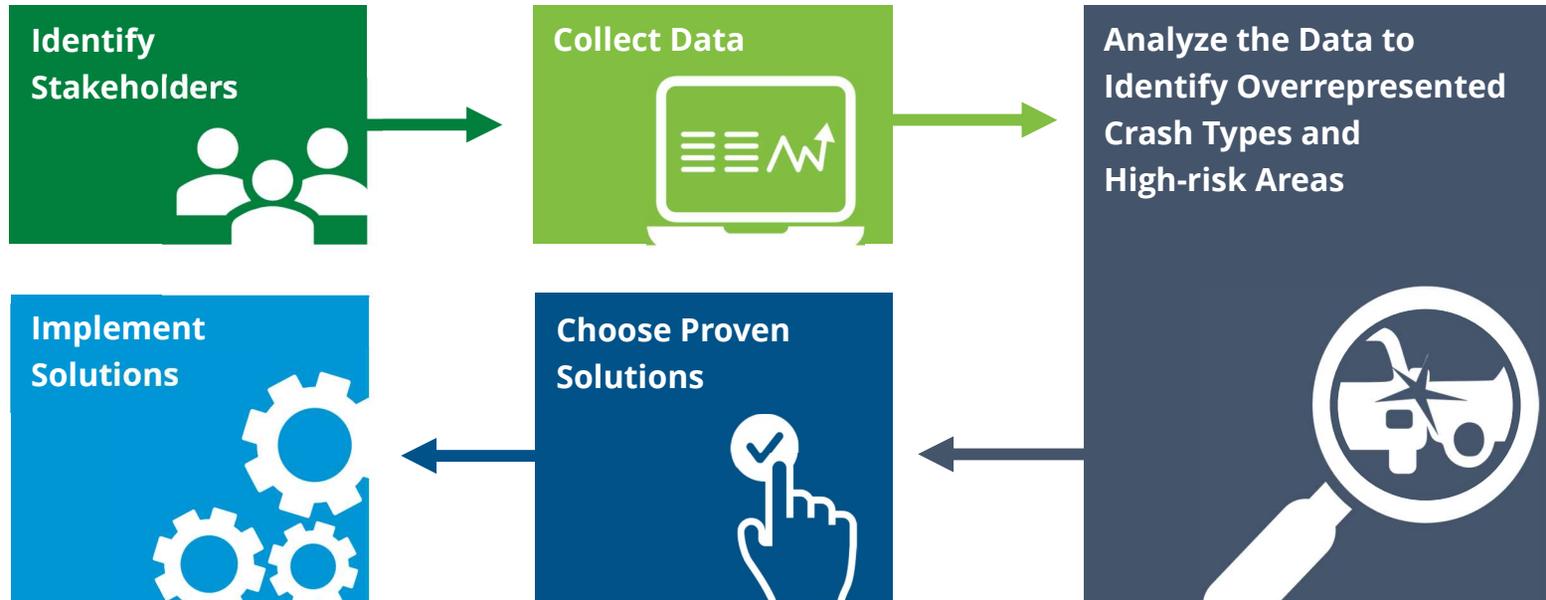
To achieve its vision and goals, the City of Hayward is committed to eliminating roadway fatalities and severe injuries by 2050 and incorporating the Safe System approach in future roadway safety efforts. The City will use data and strategies in this LRSP to prioritize traffic safety and reduce crash risk on City roadways.

PLAN DEVELOPMENT

This plan was developed in collaboration with City staff and using crash data and best practices resources.

The LRSP Drafting Process

Identify | Analyze | Prioritize | Implement | Evaluate



Source: FHWA, "Local Road Safety Plans," (January 2021), <https://safety.fhwa.dot.gov/LRSPDIY/#>.

Working Together

By nurturing longstanding partnerships with community organizations and fostering new ones, Hayward can use interagency cooperation and collaboration to work toward eliminating deaths and severe injuries on the local road network.

These agencies have been, or can be, valued safety partners in implementing this LRSP:

Transportation Agencies

Transportation agencies and providers such as AC Transit, the Alameda County Transportation Commission (CTC), Bay Area Rapid Transit (BART), and Caltrans can help identify engineering solutions at locations of shared interest, and they can help share and promote education campaigns.

Alameda CTC plans, programs, and allocates federal, state, regional, and local funding for transportation improvements. Alameda CTC plans guide transportation development and funding decisions to ensure the county's transportation system can sustain the region's growing population. Their partnership will be vital to implementing the improvements recommended in this plan.

RECOMMENDED SAFETY PARTNERS

- ▶ AC Transit
- ▶ Alameda County Transportation Commission
- ▶ BART
- ▶ Bike East Bay
- ▶ Caltrans
- ▶ Community Resources for Independent Living
- ▶ Emergency Services Providers
- ▶ Hayward Area Recreation and Park District
- ▶ Downtown Hayward Improvement Association
- ▶ Hayward Chamber of Commerce
- ▶ Hayward Fire
- ▶ Hayward Police Department
- ▶ Hayward Unified School District
- ▶ Senior Centers
- ▶ United Merchants Downtown Hayward

Community Groups, Local Organizations, & Care Homes

Community groups can give feedback on safety issues and help facilitate better communication about safety campaigns and future projects between the public and the City. Health advocacy or active transportation groups like Bike East Bay, Hayward Area Recreation and Park District (HARD), and Community Resources for Independent Living (CRIL) can help coordinate education classes through schools or at City-sponsored events. As safety liaisons, these partners help build trust between government agencies and the public. Senior centers can help organize educational programs for drivers, pedestrians, and bicyclists.

Local Business Organizations

The Hayward Chamber of Commerce, Downtown Hayward Improvement Association and United Merchants Downtown Hayward can help build trust between the City and the public. Local business associations can also help the City tailor its engagement processes to engage community members and stakeholders more effectively.

Police, Fire, & Emergency Services

Partnerships with first responders help the City proactively improve emergency response services and assess proposed safety countermeasures. Hayward Fire Department can help vet safety improvement projects for compatibility with emergency response times during the design review process. The Hayward Police Department Traffic Bureau forms enforcement location priorities based on its review of crash history. This partnership can be used to coordinate on emphasis areas and high-risk locations for road users.

School Districts

Hayward Unified School District (HUSD) can be partners in educational programs that encourage students, their families, and staff to engage in safe transportation behaviors.

Safety Steps Hayward Already Takes

This LRSP relies on Hayward’s strong foundation of plans, policies, and programs that support safe, equitable mobility in the city. For a list of the City’s existing initiatives and ongoing efforts to build a Safe System and enhance traffic safety for all modes of transportation, see Table 1.

Table 1. Existing City Safety Efforts

PROGRAM NAME	PROGRAM DESCRIPTION	SAFE SYSTEM ELEMENTS
City of Hayward’s Safe Routes to School (SR2S) Program	The SR2S program works to make it easier and safer for students to walk and bike to school. The City partners with Hayward Unified School District, Alameda County Transportation Commission, and other community organizations.	Safe Roads Safe Speeds Safe Road Users
City of Hayward’s Safe Routes for Seniors (SR4S) Program	SR4S Program helps identify areas in Hayward that need accessibility and walkability improvements. This is a collaborative program between the City, local senior housing facilities, senior centers, and community based organizations.	Safe Roads Safe Speeds
Safety Awareness Months	In May, the Hayward Police Department focuses on motorcyclist education and enforcement. In September, they focus on pedestrian safety. Funding for this program is provided by a grant from the California Office of Traffic Safety through the National Highway Traffic Safety Administration.	Safe Road Users
Shared Mobility Feasibility Study	The city is currently developing a micromobility program that will provide alternative transportation options to all community members by creating safer streets and improving access to housing and regional transit hubs. Consistent with City policy, the study’s feasibility analysis will have a racial equity lens to ensure equitable outcomes.	Safe Road Users

PROGRAM NAME	PROGRAM DESCRIPTION	SAFE SYSTEM ELEMENTS
Neighborhood Traffic Calming Program	This program helps City Staff, elected officials, and Hayward residents as they adjust to traffic calming policies and procedures. The program lists traffic calming strategies and prioritizes City investments.	Safe Roads Safe Speeds Safe Road Users
2020 Bicycle and Pedestrian Master Plan (BPMP)	The updated BPMP includes recommendations to guide Hayward’s approach to bicycle and pedestrian safety. The update inventories existing conditions; analyzes existing barriers to walking and biking; provides program, policy, and infrastructure recommendations; and presents a prioritization framework to identify a tiered list of projects for implementation. The updated plan also identifies local biking and walking high-injury networks, or HINs, based on historical collision data.	Safe Roads Safe Speeds Safe Road Users
2040 General Plan	<p>The Mobility Element of the City’s 2040 General Plan includes goals and related policies that support transportation safety goals, including most directly:</p> <p>Goal M-3: Provide complete streets that balance the diverse needs of users of the public right-of-way.</p> <p>Goal M-5: Provide a universally accessible, safe, convenient, and integrated pedestrian system that promotes walking.</p> <p>Goal M-6: Create and maintain a safe, comprehensive, and integrated bicycle system and support facilities throughout the city that encourage bicycling that is accessible to all.</p> <p>Goal M-11: Balance the safe and efficient movement of goods with local access and circulation needs.</p>	

Community Outreach

The City cannot improve roadway safety in Hayward without help from the public. The Plan includes community members' experiences and concerns, gathered by LRSP project team hosted pop-events, an interactive webmap, and online survey results.

Pop-up Events

To understand how the community thinks about and prioritizes safety, the LRSP project team set up booths at the Hayward Block Party and the Hayward Farmers Market. Through these events, the team connected individually with more than 70 community members and learned where they feel unsafe while driving, walking, biking, and taking transit and where they would like to see Hayward prioritize safety improvements.

- ▶ **Hayward Block Party**— August 18, 2022
- ▶ **Hayward Farmers Market**—August 20, 2022



Community visitors to project booths at the Hayward Farmers Market



Interactive Webmap

The project team developed [an interactive webmap](https://maps.kittelson.com/Hayward-LRSP) for community members to mark areas with safety concerns. Respondents can flag areas on the high injury network with safety concerns in one of four categories: walking, bicycling, driving, or using public transit.

The City of Hayward welcomes continued feedback on the webmap.

You can access the webmap by visiting <https://maps.kittelson.com/Hayward-LRSP>

HAYWARD LOCAL ROADWAY SAFETY PLAN

English

The City of Hayward is preparing a Local Roadway Safety Plan. The plan will identify engineering and non-engineering recommendations to improve traffic safety, and help the City get funding to implement the recommendations.

The final plan will consist of a comprehensive document that identifies and analyzes safety problems and recommends safety improvements in the City of Hayward, including at specific high-priority locations and for multiple modes.

We need your input on safety concerns for people walking, biking, driving, and taking transit in Hayward. Use the comment map to the right to enter your comment in one of the four Safety Concern categories.

The red and yellow dashed lines on the map represent the City's draft High Injury Network, which are the roadway miles with the highest concentration of fatal/severe injury crashes citywide. The red lines represent Tier 1 segments (the highest crash roadways), and the yellow lines represent Tier 2 segments. 75% of reported fatal and severe injuries occurred on the High Injury Network.

View a list of existing comments →

INSTRUCTIONS

Double click on any point in the map to begin leaving a comment. You may just make a comment on a point, or continue clicking to create a line or polygon. When you have clicked successfully, a pop-up box will appear with the instructions to "Comment on this point by clicking here". Click on the "here" to activate the comment box and begin typing. You may add the category of your comment, as well as optional demographic information.

LAYERS

Click any of the layer titles below to toggle them off the map.

- High Injury Network
- City of Hayward

Great! Comment on this point by clicking here OR continue clicking on the map to draw a line.

Mess up? No problem, just reset the map.

COMMUNITY SAFETY CONCERNS

Community concerns shared on the webmap and in-person events are organized thematically below.

Driving

- ▶ Drivers speed throughout the city.
- ▶ Addressing speeding around schools should be a priority.
- ▶ Residents would like speed bumps or other traffic calming measures.
- ▶ Residents see drivers run stop signs downtown and feel unsafe driving.
- ▶ When drivers are in the wrong lane navigating to and from freeways, they may make sudden lane changes and put others in danger.

Walking

- ▶ Residents would like safer ways to cross the freeways.
- ▶ There is a need for more crosswalks at schools and new developments.
- ▶ Sidewalks around senior centers should be wider.

Biking

- ▶ Community members would like to have an updated map of Hayward's bike facilities to understand how to get around safely.
- ▶ Many do not bike because of a lack of bicycle facilities. Residents said they would bike if they felt safer biking in the city.

Lighting & Visibility

- ▶ Community members do not feel safe navigating the streets at night due to poor visibility; more or better lighting would help.
- ▶ Trees block sightlines on some roads and make it difficult to turn onto larger roadways.

Survey

The project team developed an online survey with both English and Spanish versions. Respondents were asked how and how often they use different travel modes (including driving alone, walking, carpooling, taking paratransit, riding a bike, and riding scooters). They also could rank city priorities for safety improvements and give feedback on where the first improvements should be made.

A total of 52 people took the survey (48 in English and 4 in Spanish). When asked how frequently respondents used different modes of travel, the majority responded that they most frequently drove alone and walked (see Figure 2).

Respondents said they would like the City to prioritize addressing vehicles running red lights, speeding, and turning at two-way stop-controlled intersections (see Figure 3). Respondents who walk as their primary mode of transportation frequently prioritized pedestrian and bicycle safety more than those who primarily drive.

Respondents indicated they would like to see Hayward make safety improvements where crashes have been reported, where people who choose to bike or walk are at risk, and where streets are the busiest (see Figure 4). Respondents who stated that they walked frequently also showed a more of a priority for addressing safety where pedestrians and bicyclists were more at risk.

SURVEY RESULTS

52 Responses

Top Concerns:



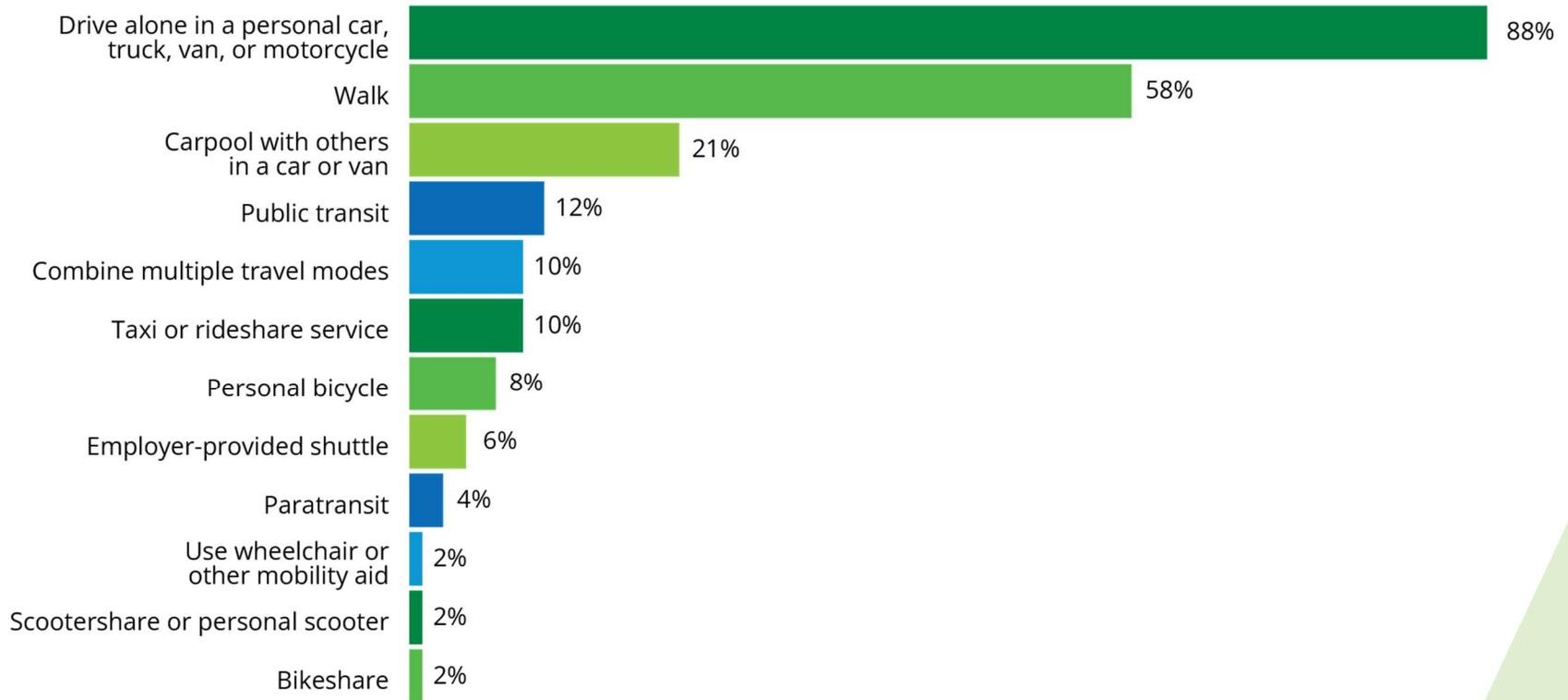
Vehicles running red lights

Speeding

**Turning at two-way
stop-controlled intersections**

HOW HAYWARD RESIDENTS GET AROUND

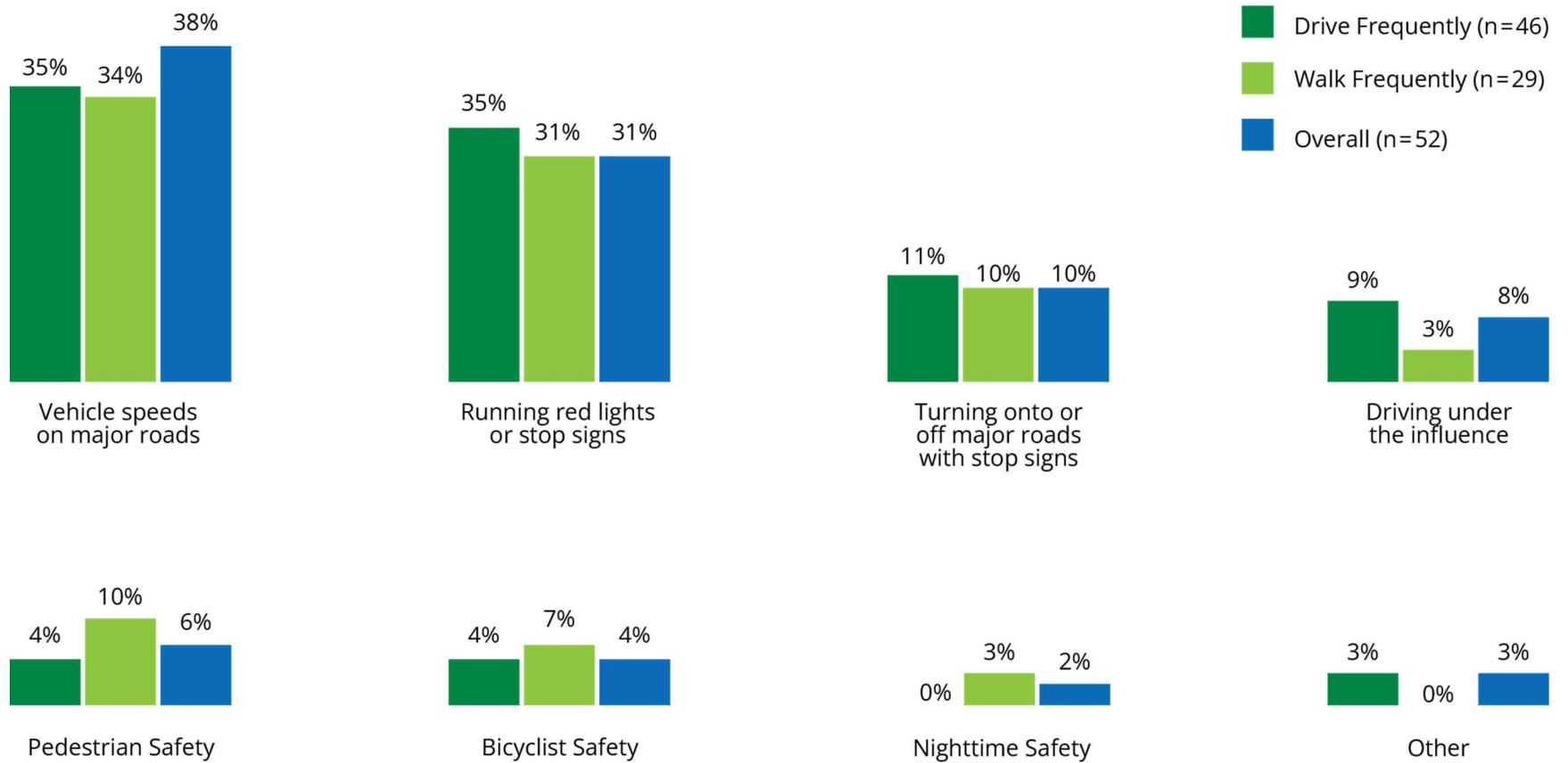
Figure 2. Frequently Used Travel Modes



Note: (n=52) "Frequent" means using the travel mode multiple times a week. Respondents could choose multiple modes of travel.

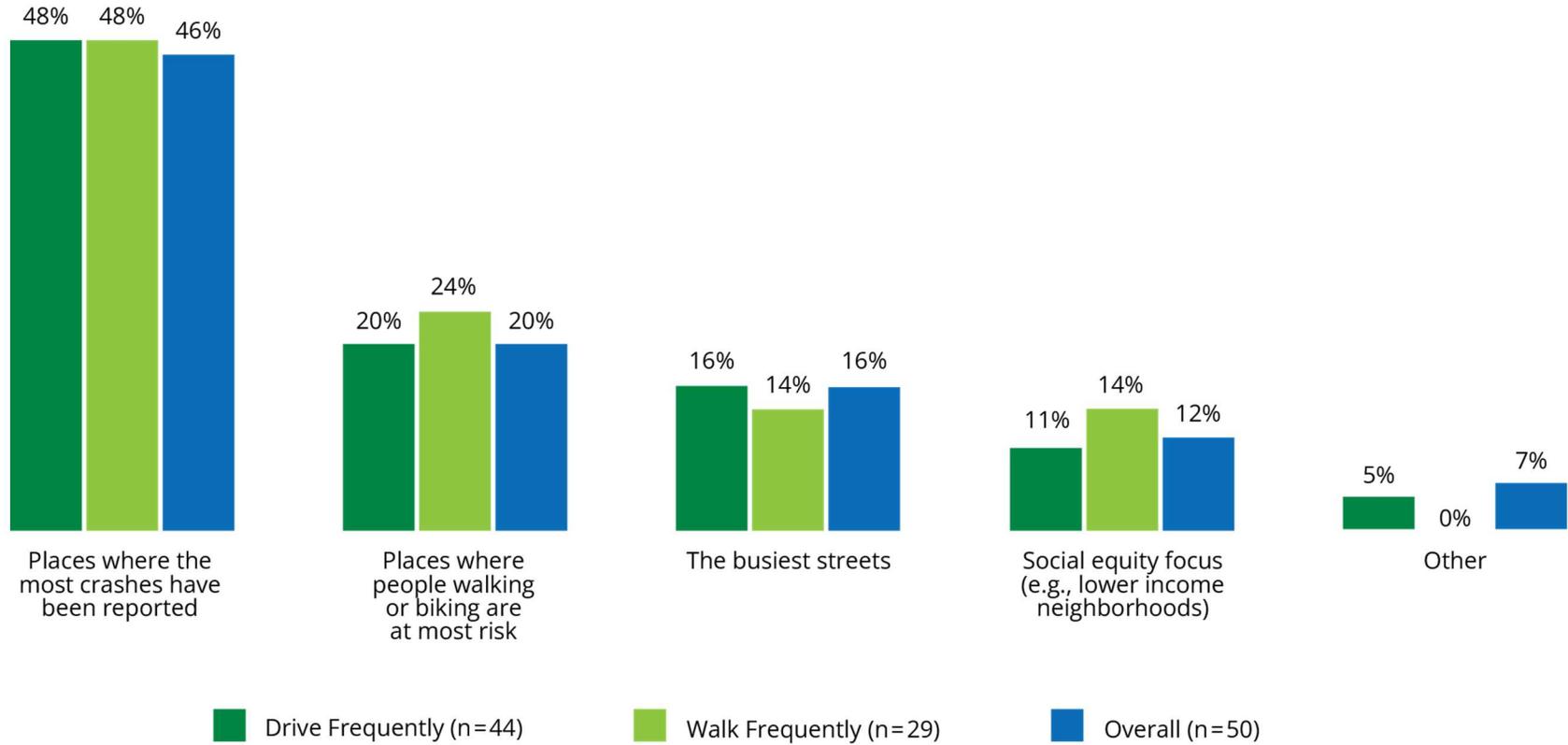
HAYWARD RESIDENTS' SAFETY PRIORITIES

Figure 3. First-Ranked Priority Areas to Improve Safety, Based on Travel Mode Frequency



WHERE HAYWARD RESIDENTS THINK THE CITY SHOULD PRIORITIZE SAFETY IMPROVEMENTS

Figure 4. First-Ranked Priority Locations to Improve Safety, Based on Travel Mode



EXISTING CONDITIONS

Hayward Safety Today

This section presents a snapshot of crashes in Hayward to better understand where, when, and why crashes happen and who was involved. This information helps maximize the City's safety improvement efforts.

About the Data

Data for this analysis come from reported crashes available on the Statewide Integrated Traffic Records System (SWITRS) from January 1, 2017, through December 31, 2021. Data from 2021 are provisional.

**IN HAYWARD FROM 2017 THROUGH 2021,
CRASHES KILLED OR SERIOUSLY INJURED**

110 drivers or passengers

53 pedestrians

10 bicyclists



Understanding Crash Severity

Crash severity is coded according to the highest degree of injury experienced.

Fatal—A person dies due to injuries sustained in the crash.

Severe Injury—A person has major, visible injuries like broken bones, severe lacerations, or other injuries that go beyond the reporting officer’s assessment of “other visible injuries.”

Moderate Injury—A person has significant and visible injuries like bruises or minor lacerations. Moderate injury crashes are sometimes referred to as “other visible injury” crashes.

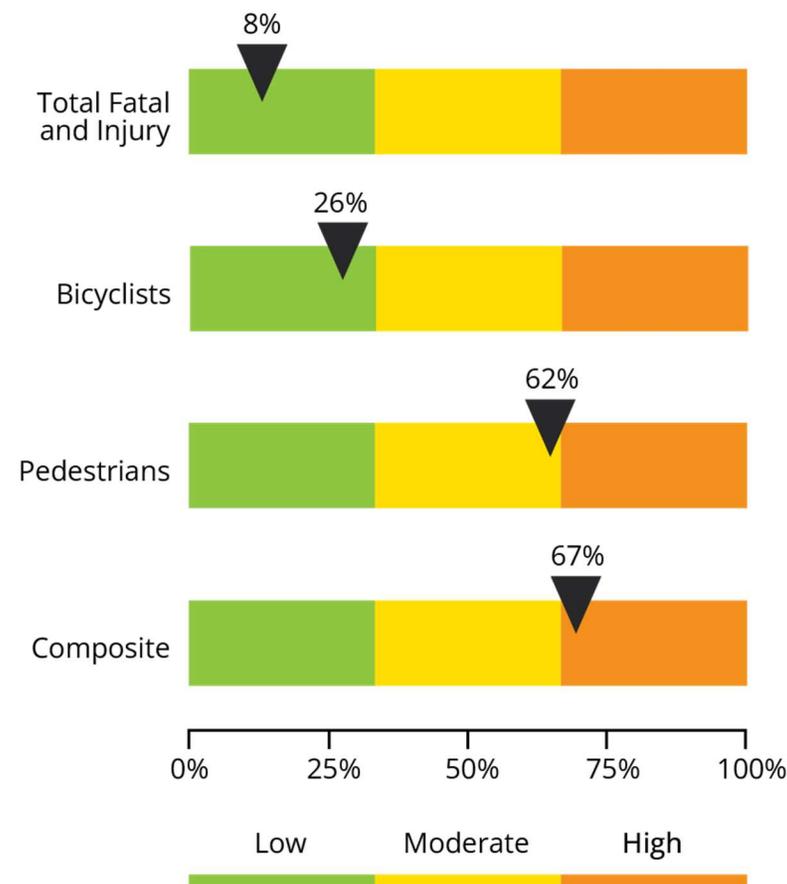
Minor Injury—A person has injuries that are not apparent from the outside. Examples include limps, neck pain, or confusion. Minor injury crashes are sometimes referred to as “complaint of pain” or “suspected injury” crashes.

Property Damage Only (PDO)—No injuries were sustained.

In this analysis, fatal and severe injury crashes are generally grouped together because the difference between death and a severe injury can depend on factors such as emergency response time or the victim’s health rather than the crash type.

HOW HAYWARD IN 2020 COMPARED TO OTHER CALIFORNIA CITIES

Percentile rank among 61 similar sized cities—a higher percentile means more crashes in that category.



Source: California Office of Traffic Safety; data compares Hayward to 61 other comparably-sized California cities.

Knowing Where to Help

Analyzing crash location and crash type helps the City maximize its limited resources by putting the right safety improvement in the right place.

Where Crashes Happen

SIGNALIZED AND UNSIGNALIZED INTERSECTIONS

Most crashes in Hayward occur at intersections. In addition to being more frequent, intersection crashes are also more likely to be severe compared to segment crashes: 87 percent of intersection crashes have fatalities or severe injuries, compared to 13 percent of segment crashes.

Fatal and severe injury crashes at signalized intersections on the arterial network are associated with drivers failing to follow traffic control. These crashes are also associated with hit-object crashes, especially when unsafe speed was a contributing factor. This suggests that arterial characteristics—more lanes and more speeds—are associated with crash frequency and severity on these roadways.

Fatal and severe injury crashes at unsignalized intersections on the arterial network are associated with violations of the automobile right of way, indicating that drivers may struggle to judge gaps in traffic when turning onto or off a street.

INTERSECTIONS ARE THE SITE OF

87% of fatal or severe injury crashes

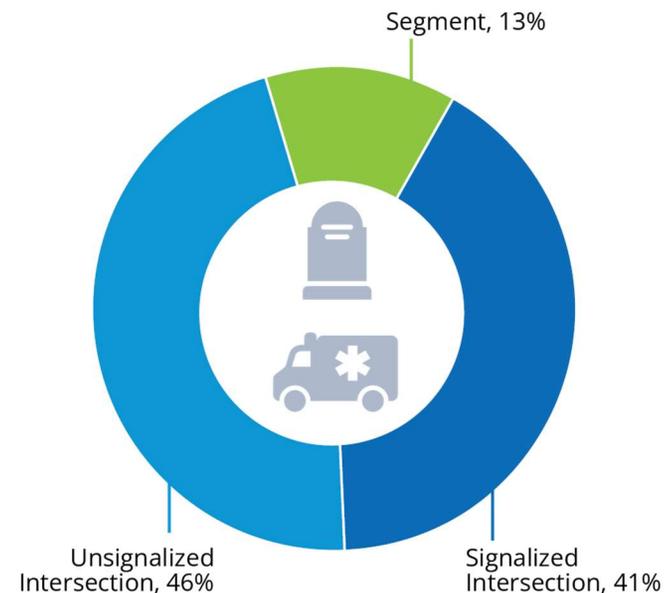
93% of broadside crashes

90% of vehicle-pedestrian crashes

85% of head-on crashes

79% of hit object crashes

Fatal and Severe Injury Crashes by Location



About 1/3 of fatal and severe injury crashes occur at an intersection and involve a pedestrian or bicyclist.

Vulnerable Road Users

PEOPLE WALKING, BIKING, AND RIDING MOTORCYCLES

People walking, biking, riding a motorcycle, or any other form of rolling are all vulnerable road users. When traveling on foot, by bike, or by motorcycle, the human body has less protection from crash forces, especially if it comes into conflict with a motor vehicle. All three groups are overrepresented in the city's fatal and severe injury crashes (see Table 2).

In Hayward, pedestrians are most often struck while crossing in a crosswalk at intersections by drivers continuing straight rather than turning (see

Figure 5). About half of all pedestrian crashes involved people not crossing in a crosswalk or being struck in the road or shoulder. When people do not have available crossing opportunities or encounter sidewalk gaps, they are more likely to risk unsafe, midblock crossings or walk along the edges of roads.

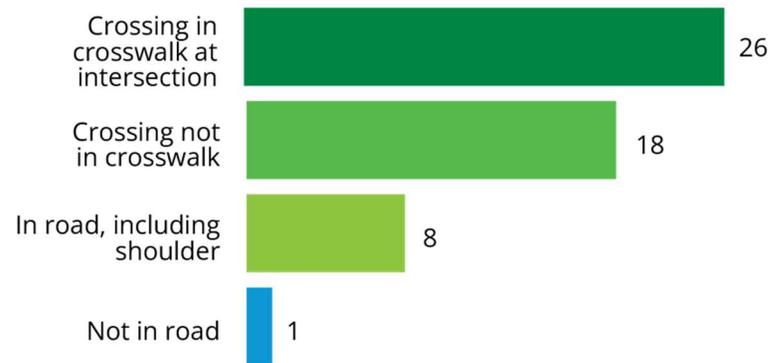
From 2017 through 2021, there were 108 crashes that involved bicyclists. More than 90 percent of these crashes resulted in fatalities or some type of injury. Most bicycle crashes are broadside crashes, and most bicyclists were traveling straight before being hit.

Moto
4% o
18%

Pedestrians are involved in 8% of reported crashes but 30% of fatal and severe injury crashes.



Figure 5. Pedestrian Crashes by Pedestrian Action, 2017–2021



Source: SWITRS, TIMS

Note: "Crossing in Crosswalk at Intersection" includes controlled and uncontrolled crosswalk locations. There were no reported pedestrian crashes with the following pedestrian actions: approaching/leaving school bus, crossing in crosswalk not at intersection, and not stated

Table 2: Road Users and Crash Severity, 2017–2021

ROAD USERS INVOLVED	CRASH COUNT				SHARE OF TOTAL REPORTED	
	Fatal	Severe Injury	Other Injury	Property Damage Only	Share of Fatal and Severe Injury Crashes (% of Column)	Share of All Reported Severity Levels (% of Column)
Pedestrian	16	37	195	11	30%	8%
Bicyclist	2	8	89	9	6%	3%
Motorcyclist	6	27	83	18	18%	4%
Motor Vehicle Only or Vehicle-Fixed Object	12	71	901	1727	46%	85%
Total Reported Crashes	35	142	1,266	1,764	100%	100%

Source: SWITRS

Note: Totals may not equal the sum of the values in the table because some crashes involve more than one of the following: bicyclist, motorcyclist, and pedestrian.

When Crashes Happen

DUSK, DAWN, AND NIGHTTIME

There is a correlation between fatal and severe injury crashes with both time of day and lighting conditions. Fatal and severe injury crashes more frequently occur at night or during twilight hours and during dusk/dawn conditions.

In Hayward, pedestrians are more frequently injured or killed in dark or dusk/dawn conditions, and pedestrian crashes are concentrated during the evening peak travel periods. A higher share of fatal and severe injury bicycle crashes occur in dark or dusk/dawn conditions.

Crash Types and Causal Factors

In Hayward, four crash types most frequently result in fatal or severe injuries; collectively, these four crash types account for 75 percent of all fatal and severe injury crashes in the city:

- ▶ Vehicle and pedestrian
- ▶ Broadside
- ▶ Hit-object
- ▶ Head-on

⁵ This is a reported PCF that indicated one of several California Vehicle Violation codes. These codes indicate a failure to adhere to traffic control, such as running a stop sign or red signal.

Three primary collision factors (PCFs) are frequently cited for Hayward's fatal and severe injury crashes; together, these three PCFs account for 44 percent of fatal and severe injury crashes (see Table 3):

- ▶ Unsafe speed
- ▶ Traffic signals and signs violations⁵
- ▶ Driving or bicycling under the influence of alcohol or drugs

58% of fatal and severe injury crashes occur between 6:00 PM and 12:00 AM.



WHAT IS A PRIMARY COLLISION FACTOR?

Reporting officers identify a primary collision factor (PCF) for each crash. Officers have several PCFs to choose from when filing a report, and these PCFs correspond to California Vehicle Code (CVC) violations. Officers use their best judgment and information available at the scene to select the single factor they deem most relevant to the crash.

SPEEDING

Driver speed is a contributing factor in many fatal and severe injury crashes, as unsafe speeds were associated with 20 percent of fatal and severe injury crashes, particularly hit-object and head-on crashes.

TRAFFIC SIGNALS AND SIGNS

Vehicle and pedestrian crashes are most frequently associated with vehicles violating pedestrian right-of-way and pedestrian violations (28 and 35 percent, respectively). Broadside crashes are largely associated with traffic signal and sign violations or automobile right-of-way violations (33 percent and 25 percent, respectively).⁶

ALCOHOL & DRUGS

Alcohol and drug involvement is a common contributing factor in fatal and severe injury crashes. Alcohol and drugs contribute to 36 percent of all of Hayward's crashes and 23 percent of its fatal and severe injury crashes. More than 20 percent of head-on crashes are associated with alcohol and drug use.⁷

⁶ Traffic signs and signals is a PCF that indicates one of several California Vehicle Violation codes. These codes indicate a failure to adhere to traffic control, such as running a stop sign or red signal indication). Automobile right of way is a PCF that indicates one of several California Vehicle Violation codes. These codes indicate a failure to yield right-of-way to conflicting traffic.

Unsafe speeds are associated with 20% of fatal and severe injury crashes.



About 28% of vehicle and pedestrian crashes are associated with a vehicle violating the pedestrian right-of-way.



Alcohol and drugs contribute to 23% of Hayward's fatal and severe injury crashes.



⁷ According to the *California Highway Patrol Collision Investigation Manual* (Revised 2003), "When the involved party, considered by the officer to be most at fault, is driving a vehicle under the influence of alcohol or drugs, the PCF shall be [driving under the influence], regardless of any other violation."

Table 3: Fatal and Severe Injury Crashes by Primary Collision Factor

PRIMARY COLLISION FACTOR	CRASH TYPE			
	Vehicle/ Pedestrian (n = 46)	Broadside (% of Column) (n = 36)	Hit Object (% of Column) (n = 26)	Head On (% of Column) (n = 25)
Automobile Right of Way	0%	25%	0%	5%
Driving or Bicycling Under the Influence of Alcohol or Drug	7%	6%	28%	23%
Improper Turning	2%	6%	8%	9%
Other Than Driver (or Pedestrian)	0%	3%	8%	9%
Pedestrian Right of Way	28%	0%	0%	9%
Pedestrian Violation	35%	0%	0%	5%
Traffic Signals and Signs	7%	33%	0%	14%
Unsafe Speed	2%	11%	40%	18%
Unsafe Starting or Backing	7%	3%	0%	0%
Other PCF or Unknown¹	13%	14%	16%	9%
Total Reported Crashes	100%	100%	100%	100%

Source: SWITRS, TIMS

¹ Other PCFs include: Other improper driving, improper passing, unsafe lane change, wrong side of road, and other hazardous violation. These constitute less than five percent of all crash types and were consolidated for table legibility.

Note: Green shaded cells indicate the most frequent PCFs for a given crash type. Additionally, totals may not add up to 100 percent due to rounding.

High Injury Network

To better understand where crashes were happening, the project team mapped Hayward's intersections and roadways according to crash frequency and severity from 2017 to 2021 (Figure 6). Crashes were weighted according to severity. Intersections and roadways were then organized by their collective crash severity score to align with Highway Safety Improvement Program (HSIP) priorities. The map reveals the city's high injury network (HIN), or the system of intersections and segments that see the highest share of fatal and severe injury crashes citywide (Table 4).

Roadway segments are organized into Tier 1 and Tier 2 high-injury locations, based on crash severity score. Tier 1 segments have the highest crash severity in Hayward between 2017 and 2021; Tier 2 segments rank the second highest in terms of crash severity (Table 5).

Of particular note is the share of the HIN within the downtown area. The high concentration of roadways and intersections within the downtown area represents a potential focus area for the City. Separate studies have shown that one-way streets in this area carry significant regional commute (cut-through) traffic avoiding freeway congestion along I-580, SR 238, and I-880.⁸

⁸ Hayward Origin-Destination Study, 2017.

HAYWARD HIN

30 priority intersections

47+ roadway miles

Accounts for 75% of all reported fatal and injury crashes

**TIER
1**

Most severe

6 centerline miles

25% of fatal and severe injury crashes

2% of total network

**TIER
2**

Second most severe

41 centerline miles

50% of fatal and severe injury crashes

16% of total network

Higher-speed, cut-through traffic creates barriers for safely walking, biking, and connecting to transit stops in the area—particularly for lower-income Hayward residents or employees and for people without access to a car. This cut-through traffic also affects side-street businesses and divides the community.

To address these locations and issues, the City may implement countermeasures addressing speed, as indicated in Tables 7–10.

HIN roadways and intersections are concentrated in the downtown area.

Despite being just 10% of the city's centerline miles, arterials with posted speeds of at least 35 miles per hour make up 48% of the HIN.



SCORING CRASH SEVERITY

(Number of Fatal Crashes
× Fatal Weight)

+ (Number of Severe Injury Crashes ×
Severe Injury Weight)

+ (Number of Moderate
Injury Crashes
× Moderate Injury Weight)

+ (Number of Minor Injury Crashes ×
Minor Injury Weight)

+ Property Damage Only Crashes

= Crash Severity Score

Figure 6. High Injury Network

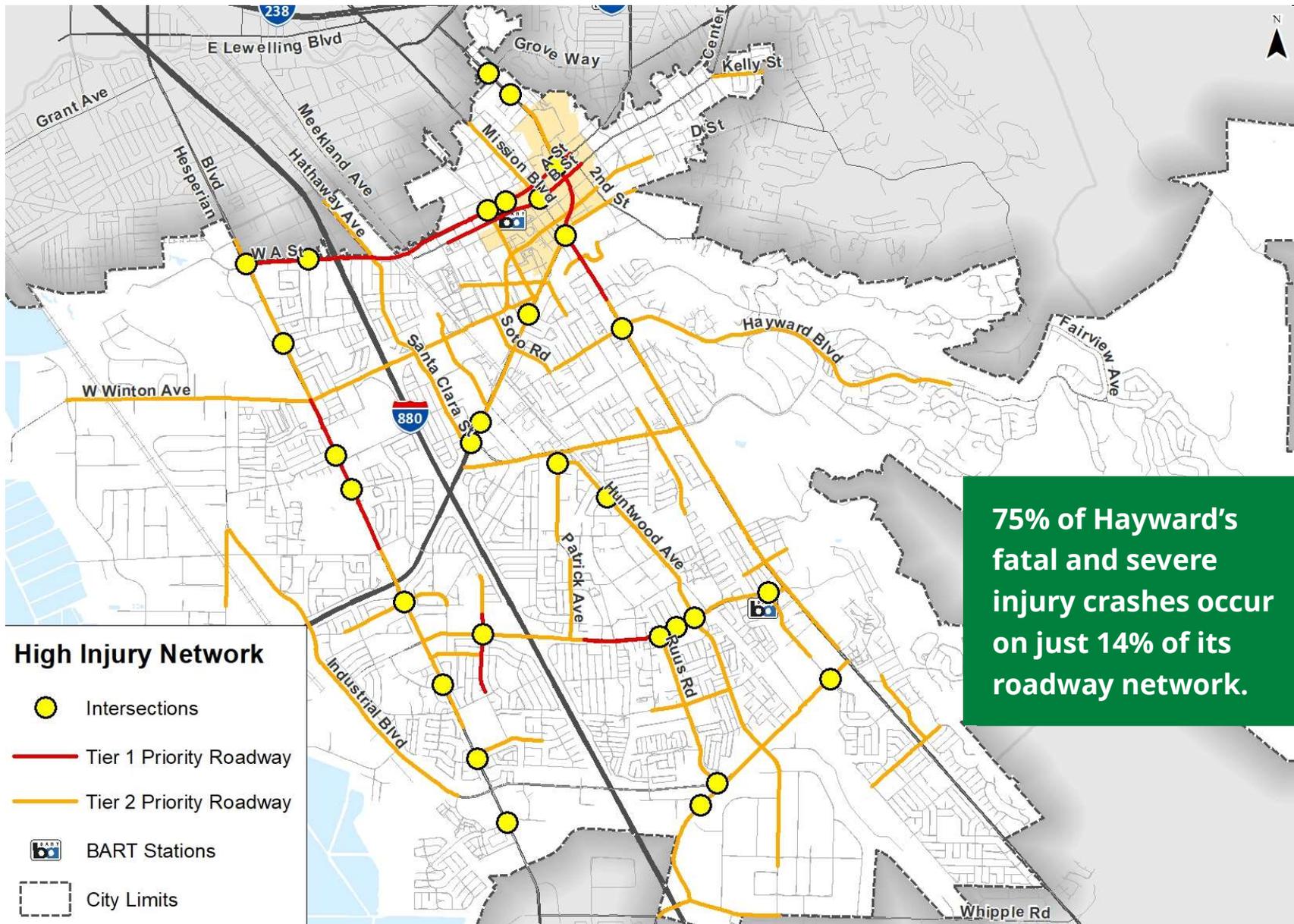


Table 4. High Injury Network Intersections

RANK	LOCATION	LOCATION TYPE	CRASH SEVERITY SCORE	TOTAL NUMBER OF CRASHES	FATAL/SEVERE INJURY CRASHES
1	Tennyson Rd & Baldwin St	Unsignalized	119.2	7	3
2	Foothill Blvd/ Mission Blvd & Jackson St	Signalized	110.5	27	4
3	Tennyson Rd & Calaroga Ave	Signalized	90.0	18	3
4	A St & Victory Dr	Signalized	79.9	8	3
5	Huntwood Ave & Montana Way	Unsignalized	77.5	3	2
6	Hesperian Blvd & Sleepy Hollow Ave	Signalized	77.3	10	3
7	Hesperian Blvd & Turner Ct	Signalized	75.0	8	3
8	A St & Foothill Blvd	Signalized	70.0	27	2
9	Tennyson Rd & Huntwood Ave	Signalized	64.0	23	2
10	Industrial Pkwy & Ruus Rd	Signalized	63.9	16	2
11	A St & Western Blvd	Signalized	62.9	17	2
12	Mission Blvd & Orchard Ave/ Carlos Bee Blvd	Signalized	62.9	22	2
13	CA-185 & B St	Signalized	59.7	16	2
14	Industrial Pkwy & Arrowhead Way/ Dixon St	Signalized	57.5	15	2
15	A St & Montgomery St	Signalized	57.3	9	2
16	Tennyson Rd & 12 St/Dixon St	Signalized	56.0	12	2
17	A St & Hesperian Blvd	Signalized	55.0	9	2

RANK	LOCATION	LOCATION TYPE	CRASH SEVERITY SCORE	TOTAL NUMBER OF CRASHES	FATAL/SEVERE INJURY CRASHES
18	Hesperian Blvd & Longwood Ave/ Skywest Dr	Signalized	53.2	8	2
19	Hesperian Blvd & Tripaldi Way/ Eden Shores Blvd	Signalized	50.8	6	2
20	Tennyson Rd & Ruus Rd	Signalized	50.6	15	2
21	Foothill Blvd & Grove Way	Signalized	50.2	32	1
22	Hesperian Blvd & West St	Signalized	49.4	4	2
23	Jackson St & Tarman Ave	Unsignalized	49.3	12	1
24	Hesperian Blvd & Tahoe Ave	Unsignalized	48.9	10	1
25	Jackson St & Alice St	Unsignalized	48.8	10	1
26	Gading Rd & Huntwood Way	Unsignalized	48.1	11	1
27	Santa Clara St & Jackson St	Signalized	47.5	29	1
28	Foothill Blvd & Kimball Ave	Unsignalized	46.6	8	1
29	Industrial Pkwy & Addison Way	Unsignalized	46.0	6	1
30	Hesperian Blvd & Oliver Dr	Unsignalized	44.6	8	1

Table 5: Priority Roadway Segments

RANK	LOCATION	LOCATION TYPE	SEGMENT LENGTH (MILES)	MAXIMUM 0.5-MILE CRASH SEVERITY SCORE	ASSOCIATED NUMBER OF TOTAL CRASHES	ASSOCIATED NUMBER OF FATAL AND SEVERE INJURY CRASHES
Tier 1						
1	Foothill Blvd, from A St to D St	Arterial	0.5	253.48	78	6
2	Hesperian Blvd, from Winton Ave to Cathy Way	Arterial	0.75	210.09	20	6
3	A St, from 2nd St to Hesperian Blvd	Arterial	2.55	177.78	18	5
4	Tennyson Rd, from Pompano Ave to Ruus Rd	Arterial	0.5	133.73	51	3
5	B St, from 2nd St to Filbert St	Arterial	1.0	123.99	38	3
6	Mission Blvd, from D St to Palisade St	Arterial	0.5	121.9	47	3
7	Calaroga Ave, from Ashbury Ln to Panama St	Collector	0.5	117.61	20	3
Tier 2						
8	Industrial Pkwy, from Whipple Rd to Mission Blvd	Arterial	2.02	114.37	20	3
9	Tennyson Rd, from Hesperian Blvd to Mission Blvd	Arterial	2.45	112.07	28	3
10	Hesperian Blvd, from Golf Course Rd to Southland Dr; from Cathy Way to Arf Ave	Arterial	2.75	110.77	21	3
11	Foothill Blvd, from Hazel Ave to A St	Arterial	0.43	102.81	55	2

RANK	LOCATION	LOCATION TYPE	SEGMENT LENGTH (MILES)	MAXIMUM 0.5-MILE CRASH SEVERITY SCORE	ASSOCIATED NUMBER OF TOTAL CRASHES	ASSOCIATED NUMBER OF FATAL AND SEVERE INJURY CRASHES
12	Sleepy Hollow Ave, from Jamaica Ln to Boca Raton St	Collector	0.75	102.34	9	3
13	Winton Ave, from Cabot Blvd to Soto Rd	Arterial	3.18	101.94	46	2
14	D St, from Meek Ave to 6th St	Arterial	1.48	96.41	48	2
15	Grand St, from A St to Meek Ave	Collector	0.62	95.56	35	2
16	B St, from Myrtle St to 2nd St	Arterial	1.00	92.58	40	2
17	Huntwood Ave, from Huntwood Way to Celia St; from Folsom Ave to Zephyr Ave	Arterial	2.75	90.55	28	2
18	Mission Blvd, from Grove Way to A St; from Palisade St to Industrial Pkwy	Arterial	3.37	88.34	29	2
19	Harder Rd, from Jackson St to Mission Blvd	Arterial	1.18	83.85	26	2
20	Orchard Ave, from Soto Rd to Mission Blvd	Arterial	0.50	80.46	29	2
21	Calaroga Ave, from Sunny Ln to Ashbury Ln	Collector	0.26	80.19	17	2
22	Clawiter Rd, from Industrial Blvd to Enterprise Ave	Collector	0.5	78.59	15	2
23	Whipple Rd, from Dyer St to Amaral St	Arterial	0.81	77.91	26	2
24	E St, from Main St to East Ave	Collector	0.45	67.27	8	2

RANK	LOCATION	LOCATION TYPE	SEGMENT LENGTH (MILES)	MAXIMUM 0.5-MILE CRASH SEVERITY SCORE	ASSOCIATED NUMBER OF TOTAL CRASHES	ASSOCIATED NUMBER OF FATAL AND SEVERE INJURY CRASHES
25	Vanderbilt St, from Garin Ave to Fairway St	Collector	0.50	66.47	4	2
26	Hayward Blvd, from Call Ave to Farm Hill Dr	Arterial	1.69	66.47	4	2
27	Jackson St, from Santa Clara St to Mission Blvd	Arterial	1.48	62.62	40	1
28	Gading Rd, from W Harder Rd to Schafer Rd	Arterial	0.58	58.07	27	1
29	Santa Clara St, from A St to Jackson Ave	Arterial	1.41	55.20	27	1
30	Ruus Rd, from W Tennyson Rd to Industrial Pkwy W	Collector	1.03	54.91	20	1
31	Patrick Ave, from St Bede Ln to W Tennyson Rd	Arterial	0.50	51.43	23	1
32	Whitman St, from Cody Rd to Peyton Dr	Collector	0.75	50.66	15	1
33	Fletcher Ln, from Fletcher Towers to Walpert St	Local	0.40	49.21	17	1
34	Meek Ave, from Filbert St to Jackson Ave	Local	0.53	49.12	17	1
35	Hathaway Ave, from Blossom Way to W A St	Arterial	0.47	47.45	23	1
36	Soto Rd, from Winton Ave to Orchard Ave	Arterial	0.54	47.45	23	1
37	Carlos Bee Blvd, from Mission Blvd to Hayward Blvd	Arterial	0.64	46.85	20	1
38	Dixon St, from Tennyson Rd to Sohay Loop	Collector	0.50	46.25	17	1
39	Industrial Blvd, from Clawiter Rd to Marina Dr	Arterial	2.29	46.18	13	1

RANK	LOCATION	LOCATION TYPE	SEGMENT LENGTH (MILES)	MAXIMUM 0.5-MILE CRASH SEVERITY SCORE	ASSOCIATED NUMBER OF TOTAL CRASHES	ASSOCIATED NUMBER OF FATAL AND SEVERE INJURY CRASHES
40	Fairway St, from Carroll Ave to Treeview St	Collector	0.58	45.86	16	1
41	Kelly St, from B Street to Mansfield Way	Arterial	0.32	44.11	17	1
42	Amador St, from Amador Village Court to Jackson St	Arterial	0.69	44.11	17	1
43	Silva Ave, from Meek Ave to Leighton St	Collector	0.26	42.81	10	1
44	Huntwood Way, from Gading Rd to Huntwood Ave	Arterial	0.14	42.39	13	1
45	Hancock St, from E 10th St to E 16th St	Local	0.32	40.86	10	1
46	Bolero Ave, from Hesperian Blvd to Calaroga Ave	Collector	0.33	39.84	10	1
47	Folsom Ave, from Harvey Ave to Huntwood Ave	Collector	0.50	39.84	10	1
48	Catalpa Way, from Hesperian Blvd to Miami Ave	Collector	0.45	39.11	11	1

Source: SWITRS, TIMS

Emphasis Areas

Using information from the safety analysis and Hayward's HIN, the project team developed seven emphasis areas (Figure 6 and Table 4). These emphasis areas help the City know what areas need the most attention. They guide LRSP recommendations and project prioritization, so the City can maximize its limited resources to be most effective in improving traffic safety. These emphasis areas also help Hayward play its part in creating a Safe System for California by aligning with six of California's SHSP high priority areas: bicyclists, impaired driving, intersections, lane departures, pedestrians, and speed management/aggressive driving.

According to the city's crash patterns and high-injury network, the following emphasis areas have the greatest potential to improve roadway safety throughout Hayward:

- ▶ Pedestrian Safety
- ▶ Bicyclist Safety
- ▶ Signalized and Unsignalized Intersections
- ▶ Unsafe Speeding and Aggressive Driving
- ▶ Broadside Crashes
- ▶ DUI Crashes
- ▶ Roadway and Lane Departure Crashes



Pedestrian Safety

Citywide, 30 percent of the city’s fatal and severe injury crashes involved pedestrians; 53 people were killed or severely injured while walking on Hayward roads. When pedestrians are hit in Hayward, they are most often hit crossing in a crosswalk at intersections by drivers continuing straight rather than turning. Tennyson Road, Mission Boulevard and A Street have the highest incidence of pedestrian crashes.

Objective: Reduce the number and severity of pedestrian crashes.



Bicyclist Safety

More than 90 percent of crashes that involve bicyclists result in death or some level of injury. Ten bicyclists (6 percent of citywide crashes) were killed or severely injured in crashes on Hayward roads.

Objective: Reduce the number of fatal and severe injury bicyclist crashes.



Signalized and Unsignalized Intersections

Citywide, 87 percent of reported crashes and of fatal and severe injury crashes occurred at intersections. Hesperian Boulevard, Tennyson Road and Foothill Boulevard have the most high-injury intersections.

Objective: Reduce the number and severity of crashes occurring at signalized and unsignalized intersections.



Speeding and Aggressive Driving

Unsafe speeds were associated with 20 percent of Hayward’s fatal and severe injury crashes. Seventy (70) percent of total reported unsafe speeding crashes involved two motor vehicles, and 23 percent involved a single motor vehicle and a fixed object, like a tree or utility pole. Speeding is one of the most frequently cited contributing factors to the city’s fatal and severe injury hit-object and head-on crashes.

Objective: Reduce the number and severity of crashes due to unsafe speeding.



Broadside Crashes

Almost one quarter of Hayward's reported crashes were broadside, where the front of one vehicle hits the side of another. Most frequently, broadside crashes are associated with drivers violating traffic signals and signs or automobile right of way. Mission Boulevard, Hesperian Boulevard and D Street see a high number of these types of crashes.

Objective: Reduce the number and severity of broadside crashes occurring due to automobile right of way and traffic signals and signs related violations.



DUI Crashes

More than 35 percent of Hayward's reported crashes and nearly a quarter of its fatal and severe injury crashes involved driving under the influence (DUI) of alcohol or drugs. In about 65 percent of these crashes, the driver hit another motor vehicle, and in 32 percent of these crashes, the driver hit a fixed object. Mission Boulevard, Hesperian Boulevard and Tennyson Road see the highest number of DUI crashes.

Objective: Reduce the number and severity of crashes occurring due to driving under the influence of alcohol or drugs.



Roadway and Lane Departure Crashes

About 37 percent of Hayward's high-injury network crashes involved a vehicle leaving its roadway or lane as part of a head-on, hit-object, or sideswipe crash. About half of these crashes occurred in the dark or low lighting conditions. Mission Boulevard, Hesperian Boulevard and Foothill Boulevard see a high number of these crash types.

Objective: Reduce the number and severity of roadway/lane departure crashes

RECOMMENDATIONS

The following recommendations will help the City spend its limited funds to build a Safe System for Hayward (Table 6).

Recommendations are based on the identified high injury network and cut across emphasis areas and include engineering countermeasures and policies and program strategies to help educate community members and improve emergency response times (Figure 6 and Table 4). Recommendations were also chosen to be consistent with the City of Hayward 2020 Bike and Pedestrian Master Plan.

Countermeasures are engineering infrastructure improvements that can be implemented to reduce the risk of crashes.

Strategies are non-engineering recommendations that can help address the other portions of a Safe System and build a culture of safety in Hayward.

Table 6. Recommendations by Safe System Category and Emphasis Area

SAFE SYSTEM CATEGORY	RECOMMENDATION	PEDESTRIAN SAFETY	BICYCLIST SAFETY	INTERSECTION SAFETY	UNSAFE SPEEDING AND AGGRESSIVE DRIVING	BROADSIDE CRASHES	DUI CRASHES	ROADWAY / LANE DEPARTURE CRASHES
Safe Roads and Safe Speeds	Implement engineering countermeasures, especially pedestrian conspicuity enhancements. ⁹ See recommended countermeasures in Table 8–Table 11 and in Appendix A for individual countermeasures and applicability to emphasis areas.	X	X	X	X	X	X	X
	Review and modify City design policies, guidelines, and standards to improve safety implementation.	X	X	X	X	X	X	X
Safe Road Users	Conduct public education and outreach to raise awareness of emphasis areas.	X	X	X	X	X	X	X
	Develop education materials related to roadway design changes and distribute them through local partners who can serve as community safety liaisons.	X	X	X	X	X	X	X
	Provide or support training to improve bicycle handling skills for bicyclists of all ages.		X					
	Promote and support Share the Road awareness programs; Safe Routes to School; and Cycling Skills Clinics, Bike Fairs, and Bike Rodeos.	X	X					

⁹ Enhancing conspicuity for pedestrians increases the opportunity for drivers to see and avoid pedestrians, particularly when it is dark.

SAFE SYSTEM CATEGORY	RECOMMENDATION	PEDESTRIAN SAFETY	BICYCLIST SAFETY	INTERSECTION SAFETY	UNSAFE SPEEDING AND AGGRESSIVE DRIVING	BROADSIDE CRASHES	DUI CRASHES	ROADWAY / LANE DEPARTURE CRASHES
	Target enforcement toward aggressive driving while monitoring and evaluating enforcement activities for social equity impacts.	X	X	X	X	X		X
	Coordinate to provide highly visible patrols with promotion and publicity such as saturation patrols, and sobriety checkpoints.				X		X	
Post-Crash Care	Coordinate with emergency medical services (EMS) to continue to consider response times in project design and implementation, and through engineering and operational solutions.	X	X	X	X	X	X	X
	Implement emergency vehicle signal preemption, which allows emergency vehicles to break a normal signal cycle and proceed through an intersection.	X	X	X	X	X	X	X
Emerging Technologies	Implement pedestrian detection. ¹⁰	X						
	Implement bicycle activated signal detection with loop detectors, bicycle signal heads, and optimized signal timing for bicyclists.		X					

¹⁰ Pedestrian detection is an intersection treatment that senses when a pedestrian is waiting at a crosswalk and automatically triggers the pedestrian "WALK" phase. This treatment can reduce crossings at inappropriate times and helps ensure pedestrians have enough time to safely cross the roadway.

SAFE SYSTEM CATEGORY	RECOMMENDATION	PEDESTRIAN SAFETY	BICYCLIST SAFETY	INTERSECTION SAFETY	UNSAFE SPEEDING AND AGGRESSIVE DRIVING	BROADSIDE CRASHES	DUI CRASHES	ROADWAY / LANE DEPARTURE CRASHES
	Consider signal systems that provide dynamic timing to respond to real-time traffic patterns and help prevent crashes.			X		X		
	Consider using intelligent speed adaptation for city-owned vehicles. ¹¹				X		X	
	Consider adoption of ignition interlock devices to prevent city-owned vehicles from starting if alcohol is detected in the driver's breath and the use the Driver Alcohol Detection System for Safety program. ¹²						X	

¹¹ Intelligent speed adaptation (ISA) involves in-vehicle devices that know the speed limit through accurate speed limit mapping and vehicle location data. These devices provide a warning or trigger active controls to help prevent speeding above limits.

¹² An alcohol ignition interlock prevents a vehicle from starting unless the driver provides a breath sample with a breath alcohol content (BrAC) lower than a pre-set level, usually .02. Interlocks typically are used as a condition of probation for DWI offenders to prevent them from driving while impaired by alcohol after their driver's licenses have been reinstated. The Driver Alcohol Detection System for Safety (DADSS, see www.dadss.org/) program is a collaborative research partnership between the automotive industry and the National Highway Traffic Safety Administration (NHTSA) to assess and develop alcohol-detection technologies that prevent vehicles from being driven when driver blood alcohol contents (BACs) exceed the illegal limit of .08 g/dL.

Implementing Enforcement

Even when engineering countermeasures and other safe system-aligned approaches like those in Table 6 are implemented, road users can fail to follow traffic laws resulting in crashes of varying severity. Traditionally, communities have relied on police enforcement to promote the rules of the road and reduce traffic crashes. However, most enforcement strategies have limited long-term impacts on changing road user behavior. The most effective enforcement strategies tend to be those that are done transparently, consistently, and in coordination with education or outreach campaigns, such as enforcement in school zones during school hours.

National studies of police traffic stops have shown racial bias in who gets stopped and subsequently searched, with Black and Hispanic drivers more likely to be searched than people of other races and ethnicities.¹³ Because of these biases, enforcement strategies should be carefully weighed for the risk that they could erode community relations and undercut broader efforts for community health and safety.

The following equity-focused initiatives may complement enforcement strategies:

- ▶ Encouraging strategies that educate and promote learning about road user behavior
- ▶ Incorporating social equity and demographic considerations into enforcement locations to avoid targeting communities
- ▶ Pursuing tiered fines for moving violations based on the ability to pay
- ▶ Allocating enforcement revenue with dedicated funding for outreach and community engagement
- ▶ Increase access and expand referrals to driver diversion classes and a DUI intensive supervision program as an alternative to traditional sanctions¹⁴

¹³ Stanford Open Policing Project. Retrieved from: <https://openpolicing.stanford.edu/findings> and Pierson, E., Simoiu, C., Overgoor, J. et al. A large-scale analysis of racial disparities in police stops across the United States. *Hum Behav* 4, 736–745 (2020). <https://doi.org/10.1038/s41562-020-0858-1>

¹⁴ Sandra C. Lapham, Laura Ring Kapitula, Janet C'de Baca, Garnett P. McMillan. Impaired-driving recidivism among repeat offenders following an intensive court-based intervention. *Accident Analysis & Prevention*, Volume 38, Issue 1, 2006. Pages 162-169. <https://doi.org/10.1016/j.aap.2005.08.00>

Prioritizing Safety & Equity

Prioritization Factors

To demonstrate which intersections and roadways Hayward may prioritize, the project team developed a prioritization spreadsheet that scores each roadway and intersection on the high injury network according to its crash severity, a location-based social equity indicator score, and how many of Hayward's seven emphasis areas were applicable to that area (Figure 6 and Table 4). The prioritization spreadsheet allows for different relative weights for each of the three factors relative to one another.

The City could consider elevating the social equity, transit, and emphasis areas above the severity score for a few reasons:

1. Severity scores had already been applied once as part of the HIN identification process.
2. Elevating social equity allows Hayward to invest in neighborhoods and locations that have historically lacked investment and that face overlapping social, economic, and safety challenges.

By focusing on emphasis areas, the City can be proactive. Rather than simply reacting to an abundance of reported crashes, the City can use the weighted scores to apply systemic safety improvements at locations with the greatest opportunity for safety benefits.

EMPHASIS AREAS



Pedestrian Safety



Bicyclist Safety



Signalized and Unsignalized Intersections



Speeding and Aggressive Driving



Broadside Crashes

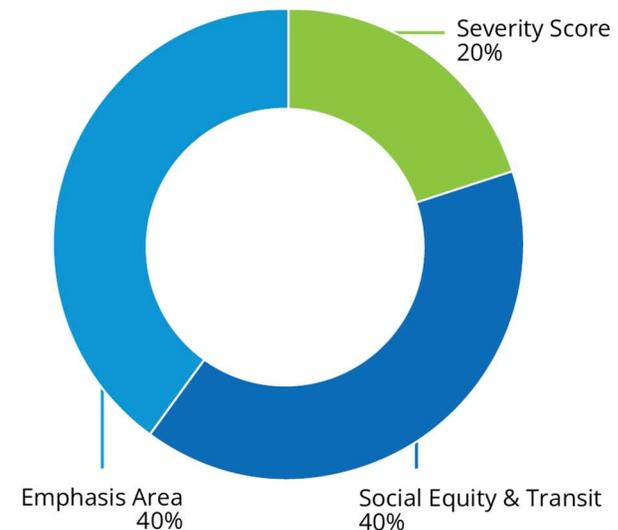


DUI Crashes



Roadway and Lane Departure Crashes

PRIORITIZATION WEIGHTS



Equity Scoring

Social equity, which includes factors such as income level, age, race, etc., scores indicate geographic areas with a high percentage of residents with transportation challenges or burdens, including less access to services, goods, employment, medical facilities, and education. Some demographic characteristics can make a community more likely to lack access to transportation services and therefore to basic needs.

To prioritize social equity, this LRSP developed and calculated a transportation disadvantaged population (TDP) index score for each census block group in the city. Using the most recent five-year American Community Survey data (2016–2020), the TDP score reviewed each of Hayward’s census block groups for the following people and groups (emphasis areas):

- ▶ Communities of color
- ▶ Populations with income less than double the federal poverty rate
- ▶ Populations with limited English proficiency
- ▶ Zero-vehicle households
- ▶ Seniors over 75
- ▶ Youth under 10
- ▶ Populations with disabilities
- ▶ Single-parent families

▶ Overburdened renters¹⁵

These scores help the City of Hayward quantify overlapping characteristics at the neighborhood level today and plan for equitable implementation of safety improvements in the future. The City now has a tool that allows location prioritization to include *any* individual factor listed above or an aggregate score (TDP) combining all nine factors. With this tool, the City can identify and prioritize locations based on social equity variables and match those locations and the communities they serve to different funding opportunities. For more about this tool’s application, see Appendix C.

¹⁵ Overburdened renters pay more than 30 percent of household income in housing costs.

Priority Locations

This LRSP developed a list of 20 priority locations using a test scenario. The scenario was run with severity score as 20 percent of the final score, social equity and transit proximity 40 percent, and emphasis areas 40 percent. Improvements at these locations have the most potential to address challenges associated with crash severity, transportation equity, and Hayward's emphasis areas. This list of locations represents just one weighting priority. Locations can be prioritized in different ways, depending on the intended outcome. For example, project identification for an HSIP grant would likely prioritize based on crash severity score more heavily. Alternatively, the City may wish to prioritize locations with just one of the social equity inputs, like locations with larger elderly populations. As a result of this plan, the City may use this prioritization tool to help prioritize locations based on different factors. Table 7 and Figure 7 show the resulting top locations with the test weights. Figure 8 shows the TDP index social equity scores that input into the prioritization.



Table 7. Top 20 Priority Locations with Test Scenario

RANK	ID#	LOCATION	LOCATION TYPE	ANNUALIZED CRASH SEVERITY SCORE ¹	TDP INDEX SCORE	EMPHASIS AREA SUM	AGGREGATED SCORE
1	R3	A St from 2nd St to Hesperian Blvd	Arterial Roadway	177.8	1.5	3	83.6
2	R6	Mission Blvd from D St to Palisade St	Arterial Roadway	121.9	1.3	5	81.1
3	R43	Silva Ave from Meek Ave to Leighton St	Arterial Roadway	42.8	1.5	4	78.8
4	I15	A St & Montgomery St	Signalized Intersection	57.3	1.5	5	75.0
5	I2	Foothill Blvd/Mission Blvd & Jackson St	Signalized Intersection	110.5	1.3	7	74.7
6	R18	Mission Blvd from Grove Way to A St and from Palisade St to Industrial Pkwy	Arterial Roadway	88.3	1.8	2	73.3
7	R13	Winton Ave from Cabot Blvd to Soto Rd	Arterial Roadway	101.9	1.5	3	72.6
8	I16	Tennyson Rd & 12 St/Dixon St	Signalized Intersection	56.0	1.4	4	71.8
9	I8	A St & Foothill Blvd	Signalized Intersection	70.0	1.4	6	70.9
10	R11	Foothill Blvd from Hazel Ave to A St	Arterial Roadway	102.8	1.4	3	69.7
10	R24	E St from Main St to East Ave	Arterial Roadway	67.3	1.4	3	69.7
10	R1	Foothill Blvd from A St to D St	Arterial Roadway	253.5	1.4	3	69.7

RANK	ID#	LOCATION	LOCATION TYPE	ANNUALIZED CRASH SEVERITY SCORE ¹	TDP INDEX SCORE	EMPHASIS AREA SUM	AGGREGATED SCORE
13	I30	Hesperian Blvd & Oliver Dr	Signalized Intersection	44.6	1.5	5	68.9
14	I11	A St & Western Blvd	Signalized Intersection	62.9	1.4	4	66.9
15	R10	Hesperian Blvd from Golf Course Rd to Southland Dr; and from Cathy Way to Arf Ave	Arterial Roadway	110.8	1.5	2	66.6
16	I9	Tennyson Rd & Huntwood Ave	Signalized Intersection	64.0	1.5	5	66.4
17	I4	A St & Victory Dr	Signalized Intersection	79.9	1.4	5	66.1
18	R4	Tennyson Rd from Pompano Ave to Ruus Rd	Arterial Roadway	133.7	1.5	2	65.4
19	R5	B St from 2nd St to Filbert St	Arterial Roadway	124.0	1.5	2	64.8
20	I14	Industrial Pkwy & Arrowhead Way/Dixon St	Signalized Intersection	57.5	1.8	3	64.1

¹ Severity score is calculated based on Caltrans costs of crash outcomes and is normalized to be expressed in terms of equivalent property damage only crashes (PDOs). The relative severity values are as follows: fatal and severe injury crashes are 119.9 equivalent PDOs at signalized intersections, 190.8 at unsignalized intersections, and 165.2 along roadways; moderate injuries are 10.7; and minor injuries are 6.1. For example, a signalized intersection with an annualized crash severity score of 48, could represent the equivalent of 48 PDO crashes per year, 2 fatal and/or severe injury crashes over 5 years ($119.9 \times 2/5 = 48$), or some combination of severity levels resulting in the same score.

Figure 7. Top 20 Priority Intersections and Roadways with Test Scenario

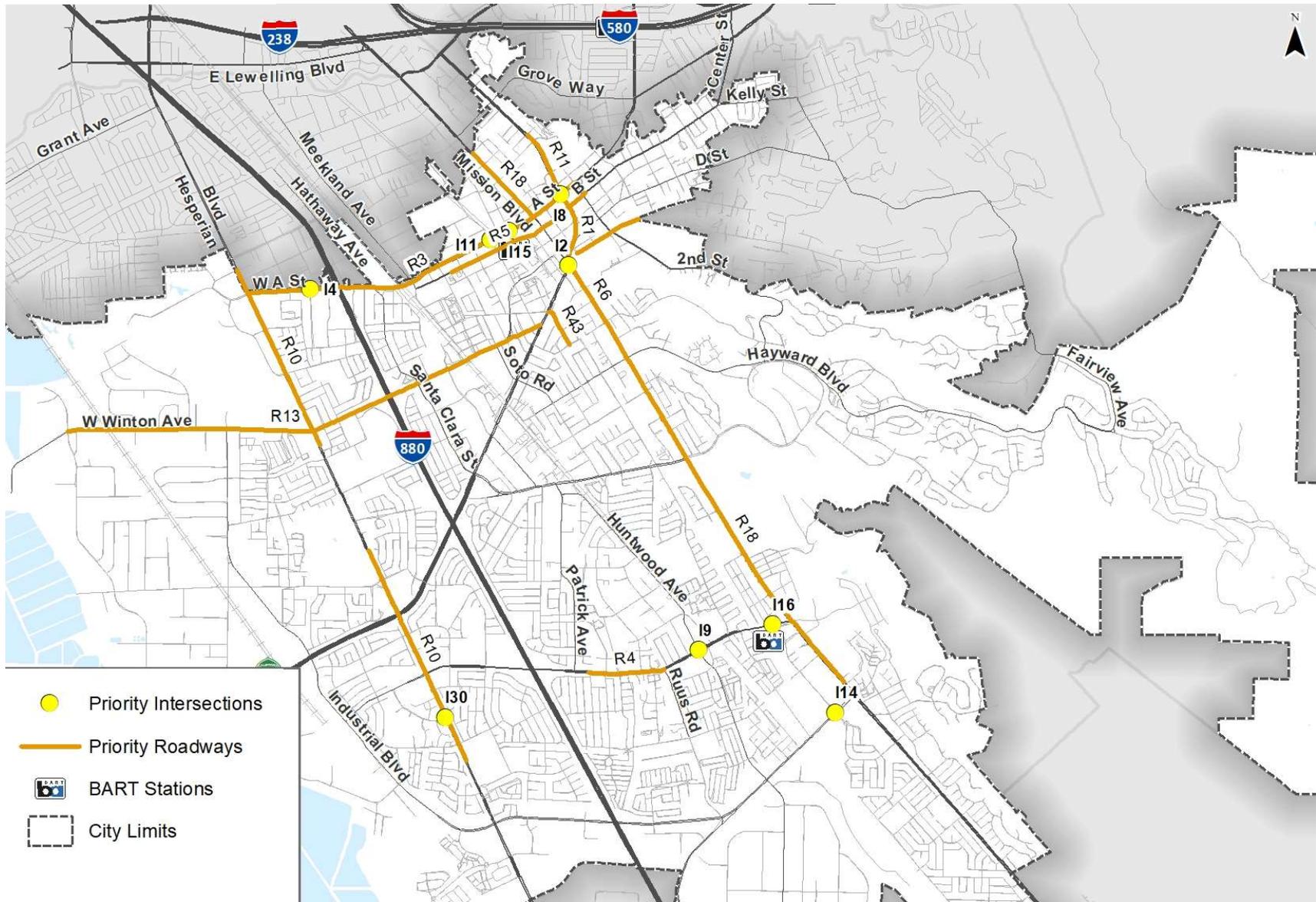
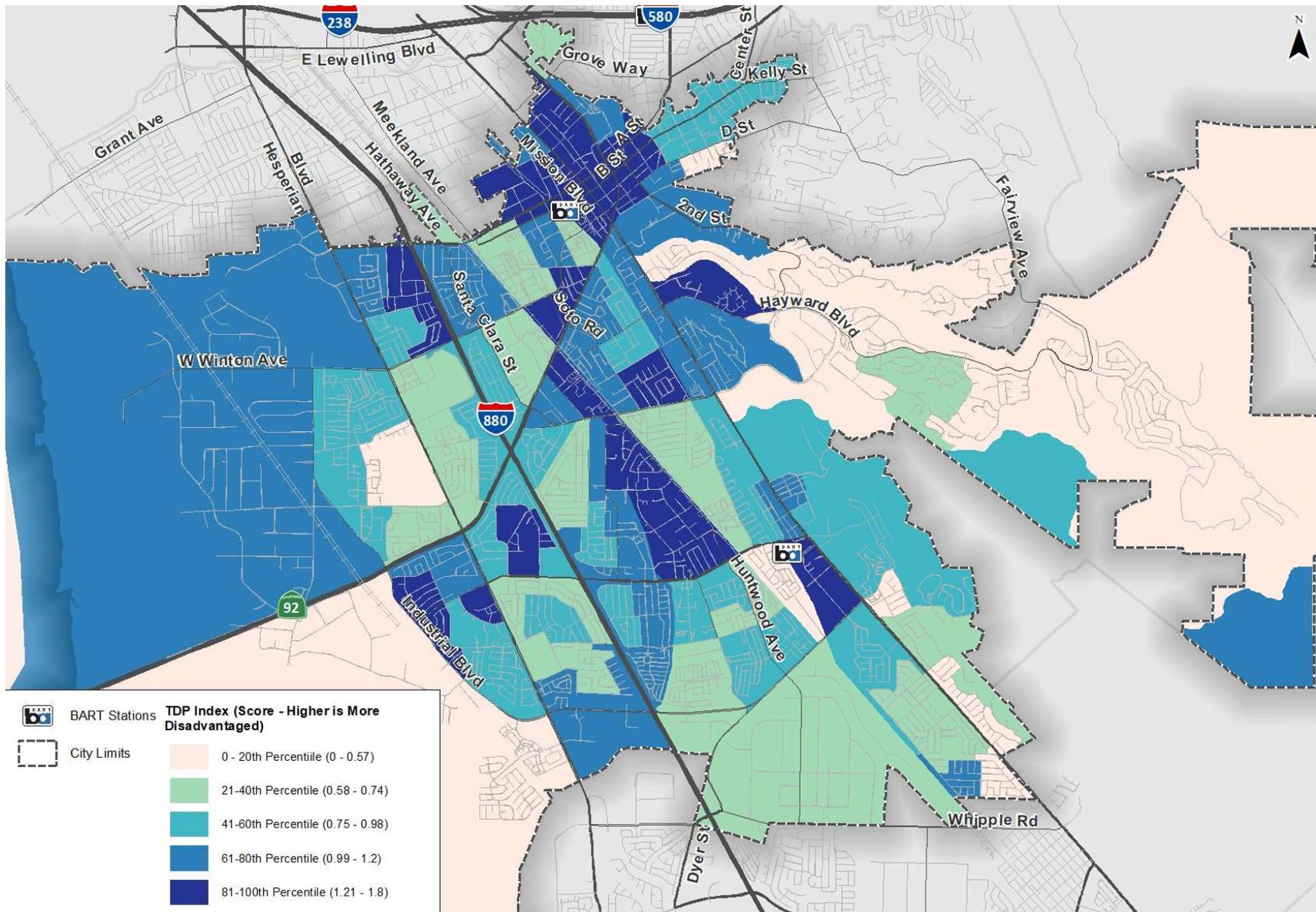


Figure 8. Disadvantaged Population Scores Used for Social Equity Input



Engineering Countermeasures

This LRSP recommends engineering countermeasures designed to maximize Hayward's investments according to the city's safety emphasis areas. More detail on these countermeasures can be found in Appendix A.

For a full list of the Federal Highway Administration's proven safety countermeasures, visit <https://highways.dot.gov/safety/proven-safety-countermeasures>.

PROVEN SAFETY COUNTERMEASURES

A key component of this LRSP, proven safety countermeasures are a set of tools and strategies that are effective in reducing fatal and severe injuries on roadways. These tools address speed management, roadway departure crashes, intersections, and pedestrian and bicyclist safety. Some proven countermeasures—like local road safety plans—cut across categories.



Throughout this section, look for this shield, which denotes that a recommendation is a proven safety countermeasure.

Table 8. Intersection Safety Treatments

COUNTERMEASURES				EMPHASIS AREAS ADDRESSED						
ID*	DESCRIPTION	COST**	NUMBER OF EMPHASIS AREAS ADDRESSED	INTERSECTION SAFETY	PEDESTRIAN SAFETY	BICYCLIST SAFETY	UNSAFE SPEED ON CITY ARTERIALS	BROADSIDE CRASHES	DUI CRASHES	ROADWAY/LANE DEPARTURE CRASHES
K01	Modify lane geometry: reduce multiple turn lanes to one turn lane	\$	5	X	X	X	X	X		
K02	Restrict right turns on red	\$	3	X	X			X		
K03	Refresh pavement markings	\$	4	X	X			X		X
K08	Implement protected intersection elements	\$-\$\$\$	4	X	X	X	X			
K16	Restrict parking near intersections, also called daylighting	\$	5	X	X	X	X	X		
 NS01, S01	Add intersection lighting	\$	5	X	X			X	X	X
 NS07	Upgrade intersection pavement markings	\$	4	X	X			X		X
 NS11	Improve sight distance to intersection	\$-\$\$\$	3	X				X	X	

COUNTERMEASURES				EMPHASIS AREAS ADDRESSED						
ID*	DESCRIPTION	COST**	NUMBER OF EMPHASIS AREAS ADDRESSED	INTERSECTION SAFETY	PEDESTRIAN SAFETY	BICYCLIST SAFETY	UNSAFE SPEED ON CITY ARTERIALS	BROADSIDE CRASHES	DUI CRASHES	ROADWAY/LANE DEPARTURE CRASHES
 NS15, S14	Create directional median openings to allow (and restrict) left turns and U-turns	\$-\$	2	X				X		
 S02	Improve signal hardware, with improvements such as larger lenses and back-plates with retroreflective borders	\$	3	X				X	X	
 S03	Adjust signal timing parameters (red-and-yellow change intervals, bicycle clearance times, etc.) to increase clearance times	\$	4	X	X	X		X		
S07	Provide protected left-turn phase	\$	4	X	X	X		X		
 S08	Convert signal to mast arm from pedestal-mounted	\$-\$\$\$	3	X				X	X	
 S11	Improve pavement friction using high friction surface treatments	\$\$	2	X		X				

*ID refers to countermeasure ID number. IDs beginning with NS, R, or S may be found in the Caltrans Local Roadway Safety Manual.

**\$ — \$50,000 or less; \$\$ — \$50,000 to \$100,000; \$\$\$ — \$100,000 or more

Table 9. Roadway Safety Treatments

COUNTERMEASURES				EMPHASIS AREAS ADDRESSED						
ID*	DESCRIPTION	COST**	NUMBER OF EMPHASIS AREAS ADDRESSED	INTERSECTION SAFETY	PEDESTRIAN SAFETY	BICYCLIST SAFETY	UNSAFE SPEED ON CITY ARTERIALS	BROADSIDE CRASHES	DUI CRASHES	ROADWAY/LANE DEPARTURE CRASHES
K09	Implement one-way to two-way conversion	\$\$-\$\$\$	5	X	X		X	X	X	
 R14	Reduce travel lanes and add a two-way left-turn and bike lanes, also called a road diet	\$	6	X	X	X	X	X		X
 R27	Install delineators, reflectors and/or object markers	\$	1							X
 R30	Install centerline rumble strips and/or stripes	\$-\$\$\$	1							X
 R31	Install edgeline rumble strips and/or stripes	\$-\$\$\$	1							X

* ID refers to countermeasure ID number. IDs beginning with NS, R, or S may be found in the Caltrans Local Roadway Safety Manual.

** \$ - \$50,000 or less; \$\$ - \$50,000 to \$100,000; \$\$\$ - \$100,000 or more

Table 10. Pedestrian Safety Treatments

COUNTERMEASURES				EMPHASIS AREAS ADDRESSED						
ID*	DESCRIPTION	COST**	NUMBER OF EMPHASIS AREAS ADDRESSED	INTERSECTION SAFETY	PEDESTRIAN SAFETY	BICYCLIST SAFETY	UNSAFE SPEED ON CITY ARTERIALS	BROADSIDE CRASHES	DUI CRASHES	ROADWAY/LANE DEPARTURE CRASHES
K05	Install curb extension	\$-\$\$\$	3	X	X		X			
 K11	Install continuous raised medians or hardened centerlines	\$-\$\$	5	X	X		X	X		X
K12	Reduce curb radius	\$-\$\$\$	3	X	X		X			
 K13	Stripe high-visibility crosswalk markings	\$	2	X	X					
K17	Install raised crosswalk	\$\$	3	X	X		X			
 NS19PB	Install raised medians and/or refuge islands	\$-\$\$	3	X	X			X		
 NS20PB, S18PB	Install new pedestrian crossing at uncontrolled locations	\$	2	X	X					
 NS23PB	Install pedestrian signal or pedestrian hybrid beacon	\$\$\$	2	X	X					

COUNTERMEASURES				EMPHASIS AREAS ADDRESSED						
ID*	DESCRIPTION	COST**	NUMBER OF EMPHASIS AREAS ADDRESSED	INTERSECTION SAFETY	PEDESTRIAN SAFETY	BICYCLIST SAFETY	UNSAFE SPEED ON CITY ARTERIALS	BROADSIDE CRASHES	DUI CRASHES	ROADWAY/LANE DEPARTURE CRASHES
 S19PB	Modify signal timing to provide a pedestrian scramble signal phase	\$	1		X					
 S21PB	Modify signal phasing to implement a leading pedestrian interval (LPI) phase	\$			X					

* ID refers to countermeasure ID number. IDs beginning with NS, R, or S may be found in the Caltrans Local Roadway Safety Manual.

** \$ — \$50,000 or less; \$\$ — \$50,000 to \$100,000; \$\$\$ — \$100,000 or more

Table 11. Bicycle Safety Treatments

COUNTERMEASURES				EMPHASIS AREAS ADDRESSED						
ID*	DESCRIPTION	COST**	NUMBER OF EMPHASIS AREAS ADDRESSED	INTERSECTION SAFETY	PEDESTRIAN SAFETY	BICYCLIST SAFETY	UNSAFE SPEED ON CITY ARTERIALS	BROADSIDE CRASHES	DUI CRASHES	ROADWAY/LANE DEPARTURE CRASHES
K10	Stripe bicycle lane extension through intersection	\$	3	X		X				X
K14	Modify signal phasing to implement a leading bicycle interval phase	\$	2	X		X				
K18	Stripe two-stage bicycle turn queue box and adjust signal timing accordingly	\$	1			X				
 R33PB	Install separated bike lanes	\$-\$-\$	2			X				X
 S20PB	Stripe advance stop bar and bicycle box before crosswalk	\$	4	X	X	X		X		

* ID refers to countermeasure ID number. IDs beginning with NS, R, or S may be found in the Caltrans Local Roadway Safety Manual.

** \$ - \$50,000 or less; \$\$ - \$50,000 to \$100,000; \$\$\$ - \$100,000 or more

Project Ideas

This section offers two examples of ways that the City of Hayward can use targeted safety improvements to help reduce fatal and severe injury crashes on its roadways.

Tennyson Road has a high number of high-injury intersections, both signalized and unsignalized (Figure 6 and Table 4). To reduce risk of future fatal and severe injury crashes, the City can install treatments designed specifically for each intersection. These exhibits demonstrate applying the recommended countermeasures presented in Table 8-Table 11 to create a safety project concept. For more on these concepts, see Appendix B.



Tennyson & Baldwin

Unsignalized Intersection

CRASHES, 2017-2021

- ▶ 7 Total
- ▶ 3 Fatal and Severe Injury: All Pedestrians
- ▶ 4 Pedestrian Crashes
- ▶ 1 Bicyclist Crash
- ▶ 1 Hit Object Crash
- ▶ 4 Night Crashes, 2 were Fatal and Severe Injury

EMPHASIS AREAS



RECOMMENDED IMPROVEMENTS

- | | |
|--------|---|
| NS23PB | Install Pedestrian Signal (including Pedestrian Hybrid Beacon [HAWK]) |
| NS19PB | Install raised medians/refuge islands (NS.I.) |
| NS20PB | Install pedestrian crossing at uncontrolled locations (new signs and markings only) |
| NS01 | Add intersection lighting (NS.I.) |
| NS15 | Create directional median openings to allow (and restrict) left turns and U-turns (NS.I.) |
| K10 | Stripe bicycle lane through intersection |
| K12 | Reduce curb radius |
| K13 | Stripe high-visibility crosswalk markings |
| K17 | Install raised crosswalk |



Tennyson & Calaroga

Signalized Intersection | *A Top 20 Priority Location*

CRASHES, 2017-2021

- ▶ 18 Total
- ▶ 3 Fatal and Severe Injury: 1 Motorcyclist, 1 Signal Violation, 1 Broadside
- ▶ 4 Signal Violation Crashes
- ▶ 7 Broadside Crashes
- ▶ 4 Night Crashes
- ▶ 2 Aggressive Driving Crashes

EMPHASIS AREAS



RECOMMENDED IMPROVEMENTS

- S21PB Modify signal phasing to implement a leading pedestrian interval (LPI)
- K01 Modify lane geometry: consider eliminating one right-turn lane
- S08 Convert signal to mast arm from pedestal-mounted
- S11 Improve pavement friction using high friction surface treatments
- S01 Add intersection lighting
- S02 Improve signal hardware with lenses, back-plates with retroreflective borders, mounting, size, and number
- K02 Restrict right turns on red
- K03 Refresh pavement markings
- K10 Stripe bicycle lane extension through intersection
- K12 Reduce curb radius
- K13 Stripe high-visibility crosswalk markings
- K14 Modify signal phasing to implement a leading bicycle interval phase
- K17 Install raised crosswalk
- S03 Adjust signal timing parameters (red-and-yellow change intervals, bicycle clearance times, etc.) to increase clearance times

IMPLEMENTATION

This LRSP is a living document and should be updated every three to five years. The plan must be monitored for progress to ensure emphasis area issues are being addressed and whether new strategies are needed. Monitoring will help provide accountability and keep various safety partners engaged throughout the implementation phase of the plan.

By implementing roadway improvements alongside changes in programming, policy, and funding, the City and its traffic safety partners can work together to improve road safety in Hayward. This section identifies a comprehensive set of action items that address emphasis areas to grow Hayward's traffic safety culture.

Implementation actions are organized by plan goal and grouped by time: near-term actions, which the City can initiate immediately, and longer-term actions, which may require coordination and additional staff time. Appendix D includes funding sources to assist the City in identifying opportunities to fund recommendations. Several of the funding sources include programmatic time to allow for the additional staff time necessary to implement this LRSP's recommendations.

Each action item has been marked with its key partners, emphasis areas, Safe System elements, and performance measures.

ACTION ITEM 1

PLAN GOALS

- ▶ Identify emphasis areas contributing to fatal and severe injury collisions to prioritize investments in countermeasures and strategies.
- ▶ Periodically monitor and evaluate emphasis areas and overall safety performance of the City's transportation network.

IMPLEMENTING THE PLAN

- ▶ Prioritize and implement strategies and improvements aligned to the identified emphasis areas.

SAFE SYSTEM ELEMENTS

- ▶ Safe Road Users
- ▶ Safe Roads
- ▶ Safe Speeds

PARTNERS

- ▶ City Public Works & Utilities
- ▶ City Development Services, Planning Division
- ▶ Dublin Unified School District
- ▶ Hayward PD

TERM	ACTION	PERFORMANCE MEASURES
Near-Term & Ongoing	<ul style="list-style-type: none"> ▶ Commit to zero fatalities and severe injuries by 2050. ▶ Review and modify City design policies, guidelines, and standards to improve safety implementation. ▶ Annually review crash data to evaluate progress on emphasis areas and for fatal and severe injury crash frequency at all locations. 	<ul style="list-style-type: none"> ▶ Total and per capita city fatal and severe injury crashes, including by emphasis area ▶ Before and after data on number of violations observed per emphasis area
Long-Term & Ongoing	<ul style="list-style-type: none"> ▶ Update the LRSP every 3-5 years using the most recent crash data and performance measures. ▶ Integrate LRSP emphasis area actions and priorities into future General Plan, bike and ped plan, other City planning efforts, and as input to Safe Routes to Schools plans 	<ul style="list-style-type: none"> ▶ Citywide fatality and severe injury rate compared to statewide goals ▶ Crash history along identified HIN, including by emphasis area

ACTION ITEM 2

PLAN GOALS

- ▶ Define priority locations for safety improvements for all modes of travel.
- ▶ Identify locations that directly benefit the following populations or users: children, older adults (65 and older), equity priority communities, disadvantaged populations, and transit users.

IMPLEMENTING THE PLAN

- ▶ Prioritize locations on the HIN for safety improvements (Figure 6 and Table 4)

SAFE SYSTEM ELEMENTS

- ▶ Safe Road Users
- ▶ Safe Roads
- ▶ Safe Speeds

TERM	ACTION	PERFORMANCE MEASURES
Near-Term & Ongoing	<ul style="list-style-type: none"> ▶ Pursue HSIP Cycle 11 and SS4A grant funding. ▶ Review all current and planned projects along the identified HIN for potential safety improvements. ▶ Track implementation of on-going safety improvements 	<ul style="list-style-type: none"> ▶ Grant money awarded for safety improvements ▶ Annual number of locations with implemented safety improvements
Long-Term & Ongoing	<ul style="list-style-type: none"> ▶ Take a strategic approach to pursuing grant funding opportunities by using the prioritization tool to identify and target top locations aligned with funding opportunities and other City priorities. ▶ Review developments along or adjacent to the identified HIN for safety improvement opportunities. ▶ Proactively track grant opportunities and pursue safety project grants with each available funding cycle. ▶ Conduct periodic roadway safety assessments of locations along the HIN for unsafe speed and automobile right-of-way violations. 	<ul style="list-style-type: none"> ▶ Number of winning grant applications submitted ▶ Funding secured for improvements for all HIN locations ▶ Number of collisions due to unsafe speed and automobile right-of-way violations ▶ Speed survey results ▶ Crash history along HIN, including by emphasis area

PARTNERS

- ▶ City's Public Works & Utilities Department
- ▶ Alameda County Transportation Commission (Alameda CTC)
- ▶ Hayward Police Department
- ▶ Emergency Service Providers
- ▶ Caltrans

ACTION ITEM 3

PLAN GOAL

- ▶ Identify cost-effective countermeasures and safety improvements that can be applied systemically.

IMPLEMENTING THE PLAN

- ▶ Implement systemic and cost-effective countermeasures aligned to the identified emphasis areas.

SAFE SYSTEM ELEMENTS

- ▶ Safe Road Users
- ▶ Safe Roads
- ▶ Safe Speeds
- ▶ Post-Crash Care

PARTNERS

- ▶ City's Public Works & Utilities Department
- ▶ Emergency Services Providers
- ▶ AC Transit
- ▶ BART

TERM	ACTION	PERFORMANCE MEASURES
Near-Term & Ongoing	<ul style="list-style-type: none"> ▶ Prioritize and implement systemic countermeasures and strategies focused on addressing the plan's emphasis areas (Table 8-Table 11). ▶ Implement systemic pedestrian and bicyclist safety improvements at HIN locations using funding. 	<ul style="list-style-type: none"> ▶ Number of intersections and roadway segments with implemented safety improvements ▶ Annual number of pedestrian and bicycle crashes occurring on the HIN ▶ Changes in emergency response time over time
Long-Term & Ongoing	<ul style="list-style-type: none"> ▶ Consider implementing identified low-cost, systemic countermeasures identified in this plan as part of projects (such as during development review, repaving, and beginning of new projects) ▶ Integrate systemic safety improvements into maintenance, capital improvement program, and other project development processes ▶ Apply for grant funding to support systemic safety implementation. ▶ Implement advance emergency vehicle signal preemption, which allows emergency vehicles to break a normal signal cycle and proceed through an intersection. ▶ Coordinate with AC Transit and BART on potential safety improvements in relation to bus service and BART station access. 	<ul style="list-style-type: none"> ▶ Before and after data on the annual number of fatalities and severe injuries on HIN ▶ Number of locations with implemented safety improvements annually ▶ Before and after data on emergency response time

ACTION ITEM 4

PLAN GOAL

- ▶ Identify transportation safety programs and strategies using the Safe System Approach and work collaboratively with agencies and safety partners toward implementation.

IMPLEMENTING THE PLAN

- ▶ Work with identified safety partners to implement the Safe System recommendations in this plan.

SAFE SYSTEM ELEMENTS

- ▶ Safe Road Users
- ▶ Safe Speeds
- ▶ Safe Vehicles

TERM	ACTION	PERFORMANCE MEASURES
Near-Term & Ongoing	<ul style="list-style-type: none"> ▶ Identify partners for public education and outreach opportunities to raise awareness of identified emphasis areas: pedestrian safety, bicyclist safety, motorcyclist safety, and aggressive and impaired driving. ▶ Share the LRSP and its goals and objectives with safety partners. ▶ Establish a Safety Task Force that includes the identified partners in this plan. 	<ul style="list-style-type: none"> ▶ Successful communication established with partners to initiate task force ▶ Regular communication with identified partners, meetings with agendas and action items ▶ Regular monthly meetings of the Safety Task Force ▶ Safety Task Force activity and participation (e.g., in City Council meetings)

PARTNERS

- ▶ City's Public Works & Utilities Department
- ▶ Hayward Police Department
- ▶ BART
- ▶ Bike East Bay
- ▶ Caltrans
- ▶ Community Resources for Independent Living (CRIL)
- ▶ Emergency Services Providers
- ▶ Hayward Area Recreation and Park District (HARD)

ACTION ITEM 4 (CONTINUED)

TERM	ACTION	PERFORMANCE MEASURES	PARTNERS (CONTINUED)
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Long-Term & Ongoing</p>	<ul style="list-style-type: none"> ▶ Partner with task force members to promote and expand educational campaigns for roadway safety, including specific campaigns for walking and biking. ▶ Develop safety messaging and campaigns to reduce impaired driving. ▶ Conduct or coordinate to provide educational trainings at schools on driving under the influence and aggressive driving. ▶ Establish roadway safety messaging to share through City media accounts throughout the year. ▶ Develop multilingual comprehensive roadway safety education programs to develop a safety culture in the City. ▶ Revisit and revise educational campaign opportunities based on crash trends and patterns. 	<ul style="list-style-type: none"> ▶ Number of trainings conducted ▶ Number of students participating in trainings ▶ Number of public information and outreach events conducted ▶ Number of attendees in each organized training 	<ul style="list-style-type: none"> ▶ Hayward Chamber of Commerce ▶ Hayward Fire ▶ Hayward Police Department ▶ Hayward Unified School District ▶ Senior Centers ▶ United Merchants Downtown Hayward

EVALUATION

This section presents measures the City can use to evaluate implementation progress and the success of the plan toward a goal of zero traffic deaths.

The City can use the following measures to evaluate goal progress and safety performance improvements:

- ▶ **Total number of fatal and severe injury crashes on City roads**
- ▶ **Number of fatal and severe injury crashes on City roads** by the following emphasis areas:
 - Pedestrian Safety
 - Bicyclist Safety
 - Signalized and Unsignalized Intersection Safety
 - Speeding and Aggressive Driving
 - Broadside Crashes
 - DUI Crashes
 - Roadway and Lane Departure Crashes
 - Children under 10
 - Adults over 75

- ▶ **Surrogate safety measures**, including:
 - Speed data at locations (particularly on the high injury network) over time
 - Speed limits, including any speed limit reductions undertaken
- ▶ **Number of recommended non-engineering activities completed**
 - Engagement activities held, including location of events and number of community members engaged
 - Number of projects improving safety, including the location of projects and each project's budget. Summarize the projects and any grant funding received to fund the projects. (These may be standalone safety projects or other project types with a safety element incorporated, e.g., a restriping project that adds a separated bike lane.)

The performance measures related to the number of crashes on City roads would be based on the latest three- and five-year annual average to normalize for random fluctuations in crashes on a year-over-year basis.

The City is also committed to updating the LRSP every five-years as new crash data becomes available and safety countermeasures are implemented on the roadway network.

Performance Measures

The City will report two sets of measures to track performance. The first set of measures are crash frequency statistics that will help the City measure the outcomes of the investments in roadway safety. The second set of measures track progress in implementing projects and programs.

For the first set of performance measures, the City will report three- and five-year averages of the number of crashes and the number of fatal and severe crashes for total crashes and emphasis area crashes (Table 12). The City will report both total reported crashes and fatal and severe crashes; however, the City's goals are specifically to reduce fatal and severe crashes which are life-altering events. For the statistics, the City will report the relative change in the statistics compared to the five-year average reported in the LRSP (2023). See Table 12 as an example table to fill out as part of evaluation.



Table 12. Three-Year and Five-Year Crash Averages by Emphasis Area

Emphasis Areas	2023 LRSP				5-YEAR LRSP UPDATE			
	Three-Year Average (2019–2021)		Five-Year Average (2017–2021)		Three-Year Average (2024–2026)		Five-Year Average (2022–2026)	
	Total Crashes	Fatal/Severe Crashes	Total Crashes	Fatal/Severe Crashes	Total Crashes	Fatal/Severe Crashes	Total Crashes	Fatal/Severe Crashes
Pedestrian Safety	92	25	177	40				
Bicyclist Safety	39	7	68	8				
Signalized & Unsignalized Intersections	329	33	654	52				
Speeding and Aggressive Driving	235	17	450	30				
Broadside Crashes	268	24	472	34				
DUI Crashes	120	8	199	15				
Roadway and Lane Departure Crashes	420	30	702	48				
Crashes Involving Adults over 65								
Crashes Involving Children under 10								
Total Reported Crashes*	1,600	104	2,823	173				

* total reported crashes are all crashes that occurred within the City of Hayward and are not a sum of the total crashes across emphasis areas.

The second set of performance measures are designed to track project and program implementation (Table 13). These may be refined based on coordination with safety partners identified in the plan to understand how best to measure the efforts and set appropriate goals.

Table 13: Project and Program Implementation

EFFORTS	TYPE	NUMBER COMPLETED
Roadway Safety Improvement Projects Completed	Engineering	
Non-Engineering Programs Completed	E.g., Education or Data Improvement	
Report Effectiveness of Completed Projects	Reporting / Transparency	

For roadway safety improvement projects, the City will describe the set of improvements, locations where the projects were implemented, expected benefits (i.e., potential crash reduction or nature of reduced crash risk) based on the countermeasures incorporated.

In addition to this table, the City will report:

- ▶ The number and type of non-engineering efforts.
- ▶ Name of the program(s).
- ▶ A description of the program(s) and implementation.
- ▶ The number of people reached with the key messages or educational materials.
- ▶ Efforts taken to promote social equity in programs.

APPENDIX A: COUNTERMEASURE TOOLBOX

Table 7. Intersection Safety Treatments

Countermeasures										
ID	Description	Brief Description	Documented Crash Reduction Factor	Intersection Safety	Pedestrian Safety	Bicyclist Safety	Unsafe Speed on City Arterials	Broadside Collisions	DUI Collisions	Roadway/Lane Departure Collisions
K01	Modify lane geometry: reduce multiple turn lanes to one turn lane	The application of this strategy usually reduces the roadway segment speeds and serious head-on crashes. In many cases the extra pavement width can be used for the installation of bike lanes. In addition to increasing bicycle safety, these bike lanes can improve the safety of on-street parking.	n/a	X	X	X	X	X		
K02	Restrict right turns on red	The purpose of this treatment is to eliminate conflicts between turning vehicles and pedestrians and/or bicyclists during a concurrent walk (or bike signal) phase. Motorists are advised of this restriction with the posting of “No Turn on Red” signs (MUTCD R10-11 series), which may be static or dynamic. Dynamic signs can be used to restrict turns during certain times of day or during certain signal phases; for example, vehicle right turns may be restricted during a bike signal phase.	0.97 ¹	X	X			X		
K03	Refresh pavement markings	Installing appropriate pavement delineation in advance of and at intersections can enhance the visibility of intersections and, thus, the ability of approaching drivers to perceive them. These markings provide approaching motorists with additional information at these locations.	25%	X	X			X		X
K08	Implement protected intersection elements	Protected intersections maintain a physical separation between motorists and bicyclists up to the intersection. They are designed to slow turning motorist speeds to induce yielding and to improve the sight line between motorists and bicyclists to reduce conflicts between turning motorists and through moving bicyclists.	n/a	X	X	X	X			
K16	Restrict parking near intersections, also called daylighting	When vehicles are parked too close to pedestrian and bicycle crossings, they can limit the sightlines between oncoming motorists and pedestrians or bicyclists needing to cross the street which can increase crash risk. Removing parking space(s) on an intersection approach can improve the visibility between pedestrians and bicyclists with approaching motorists.	0.70	X	X	X	X	X		
NS01, S01 	Add intersection lighting	Providing lighting at an intersection improves the safety of an intersection during nighttime conditions by (1) making drivers more aware of the surroundings at an intersection, which improves drivers' perception-reaction times, (2) enhancing drivers' available sight distances, and (3) improving the visibility of non-motorists. Intersection lighting is of particular benefit to non-motorized users.	40%	X	X			X	X	X

Countermeasures										
ID	Description	Brief Description	Documented Crash Reduction Factor	Intersection Safety	Pedestrian Safety	Bicyclist Safety	Unsafe Speed on City Arterials	Broadside Collisions	DUI Collisions	Roadway/Lane Departure Collisions
NS07 	Upgrade intersection pavement markings	The visibility of intersections and, thus, the ability of approaching drivers to perceive them can be enhanced by installing appropriate pavement delineation in advance of and at intersections will provide approaching motorists with additional information at these locations. The strategy is particularly appropriate for intersections with patterns of rear-end, right-angle, or turning crashes related to lack of driver awareness of the presence of the intersection.	25%	X	X			X		X
NS11 	Improve sight distance to intersection	Adequate sight distance for drivers at stop or yield-controlled approaches to intersections has long been recognized as among the most important factors contributing to overall safety at unsignalized intersections. By removing sight distance restrictions from the sight triangles at stop or yield-controlled intersection approaches, drivers will be able see approaching vehicles on the main line, without obstruction and therefore make better decisions about entering the intersection safely.	20%	X				X	X	
NS15, S14 	Create directional median openings to allow (and restrict) left-turns and U-turns	Restricting turning movement into and out of an intersection can help reduce conflicts between through and turning traffic. The number of access points, coupled with the speed differential between vehicles traveling along the roadway, contributes to crashes. This will address crashes related to turning maneuvers include angle, rear-end, pedestrian, and sideswipe (involving opposing left turns) type crashes.	50%	X				X		
S02 	Improve signal hardware such as larger lenses and back-plates with retroreflective borders	Providing better visibility of intersection signals aids the drivers' advance perception of the upcoming intersection. Signal intersection improvements include new LED lighting, signal back plates, retro-reflective tape outlining the back plates, or visors to increase signal visibility, larger signal heads, relocation of the signal heads, or additional signal heads.	15%	X				X	X	
S03 	Adjust signal timing parameters to increase clearance times (red-and-yellow change intervals, bicycle clearance times, etc.)	Signalization improvements may include adding phases, lengthening clearance intervals, eliminating or restricting higher-risk movements, and coordinating signals at multiple locations. This countermeasure should be used at locations that have a crash history at multiple signalized intersections.	15%	X	X	X		X		

Countermeasures										
ID	Description	Brief Description	Documented Crash Reduction Factor	Intersection Safety	Pedestrian Safety	Bicyclist Safety	Unsafe Speed on City Arterials	Broadside Collisions	DUI Collisions	Roadway/Lane Departure Collisions
S08 	Convert signal to mast arm from pedestal-mounted	This countermeasure provides better visibility of intersection signs and signals aids the drivers' advance perception of the upcoming intersection. It should be used at intersections currently controlled by pedestal mounted traffic signals (in medians and/or on outside shoulder) that have a high frequency of right-angle and rear-end crashes occurring because drivers are unable to see traffic signals in advance to safely negotiate the intersection.	30%	X				X	X	

1: Harkey et al 2008

Table 8. Roadway Safety Treatments

Countermeasures										
ID	Description	Brief Description	Documented Crash Reduction Factor	Intersection Safety	Pedestrian Safety	Bicyclist Safety	Unsafe Speed on City Arterials	Broadside Collisions	DUI Collisions	Roadway/Lane Departure Collisions
K09	Implement one-way to two-way conversion	A one-way to two-way conversion will generally manage traffic patterns, improve access, and change the character of a neighborhood from being a “pass-through” to a “destination” for motorists. Converting a one-way street to a two-way street can also help reduce motor vehicle speeds and vehicle miles traveled and provide improved conditions and access for bicyclists.	n/a	X	X		X	X	X	
R14 	Reduce travel lanes and add a two way left-turn and bike lanes, also called a road diet	The application of this strategy usually reduces the roadway segment speeds and serious head-on crashes. In many cases the extra pavement width can be used for the installation of bike lanes. This countermeasure should be used at areas noted as having a higher frequency of head-on, left-turn, and rear-end crashes with traffic volumes that can be handled by only 2 free flowing lanes.	35%	X	X	X	X	X		X
R27 	Install delineators, reflectors and/or object markers	The purpose of this countermeasure is to warn drivers of an approaching curve or fixed object that cannot easily be removed. They are intended to provide tracking information and guidance to the drivers.	15%							X
R30 	Install centerline rumble strips and/or stripes	Rumble strips provide an auditory indication and tactile rumble when driven on, alerting drivers that they are drifting out of their travel lane, giving them time to recover before they depart the roadway or cross the center line. Additionally, rumble stripes (pavement marking in the rumble itself) provide an enhanced marking, especially in wet dark conditions.	20%							X
R31 	Install edgeline rumble strips and/or stripes	Rumble strips provide an auditory indication and tactile rumble when driven on, alerting drivers that they are drifting out of their travel lane, giving them time to recover before they depart the roadway or cross the center line. Shoulder and edge line milled rumble strips/stripes should be used on roads with a history of roadway departure crashes.	15%							X
S21PB 	Modify signal phasing to implement a leading pedestrian interval (LPI) phase	A leading pedestrian interval (LPI) 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. This countermeasure should be used at intersections with signalized pedestrian crossing that have high turning vehicles volumes and have had pedestrian vs. vehicle crashes.	60%		X					

Table 9. Pedestrian Safety Treatments

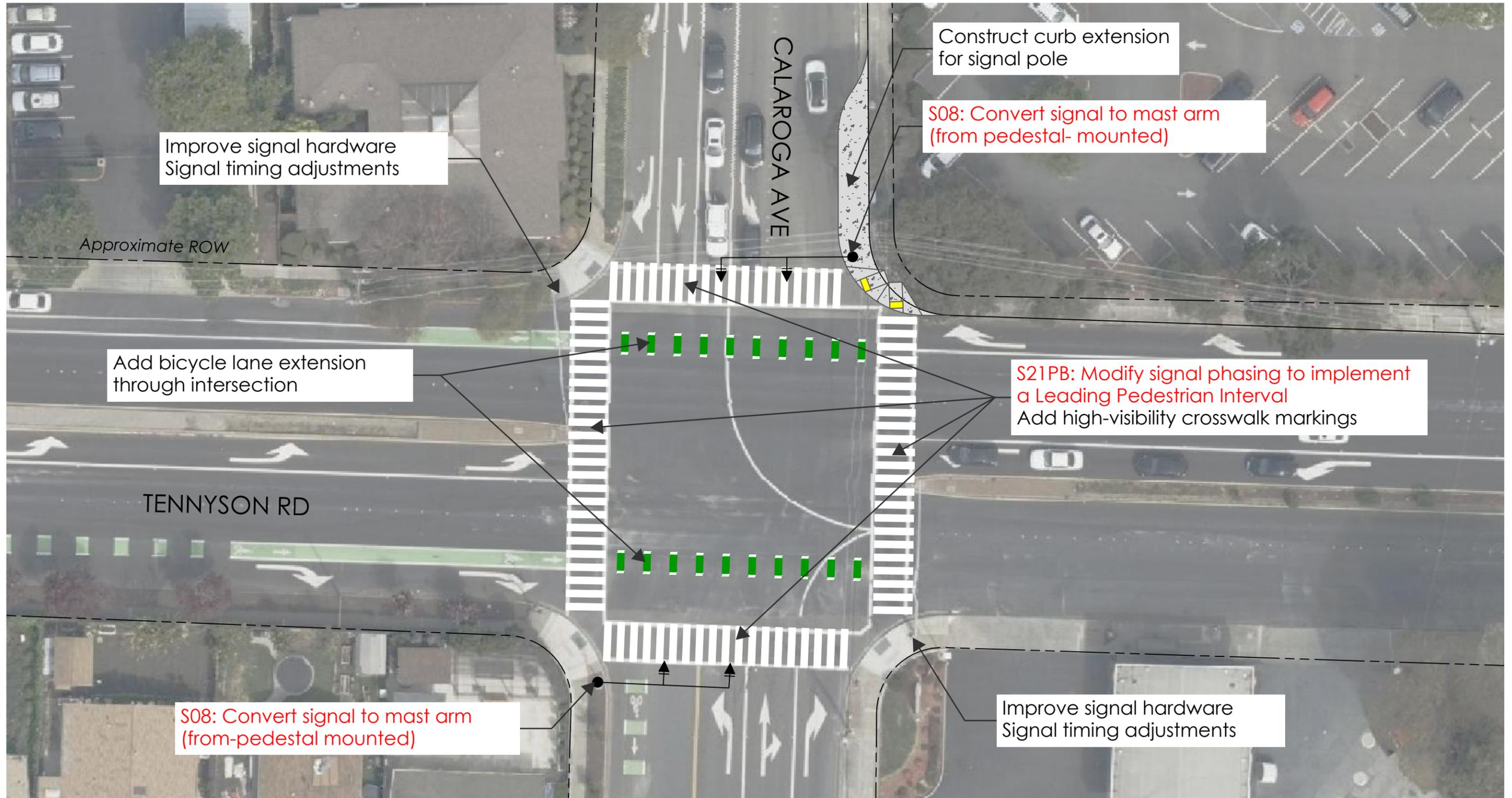
Countermeasures										
ID	Description	Brief Description	Documented Crash Reduction Factor	Intersection Safety	Pedestrian Safety	Bicyclist Safety	Unsafe Speed on City Streets	Broadside Collisions	DUI Collisions	Roadway/Lane Departure Collisions
K05	Install curb extension	Curb extensions decrease the width of a roadway through the physical extension of a curb line or sidewalk. Curb extensions may enhance pedestrian safety in several ways, such as by making pedestrians, bicyclists, and motorists more visible to each other; by keeping motor vehicles from parking too close to crossings and blocking sight lines; by reducing crossing distance; and by narrowing radii at intersections, which may slow-turning traffic. Curb extensions also tend to allow for better placement of curb ramps and prevent ramps from being blocked by vehicles that park at the corner.	n/a	X	X		X			
K11 	Install continuous raised medians or hardened centerlines	Continuous raised medians or hardened centerlines are roadway design treatments designed to provide access management and to separate opposing directions of motor vehicle travel at intersections and midblock locations. They can be extended across an intersection or a driveway, creating a continuous median to provide access management restricting motorist turning or crossing movements.	0.54 (all crashes) 0.69 (vehicle-pedestrian crashes for raised medians)	X	X		X	X		X
K12	Reduce curb radius	Curb radius reductions are a strategy to reduce turning speeds for vehicles by forcing sharper turns; they also create larger waiting areas for crossing pedestrians. All curb radius geometries should be designed to prevent turning vehicles from tracking over the curb which could injure people waiting on the corner.	n/a	X	X		X			
K13 	Stripe high-visibility crosswalk markings	High-visibility crosswalk markings, such as continental or ladder-style, are preferred over parallel line markings to improve visibility to approaching motorists. High-visibility crosswalk markings reinforce legal crosswalks at intersections and create legal crossings at non-intersection locations.	0.52	X	X					
K17	Install raised crosswalk	Adding a raised pedestrian crosswalk has the opportunity to enhance pedestrian safety at locations noted as being especially problematic. The raised crosswalk encourages motorists to reduce their speed and provides improved delineation for the portion of the roadway that is designated for pedestrian crossing.	35%	X	X		X			
NS19PB 	Install raised medians and/or refuge islands	Raised pedestrian refuge islands, or medians at crossing locations along roadways, are another strategy to reduce exposure between pedestrians and motor vehicles. Refuge islands and medians that are raised (i.e., not just painted) provide pedestrians more secure places of refuge during the street crossing. This will address crashes at intersections that have a long pedestrian crossing distance, a higher number of pedestrians, or a crash history.	45%	X	X			X		

Countermeasures										
ID	Description	Brief Description	Documented Crash Reduction Factor	Intersection Safety	Pedestrian Safety	Bicyclist Safety	Unsafe Speed on City Streets	Broadside Collisions	DUI Collisions	Roadway/Lane Departure Collisions
NS20PB, S18PB 	Install new pedestrian crossing at uncontrolled locations	The purpose of this countermeasure is to enhance pedestrian safety at locations noted as being problematic. Pavement markings delineate a portion of the roadway that is designated for pedestrian crossing and should be installed at intersections with no marked crossing where pedestrians are known to be crossing locations that involve significant vehicular traffic.	25%	X	X					
NS23PB 	Install pedestrian signal or pedestrian hybrid beacon	Adding a pedestrian signal has the opportunity to greatly enhance pedestrian safety at locations noted as being problematic. Corridors should also be assessed to determine if there are adequate safe opportunities for non-motorists to cross and if a pedestrian signal, or a Pedestrian Hybrid Beacon (PHB) are needed to provide an active warning to motorists when a pedestrian is in the crosswalk.	55%	X	X					
S19PB 	Modify signal timing to provide a pedestrian scramble signal phase	Pedestrian Scramble is a form of pedestrian "WALK" phase at a signalized intersection in which all vehicular traffic is required to stop, allowing pedestrians/bicyclists to safely cross through the intersection in any direction, including diagonally. Pedestrian Scramble may be considered at signalized intersections with very high pedestrian/bicycle volumes, e.g. in an urban business district.	40%		X					

Table 10. Bicycle Safety Treatments

Countermeasures										
ID	Description	Brief Description	Documented Crash Reduction Factor	Intersection Safety	Pedestrian Safety	Bicyclist Safety	Unsafe Speed on City Arterials	Broadside Collisions	DUI Collisions	Roadway/Lane Departure Collisions
K10	Stripe bicycle lane extension through intersection	Bicycle lane extension pavement markings through intersections are intended to provide bicyclists with a clear, highly visible pathway through an intersection and create a safer bicycling environment. They also help to alert motorists to the presence of bicycle through-traffic and encourage turning motorists to yield to through moving bicyclists.	n/a	X		X				X
K14	Modify signal phasing to implement a leading bicycle interval phase	Leading bicycle intervals (LBIs) provide bicyclists a head start when crossing at a signalized intersection. LBIs can be easily programmed into existing signals to give bicyclists an advanced green signal a minimum of 3 to 7 seconds before motorists are allowed to proceed through the intersection. This extra time provides through-bicyclists with an opportunity to establish their presence in, or to clear an intersection before motorists start turning.	n/a	X		X				
K18	Stripe two-stage bicycle turn queue box and adjust signal timing accordingly	A two-stage left-turn queue box designates an area outside of vehicle conflicts for bicyclists to wait for traffic to clear before proceeding in a different direction of travel. It may be used for left or right turns. They may be useful at locations where bicyclists would have to merge across multiple lanes of traffic, would have to wait in a shared travel lane with motorists to turn, or at locations with separated bike lanes or sidepaths where it is not possible for bicyclists to merge into motor vehicle lanes in advance of the intersection.	n/a			X				
R33PB 	Install separated bike lanes	Separated bike lanes provide increased safety and comfort for bicyclists beyond conventional bicycle lanes. By separating bicyclists from motor traffic, "protected" or physically separated bike lanes can offer a higher level of comfort and are attractive to a wider spectrum of the public. Separated bikeways are most appropriate on streets with high volumes of bike traffic and/or high bike-vehicle collisions, presumably in an urban or suburban area.	45%			X				X
S11 	Improve pavement friction using high friction surface treatments	This countermeasure is intended to target locations where skidding and failure to stop is determined to be a problem in wet or dry conditions and the target vehicle is unable to stop due to insufficient skid resistance.	55%				X			
S20PB 	Stripe advance stop bar and bicycle box before crosswalk	Adding advance stop bar before the striped crosswalk has the opportunity to enhance both pedestrian and bicycle safety. Stopping cars well before the crosswalk provides a buffer between the vehicles and the crossing pedestrians.	15%	X	X	X		X		

APPENDIX B: PROJECT CONCEPTS

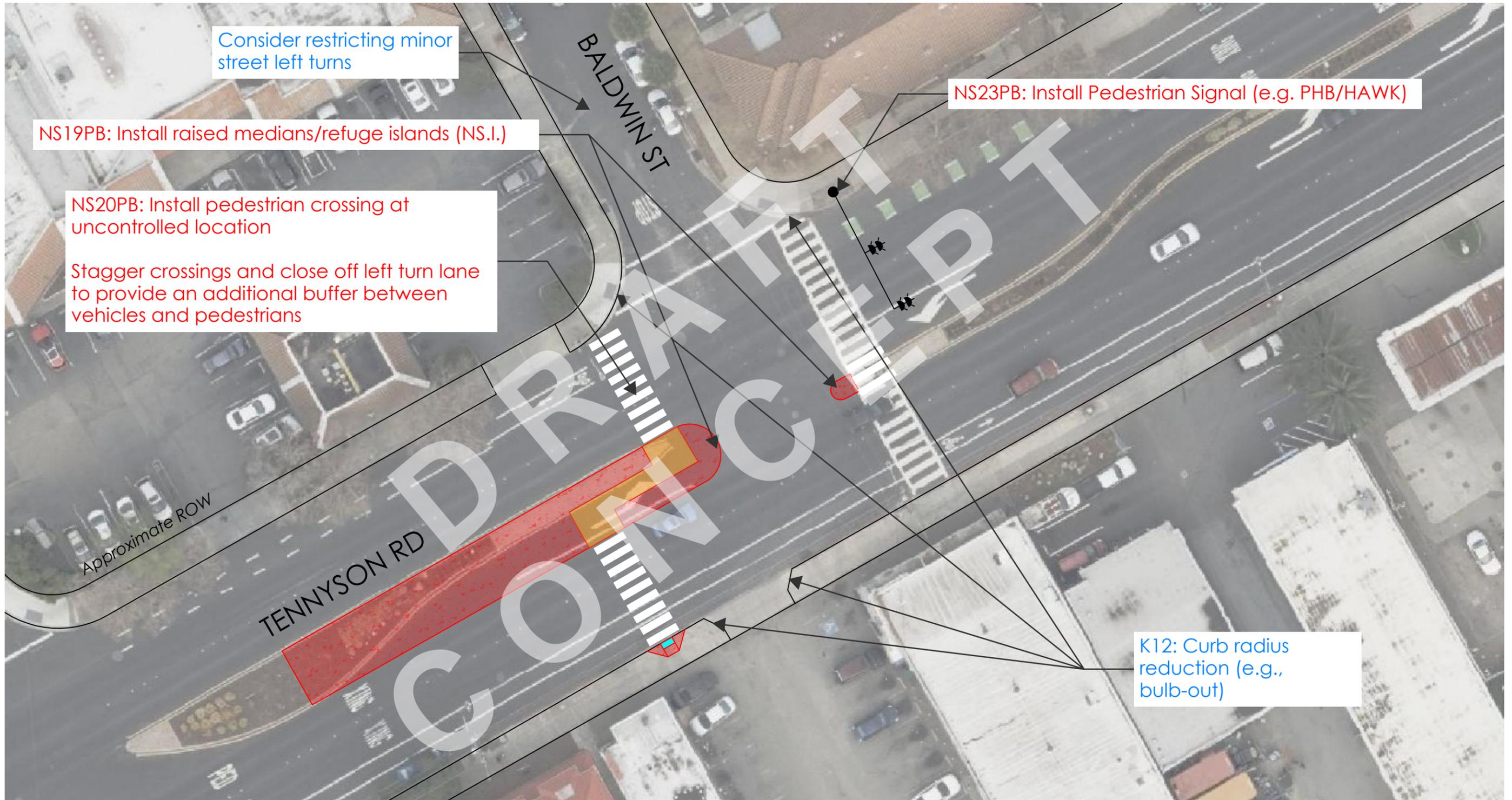


- Applicable HSIP Improvements
- Other Safety Improvements

Tennyson Rd & Calaroga Ave
Hayward, CA



C:\Users\local_silva\Temp\AcPublish\2392Tennyson-Baldwin.dwg Aug 30, 2022 - 12:07pm - silva Layout Tab: Tennyson_Calaroga



NS19PB: Install raised medians/refuge islands (NS.I.)

NS20PB: Install pedestrian crossing at uncontrolled location
Stagger crossings and close off left turn lane to provide an additional buffer between vehicles and pedestrians

NS23PB: Install Pedestrian Signal (e.g. PHB/HAWK)

K12: Curb radius reduction (e.g., bulb-out)

- Applicable HSIP Improvements
- Other Improvements

NOTE: PARKING IS ALREADY RESTRICTED;
CURB EXTENSION COULD SELF-ENFORCE

I1: Tennyson Rd & Baldwin St
Hayward, CA

Exhibit
B

C:\Users\local_silva\Temp\AcPublish_294641Tennyson-Baldwin.dwg Aug 16, 2022 - 5:11pm - silva Layout Tab: Tennyson_Baldwin_B

APPENDIX C: PRIORITIZATION MEMO

Technical Memorandum

July 22, 20221

Project# 27444

To: Kathy Garcia, P.E., Assistant Public Works Director
City of Hayward
777 B Street
Hayward, CA 94541

From: Mike Alston

CC: Obaid Khan, P.E.

RE: Hayward LRSP – Location Prioritization

INTRODUCTION AND SUMMARY

Kittelison & Associates, Inc. (Kittelison) is working with the City of Hayward (City) to develop a Local Roadway Safety Plan (LRSP). The scope of work for this project includes identifying up to 20 priority locations to identify potential improvements and developing project concepts for up to five of those locations. This technical memorandum (memo) documents Kittelison's process for identifying priority locations to identify potential improvements and proposes a list of 20 locations based on the prioritization methodology.

Information is organized as follows:

- Background
 - Crash Severity/Network Screening
 - Emphasis Areas
- Social Equity Evaluation
- Applying Prioritization

Background

The previous task of this project and associated collision analysis memo produced the following results, which were used as inputs for prioritizing locations:

- **High-injury locations (roadways and segments):** Kittelison screened the City's roadway network to find the top severity-weighted crash locations, using an equivalent property damage only (EPDO) severity weighting method. Among all intersections with collision history over the 2017-2021 period, we identified 48 high-injury roadway segments (with maximum observed half-mile annualized severity scores ranging from 39.1 to 253.48) and 29 high-injury intersections (with maximum observed annualized severity scores ranging from 44.6 to 119.2) that collectively account for 75% of the City's reported fatal and serious injury collisions.
- **Emphasis areas:** Emphasis areas represent common crash, infrastructure, or behavior characteristics that are overrepresented among the City's fatal and serious collision history. Focusing on emphasis areas would provide the greatest potential safety improvement for the City. The following emphasis areas were identified:

- Intersection safety
- Pedestrian safety
- Bicyclist safety
- Unsafe speed on arterials
- Broadside collisions
- Driving under the influence
- Roadway/lane departure collisions

Using available collisions history, each location was identified as pertaining to each emphasis area or not – so that each location can have a score from 0 (meaning no relevant emphasis areas apply) to seven (meaning that all relevant emphasis areas apply). Priority locations were identified as aligning with emphasis areas using the rules described in Table 1.

Table 1: Emphasis Area Application at Locations

Emphasis Area	Intersections	Roadways
Intersection safety	Applicable	Not applicable
Pedestrian safety	Multiple pedestrian collisions, or at least one F+SI pedestrian collision	Multiple pedestrian collisions per half-mile, or at least one F+SI pedestrian collision per half-mile
Bicyclist safety	Multiple bicyclist collisions, or at least one F+SI bicyclist collision	Multiple bicyclist collisions per half-mile, or at least one F+SI bicyclist collision per half-mile
Unsafe speed on arterials	At least half of collisions include "aggressive driving" PCFs, or at least one F+SI collision with the same PCF	At least half of collisions include "aggressive driving" PCFs, or at least one F+SI collision with the same PCF per half-mile
Broadside collisions	At least half of collisions are broadsides, or at least one broadside F+SI collision	At least half of collisions are broadsides, or at least one broadside F+SI collision per half-mile
Driving under the influence	At least half of collisions involve impaired driving, or at least one F+SI collision involving impaired driving	At least half of collisions involve impaired driving, or at least one F+SI collision involving impaired driving per half-mile
Roadway/lane departures	At least half of collisions are hit object or head on, or at least one hit object or head on F+SI collision	At least half of collisions are hit object or head on, or at least one hit object or head on F+SI collision per half-mile

Note: F+SI – Fatal and severe injury

Social Equity Evaluation

In the context of transportation, a social equity ranking identifies geographic areas with a high percentage of residents who experience challenges achieving basic access to services, goods, employment, and/or education. For example, some demographic characteristics that would cause an area to appear higher (i.e., more disadvantaged) with respect to social equity include a higher-than-average percentage of low-income people, people with a disability, and zero-vehicle households. Kittelson calculated a *Transportation Disadvantaged Population (TDP) index* score for each Census block group in the City.

The TDP index uses the variables listed below at the Census block group level using the most recent available five-year American Community Survey data (2016-2020):

- Communities of Color
- Low Income (<200% of Poverty) Population
- Limited English Proficiency Population
- Zero-vehicle Households
- Seniors Over 75
- Youth Under 10
- Population with a Disability
- Single-Parent Families
- Overburdened Renters

The equation used to develop the intersection or segment location's TDP index score is shown below:

$$TDP\ Index = \frac{(Eld + Yth + NH + Pov + (HH(Veh + Fam + Rent + LEP) + Dis)}{Pop}$$

where:

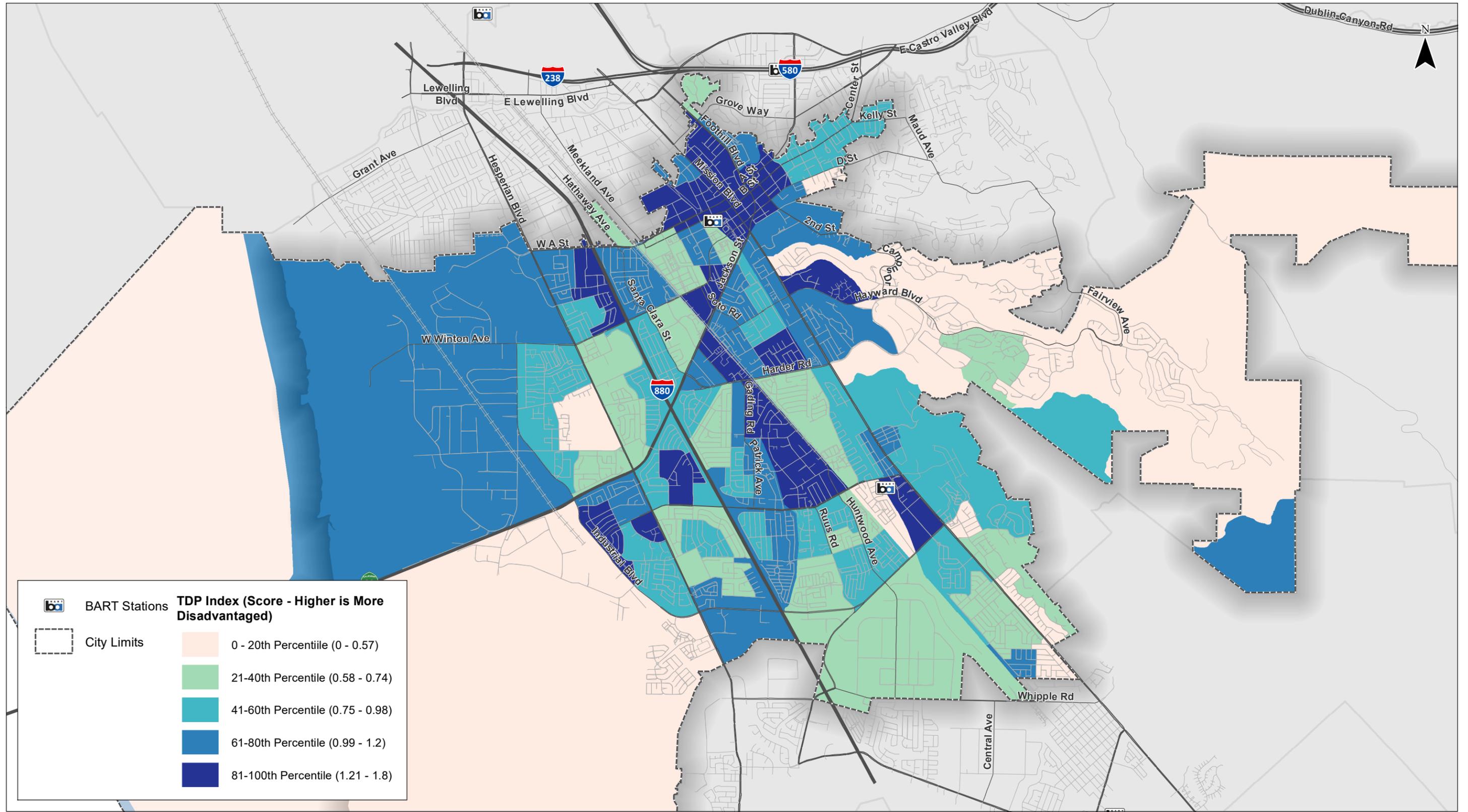
- Eld = # of residents over 75
- Yth = # of residents under 10
- NH = # of residents who identify as non-white or Hispanic (communities of color)
- LEP = # of households identified as speak English "not well" or "not at all"¹
- Pov = # of residents with income under 200% of poverty level
- HH = Average California household size
- Veh = # of households with 0 vehicles¹
- Fam = # of single-parent families¹
- Rent = Overburdened renters
- Dis = # of residents with a disability
- Pop = Total population

Scoring is continuous, with scores initially ranging from zero to a maximum possible score of eight based on the sum of indices. (Two categories, *seniors over 75* and *youth under 10* are mutually exclusive). A score of eight would indicate that every resident within the block group meets eight of the nine indicators. Each score will then be divided by the maximum score to obtain its index value relative to maximum.

This approach presents the City with an equity-focused input that prioritizes locations based on neighborhoods that stand to benefit the most from transportation investment. A higher score represents a more disadvantaged population from a transportation perspective. Scores ranged from 0.63 to 3.37 out of a maximum possible score of 8. We then assigned each intersection and corridor the highest TDP index score of the surrounding Census block group (see scores in Figure 1).²

¹ Data at the household level is multiplied by the average household size for each block group.

² If a site lies in multiple block groups, we assigned it the highest score among those block groups.



H:\2727444 - Hayward LRSP\figs\Task 6\27444_Hayward_LRSP_TDP_scores.mxd - mblston - 2:50 PM 7/2/2022

Applying Prioritization

To combine all factors, Kittelson identified the following scores for each roadway and intersection:

- **Severity Score Index:** Kittelson normalized severity scores by dividing each intersection's severity score and each roadway's maximum half-mile severity score by the maximum observed score for all locations. Normalized scores ranged from 0.15 to 1.0.
- **TDP Index score and transit presence:** Kittelson normalized each location's TDP index by dividing its score by the maximum observed score for all locations, giving each location a score from 0 to 1. That score was given 75% weight and a flag for locations that are along a bus route or within one-quarter mile of a BART station (1=yes, 0=no) was given 25% to compute a normalized TDP and transit score. Normalized scores ranged from 0.2 to 1.0. (For example, if a location had a normalized TDP index score of 0.6 and was along a transit line, its combined score would be $0.6 * 0.75 + 1 * 0.25 = 0.7$)
- **Emphasis Area score:** Kittelson summed the number of emphasis areas applicable to each location (a maximum available of seven) and normalized the scores by dividing by the maximum observed (seven). Normalized scores ranged from 0 to 1.0.

For each location, each normalized score was assigned the weights shown in Table 2, resulting in scores theoretically ranging from 0 to 100.

Table 2: Prioritization Weights

	Inputs		
	Severity Score	Social Equity and Transit	Emphasis Areas
Weighting	20%	40%	40%

The weights are chosen to elevate social equity, transit presence (as incorporated in the social equity and transit score), and emphasis areas above severity score for the following reasons:

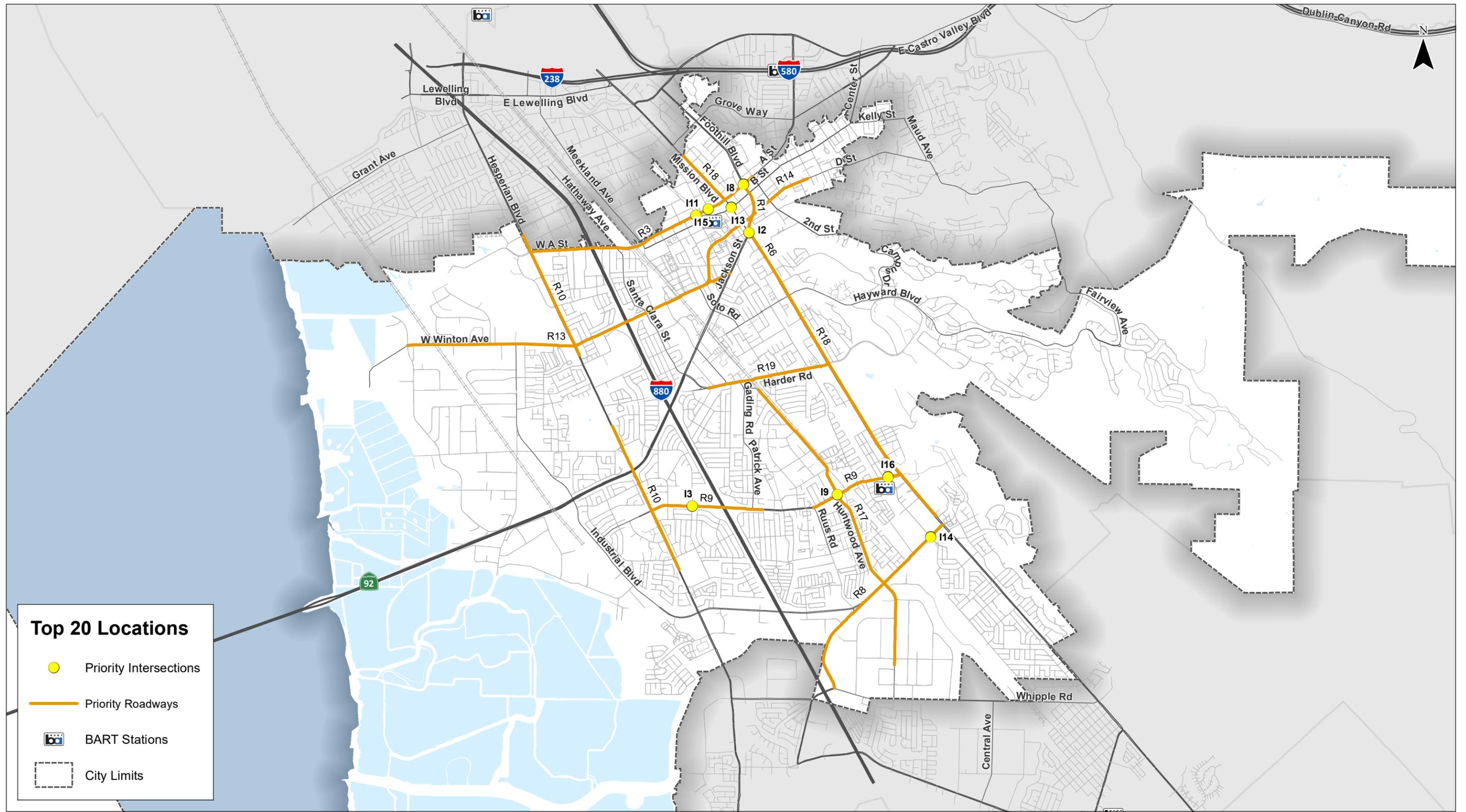
- Severity scores have already been applied given that the list of all possible intersections and roadways has been narrowed to the 29 intersections and 48 roadway segments with the highest collision frequency and severity.
- Elevating emphasis areas over severity allows the City to prioritize locations that match high-leverage safety opportunities and apply similar, systemic treatments for improvement, rather than simply reacting to an abundance of reported crashes.
- Elevating social equity in the prioritization allows the City to identify opportunities to invest in safety in neighborhoods and locations that have historically lacked investment and that face overlapping challenges.

The resulting top locations are shown in Table 3 and in , which includes 11 roadways (all arterials) and nine intersections (all signalized). Appendix A presents the table in more detail.

Table 3: Top 20 Priority Locations

Rank	ID#	Location	Location Type	Annualized Crash Severity Score ¹	TDP Index Score	Emphasis Area Sum	Aggregated Score
1	R3	A St from 2nd St to Hesperian Blvd	Arterial Roadway	177.78	1.5	6	82.5
2	I2	Foothill Blvd/ Mission Blvd & Jackson St	Signalized Intersection	110.5	1.3	7	82.2
3	I16	Tennyson Rd & 12 St/Dixon St	Signalized Intersection	56	1.4	7	81.9
4	R18	Mission Blvd From Grove Way to A St and From Palisade St to Industrial Pkwy	Arterial Roadway	88.34	1.8	6	81.3
5	R10	Hesperian Blvd From Golf Course Rd to Southland Dr; and From Cathy Way to Arf Ave	Arterial Roadway	110.77	1.5	6	78.5
6	I15	A St & Montgomery St	Signalized Intersection	57.3	1.5	6	78.1
7	R8	Industrial Pkwy From Whipple Rd to Mission Blvd	Arterial Roadway	114.37	1.8	5	77.6
8	R13	Winton Ave From Cabot Blvd to Soto Rd	Arterial Roadway	101.94	1.5	6	77.3
9	I8	A St & Foothill Blvd	Signalized Intersection	70	1.4	7	76.7
10	R9	Tennyson Rd From Hesperian Blvd to Mission Blvd	Arterial Roadway	112.07	1.7	5	75.3
11	R19	Harder Rd From, Jackson St to Mission Blvd	Arterial Roadway	83.85	1.4	6	74.3
12	R17	Huntwood Ave From Huntwood Way to Celia St and From Folsom Ave to Zephyr Ave	Arterial Roadway	90.55	1.7	5	73.6
13	I11	A St & Western Blvd	Signalized Intersection	62.9	1.4	5	71.7
14	R14	D St From Meek Ave to 6th St	Arterial Roadway	96.41	1.5	5	70.8
15	I9	Tennyson Rd & Huntwood Ave	Signalized Intersection	64	1.5	6	70.8
16	I3	Tennyson Rd & Calaroga Ave	Signalized Intersection	90	1.5	5	70.4
17	I13	CA-185 & B St	Signalized Intersection	59.7	1.3	5	70.2
18	I14	Industrial Pkwy & Arrowhead Way/ Dixon St	Signalized Intersection	57.5	1.8	5	70.2
19	R1	Foothill Blvd from A St to D St	Arterial Roadway	253.48	1.4	3	70.1
20	R6	Mission Blvd from D St to Palisade St	Arterial Roadway	121.9	1.3	5	69.8

1: Severity score is calculated based on Caltrans costs of collision outcomes and is normalized to be expressed in terms of equivalent property damage only collisions (PDOs). The relative severity values are as follows: fatal/severe injury collisions are 119.9 equivalent PDOs at signalized intersections, 190.8 at unsignalized intersections, and 165.2 along roadways; moderate injuries are 10.7; and minor injuries are 6.1. For example, a signalized intersection with an annualized crash severity score of 48, for example, could represent the equivalent of 48 PDO collisions per year, two fatal/severe injury collisions over 5 years ($119.9 \times 2/5 = 48$), or some combination of severity levels resulting in the same score.



H:\2727444 - Hayward LRSP\gis\Task 5\27444_Hayward LRSP_prioritization_scores.mxd - malston - 2:50 PM 7/22/2022

Appendix A

Expanded Priority Location Table

Factor Weight: 20% 40% 40%

Crash Score Rank	Crash Sev. Weighted Rank	#	Location	Loc Type	Total Crash Count	F+SI Crash Count	Crash Sev. Score	TDP Index Score	Emphasis Area Sum	Severity Score Index	TDP Score Index + Transit Presence	Emphasis Area Index	Aggregated Score (0 - 100)
3	1	R3	A St from 2nd St to Hesperian Blvd	Arterial	18	5	177.8	1.47	6	0.70	0.85	0.86	82.5
12	2	I2	Foothill Blvd/ Mission Blvd & Jackson St	Signalized	27	4	110.5	1.33	7	0.93	0.59	1.00	82.2
44	3	I16	Tennyson Rd & 12 St/Dixon St	Signalized	12	2	56.0	1.38	7	0.47	0.81	1.00	81.9
21	4	R18	Mission Blvd From Grove Way to A St and From Palisade St to Industrial Pkwy	Arterial	29	2	88.3	1.80	6	0.35	1.00	0.86	81.3
11	5	R10	Hesperian Blvd From Golf Course Rd to Southland Dr; and From Cathy Way to Arf Ave	Arterial	21	3	110.8	1.54	6	0.44	0.89	0.86	78.5
43	6	I15	A St & Montgomery St	Signalized	9	2	57.3	1.47	6	0.48	0.85	0.86	78.1
9	7	R8	Industrial Pkwy From Whipple Rd to Mission Blvd	Arterial	20	3	114.4	1.80	5	0.45	1.00	0.71	77.6
15	8	R13	Winton Ave From Cabot Blvd to Soto Rd	Arterial	46	2	101.9	1.52	6	0.40	0.87	0.86	77.3
31	9	I8	A St & Foothill Blvd	Signalized	27	2	70.0	1.41	7	0.59	0.62	1.00	76.7
10	10	R9	Tennyson Rd From Hesperian Blvd to Mission Blvd	Arterial	28	3	112.1	1.68	5	0.44	0.95	0.71	75.3
22	11	R19	Harder Rd From, Jackson St to Mission Blvd	Arterial	26	2	83.9	1.43	6	0.33	0.84	0.86	74.3
19	12	R17	Huntwood Ave From Huntwood Way to Celia St and From Folsom Ave to Zephyr Ave	Arterial	28	2	90.6	1.68	5	0.36	0.95	0.71	73.6
37	13	I11	A St & Western Blvd	Signalized	17	2	62.9	1.38	5	0.53	0.81	0.71	71.7
16	14	R14	D St From Meek Ave to 6th St	Arterial	48	2	96.4	1.50	5	0.38	0.87	0.71	70.8
35	15	I9	Tennyson Rd & Huntwood Ave	Signalized	23	2	64.0	1.45	6	0.54	0.64	0.86	70.8
20	16	I3	Tennyson Rd & Calaroga Ave	Signalized	18	3	90.0	1.51	5	0.76	0.67	0.71	70.4
40	17	I13	CA-185 & B St	Signalized	16	2	59.7	1.33	5	0.50	0.79	0.71	70.2
42	18	I14	Industrial Pkwy & Arrowhead Way/ Dixon St	Signalized	15	2	57.5	1.80	5	0.48	0.80	0.71	70.2
1	19	R1	Foothill Blvd from A St to D St	Arterial	78	6	253.5	1.41	3	1.00	0.82	0.43	70.1
6	20	R6	Mission Blvd from D St to Palisade St	Arterial	47	3	121.9	1.33	5	0.48	0.79	0.71	69.8
45	21	R29	Santa Clara St From A St to Jackson Ave	Arterial	27	1	55.2	1.30	6	0.22	0.78	0.86	69.7
25	22	I4	A St & Victory Dr	Signalized	8	3	79.9	1.44	5	0.67	0.64	0.71	67.6
5	23	R5	B St from 2nd St to Filbert St	Arterial	38	3	124.0	1.47	4	0.49	0.85	0.57	66.8
27	24	R23	Whipple Rd From Dyer St to Amaral St	Arterial	26	2	77.9	1.02	6	0.31	0.65	0.86	66.5
29	25	I6	Hesperian Blvd & Sleepy Hollow Ave	Signalized	10	3	77.3	1.02	6	0.65	0.45	0.86	65.4
75	26	R46	Bohero Ave From Hesperian Blvd to Calaroga Ave	Collector	10	1	39.8	1.54	6	0.16	0.69	0.86	64.9
13	27	R11	Foothill Blvd From Hazel Ave to A St	Arterial	55	2	102.8	1.41	4	0.41	0.82	0.57	63.9
69	28	I30	Hesperian Blvd & Oliver Dr	Unsignalized	8	1	44.6	1.54	5	0.37	0.69	0.71	63.5
7	29	I1	Tennyson Rd & Baldwin St	Unsignalized	7	3	119.2	1.45	3	1.00	0.64	0.43	62.9
52	30	I20	Tennyson Rd & Ruus Rd	Signalized	15	2	50.6	1.45	5	0.42	0.64	0.71	62.8
39	31	R27	Jackson St From Santa Clara St to Mission Blvd	Arterial	40	1	62.6	1.50	4	0.25	0.87	0.57	62.4
53	32	I21	Foothill Blvd & Grove Way	Signalized	32	1	50.2	1.38	5	0.42	0.61	0.71	61.5
72	33	R43	Silva Ave From Meek Ave to Leighton St	Collector	10	1	42.8	1.50	4	0.17	0.87	0.57	60.9
37	34	I12	Mission Blvd & Orchard Ave/ Carlos Bee Blvd	Signalized	22	2	62.9	1.21	5	0.53	0.54	0.71	60.6
30	35	I7	Hesperian Blvd & Turner Ct	Signalized	8	3	75.0	0.72	6	0.63	0.32	0.86	59.7
17	36	R15	Grand St From A St to Meek Ave	Collector	35	2	95.6	1.50	3	0.38	0.87	0.43	59.3
2	37	R2	Hesperian Blvd from Winton Ave to Cathy Way	Arterial	20	6	210.1	0.94	3	0.83	0.62	0.43	58.4
60	38	I27	Santa Clara St & Jackson St	Signalized	29	1	47.5	1.20	5	0.40	0.53	0.71	57.8
59	39	I25	Jackson St & Alice St	Unsignalized	10	1	48.8	1.50	4	0.41	0.67	0.57	57.7
48	40	I18	Hesperian Blvd & Longwood Ave/ Skywest Dr	Signalized	8	2	53.2	1.13	5	0.45	0.50	0.71	57.6
33	41	R26	Hayward Blvd From Call Ave to Farm Hill Dr	Arterial	4	2	66.5	1.21	4	0.26	0.74	0.57	57.6
46	42	I17	A St & Hesperian Blvd	Signalized	9	2	55.0	1.43	4	0.46	0.63	0.57	57.4
28	43	I5	Huntwood Ave & Montana Way	Unsignalized	3	2	77.5	1.20	4	0.65	0.53	0.57	57.2
4	44	R4	Tennyson Rd from Pompano Ave to Ruus Rd	Arterial	51	3	133.7	1.50	2	0.53	0.87	0.29	56.6
66	45	R39	Industrial Blvd From Clawiter Rd to Marina Dr	Arterial	13	1	46.2	1.20	4	0.18	0.73	0.57	55.9
70	46	R42	Amador St from Amador Village Court to Jackson St	Arterial	17	1	44.1	1.21	4	0.17	0.74	0.57	55.8
57	47	R34	Meek Ave From Filbert St to Jackson Ave	Local	17	1	49.1	1.50	3	0.19	0.87	0.43	55.7
61	48	R36	Soto Rd From Winton Ave to Orchard Ave	Arterial	23	1	47.5	1.50	3	0.19	0.87	0.43	55.5
32	49	R24	E St From Main St to East Ave	Collector	8	2	67.3	1.41	3	0.27	0.82	0.43	55.4
61	50	R35	Hathaway Ave From Blossom Way to W A St	Arterial	23	1	47.5	1.30	5	0.19	0.58	0.71	55.4

Factor Weight: 20% 40% 40%

Crash Sev. Score Rank	Weighted Rank	#	Location	Loc Type	Total Crash Count	F+SI Crash Count	Crash Sev. Score	TDP Index Score	Emphasis Area Sum	Severity Score Index	TDP Score Index + Transit Presence	Emphasis Area Index	Aggregated Score (0 - 100)
64	51	I28	Foothill Blvd & Kimball Ave	Unsignalized	8	1	46.6	1.38	4	0.39	0.61	0.57	55.2
41	52	R28	Gading Rd From W Harder Rd to Schafer Rd	Arterial	27	1	58.1	1.21	5	0.23	0.54	0.71	54.6
49	53	R31	Patrick Ave From St Bede Ln to W Tennyson Rd	Arterial	23	1	51.4	1.09	4	0.20	0.68	0.57	54.3
74	54	R45	Hancock St From E 10th St to E 16th St	Local	10	1	40.9	1.20	5	0.16	0.53	0.71	53.1
56	55	R33	Fletcher Ln From Fletcher Towers to Walpert St	Local	17	1	49.2	1.07	5	0.19	0.48	0.71	51.5
50	56	I19	Hesperian Blvd & Tripaldi Way/Eden Shores Blvd	Signalized	6	2	50.8	1.04	4	0.43	0.46	0.57	49.9
68	57	R40	Fairway St From Carroll Ave to Treeview St	Collector	16	1	45.9	0.98	5	0.18	0.44	0.71	49.7
58	58	I24	Hesperian Blvd & Tahoe Ave	Unsignalized	10	1	48.9	1.04	4	0.41	0.46	0.57	49.5
51	59	R32	Whitman St From Cody Rd to Peyton Dr	Collector	15	1	50.7	1.43	2	0.20	0.84	0.29	48.9
36	60	I10	Industrial Pkwy & Ruus Rd	Signalized	16	2	63.9	0.80	4	0.54	0.36	0.57	47.8
54	61	I22	Hesperian Blvd & West St	Signalized	4	2	49.4	0.94	4	0.41	0.42	0.57	47.8
8	62	R7	Calaroga Ave from Ashbury Ln to Panama St	Collector	20	3	117.6	1.51	2	0.46	0.67	0.29	47.5
55	63	I23	Jackson St & Tarman Ave	Unsignalized	12	1	49.3	1.20	3	0.41	0.53	0.43	46.7
47	64	R30	Ruus Rd From W Tennyson Rd to Industrial Pkwy W	Collector	20	1	54.9	1.45	1	0.22	0.84	0.14	43.8
65	65	R38	Dixon St From Tennyson Rd to Sohay Loop	Collector	17	1	46.3	1.80	0	0.18	1.00	0.00	43.6
26	66	R22	Clawiter Rd From Industrial Blvd to Enterprise Ave	Collector	15	2	78.6	0.98	2	0.31	0.64	0.29	43.1
23	67	R20	Orchard Ave From Soto Rd to Mission Blvd	Arterial	29	2	80.5	1.21	2	0.32	0.54	0.29	39.2
75	68	R47	Folsom Ave From Harvey Ave to Huntwood Ave	Collector	10	1	39.8	0.92	2	0.16	0.61	0.29	38.8
77	69	R48	Catalpa Way From Hesperian Blvd to Miami Ave	Collector	11	1	39.1	1.04	3	0.15	0.46	0.43	38.7
70	70	R41	Kelly St From B Street to Mansfield Way	Arterial	17	1	44.1	0.96	3	0.17	0.43	0.43	37.7
67	71	I29	Industrial Pkwy & Addison Way	Unsignalized	6	1	46.0	0.59	3	0.39	0.26	0.43	35.4
14	72	R12	Sleepy Hollow Ave From Jamaica Ln to Boca Raton St	Collector	9	3	102.3	1.51	0	0.40	0.67	0.00	34.8
24	73	R21	Calaroga Ave From Sunny Ln to Ashbury Ln	Collector	17	2	80.2	1.51	0	0.32	0.67	0.00	33.1
73	74	R44	Huntwood Way From Gading Rd to Huntwood Ave	Arterial	13	1	42.4	1.20	0	0.17	0.73	0.00	32.7
63	75	R37	Carlos Bee Blvd From Mission Blvd to Hayward Blvd	Arterial	20	1	46.9	1.21	1	0.18	0.54	0.14	30.9
33	76	R25	Vanderbilt St From Garin Ave to Fairway St	Collector	4	2	66.5	0.61	2	0.26	0.27	0.29	27.6
18	77	R16	B St From Myrtle St to 2nd St	Arterial	40	2	92.6	0.00	0	0.37	0.20	0.00	15.3

APPENDIX D: FUNDING

FUNDING

Both Federal and State agencies offer funding for regional and local transportation projects, policies, and programs. Because the City of Hayward has limited internal funding, this LRSP will increase the City's ability to secure funding to implement much-needed safety strategies.

Federal Funding

Congestion Management & Air Quality (CMAQ)

Federal Highway Administration (FHWA)

The Congestion Mitigation and Air Quality Improvement (CMAQ) program provides flexible funding for State and local governments' transportation projects and programs to meet the requirements of the Clean Air Act (CAA) and its amendments. CMAQ money supports transportation projects that reduce mobile source emissions in areas designated by the U.S. Environmental Protection Agency (EPA) to be in nonattainment or maintenance of the national ambient air quality standards. See MTC's One Bay Area Grant (OBAG) program for how CMAQ funding is distributed within the nine-county Bay Area. OBAG disburses federal funds in accordance with MTC's regional transportation priorities and associated land-use and housing goals.

<https://www.transportation.gov/sustainability/climate/federal-programs-directory-congestion-mitigation-and-air-quality-cmaq>

Surface Transportation Block Grant (STBG) Program

FHWA

The Fixing America's Surface Transportation (FAST) Act converts the long-standing Surface Transportation Program (STP) into the Surface Transportation Block Grant Program (STBG). The STBG provides flexible funding address State and local transportation needs. Funding may be used to preserve and improve conditions and performance on the following: Federal-aid highway, bridge and tunnel projects on qualifying public roads; pedestrian and bicycle infrastructure; and transit capital

projects, including intercity bus terminals. OBAG disburses federal funds in accordance with MTC's regional transportation priorities and associated land-use and housing goals.

<https://www.fhwa.dot.gov/specialfunding/stp/>

Land and Water Conservation Fund (LWCF)

National Park Service

The LWCF matches grants for states and local governments to acquire and develop public outdoor recreation areas and facilities. The LWCF has provided more than \$16.7 billion to state and local governments to acquire new federal recreation lands. Projects can include open space acquisition, small city and neighborhood park development, and trail or greenway construction.

<https://www.nps.gov/subjects/lwcf/index.htm>

Rivers, Trails, and Conservation Assistance (RTCA) Program

National Park Service

The RTCA program supports community-led natural resource conservation and outdoor recreation projects nationwide. The National Park Service helps community groups, nonprofits, Tribes, and State and local governments design trails and parks, conserve and improve river access, protect special places, and create recreation opportunities.

<https://www.nps.gov/orgs/rtca/index.htm>

OTHER FEDERAL GRANTS

Because the continued existence of these grant programs is at the discretion of Congress, research the current state of funding before considering these sources.

Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Grant

United States Department of Transportation (USDOT)

The RAISE Discretionary Grant program provides a unique opportunity for USDOT to invest in road, rail, transit, and port projects that promise to achieve national objectives. Previously known as Better Utilizing Investments to Leverage Development (BUILD) and Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grants, the eligibility requirements of RAISE allow project sponsors at the state and local levels to obtain funding for multimodal, multi-jurisdictional projects that are more difficult to support through traditional department of transportation programs.

<https://www.transportation.gov/RAISEgrants>

Infrastructure for Rebuilding America (INFRA) Grant

USDOT

The INFRA Grants program funds transportation projects that focus on rebuilding existing infrastructure. To be eligible, projects must be on the National Highway System; a railway/highway grade separation project; a freight project that is rail or intermodal; or improve freight movement within an intermodal facility. Most governmental bodies (e.g., unit of local government, port authority, groups of jurisdictions) are eligible applicants. Minimum awards for large projects are \$25 million and \$5 million for small projects.

<https://www.transportation.gov/grants/infra-grants-program>

Infrastructure Jobs and Investment Act (IIJA)

USDOT

The bipartisan IIJA provides the basis for FHWA programs and activities through September 30, 2026. The IIJA makes a once-in-a-generation investment of \$350 billion in highway programs and includes the largest dedicated bridge investment since the construction of the Interstate Highway System. New programs under the law focus on rehabilitating bridges in critical need of repair, reducing carbon emissions, increasing system resilience, removing barriers to connecting communities, and improving mobility and access to economic opportunity. Many of the new programs include eligibility for local governments, Metropolitan Planning Organizations (MPOs), Tribes, and other public authorities.

One program, the Safe Streets for All (SS4A) Grant Program, has appropriated \$5 billion over the next five years, with up to \$1 billion available in fiscal year 2022. Funding is available for the following activities:

- ▶ Comprehensive safety action plans
- ▶ Planning, design, and development activities in support of an Action Plan (like this LRSP)
- ▶ Projects and strategies identified in an Action Plan (like this LRSP)

For a list of funding-eligible activities, visit <https://www.fhwa.dot.gov/bipartisan-infrastructure-law/>. For more on SS4A, visit <https://www.transportation.gov/grants/SS4A>.

State Funding

Senate Bill 1 (SB 1)

SB1, the Road Repair and Accountability Act of 2017, is a long-term transportation reform and funding package. The bill includes new revenues that address a variety of transportation projects, such as road safety improvements, street repair, transit, and roadway and bridge construction. SB 1 provides more than \$5 billion annually to transportation projects throughout California.

<http://rebuildingca.ca.gov/>

Highway Safety Improvement Program (HSIP)

Caltrans

The Highway Safety Improvement Program (HSIP) is one of the core federal-aid programs in the federal surface transportation act, Fixing America's Surface Transportation Act (FAST). HSIP aims to significantly reduce traffic fatalities and severe injuries on all public roads—including non-State-owned public roads and roads on Tribal land—by funding eligible projects such as crosswalk markings, rapid flashing beacons, curb extensions, speed feedback signs, guard rails, pedestrian refuge islands, slurry seal, and other pavement markings.

<https://dot.ca.gov/programs/local-assistance/fed-and-state-programs/highway-safety-improvement-program>

Office of Traffic Safety (OTS) Grants

California Office of Traffic Safety

OTS strives to eliminate traffic deaths and injuries by granting funds to local and state public agencies for programs that enforce traffic laws, educate the public in traffic safety, and provide varied and effective means of reducing fatalities, injuries, and economic losses from crashes.

<https://www.ots.ca.gov/grants/>

Active Transportation Program (ATP) Grants

California Transportation Commission (CTC)

The ATP consolidates existing federal and state transportation programs, including the Transportation Alternatives Program (TAP), Bicycle Transportation Account (BTA), and State Safe Routes to School (SR2S), into a single discretionary grant program that focuses on making California a national leader in active transportation. The ATP aims to encourage active transportation by increasing the proportion of trips made by bicycle or on foot; increasing non-motorized user safety; reducing greenhouse gases; enhancing public health; and ensuring that disadvantaged communities share fully in program benefits.

<https://catc.ca.gov/programs/active-transportation-program>

State-Local Partnership Program (LPP)

CTC

Created by the Road Repair and Accountability Act of 2017 through SB1, the Local Partnership Program (LPP) annually appropriates \$200 million from the Road Maintenance and Rehabilitation Account to local and regional transportation agencies that have passed sales tax measures, developer fees, or other imposed transportation fees. Funds are awarded for road maintenance and rehabilitation, sound walls, and other transportation improvement projects. LPP also funds local and regional agency projects that improve aging infrastructure, road conditions, active transportation, and health and safety. Consistent with the intent behind SB1, the CTC intends this program to balance the need to direct increased revenue to the State's highest transportation needs and the need to fairly distributing the economic impact of increased funding.

<https://catc.ca.gov/programs/sb1/local-partnership-program>

Sustainable Transportation Grant Program

Caltrans

The Sustainable Transportation Planning Grant Program was created to support the Caltrans mission: provide a safe, sustainable, integrated, and efficient transportation system to enhance California's economy and livability. Eligible planning projects must have a transportation nexus and ideally demonstrate that they directly benefit the multimodal transportation system. Sustainable Communities Grants will also improve public health, social equity, environmental justice, the environment, and provide other important community benefits.

<https://dot.ca.gov/programs/transportation-planning/regional-planning/sustainable-transportation-planning-grants>

State Highway Operation and Protection Program (SHOPP)

Caltrans

SHOPP is the "fix-it-first" program from the State Highway System (SHS). SHOPP funds repair and preservation, emergency repairs, safety improvements, and some highway operational improvements on the SHS. Although SHOPP is intended for projects on statutorily designated State-owned roads, highways (including the interstate system), and bridges, it can be used for associated bicycle and pedestrian facilities. Revenues for the SHOPP are generated by federal and State gas taxes and are fiscally constrained by the State Transportation Improvement Program Fund Estimate that is produced by Caltrans and adopted by the CTC.

<https://dot.ca.gov/programs/financial-programming/state-highway-operation-protection-program-shopp-minor-program-shopp>

State Transportation Improvement Program (STIP)

CTC

The STIP is a biennial, five-year plan adopted by the CTC for future allocations of certain State transportation funds for State highway improvements, intercity rail, and regional highway and transit improvements. State law requires the CTC to update the STIP biennially, on even-numbered years, with each new STIP adding two new years to prior programming commitments. CTC staff recommendations are based on the combined programming capacity for the Public Transportation Account (PTA)

and State Highway Account (SHA) as identified in the fund estimate adopted by the CTC. To be included in the STIP that is adopted by the CTC, projects must first be nominated by the MTC in its Regional Transportation Improvement Program (RTIP), or by Caltrans in its Interregional Transportation Improvement Program (ITIP). <https://catc.ca.gov/programs/state-transportation-improvement-program>

Recreational Trails Program (RTP)

California Department of Parks and Recreation

RTP annually provides federal funds for recreational trails and trail-related projects. The RTP is administered at the federal level by the FHWA and at the state level by the California Department of Parks and Recreation (DPR) and the Department of Transportation (Caltrans) Active Transportation Program (ATP). Eligible non-motorized projects include acquisition of easements and fee simple title to property for recreational trails and recreational trail corridors; and development or rehabilitation of trails, trailside, and trailhead facilities.

https://www.parks.ca.gov/?page_id=24324

Affordable Housing and Sustainable Communities (AHSC) Program

California Strategic Growth Council

The AHSC program aims to reduce greenhouse gas emissions through projects that implement land-use, housing, transportation, and agricultural land preservation practices to support infill and compact development and that support related and coordinated public policy objectives. The AHSC program includes transportation focuses related to reducing air pollution, improving conditions in disadvantaged communities, supporting or improving public health, improving connectivity and access to jobs, increasing options for mobility, and increasing transit ridership. Funding for the AHSC Program is provided from the Greenhouse Gas Reduction Fund (GGRF), an account established to receive cap-and-trade auction proceeds.

<https://sgc.ca.gov/programs/ahsc/>

Transformative Climate Communities (TCC) Program

California Strategic Growth Council

Established by Assembly Bill 2722, the TCC program funds development and implementation of neighborhood-level transformative climate community plans that include multiple coordinated greenhouse gas emissions reduction projects that provide local economic, environmental, and health benefits to disadvantaged communities. The TCC Program helps realize the State's vision of vibrant communities and landscapes and demonstrates how meaningful community engagement coupled with strategic investments in transportation, housing, food, energy, natural resources, and waste can reduce greenhouse gas emissions and pollution, advance social and health equity, and enhance economic opportunity and community resilience. The TCC Program funds both implementation and planning grants. While the program can fund a variety of projects, transportation-related projects can include developing active transportation and public transit projects; supporting transit ridership programs and transit passes for low-income riders; expanding first/last mile connections; building safe and accessible biking and walking routes; and encouraging education and planning activities to promote increased use of active transportation modes.

<https://sgc.ca.gov/programs/tcc/>

Environmental Enhancement and Mitigation (EEM) Grant Program

California Natural Resources Agency

The EEM program authorizes the California State Legislature to allocate up to \$7 million each fiscal year from the Highway Users Tax Account. EEM projects must contribute to mitigation of the environmental effects of transportation facilities. The EEM Program does not generally fund commute-related trails or similar bicycle and pedestrian infrastructure. However, EEM does fund recreational and nature trails as part of storm water management or green infrastructure projects.

<https://catc.ca.gov/programs/environmental-enhancement-mitigation>

Urban Greening Grant Program

California Natural Resources Agency

Part of the California State Senate Bill 859, the Urban Greening Program is funded by the Greenhouse Gas Reduction Fund to support the development of green infrastructure projects that reduce greenhouse gas emissions and other benefits. To maximize economic, environmental, and public benefits, priority is given to projects in disadvantaged communities. The Urban Greening Program funds projects that reduce greenhouse gases by sequestering carbon, decreasing energy consumption, and reducing vehicle miles traveled while transforming the built environment into places that are more sustainable, enjoyable, and effective at creating healthy and vibrant communities. These projects will establish and enhance parks and open space by using natural solutions to improve air and water quality, reducing energy consumption, and creating more walkable and bikeable trails.

<https://files.resources.ca.gov/grants/urban-greening/>

Environmental Justice (EJ) Small Grants Program

California Environmental Protection Agency

EJ Small Grants provide funding to help eligible non-profit community organizations and federally-recognized Tribal governments address environmental justice issues in areas disproportionately affected by environmental pollution and hazards. EJ Small Grants are awarded on a competitive basis with a maximum amount \$50,000 per grant. EJ Small Grants can be used for a variety of environmental purposes and to augment community engagement, health, trainings, and programmatic opportunities in underserved communities.

<https://calepa.ca.gov/envjustice/funding/>