

# **NVTA VISION ZERO**

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# Dedication

The Napa Valley Transportation Authority would like to dedicate this Vision Zero Plan to all of the people – grandparents, parents, children, friends, partners and colleagues – who have lost their lives or sustained life-altering injuries on Napa Valley roadways. Many thanks to all of those dedicated to improving roadway safety in Napa Valley and reducing these tragic events to zero.



# A Message from NVTA

As one of the foremost wine regions in the world, Napa Valley attracts visitors year-round. The Valley's vibrant character is heavily influenced by the agriculture, tourism and hospitality industries. It is home to a diverse community of residents and a thriving workforce that support and value the local character that is Napa Valley. Our transportation's safety is key to sustaining our way of life.

Whether it's embarking on a scenic a bike tour along the Vine Trail, walking to the nearest bus stop to get to work or school, or taking a stroll through the neighborhood or a local downtown, every resident, worker, and visitor should be able to safely move around Napa Valley. Similar to many places in the country, Napa Valley continued to experience fatal and severe injury collisions through the pandemic even though vehicle travel had declined during that time. Safety of all roadway users in Napa Valley is among our highest priorities. This is why, in 2023, Napa Valley's governments are embracing Vision Zero as a traffic safety strategy with the goal of eliminating traffic fatalities and serious injuries, and to continue to prioritize roadway safety as a primary objective.

Applying the Safe System Approach as the guiding paradigm to address roadway safety, commits NVTA and its member agencies to create a system that builds and reinforces multiple layers of protection that can minimize the severity of crashes and ultimately prevent fatalities altogether. This holistic and comprehensive approach to safety is woven into all aspects of the Napa Valley Vision Zero Action Plan.

This Action Plan is the culmination of collaboration between NVTA, Napa County, the City of Napa, the City of American Canyon, the town of Yountville, the City of St. Helena, the City of Calistoga, law enforcement agencies, key stakeholders and Napa Valley community members. We are proud to share this Vision Zero Action Plan, and look to a future where tragedies are prevented on our roadways.

NVTA, and its member jurisdiction leaders are committed to making our roads safe as we work together to make Napa Valley a model of Vision Zero excellence and a place where all can move freely and safely on our roadways.

Sincerely,

Liz Alessio,  
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# **NVTA VISION ZERO**

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# 1

## Introduction, Background, and Vision

Napa Valley Transportation Authority and its member agencies are committed to prioritizing transportation safety and decreasing the number of traffic related deaths and serious injuries on roadways throughout the region.

This Vision Zero Action Plan builds on existing and ongoing efforts by NVTAA and its member agencies by proactively identifying and evaluating hot spots and systemic risk factors. The Action Plan identifies proven countermeasures that can be implemented through roadway design changes, as well as non-infrastructure programmatic efforts through key partnerships with safety stakeholders.

An Action Plan is prepared to ensure that efforts made towards zero deaths and serious injuries are evaluated and updated on a yearly basis to track the progress that has been made. This Plan applies the Safe System Approach, an international, national, and state best practice framework, as the foundation for improving roadway safety

### Safe System Approach

Crashes can irreversibly change the course of human lives, touching victims, their families and loved ones, and society as a whole. Through collective action on the part of all roadway system stakeholders—from system operators and vehicle manufacturers to law enforcement and everyday users—we can move to a Safe System Approach that anticipates human mistakes, with the goal of eliminating fatal and serious injuries for all road users.

A Safe System acknowledges the vulnerability of the human body—in terms of the amount of kinetic energy transfer a body can withstand—when designing and operating a transportation network to minimize serious consequences of crashes. According to the World Health Organization, the goal of a Safe System is to ensure that if crashes occur, they “do not result in serious human injury.”<sup>1</sup> The Safe System Approach to road safety started internationally as part of the

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<sup>1</sup> World Health Organization (2011). Decade of Action for Road Safety 2011-2020. Retrieved from [https://www.who.int/roadsafety/decade\\_of\\_action/plan/plan\\_en.pdf](https://www.who.int/roadsafety/decade_of_action/plan/plan_en.pdf), p. 9

Vision Zero proclamation that no one should be killed or seriously injured on the road system.<sup>2,3</sup>

As shown in **Figure 1**, the Safe System Approach is founded on the principle that people make mistakes and that the road system should be adapted to anticipate and accommodate human mistakes and the physiological and psychological limitations of humans.<sup>4</sup>

**Figure 1**

The Safe System Approach



Countries that have adopted the Safe System Approach have had significant success reducing highway fatalities, with reductions in fatalities between 50% and 70%.<sup>5</sup> The Safe System Approach is the foundation for the National Safety Strategy released by USDOT in 2022. Caltrans has also adopted both a Safe System Approach and a Vision Zero goal as part of their Strategic Highway Safety Plan. The Institute of Transportation Engineers (ITE) and the Road to Zero Coalition's Safe Systems Explanation and Framework articulate that to anticipate human mistakes, a Safe System seeks to:

- » Separate users in a physical space (e.g., sidewalks, dedicated bicycle facilities)
- » Separate users in time (e.g., pedestrian scramble, dedicated signal turn phases)
- » Alert users to potential hazards
- » Accommodate human injury tolerance through interventions that reduce speed or impact force

Creating a Safe System means shifting a major share of the responsibility from road users to those who design the road transport system. "Individual road users have the responsibility to abide by laws and regulations"<sup>6</sup> and do so by exhibiting due care and proper behavior on the transportation system. While road users are responsible for their own behavior, this is a shared responsibility with those who design, operate, and maintain the transportation network: including the automotive industry, law enforcement, elected officials, and government bodies.<sup>7</sup> In a Safe System, roadway system designers and operators take on the highest level of ethical responsibility.

<sup>2</sup> Johansson, R. (2009). Vision Zero- Implementing a policy for traffic safety. *Safety Science*, 47, 826-831

<sup>3</sup> Tingvall, C., & Haworth, N. (1999). An Ethical Approach to Safety and Mobility. Paper presented at the 6th ITE International Conference Road Safety and Traffic Enforcement. 6-7 September 1999, Melbourne, Australia

<sup>4</sup> Belin, M.-Å., Tillgren, P., & Vedung, E. (2012). Vision Zero- a road safety policy innovation. *International Journal of Injury Control and Safety Promotion*, 19, 171-179.

<sup>5</sup> World Resources Institute (2018). Sustainable and Safe: A Vision and Guidance for Zero Road Deaths. Retrieved from <https://www.wri.org/publication/sustainable-and-safe-vision-and-guidance-zero-road-deaths>

<sup>6</sup> World Health Organization (2011). Decade of Action for Road Safety 2011-2020. Retrieved from [https://www.who.int/roadsafety/decade\\_of\\_action/plan/plan\\_en.pdf](https://www.who.int/roadsafety/decade_of_action/plan/plan_en.pdf)

## ITE Safe System Framework: Focus on Safe Speeds

The ITE Safe System framework provides important context for the focus on safe speeds within a Safe System Approach. For all road users, especially those who walk or bike, speed is a determining factor in survivability. As shown in **Figure 2**, increased speed narrows sight line visibility of vulnerable users, and a human’s chance of surviving after being struck by a vehicle increases from 10% at 40 miles per hour to 50% at 30 miles per hour to 90% at 20 miles per hour.

Reducing speed in the presence of vulnerable users is a key Safe System strategy. Approaches include:

- » Physical roadway designs (reduced width, horizontal alignment) to limit speeds
- » Traffic calming treatments that induce slower speeds
- » Traffic signal timing that minimizes high speed flow
- » Traditional or automated enforcement (currently not legal in California) that discourages speeding

**Figure 2**

Pedestrian Crash Survival as a Factor of Vehicle Speed

### PEDESTRIAN STRUCK BY VEHICLE GOING

**20  
MPH**



DEATH RISK

**10%**

### PEDESTRIAN STRUCK BY VEHICLE GOING

**30  
MPH**



DEATH RISK

**50%**

### PEDESTRIAN STRUCK BY VEHICLE GOING

**40  
MPH**



DEATH RISK

**90%**

## About Napa Valley

Napa Valley is in the nine-county Bay Area, north of the San Pablo Bay. The county's economy is largely dependent on manufacturing, agriculture, tourism, and hospitality, which shapes the demographics of the workers who live in and travel to Napa Valley. The county is navigable via several highways, including State Route (SR) 121, SR 29, and SR 128. Its land uses are primarily rural and agricultural, with cities dispersed along the highways from north to south.

Napa Valley has an estimated population of 139,000 residents. The population is 67 percent white, 8 percent Asian, 2 percent black, 13 percent other, and 35 percent of the population identifies as Hispanic or Latino. Napa Valley is comprised of five cities and towns, from south to north – City of American Canyon, City of Napa, Town of Yountville, City of St. Helena, and City of Calistoga – in addition to regions, unincorporated areas, and parklands.

Napa Valley's economy is largely centered around agriculture and its wine industry. Nearly half of all employment in the Valley depends on the wine industry. Alongside wine, Napa Valley has a thriving hospitality and retail sector which contributes to the local economy and provides employment opportunities. Nearly four million people visit Napa each year, accounting for \$2.3 billion in direct spending to the local economy. The hospitality sector continues to grow annually.

The region's nature as a world-class destination for tourism and viticulture presents unique challenges, including heavy traffic flow on weekends and holidays, as well as a high incidence rate for driving under the influence (DUI). The unincorporated areas of the region are criss-crossed by rural, often winding two-lane highways that carry high volumes of fast-moving regional traffic, and which generally lack facilities people walking and biking.

**City of American Canyon** has a population of 21,700 and is located at the northern point of the San Pablo Bay and has easy access to Marin County and San Francisco. Like most of the Valley, American Canyon has a booming wine industry and also has a number of park spaces. The City's main arteries include State Route 29 and American Canyon Road, which are both wide, high-speed arterials that present safety concerns.

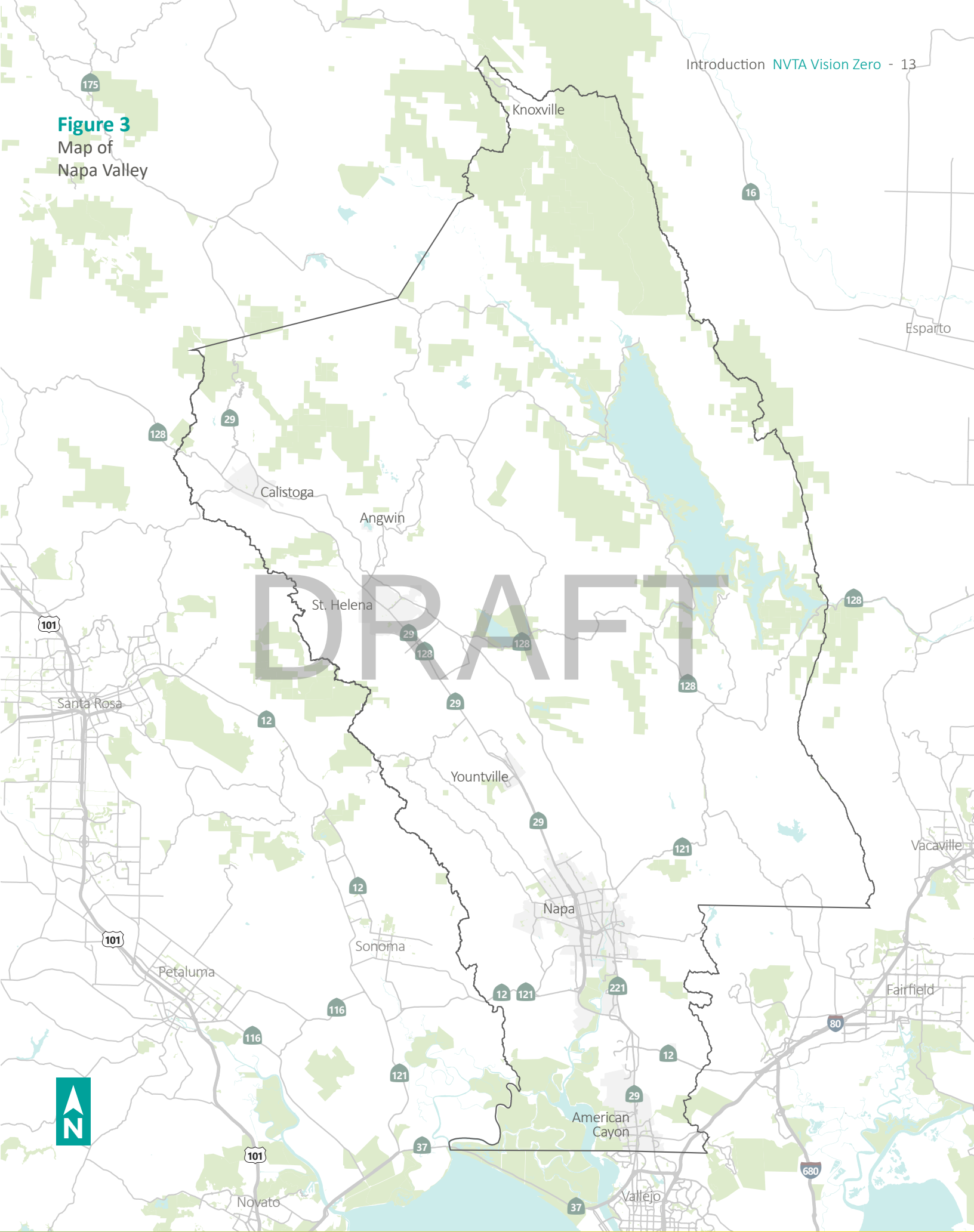
**City of Napa** serves as the County seat and is the largest city in Napa Valley with a population of nearly 78,000 people. The City features a vibrant downtown area, and is known for its scenic riverfront, historic architecture, and hospitality sector. As the largest urban center in the region, the City of Napa has the largest share of recorded collisions within the region, and features numerous roadways with large traffic volumes and safety concerns.

**Town of Yountville** has a population of 3,300 and is known for its dining establishments, boutique hotels, and vineyards. The Town hosts annual events such as the Taste of Yountville Food and Wine Festival. State Route 128 transitions from a controlled-access freeway to a surface roadway in Yountville, and the interface between the highway and the Town has been a hotspot for safety concerns.

**City of St. Helena**, with a population of 5,500, is renowned for its wineries, resorts, and dining experiences. The City provides ample opportunities for outdoor activities such as hiking, biking, and hot air balloon rides. It is bisected by State Route 128, which serves as both the City's main commercial strip and a heavily-trafficked regional corridor.

**City of Calistoga** is located at the northern end of the county and has a population of 5,200. It is known for its natural hot springs, mud baths, and wellness retreats. State Routes 128 and 29 both run through the heart of the City on local two-lane streets, and the mix of local uses and regional traffic on these roadways present safety challenges.

**Figure 3**  
Map of  
Napa Valley



## Existing Plans and Programs

NVTA and its member agencies have made investments in roadway safety through project and program implementation, traffic education and enforcement, pursuing funding through grant applications, roadway maintenance, and adoption of planning documents that identify transportation safety priorities and future projects.

Connected and safe roadways provide opportunities for the community to be more active and take alternative modes of transportation. Planning documents that have specific safety-related goals, policies, projects, and recommendations were reviewed to set the foundation for this Vision Zero Action Plan. Existing programs that promote biking and walking through Napa Valley are also identified in this section.

### **City of Napa Local Roadway Safety Plan (2022)**

City of Napa LRSP uses data-driven analysis to identify the primary road safety concerns in the City and project recommendations to reduce the likelihood and severity of collisions. Collision data collected from 2016 to 2020 was used to identify prevalent collision characteristics and locations which have caused disproportionate numbers of collisions. The plan identifies seven emphasis areas based on the primary collision factors, including intersection safety, rear-end collisions, broadsides, and pedestrian safety. Additionally, a High Injury Network was identified to visualize priority corridors and intersections. This Vision Zero Action Plan uses the High Injury Network from the City's LRSP as a guide to align the regional Vision Zero recommendations with local planning. Education, enforcement, and engineering countermeasures are compiled for each emphasized collision type and a list of viable safety projects which would be eligible for state or federal funding opportunities.

### **Napa County Local Roadway Safety Plan (2022)**

The Napa County LRSP qualitatively and quantitatively evaluated collisions to identify the leading risk factors for collisions in the region and a list of priority projects to improve roadway safety across the unincorporated areas of the County. Additionally, the plan identifies funding opportunities which can be used by the County to ultimately implement the recommendations in the plan. The LRSP provides recommendations and guidance to reduce the likelihood of fatalities and serious injuries along County roadways. The plan identifies the ten intersections and ten corridors with the highest weighted collision severity for the evaluation period from 2016 to 2018. Various projects were evaluated for their benefit to cost ratio and the six highest ranked projects were identified for the County to pursue in upcoming grant and funding cycles through state and federal opportunities.

### **American Canyon Local Roadway Safety Plan (2022)**

The American Canyon LRSP uses systemic safety analysis to identify the primary safety concerns and project recommendations to reduce the likelihood and severity of collisions in American Canyon. Collision data collected from 2016 to 2020 were used to identify prevalent collision characteristics and locations where there have been a disproportionate numbers of collisions. The plan identifies seven emphasis areas based on the primary collision factors, including intersection safety, rear-end collisions, broadsides, and pedestrian safety.

### **NVTA Community-Based Transportation Plan (2018)**

NVTA's Community-Based Transportation Plan (CBTP) considers the mobility needs of historically underserved communities, including low-income and otherwise disadvantaged communities. Using both region and county-specific criteria to identify Equity Priority Communities, the Plan engaged with Community Based Organizations and neighborhood associations with emphasis on representing low-income, disabled, and senior populations. Through a robust engagement process, the CBTP evaluated the highest priority concerns for the identified communities and developed a needs assessment for each area with project recommendations to meet those needs.

### **State Route 29 Comprehensive Multimodal Corridor Plan (2020)**

The SR 29 Comprehensive Multimodal Corridor Plan evaluates the current conditions of the highway as it relates to traffic operations, crash risk, multimodal connectivity, and reliability and travel times for transit. The plan identifies multimodal improvements on SR 29 to be implemented over the next 20 years which address concerns about safe crossings, active transportation accommodations, and transit.

### **Advancing Mobility 2045 (2021)**

The Countywide Transportation Plan showcases NVTA's shared transportation vision for 2045. The plan focuses on implementation efforts to relieve congestion, improve traffic safety, and create more active transportation infrastructure. NVTA hopes to provide more access to transit through providing more reliable and frequent bus service and improving the existing roadway network.

### **Napa Countywide Pedestrian Master Plan (2016)**

The Napa Countywide Pedestrian Master Plan provides guidance for infrastructure, policy, programs, and development standards to support safety and connectivity for people walking in Napa Valley. Four goals are identified to guide the recommendations throughout, with specific policies that are aimed to achieve these goals. Walking trends, collisions involving pedestrians, and community input were all analyzed to develop a list of priority projects and identify the countywide pedestrian network. Each city and town was evaluated individually to develop recommendations for their unique contexts and needs, and a countermeasure toolbox was provided for implementation in priority areas.

### **Napa Countywide Bicycle Master Plan (2019)**

The Napa Countywide Bicycle Master Plan provides guidance for infrastructure, policy, programs, and development standards to support safety and connectivity for people biking in Napa Valley. A data-driven analysis, paired with extensive community engagement, was used to develop four goals and policies that are aimed to achieve these goals. Evaluating corridors and intersections based on level of traffic stress, collisions involving a bicycle, and community input were all reviewed to develop a list of priority projects and identify the countywide bicycle network. Each city and town was evaluated individually to develop recommendations for their unique contexts and needs, and a countermeasure toolbox was provided for implementation in priority areas.

## Equity Considerations

Equity considerations are an important component of analyzing and improving roadway safety through the Safe System Approach. Low-income communities and communities of color have experienced decades of disinvestment and neglect in transportation and are disproportionately impacted by roadway safety issues.

### Geographic Indicators

As part of the analysis for this Plan, common indicators used to identify disadvantaged communities in the region and state were explored to identify potential focus areas for equity.

### Equity Priority Communities

The Metropolitan Transportation Commission (MTC), the metropolitan planning organization (MPO) for the nine-county Bay Area region, designates a set of census tracts as Equity Priority Communities (EPCs). These are areas it considers historically underserved and in need of special investment to attain equitable access to transportation, housing, and services. EPCs are defined using a variety of demographic and socioeconomic factors, including race and ethnicity, household income, linguistic isolation, access to a vehicle, housing affordability, and numbers of seniors and people with disabilities, among others. Tracts that are identified as EPCs are further divided into three classes based on their scoring – “high,” “higher,” and “highest.”

As shown in **Figure 4**, Napa County has only five census tracts identified as EPCs, the second fewest among the nine Bay Area Counties – only Marin has fewer with four. One tract consists of the campus of Napa State Hospital and is classified as “highest.” Of the remaining four, three are in the City of Napa and one consists of the entirety of the City of Calistoga; all four of these tracts are classed as “high.” As such, Napa County has the fewest EPC census tracts amongst the nine counties classified as “higher” or “highest.”

### Healthy Places Index

The Healthy Places Index is a socioeconomic index that uses 25 community characteristics including economic, educational, transportation, housing, environmental, healthcare access, and other indicators to define a composite score that rates an area’s health from a holistic perspective. The California Transportation Commission (CTC) defines criteria for disadvantaged communities. It qualifies areas that the Healthy Places Index scores in the bottom 25th percentile or below (with lower scores being worse) as disadvantaged communities.

No tract in Napa County scores lower than the 40th percentile on the HPI, and all but five tracts in the City of Napa score above the state average. As such, no tract in Napa County meets the State’s criteria for disadvantaged communities based on HPI.

### CalEnviroScreen

CalEnviroScreen is an environmental justice index developed by the California Office of Environmental Health Hazard Assessment (OEHHA). The index, now in its 4.0 edition, aggregates a variety of metrics to identify communities that are disproportionately vulnerable to pollution and environmental burdens. The CTC qualifies areas that CalEnviroScreen scores in the 75th percentile or above (with higher scores being worse, unlike the HPI) as disadvantaged communities.

No tract in Napa County scores higher than the 70th percentile on the latest edition of CalEnviroScreen, and all but eight tracts in the south of the County in or near the Cities of American Canyon and Napa scores above the state average. As such, no tract in Napa County meets the State’s criteria for disadvantaged communities based on CalEnviroScreen.





**Figure 4**  
MTC Equity Priority  
Communities (EPCs)  
in Napa Valley

- Key**
- Class "High" EPCs
  - Class "Highest" EPCs

## Beyond Traditional Indicators

The indicators mentioned above do not capture the full story in Napa Valley. These metrics are reliant on Census data and other data sources that have a tendency to undercount populations without permanent addresses. As a result, these metrics likely do not accurately capture certain underserved populations within the region.

### Seasonal Workers

Farmworkers and other seasonal workers are a pillar of Napa Valley's economy and communities, but are often undercounted in Census data and other data sources, and underserved and disadvantaged in the planning process. The safety analysis of this Plan includes focused examination of collision patterns near each of the three farmworker centers operated by the Napa County Housing Authority (NCHA) in order to draw focus on the safety needs of seasonal farmworkers in the region. However, true and lasting progress towards greater inclusion in the planning process and improvements in safety outcomes can only be achieved through long-term partnership and understanding, developed through robust outreach and engagement with seasonal worker communities. This Plan must be followed up with regular, ongoing outreach that meet these communities where they are and provide appropriate language resources.

### Homeless Individuals

The Bay Area as a whole faces a significant crisis surrounding housing affordability and homelessness. While the homelessness crisis is more pronounced in other counties in the Bay Area such as San Francisco and Alameda, there is nonetheless a need for Napa Valley to take the issue into consideration as part of this roadway safety planning process.

According to the Napa City-County Continuum of Care's Strategic Plan to Address Homelessness (2022), 464 people were identified as experiencing homelessness on a single night during the annual January Point-in-Time count on January 24, 2020. The report indicated that 65% of respondents were living unsheltered, and 98% resided in Napa or a neighboring County when they became homeless. However, it is important to note that this figure may likely be an undercount due to the difficulty of collecting accurate and complete data on homeless individuals, who likely also are undercounted in Census data and see underreporting in collisions they are involved in.

While addressing the root causes of homelessness may fall outside the realm of roadway safety, it still has a role to play in contributing to alleviating the crisis. For example, making policies around encampments and overnight RV parking with roadway safety as a priority, such as by designating safe areas that are away from areas with known hazards, such as high speeds or obstructed sight lines. Furthermore, continued coordination among the multidisciplinary team of stakeholders in roadway safety should reach out to homeless individuals and provide services in conjunction with addressing roadway safety concerns. It would benefit Napa Valley to institutionalize this practice so such outreach is done on a ongoing and regular basis.

## Alternatives to Enforcement

Over the course of the stakeholder outreach for this Plan, stakeholders at local police departments and CHP highlighted that their current staffing levels limit their ability to conduct widespread traffic enforcement. This feedback is in line with regional and national trends and a consequent shift of police resources towards serious and violent crime. For example, San Francisco has seen traffic citations drop from an average of 74 a day in 2019 to 10 a day in the first half of 2022; its number of dedicated traffic officers has declined from 69 to 45 in the same period. Similarly, the City of Seattle has seen its dedicated traffic details eliminated since 2019, and traffic citations issued in Seattle are down 86% between 2019 and 2022. This decline in traffic enforcement also comes at the same time as a national reckoning over policing and policing reforms aimed to try to address issues such as racial profiling, abuse, and violence, many of which involve or start with traffic enforcement stops.

However, enforcement of traffic laws is nonetheless necessary and a vital component to the Safe System Approach. Enforcement is instrumental to ensuring that rules of the road are followed, that engineering countermeasures are effective and used as intended, and that all road users are reminded and educated to use the transportation system safely. In light of the present difficulties surrounding traditional enforcement, this Plan explores several alternatives that can complement it and ensure that these vital functions are being fulfilled.

One prominent alternative is the use of automated red light and speed enforcement cameras, which have been deployed in several jurisdictions around the country. These cameras have had positive results in terms of their ability to reduce violations, crashes, injuries, and fatalities. Automated red light cameras are permitted in California, while automated speed enforcement cameras are not; however, both are included

for informational purposes in this Plan as non-engineering countermeasures, as strong evidence exists for both that they can reduce violations, crashes, injuries, and fatalities. While automated enforcement cameras are often politically unpopular and seen as revenue generators for municipal governments, they can be made more palatable by:

- » tying cameras to specific areas for enforcement, such as school zones and construction areas
- » removing financial incentives for vendors to issue fines – for example, paying the vendor a flat fee or on a per camera basis, as opposed to a per citation basis
- » instituting a progressive fine structure with different fine amounts for those of different income levels
- » maintaining transparency on the amount and use of program revenue and clearly message that revenue generation is not a purpose or goal of the program
- » instituting the program as a pilot that is reevaluated and renewed after a predetermined period

Another alternative to traditional enforcement is the use of civilian staff to issue traffic citations. There is a move in several cities to use civilian staff to issue traffic citations. For example, Philadelphia's first public safety officers were sworn in in March, tasked with traffic duties and issuing citations which would allow sworn officers to be redirected towards serious crime. While not currently allowed in California, a bill currently in the Legislature would legalize such civilian forces for jurisdictions in the state currently exploring the option. For example, the City of Berkeley passed a measure in 2020 to shift traffic stop duties to a civilian staff, which remains moot until changes in state law; an unreleased report from the City of Los Angeles Department of Transportation also recommended that most traffic enforcement be conducted by civilians.



NVTA's vision statement and guiding principles were collaboratively developed with NVTA, member jurisdictions, and members from the Stakeholder and Technical Advisory Working Groups. A summary of the working group meetings and community engagement is in the following chapter.

## Vision Statement

Napa Valley is committed to an equity-focused, data-driven effort to eliminate traffic deaths and severe injuries on our streets by 2030.

## Guiding Principles

- » **Safety is the highest priority.** Motor vehicle collisions should not result in a fatality or serious injury on Napa Valley roadways. They are preventable and unacceptable incidents.
- » **People make mistakes.** Driver behavior will be taken into consideration for design, construction, operation, and continuous evaluation of roadways to determine the impact on vulnerable road users.
- » **A data-driven approach.** Ongoing evaluation should continue to identify where and why traffic collisions occur and prioritize projects and programs that eliminate fatal and severe injury collisions. NVTA will work with local jurisdictions to proactively and reactively make data-driven engineering decisions to manage roadways and reduce the severity of collisions.
- » **Safety is a shared responsibility.** Everyone is a key partner in roadway safety. We want to create a system where users, roadway designers, law enforcement, and post-crash care create redundancy to reinforce safety.
- » **Transportation networks must be equitable.** The transportation networks in Napa Valley must be equitable for all road users and serve all ages and abilities. Equity Priority Communities will be considered as projects are developed. New safety interventions will not worsen equity concerns, especially as it is related to enforcement.
- » **Vision Zero will be accountable and transparent.** Evaluation through an equity lens will be ongoing. NVTA strives to be transparent in its communications on roadway designs, prioritizing competing improvements, and use of limited resources needed to reduce data and severe collisions on Napa Valley roadways.

# **NVTA VISION ZERO**

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# 2

## Engaging the Community

NVTA has engaged with community stakeholders throughout the development of the Vision Zero Action Plan to receive holistic perspectives from community members on the means for improving Napa Valley's road safety. The engagement process has sought insights from stakeholder groups and the community at large to ensure that the plan aligns with the goals of local jurisdictions.

### Stakeholder Groups

Two working groups were developed during the Plan's initiations: Technical Advisory Working Group (TAWG) and Stakeholder Working Group (SWG).

The TAWG was developed to give insights into the roadway safety concerns and priorities for the five member agencies and Napa County to identify their unique challenges to achieving safer roadways. Members of the TAWG included representatives from local jurisdictions, Police Departments, California Highway Patrol, Fire Departments, and the County.

The SWG was comprised of representatives of organizations, departments, or demographics which are significantly impacted by roadway safety, including school districts, active transportation advocates, and the farmworking community. Group members provided perspectives about the needs of the communities and the priorities that they have previously identified.

Both the TAWG and the SWG met three times to discuss the vision, goals, priorities, existing conditions, and collision risk profiles in Napa Valley. During the first meeting, groups discussed the initial collision data analysis and their understanding of potential causes for the primary collision profiles. Working group members shared information about ongoing safety related projects or policies taking place within their jurisdiction or by their organization. During the second meeting, the groups reviewed the initial countermeasures identified for the collision profiles and discussed the effectiveness of the profiles in capturing the most significant challenges in Napa Valley. During the final meeting, groups reviewed and provided feedback on the draft Vision Zero Action Plan.



## Community Outreach

NVTA strategically engaged with the community to create multiple avenues for people to share their needs and priorities for roadway safety in the County. A combination of in-person events, presentations, and online access to project information provided a wide range of opportunities for people to provide feedback throughout the Plan's development.

The NVTA Project team attended community events to receive feedback on the needs and priorities of Napa Valley residents. These events included the following:

- » Napa Farmers Market Stand (June 4, 2023)
- » Earth Day Fair at the Napa Commons (April 23, 2023)
- » Bikefest (May 7, 2023)
- » Bike to School or Work Day (May 18, 2023)

Community engagement emphasized access for Spanish speaking residents of the County, including Spanish Radio Station advertising and online advertisements. NVTA also engaged with the Napa Valley Farmworker Housing groups through six presentations to the group between June 19 and June 23, 2023.

Engagement was also facilitated through a project webpage which was advertised through social media targeted advertising, emails to subscribed residents, and local radio stations. The site provided information about the Vision Zero Plan and encouraged responses to an Attitudinal Survey and an interactive mapping site. Respondents were asked to highlight areas of traffic safety concern on the map, including issues like speeding, rolling through stop signs, poor street lighting, or visibility at intersections.



## Committee Presentations

NVTA also gave outreach presentations to jurisdictional committees and relevant internal groups.

### Jurisdiction Advisory Committees

City of Napa Bicycle and Pedestrian Advisory Commission (BPAC)

- » 12/8/22 Overview of Napa Valley Vision Zero Plan
- » 4/13/23 Vision Zero Plan Progress Update
- » 6/8/23 Vision Zero Plan Progress Update
- » City of Calistoga Active Transportation Advisory Committee (ATAC)
- » 4/5/23 Vision Zero Plan Progress Update

City of American Canyon Open Space Active Transportation and Sustainability Commission (OSATS)

- » 8/2/23 Vision Zero Plan Presentation and Progress Update

### NVTA Advisory Committees

NVTA Active Transportation Advisory Committee (ATAC)

- » 9/26/22 Plan Introduction/Kick off
- » 11/28/22 Ad Hoc-Vision Zero Stakeholder Representative selection
- » 1/23/23 Vision Zero Plan Progress Update
- » 5/22/23 Vision Zero Plan Progress Update

NVTA Citizens Advisory Committee (CAC)

- » 7/7/22 Vision Zero Plan introduction
- » 1/11/23 Vision Zero Plan Progress Update
- » 3/1/23 Vision Zero Plan Progress Update
- » 5/3/23 Vision Zero Plan Progress Update
- » 7/12/23 Vision Zero Plan Progress Update

NVTA Technical Advisory Committee

- » 9/1/22 Vision Zero Plan Introduction
- » 1/5/23 Ad Hoc Stakeholder Group Representatives selection
- » 3/2/23 Vision Zero Plan Progress Update
- » 5/4/23 Vision Zero Plan Progress Update
- » 7/13/23 Vision Zero Plan Progress Update

NVTA Board

- » 10/11/22 Work Authorization-Initial presentation
- » 1/11/23 Ad Hoc-Vision Zero Stakeholder Representative selection
- » 3/8/23 Vision Zero Progress Update
- » 7/19/23 Vision Zero Progress Update

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## Attitudinal Survey

NVTA distributed a survey, both online and on paper, to gauge the attitude of Napa Valley residents on a variety of safety issues. The survey included 22 questions, and was made available to residents from April 20th, 2023 until June 30th, 2023 in both English and Spanish. In total, 585 responses were collected from residents of the member

agencies and unincorporated areas within Napa County. **Appendix C** includes a full summary of the survey responses. The survey was publicized through in-person venues like Farmer's Markets and at the farmworker housing sites, and through advertisements in the Napa Register and KVON radio station.

**Figure 5**

Social Media Graphics Advertising the Survey



## People Agree That Roadway Safety is a Top Priority

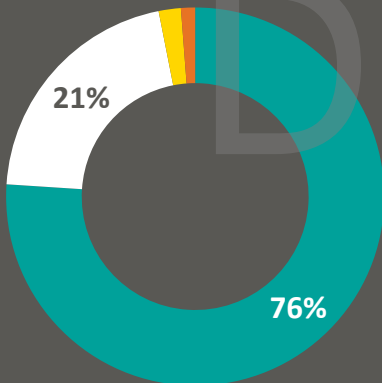
Overall, the survey results reflected Napa Valley residents' shared consensus that roadway safety is important, as shown in **Figure 6**. When asked if they supported the goal of eliminating traffic fatalities and serious injuries on roads and streets in Napa Valley, 76% strongly agreed and 21% agreed. In downtown areas or commercial corridors,

83% of responses agreed that space for people to walk, bike, and cross the street safely should be prioritized over on-street parking. Nearly all of the respondents – 96% – agreed or strongly agreed that safety should be the top priority when making decisions about road or street design.

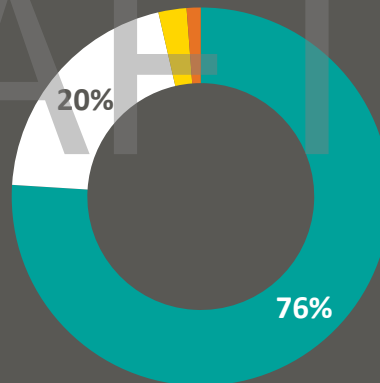
**Figure 6**  
Attitudinal Survey Results:  
*People Agree That Roadway Safety is a Top Priority*

**Strongly Agree** **Agree**  
**Disagree** **Strongly Disagree**

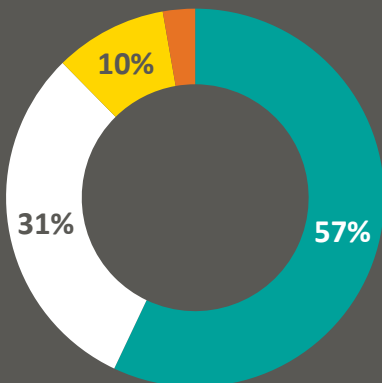
I support the goal of eliminating traffic fatalities and serious injuries on roads and streets in Napa Valley



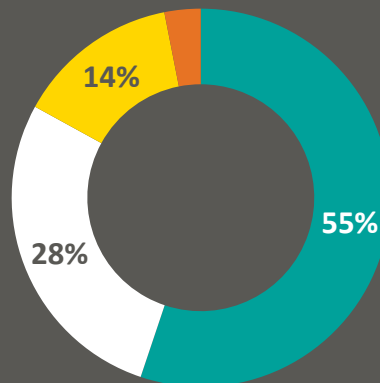
When making decisions about road or street design, safety should be the top priority.



Intersection changes reducing the possibility of crashes should be prioritized over those reducing delay



In downtowns or commercial corridors, space to walk, bike, and cross the street safely should be prioritized over parking



## People Agree That Safety Outcomes Can Be Improved

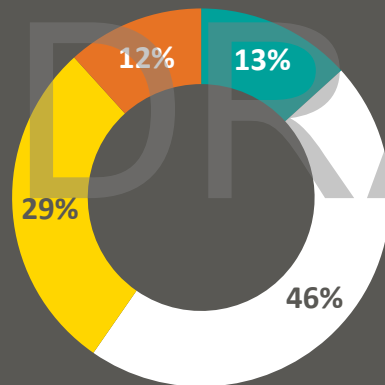
As shown in **Figure 7**, the survey also reflects that residents see a need for roadway safety to improve in Napa Valley. When it came to respondents' experiences with safety in the county, about 60% feel safe walking along or crossing streets in Napa Valley's downtown areas and neighborhoods. Fewer than half

feel safe walking along or crossing rural or county roads, and less than 25% feel safe walking along or crossing the highways throughout Napa Valley.

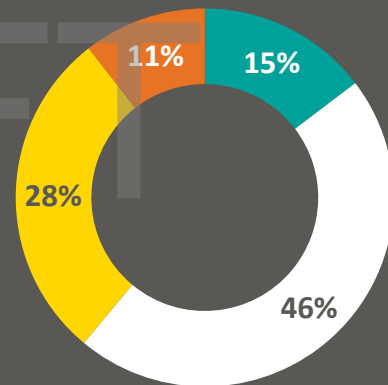
**Figure 7**  
Attitudinal Survey Results:  
*People Agree That Safety Outcomes Can Be Improved*

**Strongly Agree** **Agree**  
**Disagree** **Strongly Disagree**

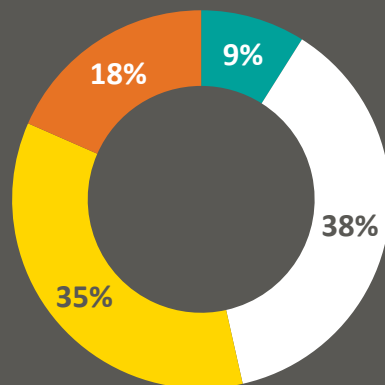
I feel safe walking along or crossing roadways in *downtown areas* with my family



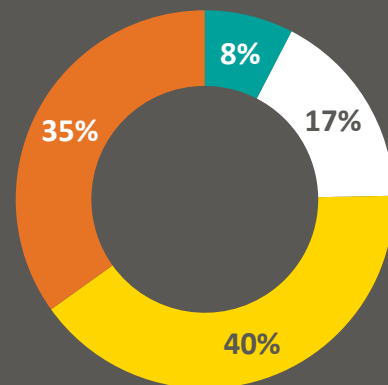
I feel safe walking along or crossing *neighborhood streets* with my family



I feel safe walking along or crossing *rural roadways* with my family



I feel safe walking along or crossing *highways* with my family



## Behavior Change Requires Continued Mindset Shift

Nearly all respondents – 94% – agreed that they were willing to change their behaviors to reduce safety risks. However, a smaller share are willing to commit to specific changes. For example, speeding continues to be pervasive on roadways around the region, and collision records indicate that speeding continues to

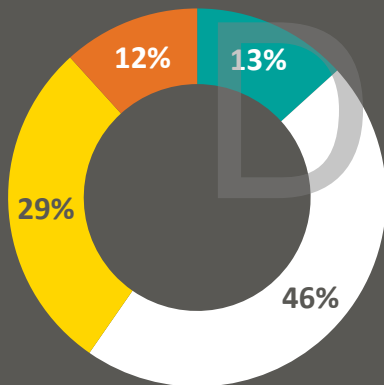
be a leading contributing factor to crashes. However, a smaller share of respondents – 85% – agreed or strongly agreed that they observed speed limits, and an even smaller share – 71% – agreed or strongly agreed that they are willing to reduce their speed to 35 miles per hour on rural roads.

**Figure 8**

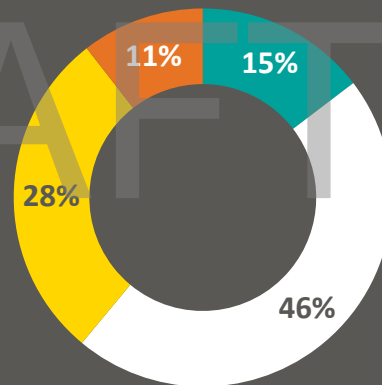
Attitudinal Survey Results:  
*Behavior Change Requires Continued Mindset Shift*

**Strongly Agree** **Agree**  
**Disagree** **Strongly Disagree**

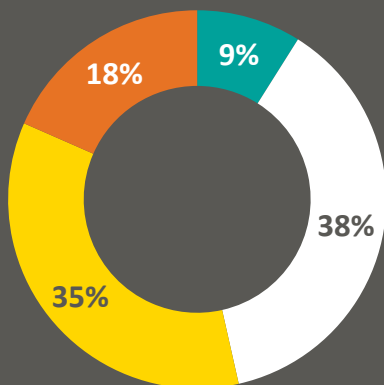
**I am willing to change my behavior when driving to help reduce the risk of fatality or severe injury.**



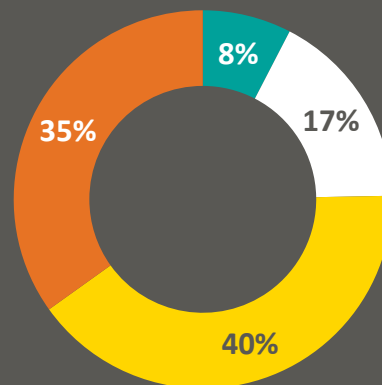
**When I drive, I travel at or below the speed limit**



**I am willing to reduce my speed to 35 MPH on two-lane rural or country roads**



**In areas where children or elderly may be present, the roadway should be designed for cars to drive 20 MPH or slower.**



# **NVTA VISION ZERO**

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# 3

## Summary and Analysis of Safety Data

Chapter 2 of Caltrans' Local Roadway Safety Manual (LRSM) instructs safety practitioners to "consider a wide range of data sources to get an overall picture of the safety needs." To this end, this Vision Zero effort will be data-driven and synthesize findings from collision records alongside input from key stakeholders, a technical advisory group, and staff.

Collision records on roadways in Napa Valley\* from 2015 to 2021 were investigated to describe historic collision trends and identify high-risk locations. This information acts as a primary resource for this Vision Zero effort, providing the underlying data to support key analyses.

The data-driven process for this Vision Zero process includes:

- **Examination of Collision Trends**  
Review of collision statistics to evaluate when, where, and why collisions occur and who is involved.

- **Development of a High-Injury Network**  
Identification of roadways where most injury collisions are concentrated for targeted intervention
- **Development of Collision Profiles of Emphasis** using a combination of collision factors to identify the most prevalent collision types and contexts.
- **Development of a Countermeasure Toolbox**  
Identification of effective, nationally proven countermeasures applicable to different collision profiles
- **Identification of Priority Project Locations**  
Identification of locations suitable for project implementation based on collision density and community verification

The following section will present findings from the first of these stages of data analysis, identifying collision patterns and trends.

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\* Throughout this document, "Napa Valley" will be used to denote the areas served by NVTVA- that is, the entirety of Napa County, including all its incorporated and unincorporated areas. The City of Napa and the County of Napa will always be referred to in their long-form names to prevent any ambiguity.

## A Note on the Data Source

This analysis utilizes data on injury collisions from 2015 through 2021 available through the Transportation Injury Mapping System (TIMS) as of November 2022. TIMS reports injury collisions from the Statewide Integrated Traffic Records System (SWITRS), but excludes collisions that cause property damage only (PDO) and no injuries.

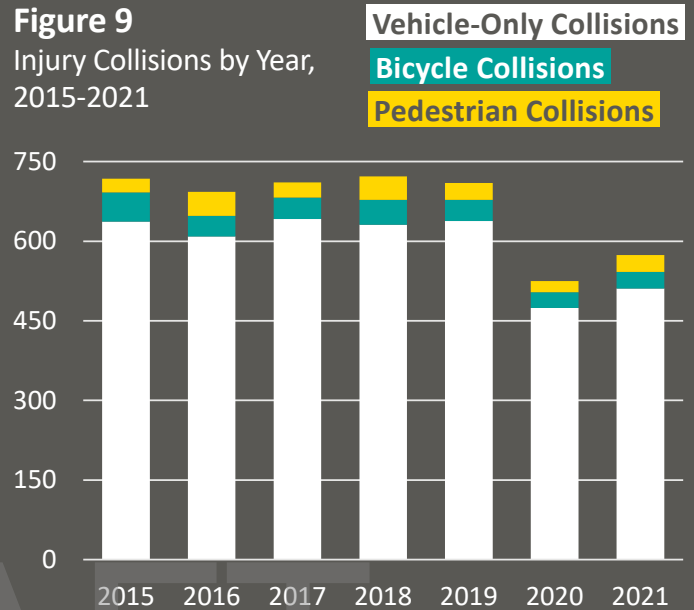
Geographically, the data includes all collisions that occur within both incorporated and unincorporated areas of Napa County. The data excludes collisions that occur on limited-access roadways (i.e. freeways) but include collisions on all other roadways, including State highways and other Caltrans-maintained roadways as well as privately-maintained roadways.

While collision databases like TIMS remain the best source of collision data, they have been found to have certain reporting biases, including:

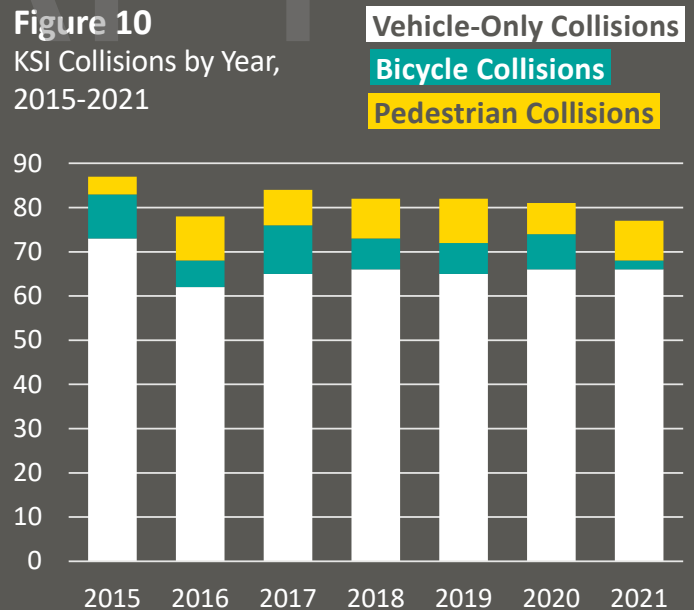
- Collisions involving people walking, on bicycles, or on motorcycles are less likely to be reported than collisions with people driving
- Property damage only collisions are less likely to be reported compared to more severe collisions
- Younger victims are less likely to report collisions
- Alcohol-involved collisions may be underreported

Race, income, immigration status, and English proficiency may also impact reporting, but there is limited research on these factors.

**Figure 9**  
Injury Collisions by Year, 2015-2021



**Figure 10**  
KSI Collisions by Year, 2015-2021





## Collisions by Year and by Mode

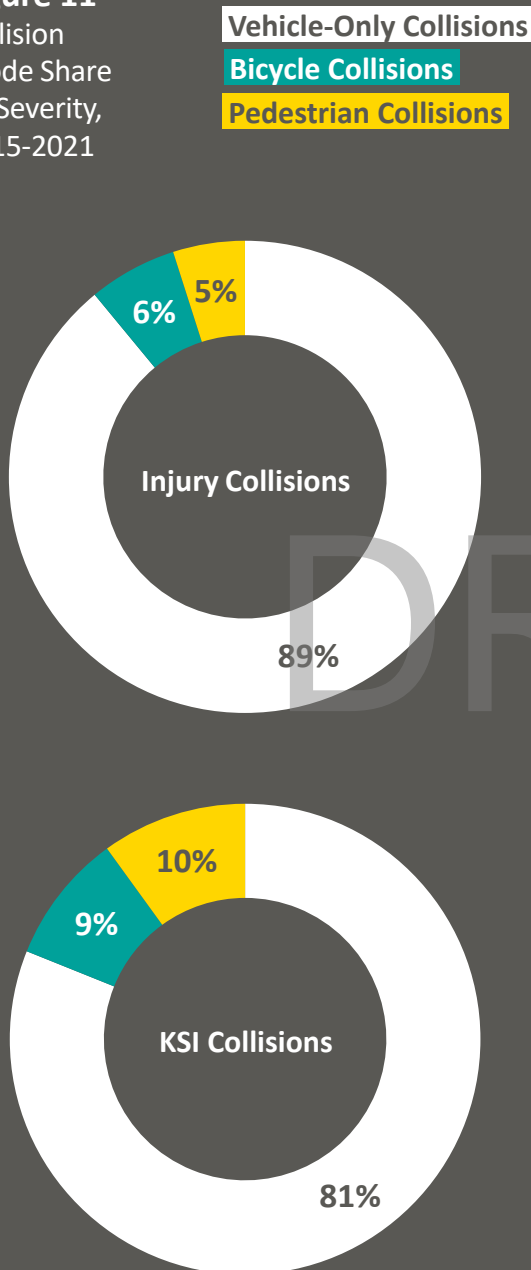
The table below provides a summary of the number of collisions in Napa Valley by mode and severity within the dataset, which includes all collisions that result in injury or fatality. From 2015 to 2021, there were a total of 4,651 injury collisions, of which 571 were KSI collisions: collisions where someone was killed or severely injured.

Collision Summary	Total	KSI
Total	4,651	571
Bicycle	282	51
Pedestrian	229	57

Figures 9 and 10 show the temporal trends of collisions in Napa Valley. As shown, the annual number of overall collisions in Napa Valley remained steady through 2019 and, as shown, experienced a decrease in 2020 and 2021. The number of KSI collisions per year, however, has remained steady not just from 2015 to 2019, but through the years of the COVID-19 pandemic as well. This is in line with national trends during the pandemic where the annual number of KSI collisions has remained steady despite changes in travel patterns.

People walking or biking are particularly vulnerable in the event of a collision, as they lack the protection afforded to them by being inside a motor vehicle. As a result, collisions involving people walking or biking are more likely to result in injury and fatality. As shown in Figure 11, people walking and biking are involved in 11% of all injury collisions, but 18% of KSI collisions.

**Figure 11**  
Collision  
Mode Share  
by Severity,  
2015-2021



## Collisions by Collision Type

**Figure 12** illustrates the share of collisions in the study period that fall into each collision type. As shown, the most common collision types across all collisions in Napa Valley are Rear-End collisions at 29%, Broadside collisions at 23%, and Hit Object collisions at 21%.

Taking a closer look at KSI collisions show a different breakdown percentage. Hit Object collisions are most common among KSI collisions at 31%, followed by Broadside collisions at 15%, and Head-On collisions at 13%. This further illustrates the disproportionate impact in severity that collision type can play. For example, while Rear-End collisions account for a large share of overall collisions, they are generally less likely to result in fatalities and severe injuries.

## Collisions by Primary Collision Factor (PCF)

**Figure 13** illustrates the share of collisions in the study period that are classified under each Primary Collision Factor (PCF). PCFs are cited by the responding officer and are based on that person's judgment of what contributed to the collision. It is important to note that PCFs do not include contextual information about the design aspects of the collision location that could have been primary or secondary contributors to a collision. In Napa Valley, the most common PCFs are Unsafe Speed at 32%, followed by Improper Turning at 20%, and Vehicle Right of Way Violation at 13%.

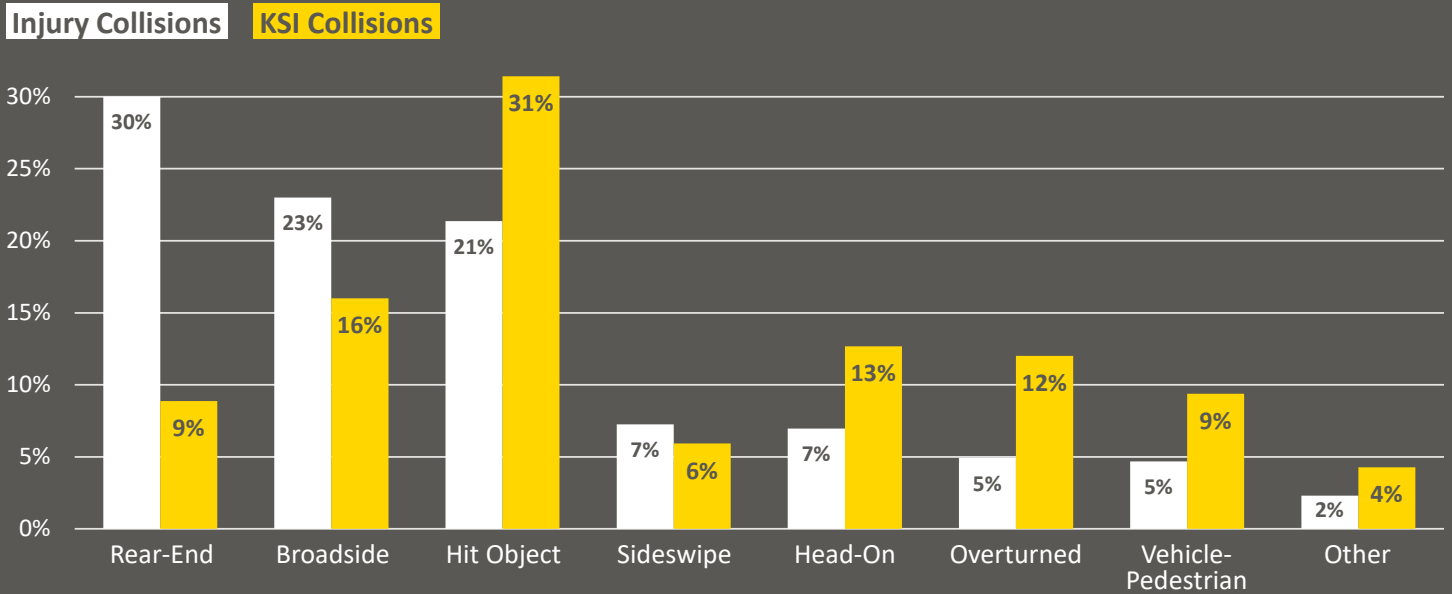
Taking a closer look at KSI collisions show a different PCF breakdown percentage. The most common PCFs for KSI collisions are Improper Turning at 28%, followed by Driving or Bicycling Under the Influence at 19%, and Unsafe Speed at 18%.

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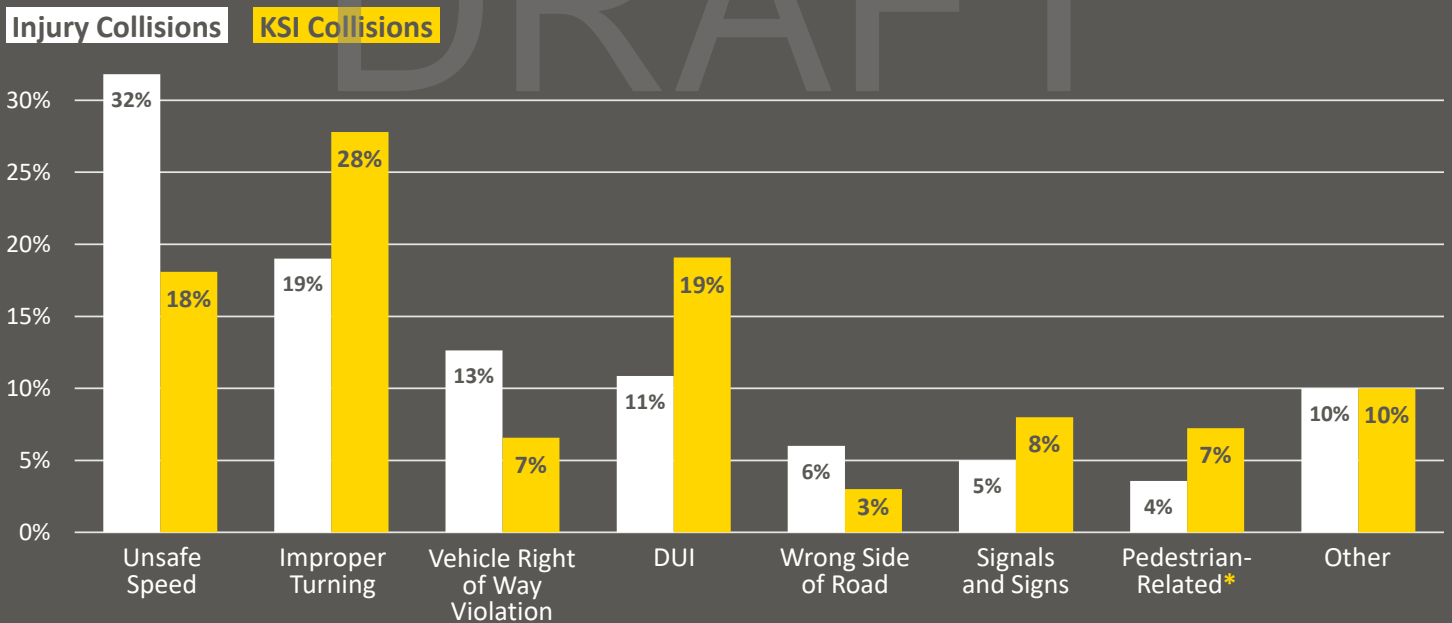
**Figure 12**

Share of Injury Collisions by Collision Type, 2015-2021



**Figure 13**

Share of Injury Collisions by Primary Collision Factor (PCF), 2015-2021



**\* Note on Pedestrian PCF Categories**

The “Pedestrian-Related” category shown here combines two PCF categories: Pedestrian Violation and Pedestrian Right of Way Violation. The former indicates that the pedestrian violated a rule of the road, such as crossing outside of a crosswalk, where the latter indicates the driver of a vehicle violated the pedestrian’s right of way. The Pedestrian Violation category may be overrepresented due to a lack of clear information related to collision circumstances, and the increased likelihood that the pedestrian party may be unable to provide their side of the incident at the time of the collision. For this reason, we have elected to not show the distinction in these tallies, and instead show all pedestrian-related collisions in one single category.

## Collisions by Lighting Conditions

**Figure 14** illustrates the share of collisions in the study period that occur at night\*. As shown, nighttime collisions are overrepresented among KSIs. Collisions that occur during nighttime also disproportionately affect people walking, with more than half of all pedestrian KSI collisions occurring at night. While most nighttime collisions occurred where streetlights were present, the quality of the lighting can vary widely. Factors that may contribute to the quality of streetlights include lights being insufficiently bright, placed too widely apart, or poor quality of lighting for people walking on the sidewalk, as streetlights are often designed primarily for vehicles in travel lanes.

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\* Nighttime collisions are defined as those collisions whose lighting information is not reported as "daylight".

## Driving Under the Influence (DUI)

**Figure 15** illustrates the share of collisions of various types in the study period that involved at least one party driving under the influence (DUI). Drugs or alcohol increase the likelihood of increased crash severity. As shown, the number of DUI collisions are overrepresented amongst KSI collisions. While 12% of all injury collisions involve drugs or alcohol in Napa Valley, 23% of KSI collisions do.

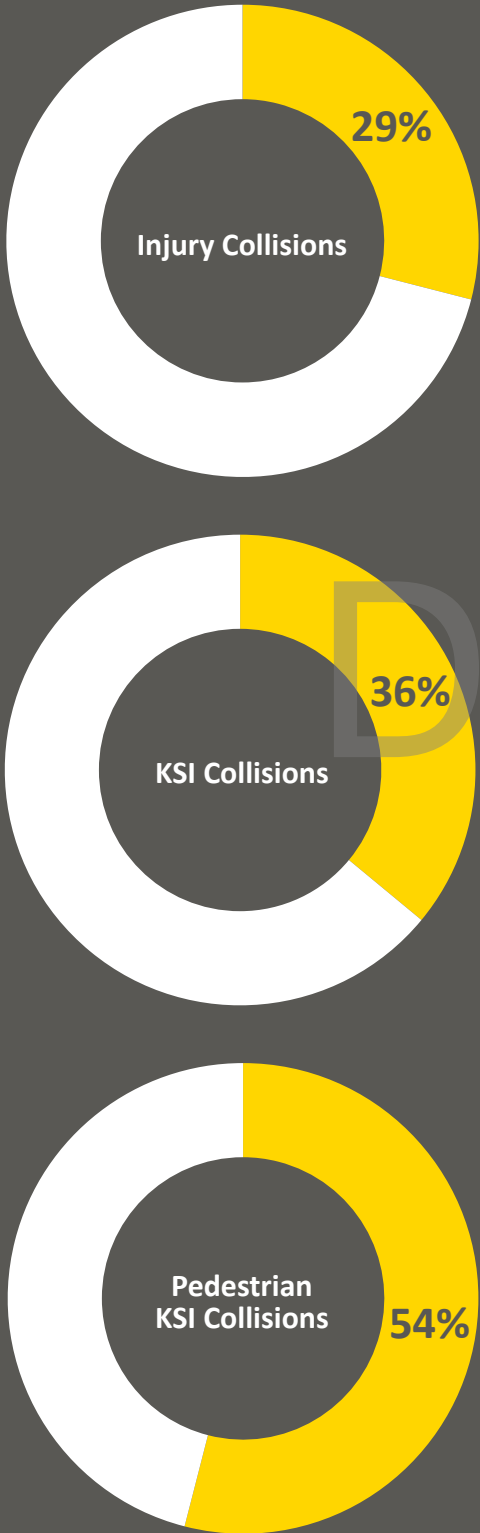
These percentages reflect the portion of collisions involving one or more parties determined to be under the influence of drugs or alcohol. Driving under the influence may not always be listed as the primary collision factor even if a driver is found to be under the influence.

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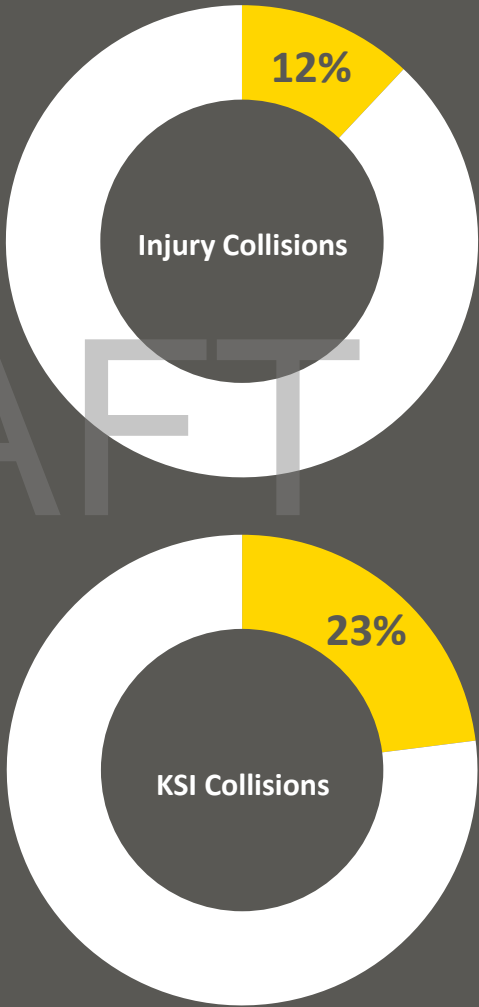
**Figure 14**  
Nighttime  
Collisions,  
2015-2021

**Daytime Collisions**  
**Nighttime Collisions**

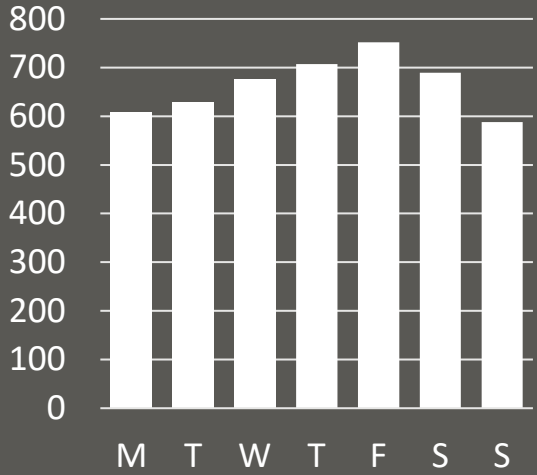


**Figure 15**  
DUI Collisions,  
2015-2021

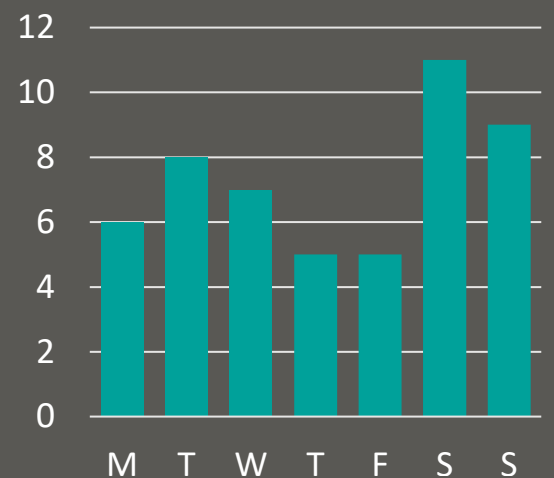
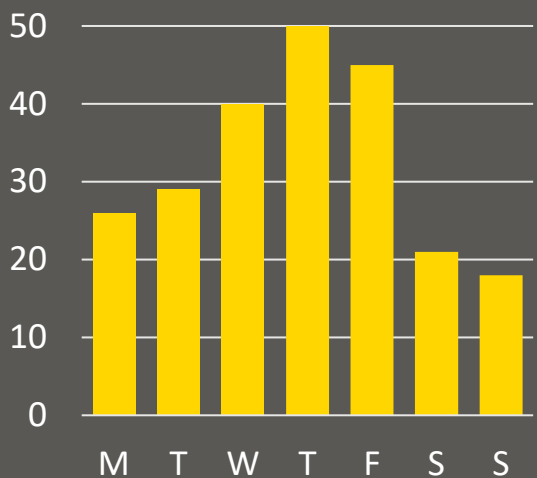
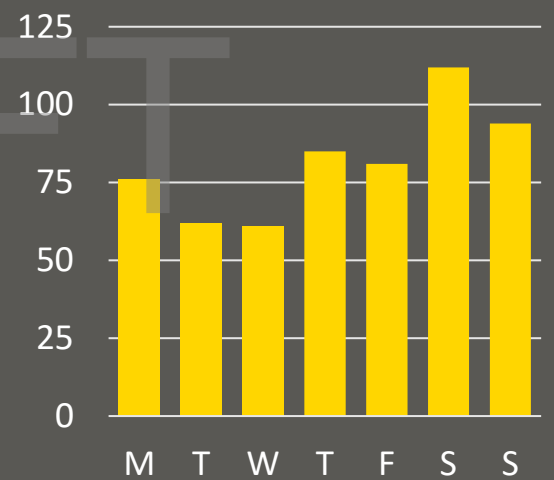
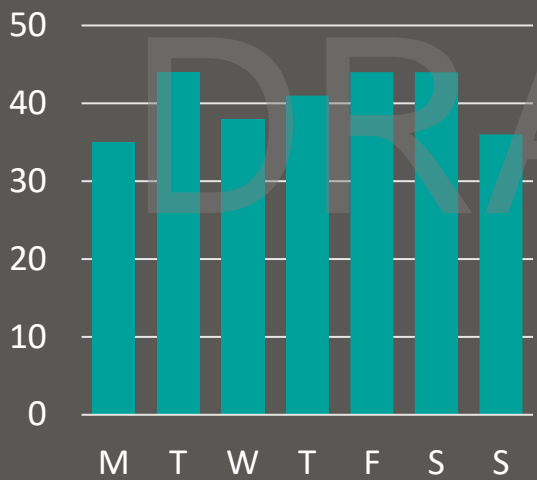
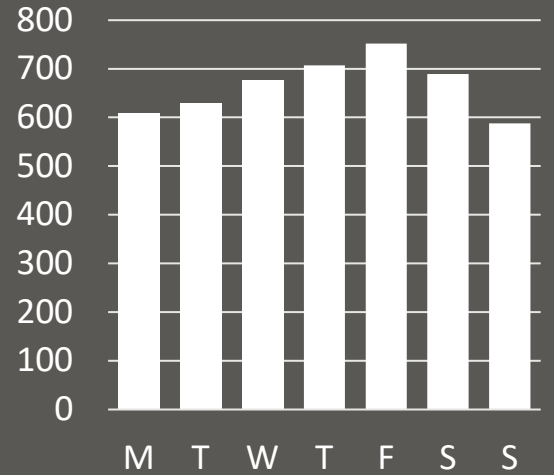
**DUI Collisions**  
**Other Collisions**



**Figure 16**  
Injury Collisions  
by Mode and  
Day of Week,  
2015-2021



**Figure 17**  
Injury Collisions  
by Severity and  
Day of Week,  
2015-2021



## Collisions by Mode and Day of Week

**Figure 16** shows the distribution of injury collisions involving all modes, those involving bicycles, and those involving pedestrians across days of the week, while **Figure 17** shows the same for all injury collisions, KSI collisions, and bicycle KSI collisions.

As shown, there is clear distinction in the time of week that collisions are occurring based on mode and severity. While pedestrian collisions are more likely to occur during the week, bicycle collisions are occurring at roughly equal rates on weekdays and weekend days. Although bicycle KSI collisions and overall KSI collisions see peaks during the weekend, the overall level of collisions during the weekend are not significantly different than that of weekdays.

The peak in KSI collisions on the weekend is noteworthy. These distribution patterns may reflect the region's status as a regional tourist and recreational destination and the associated weekend traffic volumes.

## Countywide High Injury Network

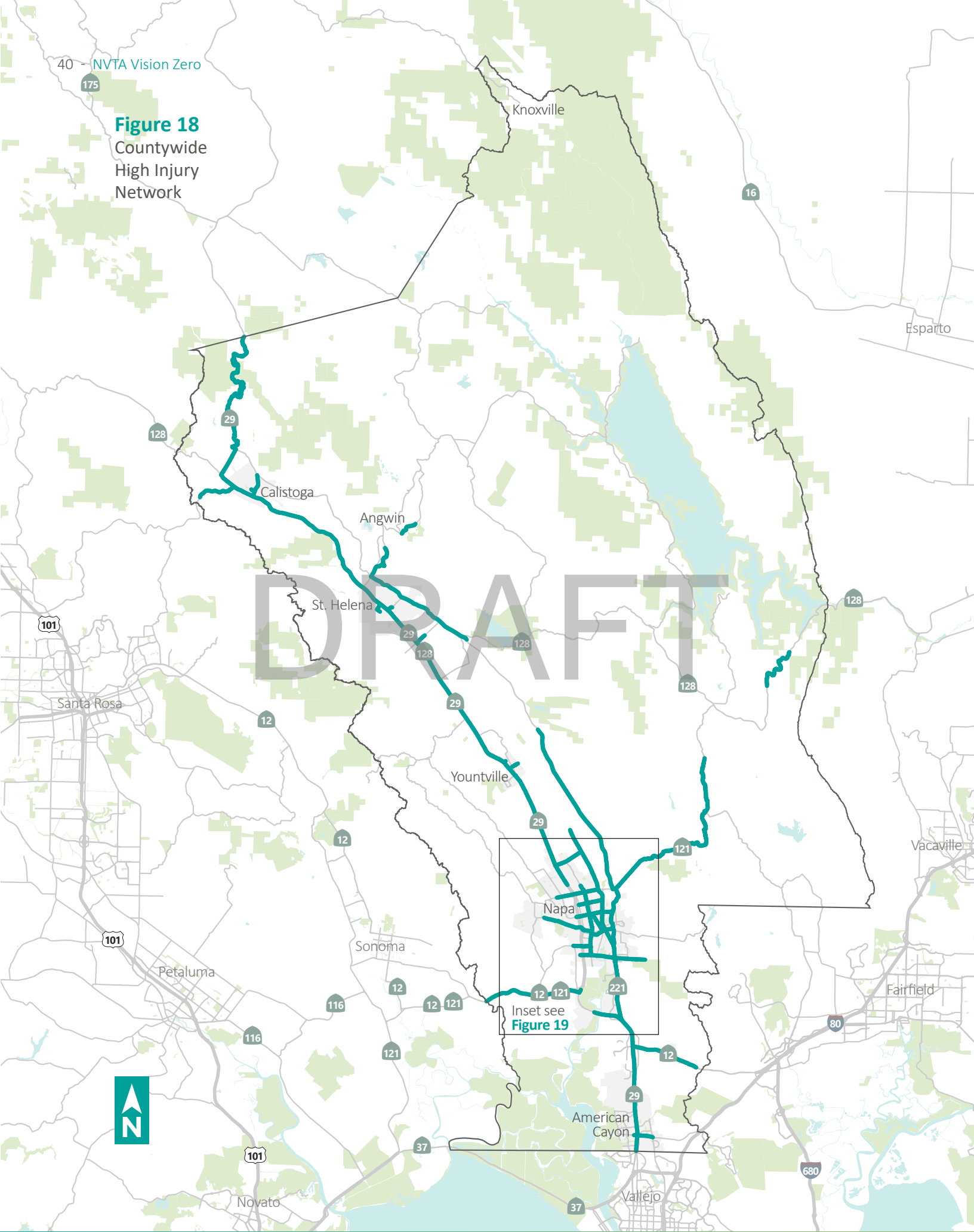
*Almost three-quarters of all injury collisions and two-thirds of all KSI collisions in the region occur on just 8% of its roadways.*

From the collision data, a Countywide High Injury Network was developed to identify the roadways with the highest levels of injury collisions, as shown on **Figure 18**.

The Countywide High Injury Network consists of just 8% of the roadway network of Napa Valley, but is the site of the vast majority of injury collisions. 4,651 collisions occurred during the study period. Of these, 3,357, or 72%, were located along the High Injury Network. 571 of these study period collisions were KSIs, of which 371, or 65%, were located along the network.

40 NVTA Vision Zero  
175

**Figure 18**  
Countywide  
High Injury  
Network



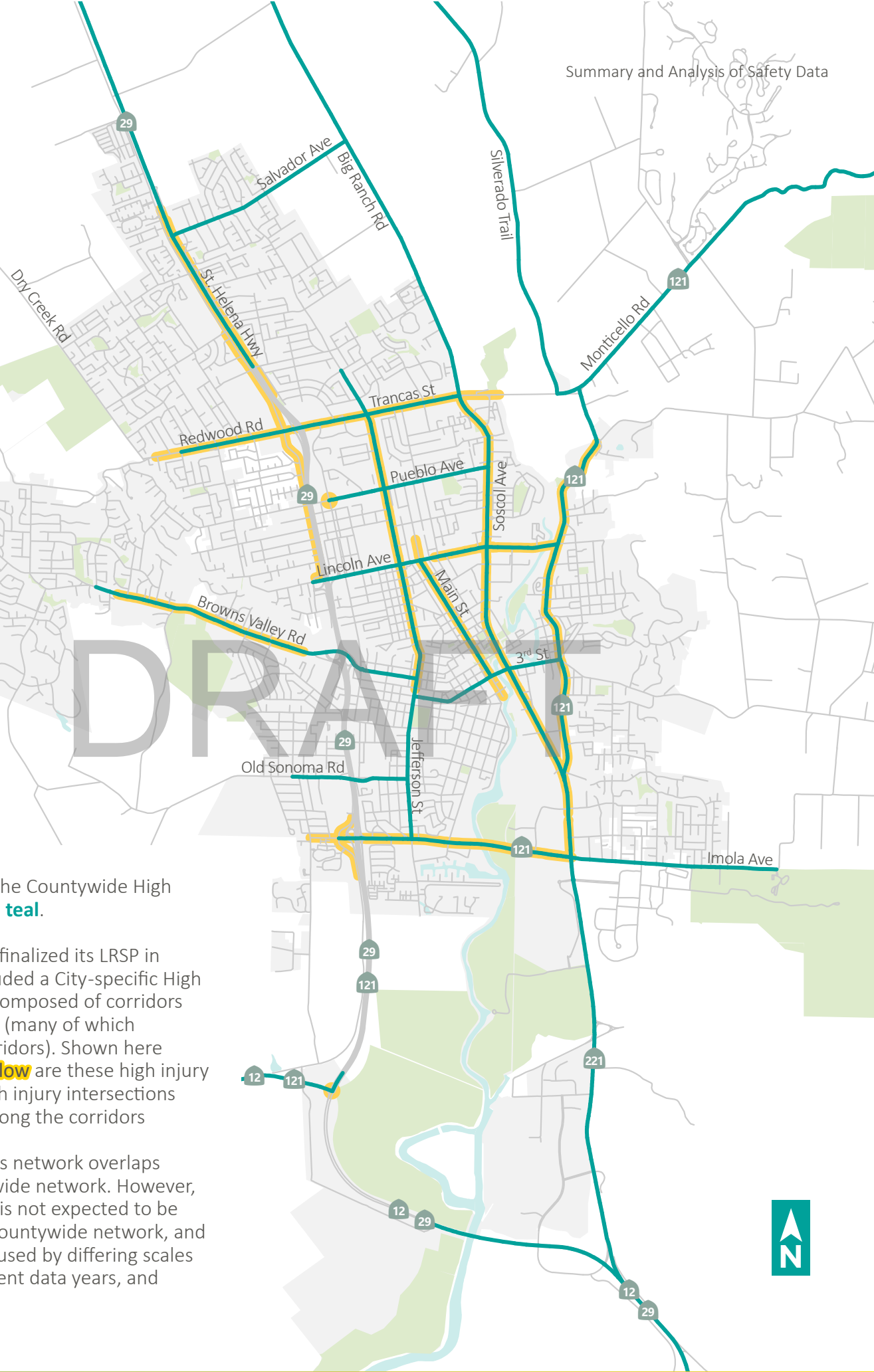
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Inset see  
Figure 19





**Figure 19**  
Countywide High Injury Network (Napa Inset)



This map shows the Countywide High Injury Network in teal.

The City of Napa finalized its LRSP in 2022, which included a City-specific High Injury Network, composed of corridors and intersections (many of which fall along the corridors). Shown here highlighted in yellow are these high injury corridors and high injury intersections that do not fall along the corridors

Much of the City's network overlaps with the Countywide network. However, the City network is not expected to be identical to the Countywide network, and deviations are caused by differing scales of analysis, different data years, and other factors.



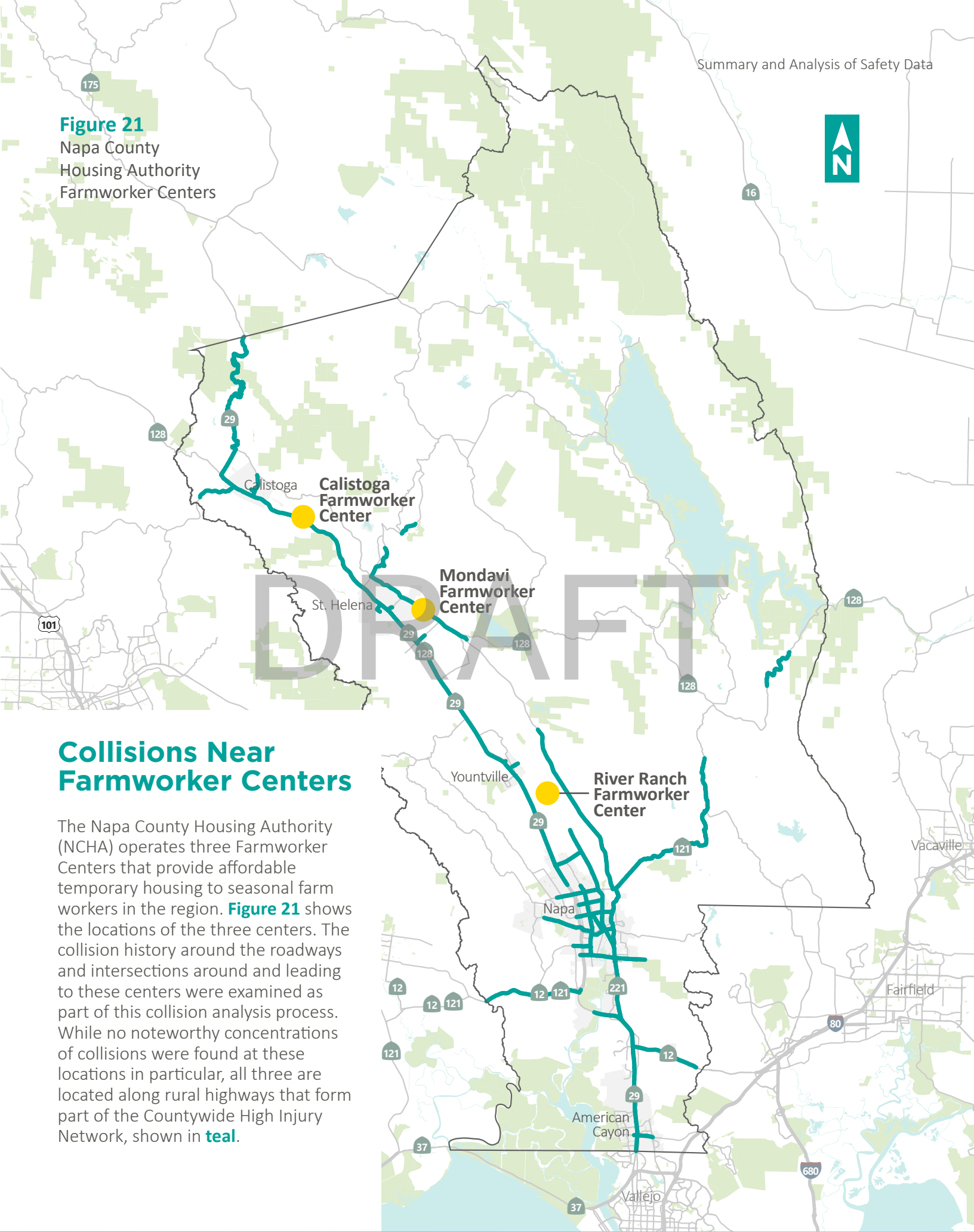
**Figure 20**

Countywide High Injury Network  
(Calistoga, St. Helena, Yountville, and American Canyon insets)





**Figure 21**  
Napa County  
Housing Authority  
Farmworker Centers



### Collisions Near Farmworker Centers

The Napa County Housing Authority (NCHA) operates three Farmworker Centers that provide affordable temporary housing to seasonal farm workers in the region. **Figure 21** shows the locations of the three centers. The collision history around the roadways and intersections around and leading to these centers were examined as part of this collision analysis process. While no noteworthy concentrations of collisions were found at these locations in particular, all three are located along rural highways that form part of the Countywide High Injury Network, shown in teal.

# **NVTA VISION ZERO**

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# 4

## Collision Profiles of Emphasis

Through a systemic analysis of collision records, ten profiles of emphasis were identified for Napa Valley. These profiles were identified through historical collision data, contextual data, and stakeholder feedback, and represent the most significant patterns behind injury collisions - and especially KSI collisions - in the region. Combined, they account for X% of injury collisions and X% of KSI collisions in Napa Valley during the study period.

The ten profiles are as follows:

1. Unsafe Speeds on Non-Urban Thoroughfares
2. Driving Under the Influence (DUI)
3. Broadside Collisions
4. Hit Object Collisions
5. Nighttime Collisions Along Major Roadways
6. Pedestrians Hit in Crosswalks at Intersections
7. Pedestrians Hit Crossing Outside Crosswalks or Walking in Road
8. Bicycle Collisions at Intersections
9. Highway Gateways
10. Collisions along Highways Serving as Main Streets

The following pages contain cutsheets that present each collision profile, along with the following information:

- Description and associated information about each profile
- Number of collisions associated, including number of KSI collisions among those (note that profiles are not mutually exclusive; collisions can fall under multiple profiles, and totals will exceed 100%)
- A map of collision locations

Engineering countermeasures that can potentially address these collisions are arranged by level of implementation effort for consideration in generating short-, medium-, and long-term plans. The full suite of engineering countermeasures can be found in

Profile  
**1**

# Unsafe Speeds on Non-Urban Thoroughfares























Speeding remains a top concern in Napa Valley, especially in contexts outside the region's cities and towns where roadways can feel like the “open road,” but actually serve substantial numbers of wayside uses and see substantial cross traffic from intersecting roadways and driveways.

The listed countermeasures aim to slow vehicles either through changes in roadway geometry, roadway cross-section, or visual information. Using multiple countermeasures creates a more redundant system.

Overall Collisions <b>828</b> 18% of injury collisions	Bike Collisions <b>15</b> 5% of injury bike collisions
KSI Collisions <b>72</b> 13% of KSI collisions	Bike KSI Collisions <b>10</b> 20% of KSI bike collisions

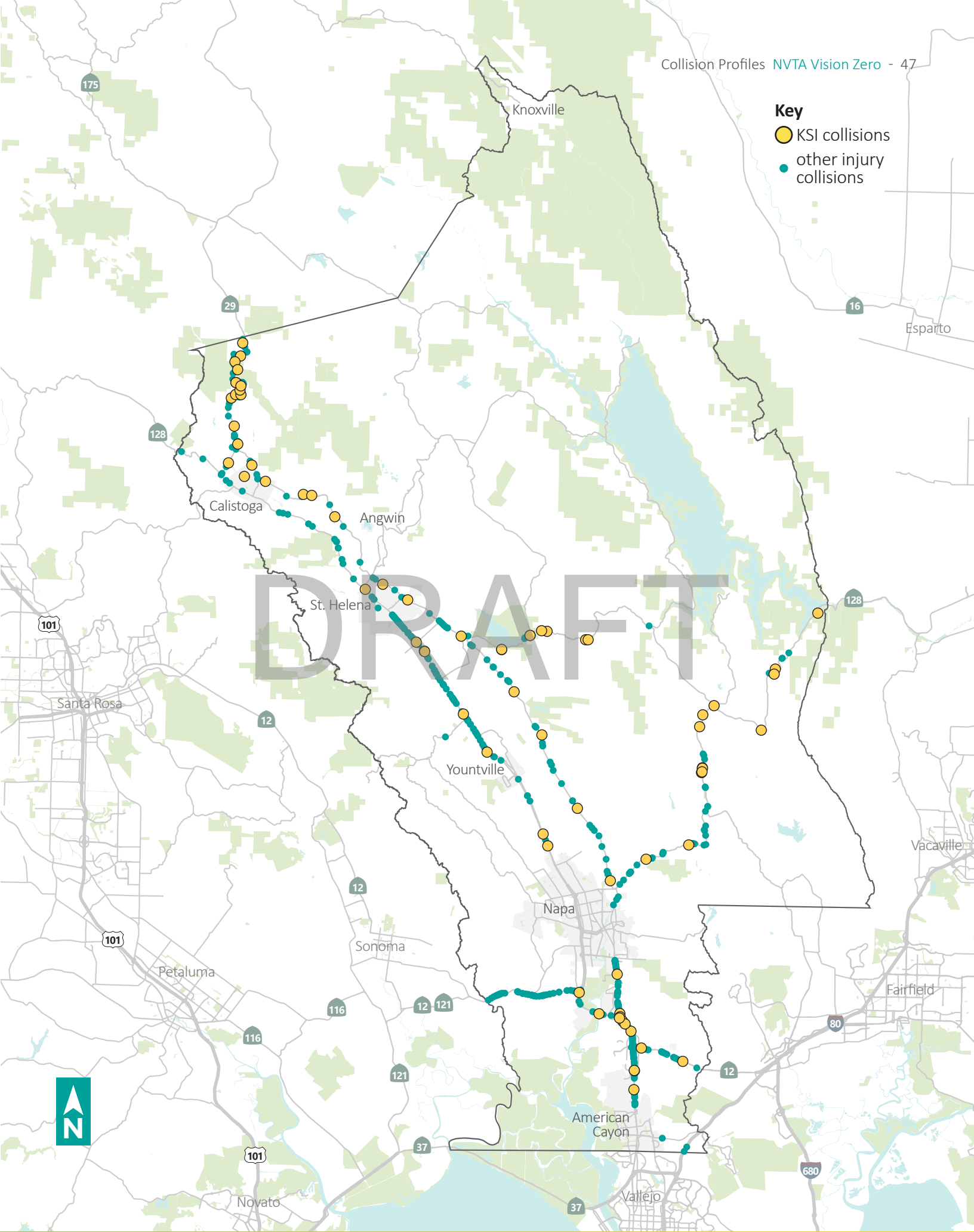
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## Potential Engineering Countermeasures

Low Cost	 Chevron Signs on Horizontal Curves	 Curve Advance Warning Sign	 Delineators, Reflectors, and/or Object Markers	 Extend Yellow and All Red Time
	 Lane Narrowing	 LED-Enhanced Sign	 Retroreflective Tape on Signal/Improve Signal Visibility	 Rumble Strips
	 Safety Edge	 Speed Feedback Sign	 Speed Limit Reduction	
Medium Cost	 Advanced Dilemma Zone Detection	 Guardrail	 Improved Pavement Friction	 Intersection Lighting
	 Protected Left Turns	 Raised Median	 Segment Lighting	 Speed Sensitive Rest in Red Signal
High Cost	 Intersection Reconstruction and Tightening	 Roundabout	 Signal	

**Key**

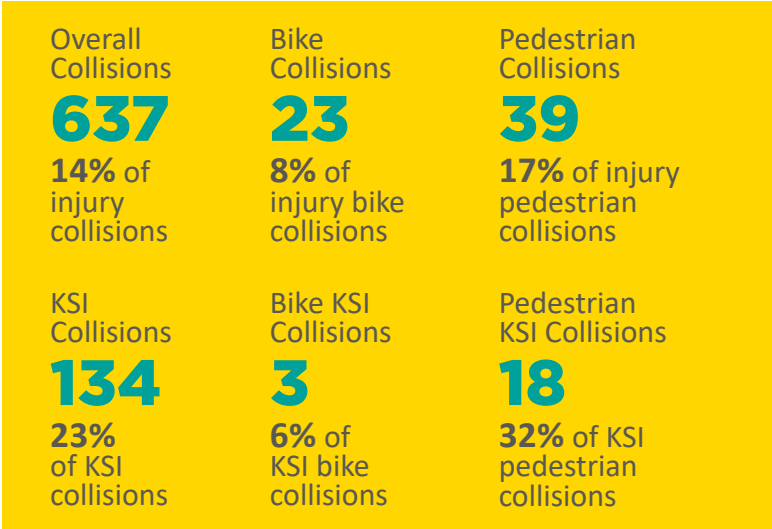
- KSI collisions
- other injury collisions



Profile  
**2**

# Driving Under the Influence













Driving Under the Influence (DUI) collisions account for almost a quarter of all KSI collisions in Napa Valley. The region's status as a global wine destination further contributes to the serious concerns surrounding DUI collisions, which tend to be more severe. Non-engineering interventions will need to be the primary means of addressing these challenges, but may be supplemented with the listed engineering countermeasures that aim to make roadway designs more forgiving in general.



## Potential Non-Engineering Countermeasures

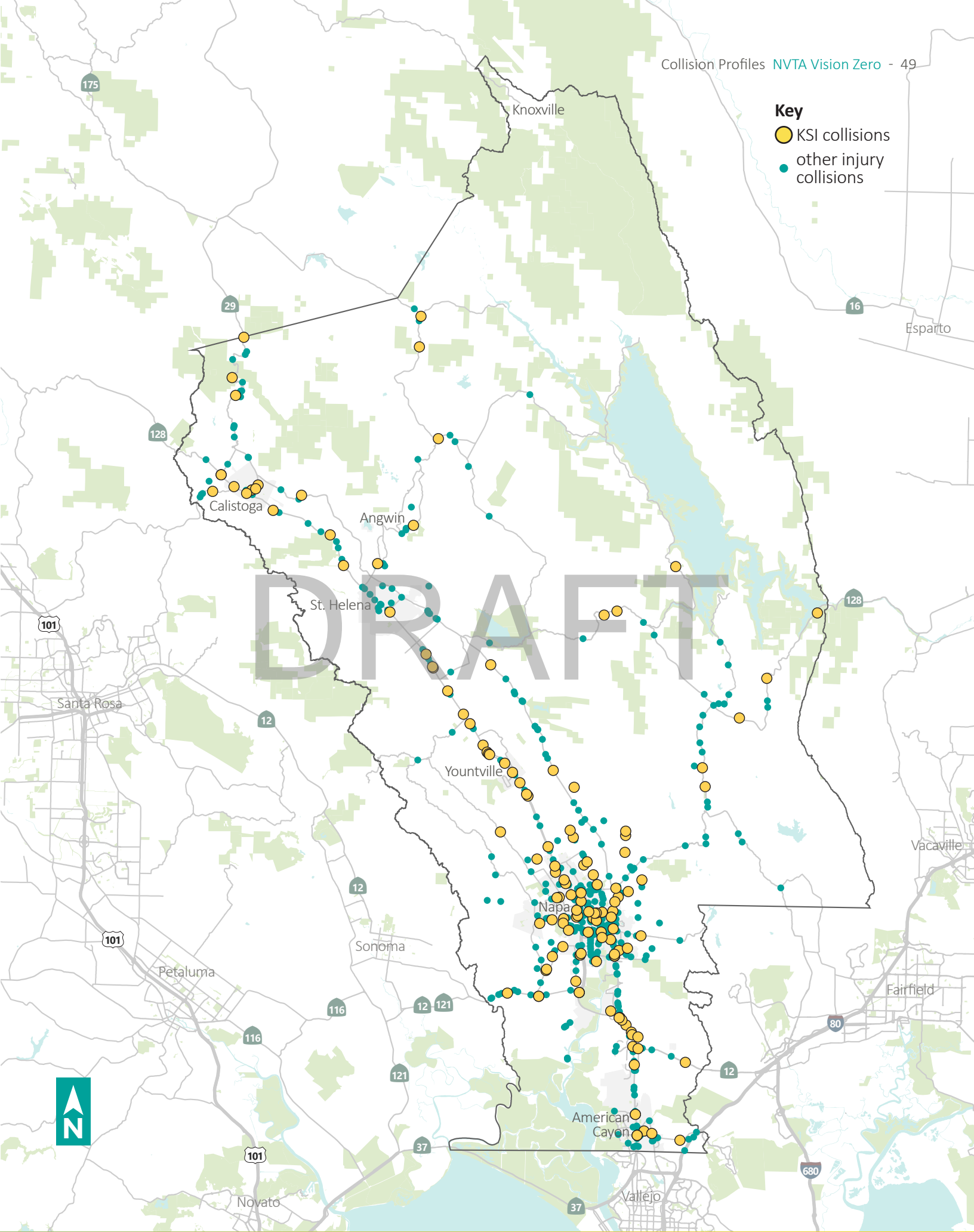
-  Travel Demand Management (TDM) Policies
-  Public Information Campaigns
-  Partner with Local Businesses & Stakeholders
-  Targeted Enforcement and Deterrence

## Potential Supplementary Engineering Countermeasures

- |             |  |  |   |  |
|-------------|--|--|---|--|
| Low Cost    |  Chevron Signs on Horizontal Curves |  Curve Advance Warning Sign                 |  Delineators, Reflectors, and/or Object Markers |  LED-Enhanced Sign                  |
|             |  Rumble Strips                      |  Safety Edge                                |  Speed Feedback Sign                            |  Speed Limit Reduction              |
|             |  Upgrade Striping                   |  |   |  |
| Medium Cost |  Guardrail                          |  Improved Pavement Friction                 |  Raised Median                                  |  Speed Sensitive Rest in Red Signal |
|             | High Cost  |  Intersection Reconstruction and Tightening |  Roundabout                                      |  |



- Key**
- KSI collisions
  - other injury collisions

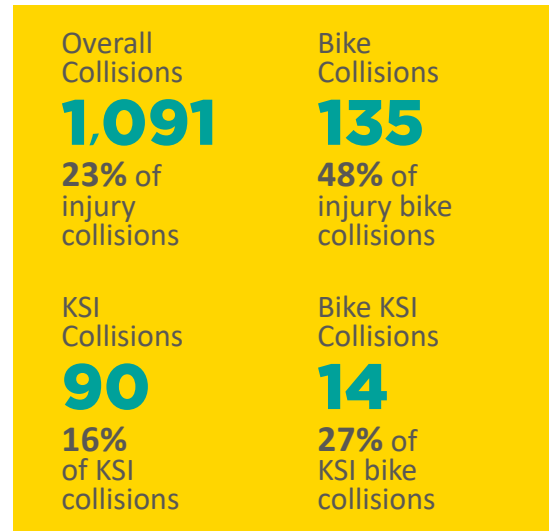


Profile  
**3**

# Broadside Collisions




Broadside collisions are one of the collision types most likely to cause death or severe injury due to the high amount of kinetic energy transfer. Locations and roadway contexts of particular concern include intersections of minor roadways with major roadways or highways, intersections with side-street stop control, and intersections with unprotected left turns.

The listed countermeasures are aimed to reduce or separate turning movement conflicts and slow vehicles upon approach to and through intersections.



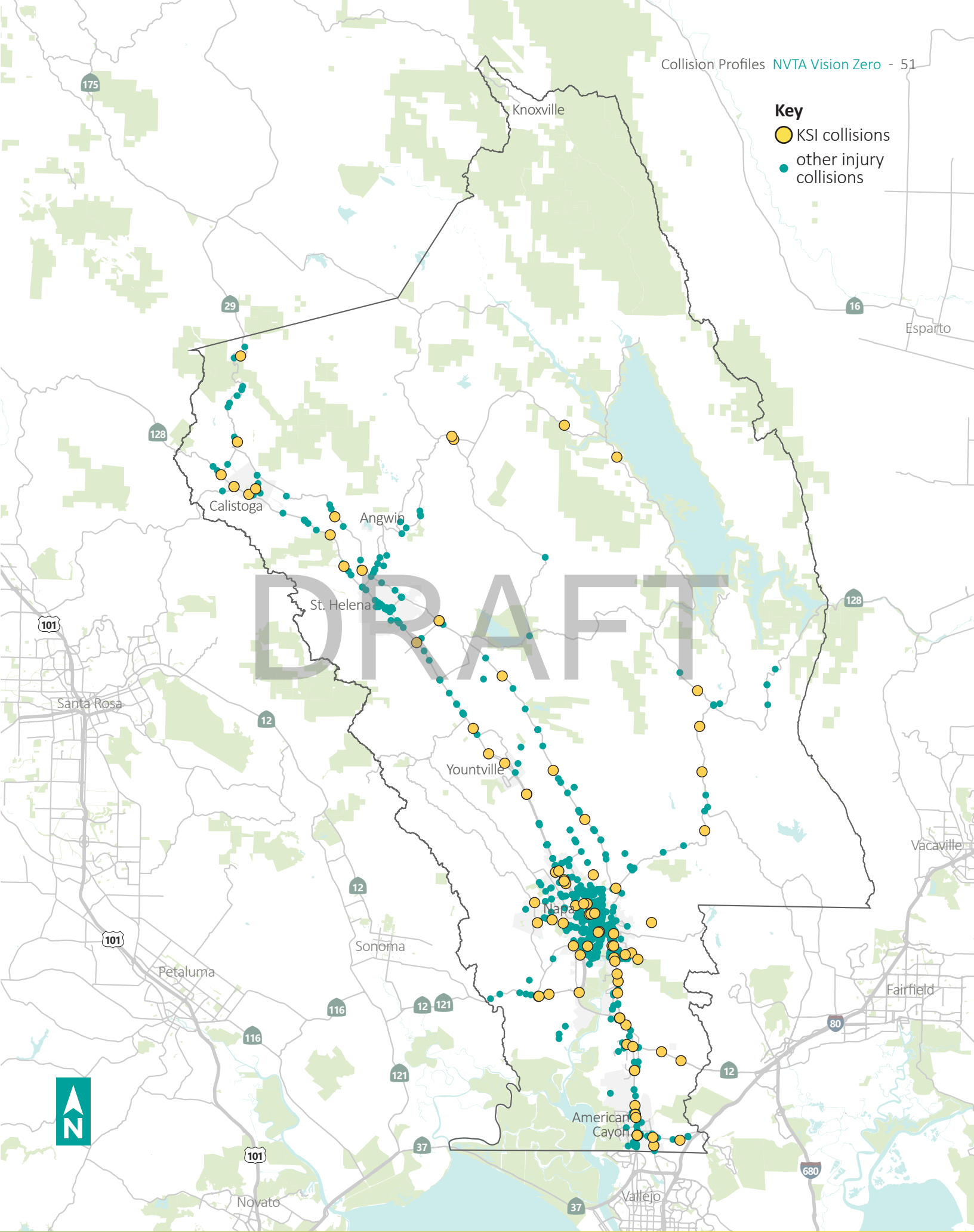
# DRAFT

## Potential Engineering Countermeasures

Low Cost	 All-Way Stop Control	 Centerline Hardening	 Delineators, Reflectors, and/or Object Markers	 Extend Yellow and All Red Time
	 Provide Appropriate Sightlines	 Retroreflective Tape on Signal/ Improve Signal Visibility	 Speed Limit Reduction	 Upgrade Signal Head
Medium Cost	 Advanced Dilemma Zone Detection	 Intersection Lighting	 Protected Left Turns	 Raised Median
	 Raised Median	 Red Light Camera	 Segment Lighting	 Speed Sensitive Rest in Red Signal
	 Supplemental Signal Heads			
High Cost	 Intersection Reconstruction and Tightening	 Roundabout	 Signal	

**Key**

- KSI collisions
- other injury collisions



Profile  
**4**

# Hit Object Collisions

Hit Object collisions are those in which vehicles collide with fixed objects, such as a roadside utility pole or signpost, rather than another party. They can be related to other risk factors such as speeding or driving under the influence, as both increase the risk of vehicles losing control and hitting roadside objects.

The listed countermeasures are aimed to increase the likelihood of vehicles staying in road and in their proper lane and decrease potential severity of a collision if a vehicle does leave the roadway.

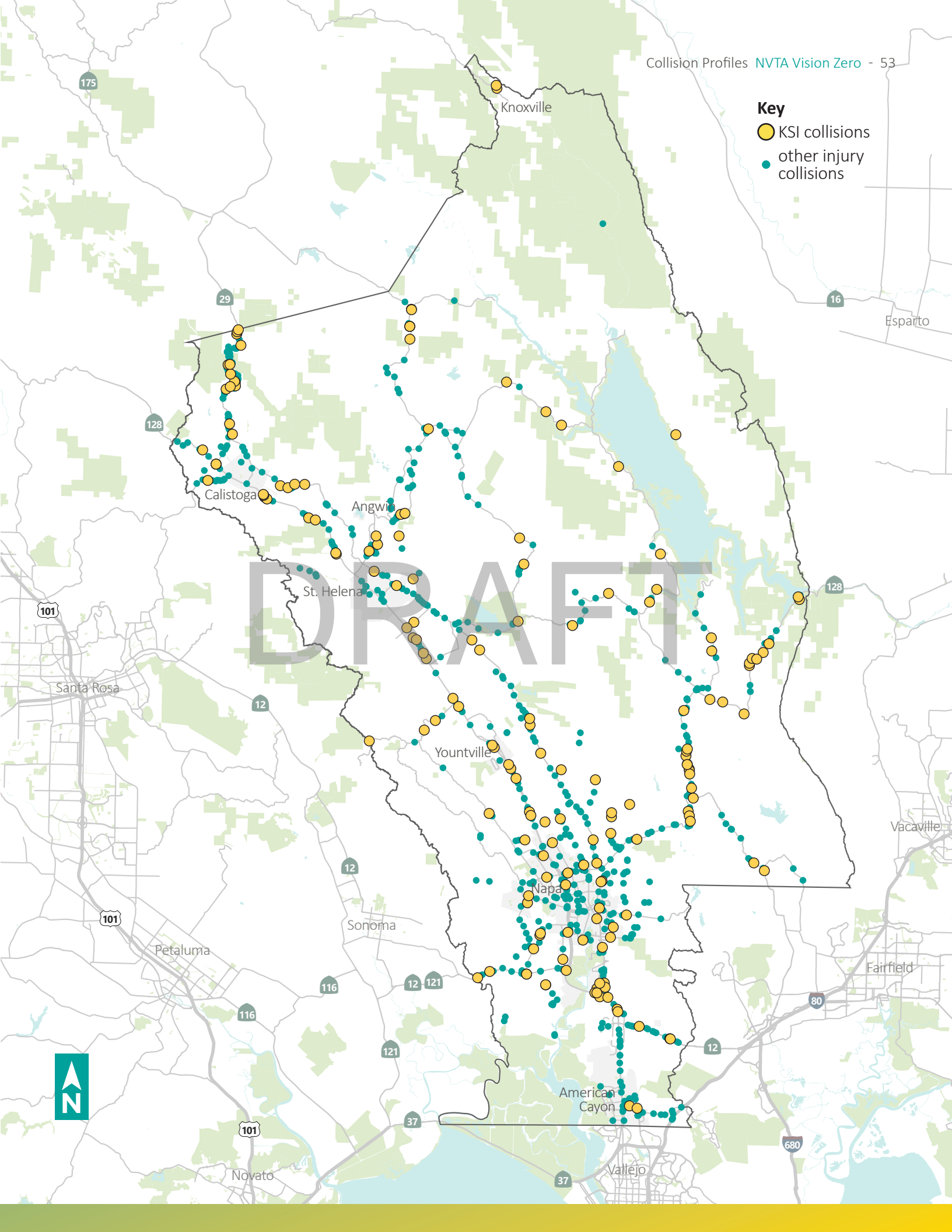
Overall Collisions  
**974**  
21% of injury collisions

KSI Collisions  
**175**  
31% of KSI collisions

## Potential Engineering Countermeasures

Cost Category	Countermeasure 1	Countermeasure 2	Countermeasure 3	Countermeasure 4
Low Cost	Centerline Hardening	Chevron Signs on Horizontal Curves	Curve Advance Warning Sign	Delineators, Reflectors, and/or Object Markers
	Lane Narrowing	Provide Appropriate Sightlines	Rumble Strips	Safety Edge
	Speed Feedback Sign	Speed Limit Reduction	Upgrade Striping	
Medium Cost	Advanced Dilemma Zone Detection	Create or Increase Clear Zone	Guardrail	Impact Attenuators
	Improved Pavement Friction	Intersection Lighting	Raised Median	Relocate Select Hazardous Utility Poles
	Segment Lighting	Speed Sensitive Rest in Red Signal	Widen/Pave Shoulder	
High Cost	Intersection Reconstruction and Tightening			

- Key**
- KSI collisions
  - other injury collisions

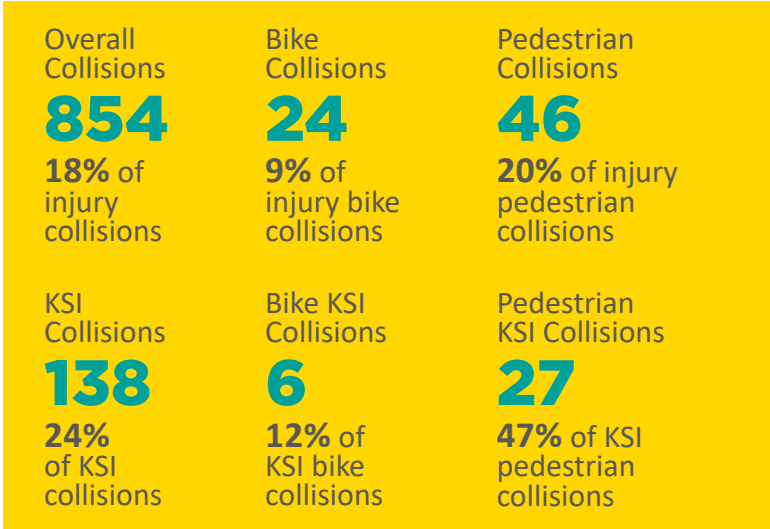


Profile  
**5**

# Nighttime Collisions Along Major Roadways

Collisions during the nighttime are a serious concern, as many of the rural roadways in the region are not well-lit, and streetlights that do exist vary in their efficacy.

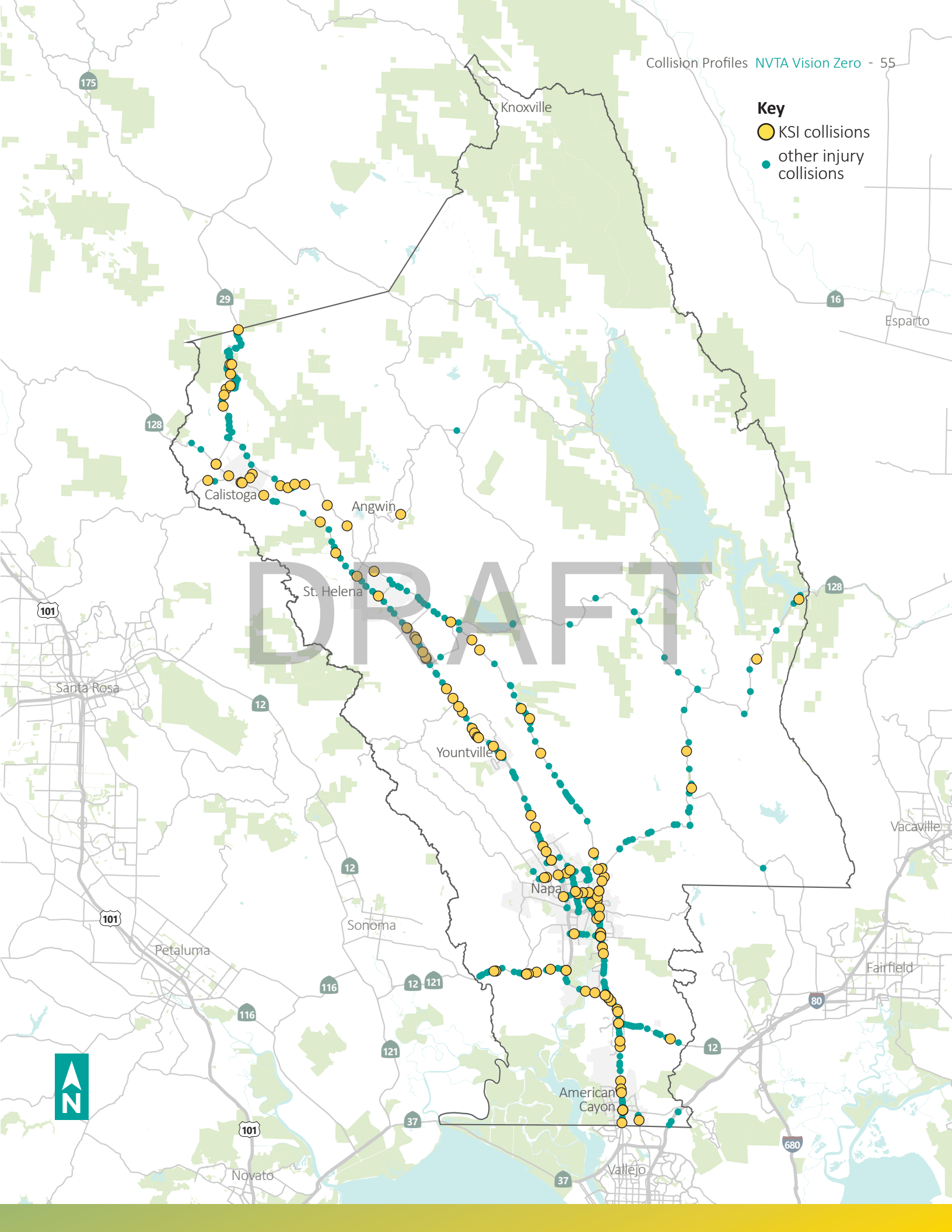
The listed countermeasures are aimed to improve visibility for and of all modes in dark conditions and creating safety redundancies in anticipation of impaired visibility.



## Potential Engineering Countermeasures

Cost Category	Countermeasure 1	Countermeasure 2	Countermeasure 3	Countermeasure 4
Low Cost	Advance Stop Bar	Advance Yield Markings	Chevron Signs on Horizontal Curves	Curve Advance Warning Sign
	Delineators, Reflectors, and/or Object Markers	Green Conflict Striping	High-Visibility Crosswalk	Leading Pedestrian Interval (LPI)
	Provide Appropriate Sightlines	Retroreflective Tape on Signal/ Improve Signal Visibility	Rumble Strips	Safety Edge
	Speed Limit Reduction	Upgrade Striping		
Medium Cost	Add Sidewalk	Guardrail	Intersection Lighting	Raised Crosswalk
	Raised Median	Rectangular Rapid Flashing Beacon	Segment Lighting	
High Cost	Intersection Reconstruction and Tightening	Pedestrian Hybrid Beacon	Separated Bikeway	

- Key**
- KSI collisions
  - other injury collisions



Profile  
**6**

# Pedestrians Hit in Crosswalks at Intersections

Collisions during the nighttime are a serious concern. Many roadways simply do not have streetlights, and streetlights that do exist vary in luminosity and spacing, and are not always effective, especially for pedestrians and bicyclists, as they are often designed primarily to illuminate the roadway for vehicles.










The listed countermeasures are aimed to improve visibility for and of all modes in dark conditions and creating safety redundancies in anticipation of impaired visibility.

Pedestrian Collisions  
**130**  
57% of injury pedestrian collisions






Pedestrian KSI Collisions  
**23**  
40% of KSI pedestrian collisions

## Potential Engineering Countermeasures

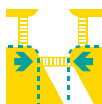





### Low Cost

- |   |  |   |                                   |  |  |   |                             |
|---|--|---|-----------------------------------|--|--|---|-----------------------------|
|   | Advance Stop Bar                               |   | Advance Yield Markings            |   | All-Way Stop Control                   |   | Centerline Hardening        |
|  | Delineators, Reflectors, and/or Object Markers |  | Extend Pedestrian Crossing Time   |  | Extend Yellow and All Red Time         |  | Extended Time Push Button   |
|  | High-Visibility Crosswalk                      |  | Leading Pedestrian Interval (LPI) |  | Provide Appropriate Sightlines         |  | Remove Crossing Prohibition |
|  | Speed Limit Reduction                          |  | Straighten Crosswalk              |  | Upgrade Intersection Pavement Markings |  | Yield To Pedestrians Sign   |

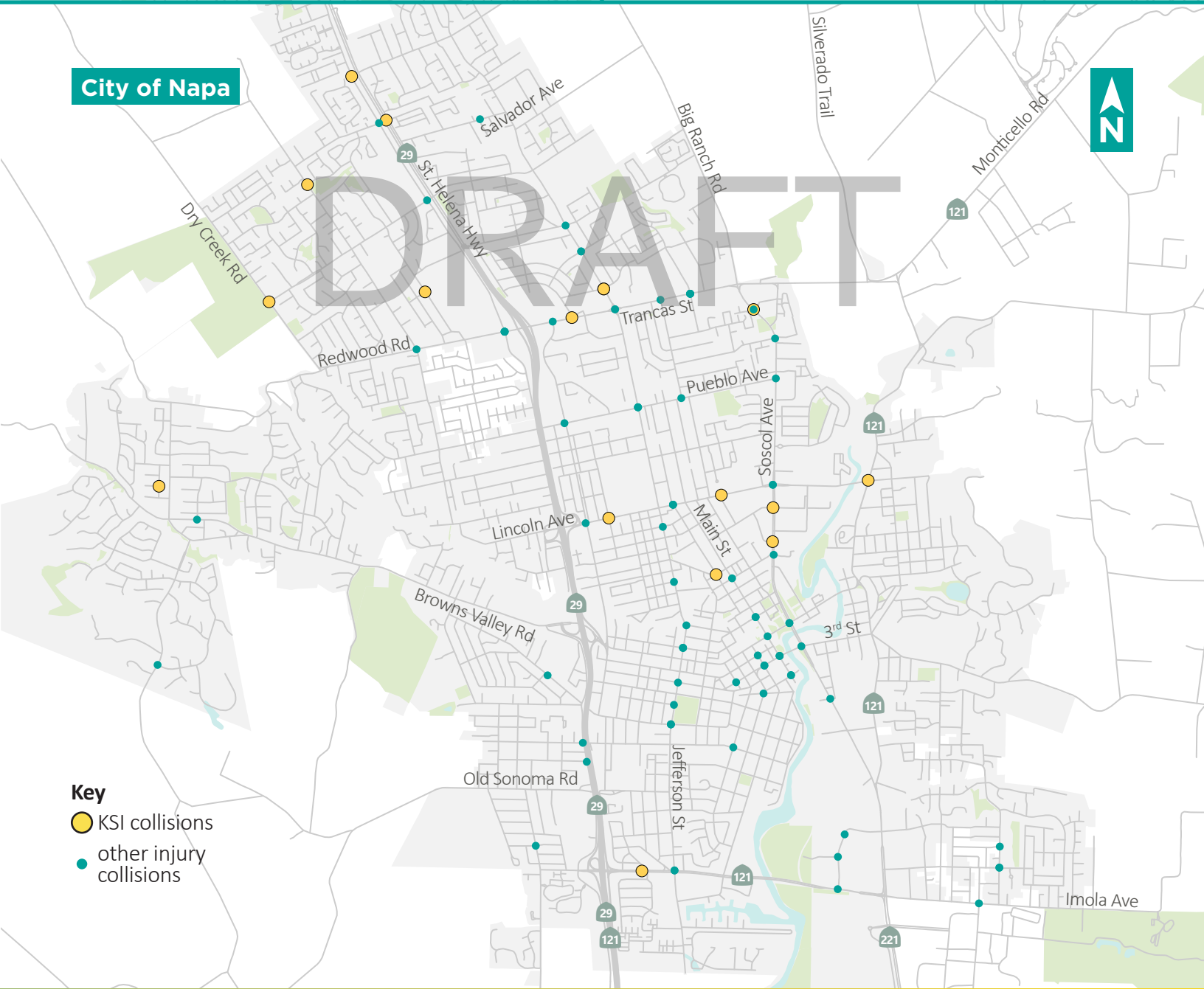
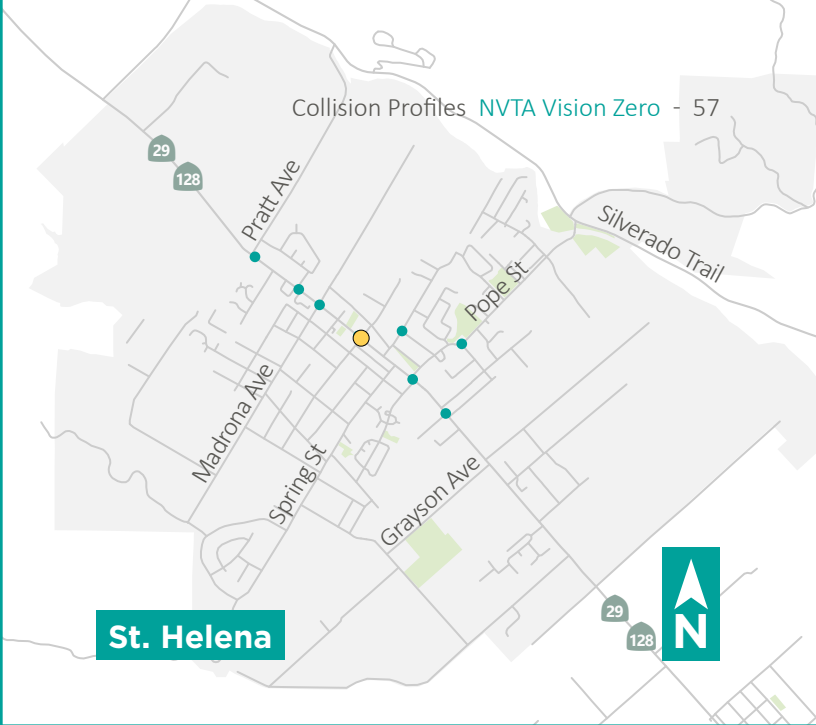
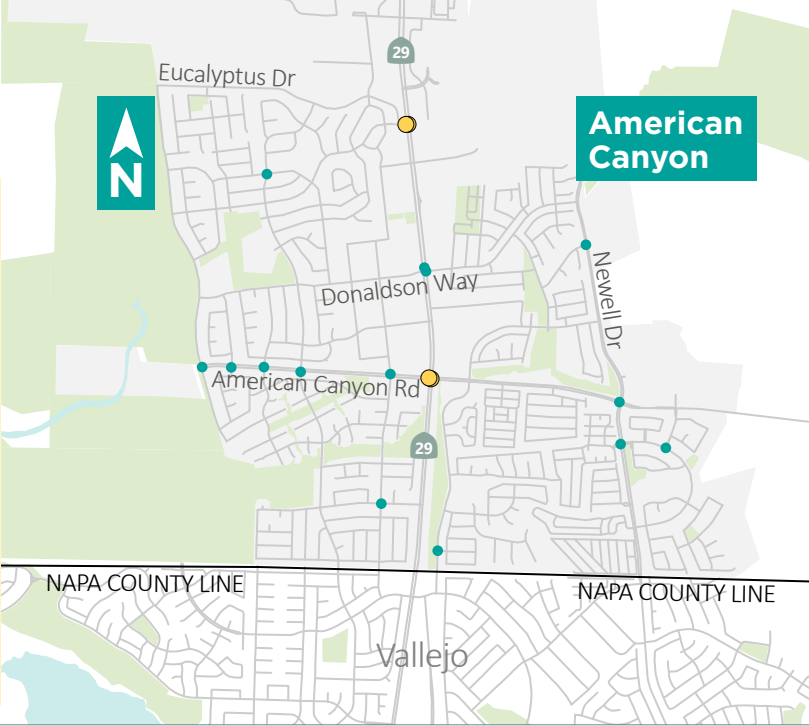
### Medium Cost

- |   |                  |   |                                   |  |                            |   |                      |
|---|------------------|---|-----------------------------------|--|----------------------------|---|----------------------|
|  | Curb Extensions  |  | Intersection Lighting             |  | Pedestrian Countdown Timer |  | Protected Left Turns |
|  | Raised Crosswalk |  | Rectangular Rapid Flashing Beacon |  | Refuge Island              |  | Road Diet            |

### High Cost

- |   |  |   |                          |  |                        |   |                     |
|---|--|---|--------------------------|--|------------------------|---|---------------------|
|  | Intersection Reconstruction and Tightening |  | Pedestrian Hybrid Beacon |  | Protected Intersection |  | Raised Intersection |
|  | Roundabout                                 |  | Signal                   |  |                        |   |                     |





Profile  
**7**

# Pedestrians Hit Crossing Outside Crosswalks or Walking in Road
















The region has many roadways and intersections that lack sidewalks and crosswalks, respectively. Many pedestrian collisions, including a majority of pedestrian KSIs, occurred with people crossing outside of crosswalks or walking along the road, suggesting unmet desire lines, which the listed countermeasures are aimed to help meet.

Pedestrian Collisions  
**130**  
57% of injury pedestrian collisions

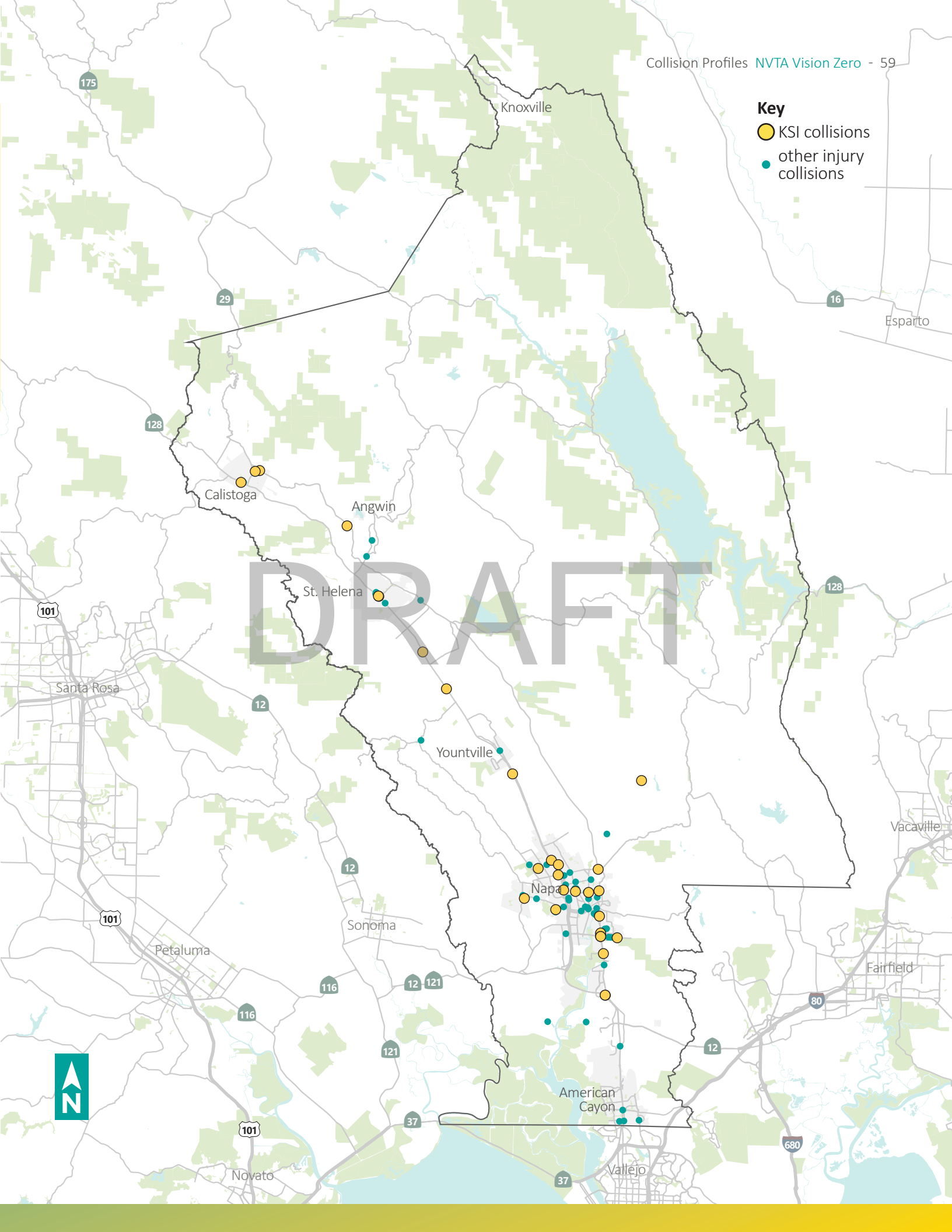
Pedestrian KSI Collisions  
**23**  
40% of KSI pedestrian collisions

# DRAFT

## Potential Supplementary Engineering Countermeasures

Low Cost	 Advance Stop Bar	 Advance Yield Markings	 High-Visibility Crosswalk	 Upgrade Uncontrolled Pedestrian Crossings
	 Remove Crossing Prohibition	 Provide Appropriate Sightlines	 Speed Limit Reduction	 Yield To Pedestrians Sign
Medium Cost	 Add Sidewalk	 Curb Extensions	 Raised Crosswalk	 Rectangular Rapid Flashing Beacon
	 Refuge Island	 Road Diet		
High Cost	 Pedestrian Hybrid Beacon			

- Key**
- KSI collisions
  - other injury collisions



Profile  
**8**

# Bicycle Collisions at Intersections

The region has a large number of roadways without adequate bicycle facilities. People biking are vulnerable on roadways, especially when interacting with vehicles at intersections.


















The listed countermeasures aim to increase bike visibility at the intersection and slow down vehicles as they approach and travel through intersections.

Bike Collisions  
**236**  
84% of injury bike collisions

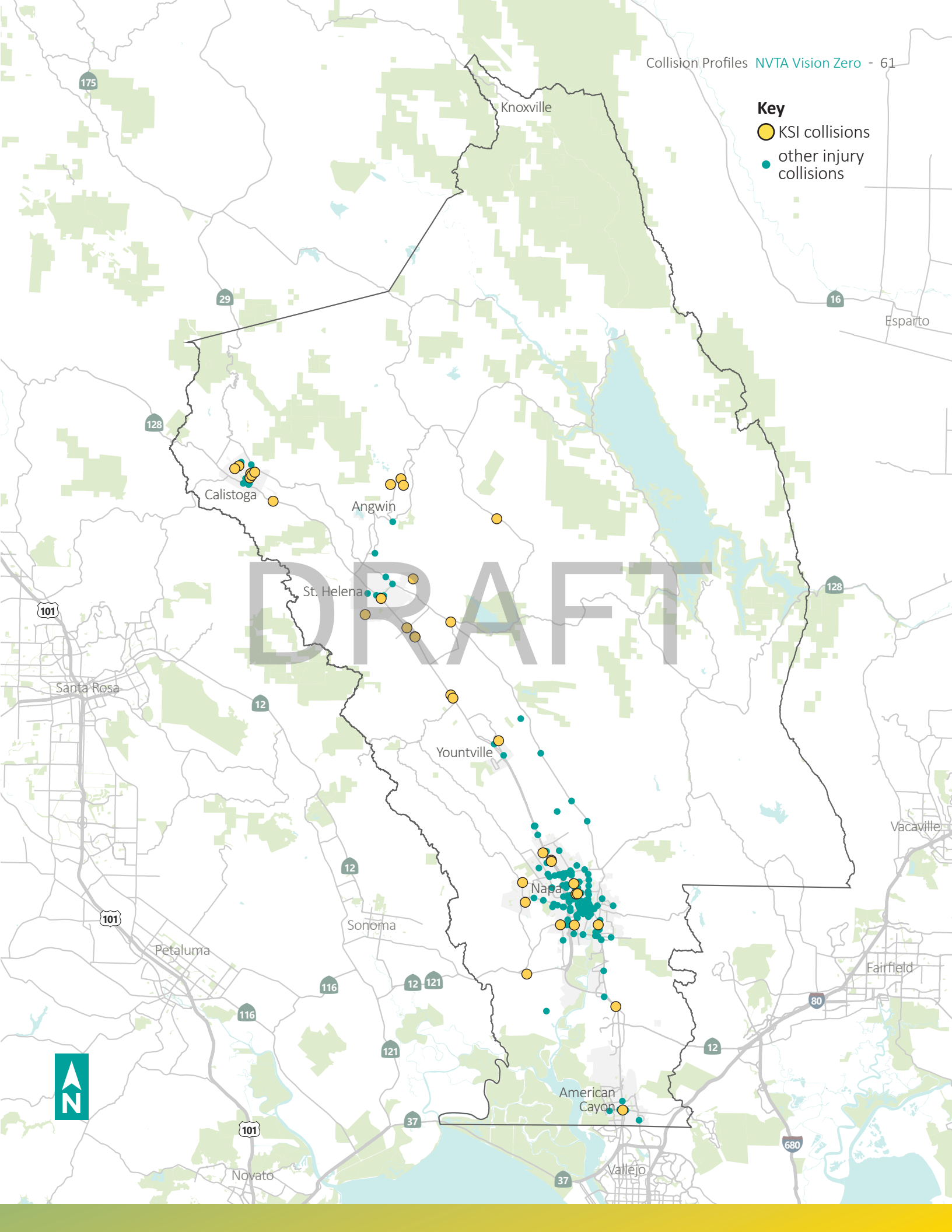
Bike KSI Collisions  
**35**  
69% of KSI bike collisions

# DRAFT

## Potential Engineering Countermeasures

Low Cost		Bicycle Crossing (Solid Green Paint)		Bicycles May Use Full Lane Sign		Bike Box		Delineators, Reflectors, and/or Object Markers
		Extend Bike Lane to Intersection		Green Conflict Striping		Mixing Zone		Prohibit Right Turn on Red
		Shared Sidewalk Sign		Speed Limit Reduction				
Medium Cost		Bike Detection		High-Quality Bike Lane		Intersection Lighting		Protected Left Turns
		Road Diet						
High Cost		Bicycle Signal/Exclusive Bike Phase		Protected Intersection		Separated Bikeway		

- Key**
- KSI collisions
  - other injury collisions



Profile  
**9**

# Collisions at Highway Gateways

Yountville and Calistoga both feature at-grade intersections that serve as the primary gateway and point of interface between the highway and the center of the city. Risk at these intersections arise from higher speed through-traffic crossing and mixing with local traffic without sufficient transition space in between.

The listed countermeasures aim to reduce vehicle speeds at these locations and reduce conflicts between major and minor streets.

Overall Collisions

**47**

**46%** of injury collisions in Calistoga and Yountville

KSI Collisions

**175**

**31%** of KSI collisions in Calistoga and Yountville

**Potential Engineering Countermeasures**

Low Cost



Advance Stop Bar



Advance Yield Markings



Centerline Hardening



Delineators, Reflectors, and/or Object Markers



Extend Yellow and All Red Time



Lane Narrowing



Prohibit Left Turn



Prohibit Right Turn on Red



Provide Appropriate Sightlines



Retroreflective Tape on Signal/Improve Signal Visibility



Rumble Strips



Shorten Cycle Length



Speed Limit Reduction



Upgrade Intersection Pavement Markings



Upgrade Striping

Medium Cost



Access Management/Close Driveway



Curb Extensions



Protected Left Turns



Raised Median

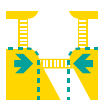


Refuge Island



Supplemental Signal Heads

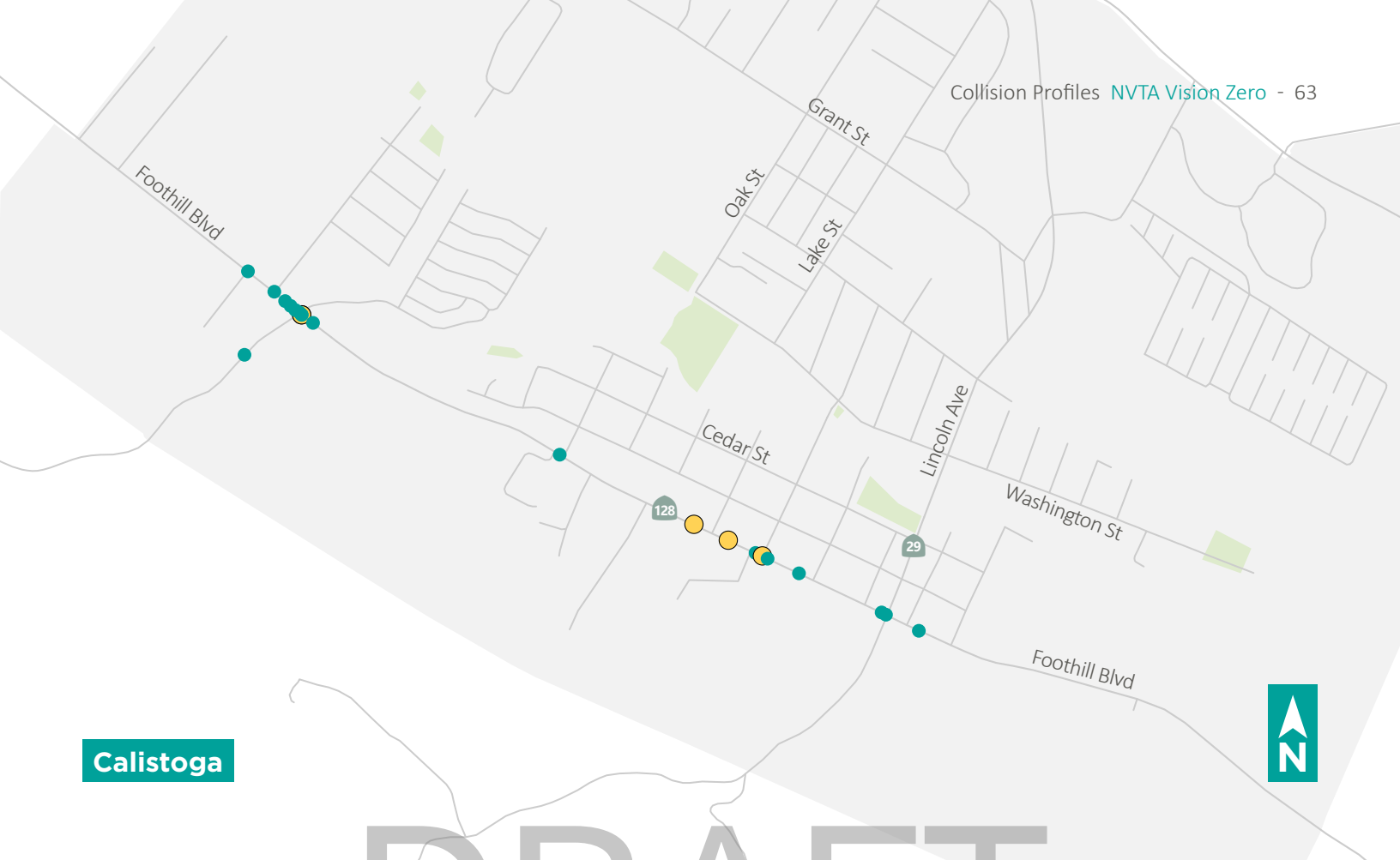
High Cost



Intersection Reconstruction and Tightening



Roundabout

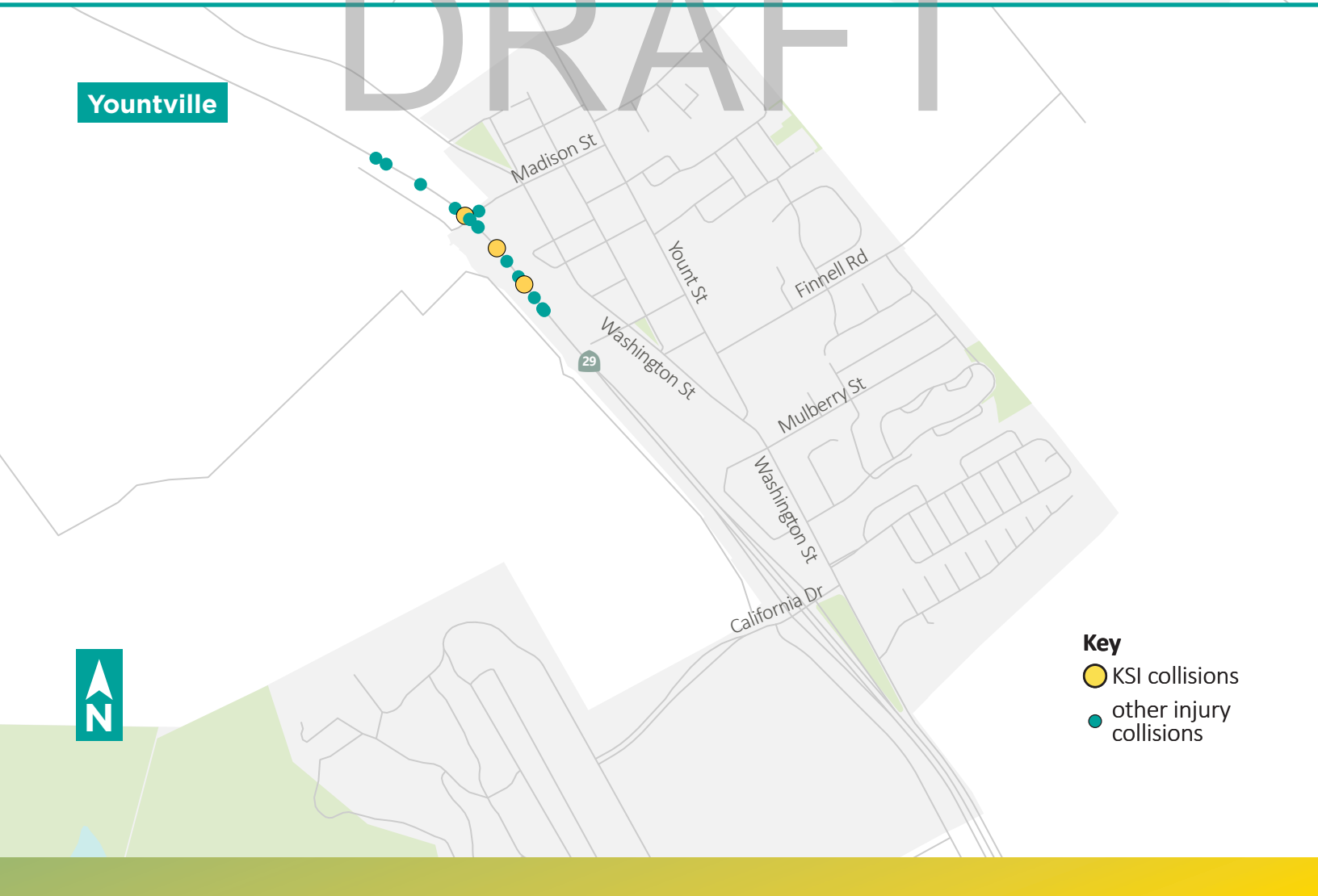


Calistoga





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Yountville



**Key**

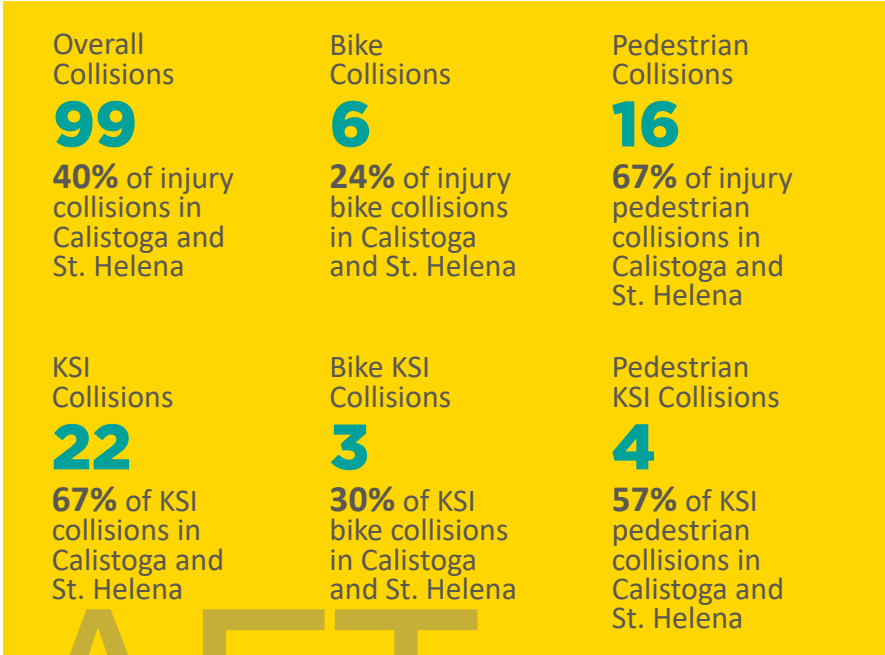
-  KSI collisions
-  other injury collisions

Profile  
**10**

# Collisions along Highways Serving as Main Streets




St. Helena and Calistoga both feature main streets with high activity that also serve as highly-trafficked thoroughfares, and this double role can create safety risks in the interaction between high volumes of higher-speed through traffic and local activity.

The listed countermeasures aim to reduce speeds as vehicles travel on main streets through downtowns to improve the safety of other road users in dynamic, mixed-use areas.



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## Potential Engineering Countermeasures

Low Cost	 All-Way Stop Control	 Centerline Hardening	 Curbside Management	 High-Visibility Crosswalk
	 Upgrade Uncontrolled Pedestrian Crossings	 Lane Narrowing	 Speed Hump or Speed Table	 Speed Limit Reduction
	 Straighten Crosswalk			
Medium Cost	 Access Management/Close Driveway	 Curb Extensions	 Raised Crosswalk	 Rectangular Rapid Flashing Beacon
	 Refuge Island			
High Cost	 Intersection Reconstruction and Tightening	 Raised Intersection	 Roundabout	



Calistoga

St. Helena

DRAFT

- Key**
- KSI collisions
  - other injury collisions



# **NVTA VISION ZERO**

**DRAFT**

# 5

## Proven Safety Countermeasures

This section presents safety countermeasures covering the Safe System elements that address the collision trends identified through the collision analysis process. This section builds upon the work that NVTA and its member agencies have done to prioritize safer roadway design through efforts such as project implementation, grant applications, maintenance activities, and adoption of planning documents that identify priorities and future projects.

The focus on the Safe System Approach, along with the emphasis on equity, helps to provide alignment with the Plan’s vision and goals, and

sets NVTA and its member agencies up for success in recognition of emerging safety best practices.

Systemic improvements, both engineering and non-engineering related, were identified for implementation where and when appropriate. The countermeasures cover the five elements of a Safe System: Safe Roads, Safe Road Users, Safe Speeds, Safe Vehicles, and Post-Crash Care, as shown in **Figure 22**. Engineering countermeasures fall into the Safe Roads and Safe Speeds category, while there are non-engineering countermeasures in each of the five categories.

**Figure 22**  
The Five Elements  
of a Safe System



Engineering countermeasures are physical, infrastructure-based improvements that can be made to roadways to make them safer by design. In addition to engineering and design strategies, there are non-engineering strategies that can be implemented to improve safety on Napa Valley roads. These countermeasures introduce education, enforcement, and other policy instruments as means of encouraging safer roadways through user behavior, and they can be used to tackle traffic safety problems such as alcohol and drug impaired driving, distracted driving, speeding and speed management, and pedestrian and bicycle safety. In the selection of non-engineering countermeasures, the Ninth Edition of *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices*, published by the National Highway Traffic Safety Administration (NHTSA) in 2017, served as a guide. Non-engineering countermeasures are given effectiveness ratings based on these guidelines, if data is available. **Figure 23** shows the scale for these ratings.

## Safe Roads

All engineering countermeasures fall under the Safe Roads category. A full toolbox of engineering countermeasures are included in **Appendix A**. Many of these countermeasures are recommended for the hot spots and collision profiles included in Chapter 3 of this report. Most of the countermeasures are included in the 2020 Caltrans Local Roadway Safety Manual (LRSM) and can be advantageous for use in Caltrans Highway Safety Improvement Program (HSIP) grant funding applications. There are also many effective safety countermeasures beyond those listed in the LRSM, and several are included in this toolbox.

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**Figure 23**  
Effectiveness Ratings  
for Non-Engineering  
Countermeasures



**Demonstrated to be effective** by several high-quality evaluations with consistent results



**Demonstrated to be effective in certain situations**



**Likely to be effective** based on balance of evidence from high-quality evaluations or other sources



**Effectiveness still undetermined** as different methods of implementation produce different results



**Limited or no high-quality evaluation evidence**

## Regular Regional Traffic Safety Coordination Meetings

As Napa Valley sees residents and visitors who often pass through different jurisdictions on a daily basis, coordination and updates on roadway safety best practices across the region can create a unified approach to traffic safety. Information sharing could improve efficiencies in traffic safety management, including policies that are working and those that require improvement. The meetings could be held monthly or quarterly.

In February 2023, NVTA hosted a Technical Advisory Working Group and Stakeholder Working Group with representatives from member agencies, first responders, community-based organizations, and Elected Members, among others. These members spoke on a number of projects happening within their jurisdiction including guard rail upgrades regionally, updates to the Neighborhood Traffic Calming Manual, bike improvement projects, and speed lowering efforts. This allowed members within the region to hear about best practices, successes, and challenges to enhance their understanding of roadway safety.

### Lead Agency

NVTA

### Partner Agencies

Member agency Public Works Departments

### Funding Sources

NVTA funds

### Context

Regional

## Placemaking in Traffic Safety Initiatives

Launch a regional initiative to treat streets as places by incorporating permanent placemaking efforts (public art, green infrastructure, and neighborhood amenities) into traffic safety initiatives. Such amenities can activate streetscapes and encourage lower speeds and better awareness of non-vehicle users. Prioritize areas with high numbers of vulnerable users.

### Lead Agency

Member agency Public Works Departments

### Partner Agencies

- » NVTA
- » Community-based organizations

### Funding Sources

- » Member agency local funds
- » Public-private partnerships
- » User fees

### Context

Areas with high volumes of vulnerable users

## Safe Road Users

### Education & Public Awareness Campaigns Targeted at Speeding, Driving Under the Influence, and Increasing Awareness of People Walking and Biking

Coordinate with member agency Communications Department to use existing social media accounts (e.g. Facebook, NextDoor, Twitter, etc.) to establish an ongoing public education campaign focused on safe and responsible driving, discouraging drinking and driving, and increasing awareness of pedestrians and bicyclists. Campaigns could also involve collaborating with local radio station to disseminate safety messages in English and Spanish. Additionally, campaigns could collaborate with community-based organizations and direct service providers to vulnerable populations.

#### Resources

The OTS Go Safely California campaign has free resources for local agencies to use in implementing public awareness campaigns.

#### Lead Agency

- » NVTA
- » Member agency Police Departments

#### Partner Agencies

- » Member agency Communications Departments
- » Member agency Public Health Departments
- » Community-based organizations
- » Local media outlets
- » OTS Go Safely California Campaign

#### Funding Sources

California Office of Traffic (OTS) Grants

#### Context

Regional

#### Effectiveness

Mass Media Campaigns on DUI



*Pedestrian Crossing Campaign*  
San Francisco Municipal Transportation Agency's (SFMTA) "Be Nice, Look Twice" Pedestrian Safety Campaign aims to increase driver awareness of pedestrians in crosswalks and encourage proper yielding behavior.

Source: SFMTA



*Turning Campaign*  
"Safety - It's Your Turn", an SFMTA campaign, encourages safe left-turn behavior through social media, billboard, and bus poster messaging, disseminated in multiple languages.

Source: SFMTA

## Public Health Partnerships on DUI Prevention

Prevention and education policies focus on mobilizing and educating the community and intervening before driving under the influence takes place. According to NHTSA research, alcohol problem assessment and treatment programs, as well as alcohol intervention in settings such as a doctor’s office, are highly effective strategies for improving safety outcomes.

To help residents with alcohol treatment, the Napa County Alcohol & Drug Services and Aldea Children and Family Services provides counseling and treatment services for adults, young adults, and youth. The County’s Health & Human Services Department could partner with the Member Agency Police Department’s to share information and conduct screenings.

### Resources

- » Behavior Change Campaigns to Improve Traffic Safety Toolkit
- » Countermeasures that Work, 10th Edition

### Lead Agency

Napa County Public Health Agency

### Partner Agencies

- » Medical offices/centers
- » Member agency Police Departments
- » California Highway Patrol (CHP)

### Funding Sources

California Office of Traffic (OTS) Grants

### Context

Regional, focused on DUI crash hotspots

### Effectiveness

Alcohol Screening & Brief Intervention



## Safe Routes to School with Street Safety Ambassadors

The Safe Routes to School program is a partnership between the Napa County Office of Education, Napa Valley Transportation Authority, and the Napa County Bicycle Coalition (NCBC). NCBC currently leads the Napa County Safe Routes program regionally and provides on-bike safety education for elementary school students, family biking workshops, and hosts Bike to School Day. The program also worked with 31 public schools between 2018-2022 to identify barriers to safe walking and biking and create a comprehensive report on actions to eliminate these barriers.

The program can be expanded to study additional schools and partner with school districts and Member Agency Police Departments to train and engage street safety ambassadors to support school arrival and dismissal operations. These safety ambassadors can help to facilitate safe pick-up and drop-off throughout the year, with an emphasis on the start of the school year.

### Resources

Safe Routes – National Center for Safe Routes to School, <https://www.saferoutesinfo.org/>

### Lead Organization

Napa County Bicycle Coalition

### Partner Agencies/Organization

- » NVTA
- » Napa County Office of Education
- » Local school districts

### Funding Sources

- » California Active Transportation (ATP) Grants
- » California Office of Traffic (OTS) Grants

### Context

Regional

### Effectiveness

Safe Routes to School





## Safe Road Users

### High-Visibility Enforcement for DUI

Deterrence policies, such as high visibility enforcement, focus on raising the actual and perceived risk of high-risk behaviors. Member agency Police Departments should continue their use of high visibility enforcement for DUIs to deter and increase awareness of the risks of this behavior.

High visibility enforcement for driving under the influence, such as publicized sobriety checkpoints and saturation patrols, has been found to be effective to improve safety outcomes. Since speeding and driving aggressively are moving violations, officers can focus their efforts along corridors with a history of speeding-related collisions and speeding violations since they must observe driving behavior on the road.

Based on the evaluation evidence gathered by NHTSA in Countermeasures that Work, the findings have been inconclusive on the effectiveness of high-visibility enforcement efforts focused on speeding and driving aggressively. Some studies found these efforts produced safety-related benefits while other studies found these efforts produced no benefits or even negative outcomes (e.g. an increase in crashes). Integrated enforcement would include coordination with Public Awareness Campaigns. For example, widespread dissemination of multi-lingual educational messaging and promotion of safe rides home programs in advance of major DUI enforcement efforts will help to mitigate equity concerns about disproportionate impacts of fines/fees on lower income residents.

#### Resources

Massachusetts Saving Lives – Enforcement Strategies, <https://solutions.edc.org/solutions/prevention-solutions>

This program combines community engagement events, high-visibility enforcement including sobriety checkpoints, and media communication to discourage DUI.

#### Lead Agency

Law Enforcement Officials (LEO), Member Agency Police Departments

#### Partner Agencies

- » NVTA
- » California Office of Traffic Safety (OTS)

#### Funding Sources

California Office of Traffic (OTS) Grants

#### Context

Regional, focused on DUI crash hotspots

#### Effectiveness

Publicized Sobriety Checkpoints



High-Visibility Saturation Patrols





## Safe Ride Home Program

Develop partnerships between the Member Agencies Public Works Department and Police Departments, TNC operators, NVTA, and local businesses to offer promotional codes for free or discounted rides home from establishments or events throughout the county to reduce the potential for DUI, drowsy driving, or distracted driving.

### Resources

Portland Bureau of Transportation Safe Ride Home Program, <https://www.portlandoregon.gov/transportation/76611>

PBOT partnered with the Portland Police Bureau, TriMet, Old Town Hospitality Group, and Portland cab companies Radio Cab, Broadway Cab, New Rose City Cab and United Independent Cab, as well as transportation network companies Lyft and Uber to provide promo codes for discounted rides. The program is funded by a 50-cent fee charged for every taxi and TNC ride in Portland.

### Lead Agency

NVTA

### Partner Agencies

- » Member agency Public Works Departments
- » Member agency Police Departments
- » TNC operators
- » Local businesses

### Funding Sources

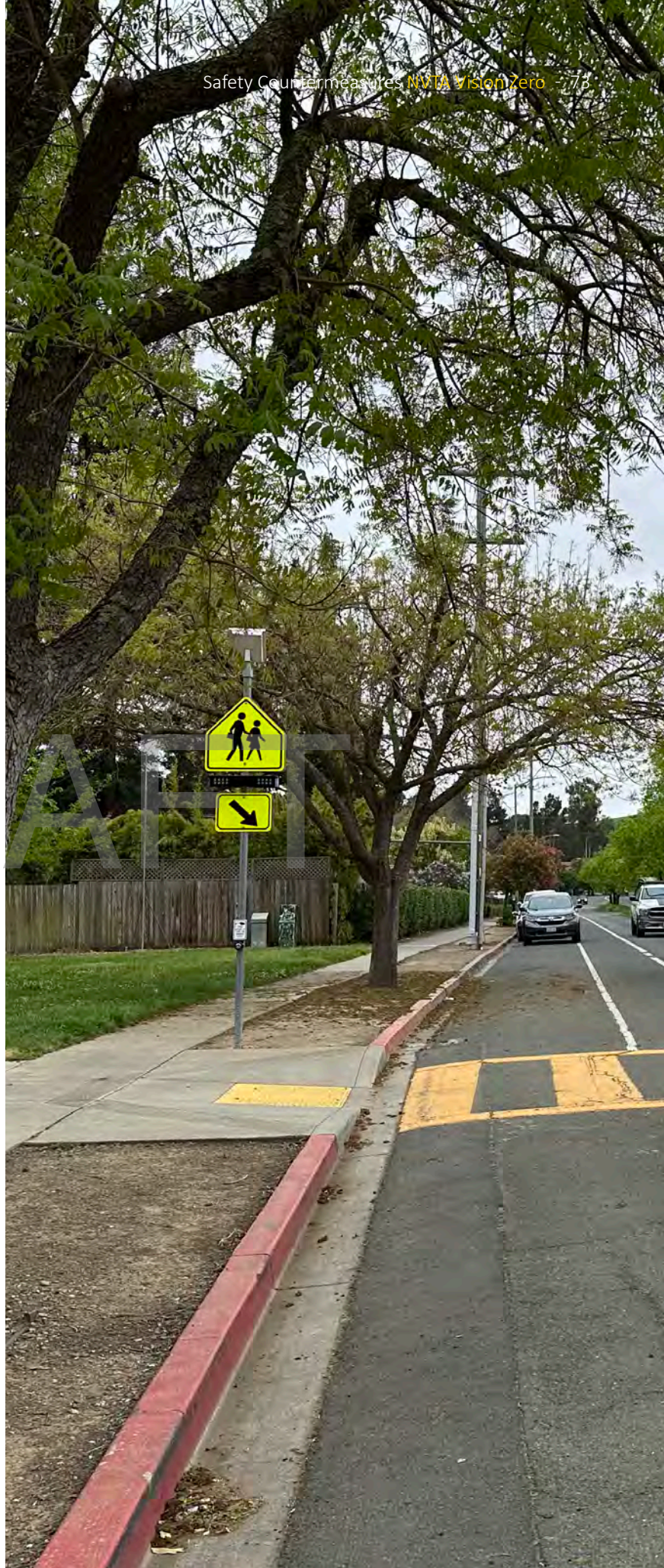
User Fees (taxi and TNC fares)

### Context

Regional, during weekends, holidays, and other special events

### Effectiveness:

Alternative Transportation



## Safe Road Users

### Pedestrian Safety and Unhoused Services

Homeless services provide temporary residence for homeless individuals and families. In jurisdictions with a large unsheltered population, unsheltered people are often disproportionately represented in pedestrian collisions. Unsheltered people have a relatively high level of traffic exposure as they may stand in medians, cross roadways outside of designated pedestrian crossings, and/or frequent parking lots.

#### Lead Agency

Napa County Health & Human Services

#### Partner Agencies

- » Member agency Police Departments
- » Napa County Sheriff's Department
- » Member agency Public Works Departments
- » California Highway Patrol (CHP)
- » Housing organizations

#### Funding Sources

- » County Funds
- » Public-private partnerships

#### Context

Regional, focused on areas with higher homelessness populations

#### Effectiveness

High-visibility Saturation Patrols



Integrated Enforcement



### Enforcement Priorities Mandate

Use crash history and emphasis area corridors as one criterion to direct enforcement efforts, with a focus on the three "Ds" identified by the Member Agency Police Departments: Driving Under the Influence, Distracted Driving, and Dangerous Driving. This may require additional police department funding.

#### Resources

- » Behavior Change Campaigns to Improve Traffic Safety Toolkit
- » Countermeasures that Work, 10th Edition

#### Lead Agency

- » Member agency Police Departments
- » Napa County Sheriff's Department

#### Partner Agencies

- » NVTA
- » Member agency Public Works Departments

#### Funding Sources

California Office of Traffic (OTS) Grants

#### Context

Hot spot corridors and locations with DUIs, distracted driving, and dangerous driving

#### Effectiveness

Communications and Outreach Supporting Enforcement



High-Visibility Cell Phone and Text Messaging Enforcement



## Pair Education with Engineering Countermeasures

Educational materials can be used to teach people how to use new and unfamiliar safety countermeasures, such as rectangular rapid flashing beacons (RRFB), roundabouts, or protected bikeways. These materials can consist of informational signs or demonstration videos, and should be presented in multiple languages, including English and Spanish.

### Resources

- » City of Sacramento Bicycling videos, <https://www.cityofsacramento.org/Public-Works/Transportation/Programs-and-Services/Bicycling-Program/Bicycle-Videos>

The City of Sacramento has used demonstration videos to engage residents in bicycling safety procedures. The videos on their website feature a series of safety improvements such as protected bike lanes, bike boxes, and bike signals, and inform residents how to use these new roadway features, both as a bicyclist and a driver.



The City of Sacramento's video explanation of how to use bike boxes.

Source: City of Sacramento

- » City of Los Angeles Education through Pop-Up Installations

As part of Bike to Work Day in 2019, LADOT used temporary pop-up installations to introduce safety improvements in specific neighborhoods. Hay bales, straw wattles, and plants were used to test the roundabout design and educate drivers on how to use the traffic circle countermeasure. In addition to introducing safety improvements, pop-up installations can bring out emergency vehicles to ensure the vehicles can navigate around roundabouts or curb extensions.

- » City of San Francisco Informational Signs

The San Francisco Municipal Transportation Agency (SFMTA) posted signs with a brief explanation next to a newly installed protected bike lane in multiple languages as part of their Vision Zero SF initiative. This approach was also applied to educate people about pedestrian scrambles and bus bulb outs.

- » City of Berkeley "How to Use a Pedestrian Hybrid Beacon" Flyer

This informational flyer was paired with the installation of a new PHB and includes both driver and pedestrian instruction for properly using the new countermeasure.



San Francisco Municipal Transportation Agency's (SFMTA) signage explaining newly-installed protected bike lanes.

Source: SFMTA

# Safe Speeds

## Speed Limit Modification

California Assembly Bill (AB) 43 was passed in 2021 to provide a means to lower speed limits on additional corridors. Cities will have increasing flexibility starting in 2024 to enforce context-sensitive speed limits. AB 43 features the following five major components, focused on giving local jurisdictions more flexibility in setting speed limits, especially regarding vulnerable road users:

- » **Engineering & Traffic Survey (E&TS)**  
An option to extend enforceable time period
- » **Post E&TS**  
An agency can elect to retain current or immediately prior speed limit
- » **Speed Limit Reduction**  
Reduction of additional 5 mph based on several factors, including designation of local “Safety Corridors”
- » **Prima Facie Speed Limits**  
Options for 15 and 25 mph in certain areas depending on context
- » **Business Activity Districts**  
Option for 20 or 25 mph

In particular, the designation of “Safety Corridors” could be applied to roadways where the highest number of serious injury and fatality crashes occur, identifying specific locations or corridor-level segments with high crash occurrences and stratified by mode. These designations must be approved by a professional engineer.

The Cities of Napa and American Canyon have put AB 43 into effect, lowering speed limits in their downtown districts and in school zones.

### Lead Agency

Member agency Public Works Departments

### Partner Agencies

- » Member agency Police Departments
- » Napa County Sheriff’s Department
- » California Highway Patrol (CHP)

### Funding Sources

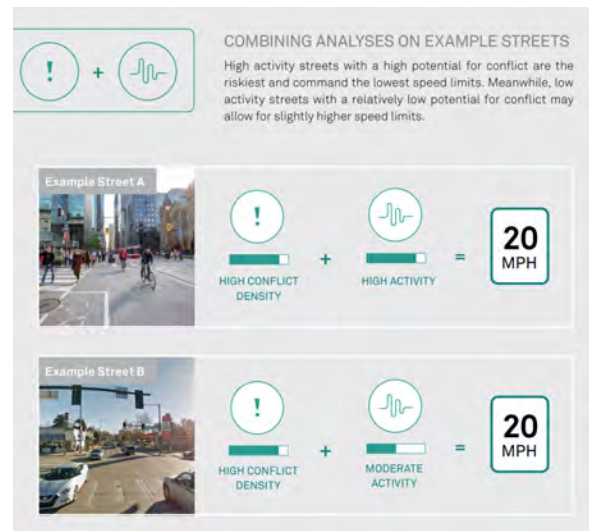
- » California Office of Traffic Safety (OTS) Grants
- » Local funds

### Context

Regional, focused on “safety corridors,” business activity districts, and school zones

### Effectiveness

Speed Limits



Source: NACTO

## Automated Enforcement

Automated enforcement, such as red-light cameras or speed cameras, target the specific drivers who are behaving dangerously. Such enforcement is already allowed in California. Automated speed detection devices can identify speeding violations and provide citations. Such enforcement is currently not legally allowed in California, but the Legislature is currently considering legislation to allow this type of enforcement.

A strictly data-driven approach to automated enforcement might place red-light or speed cameras in locations with the highest number of collisions. However, given that many low-income neighborhoods have historically received fewer infrastructure investments, which often results in a higher rate of collisions, a strictly data-driven approach could lead to a disproportionate burden of enforcement. Therefore, automated enforcement should be implemented evenly across a jurisdiction at problem locations. In addition, jurisdictions should pair automated enforcement with updated fine structures so that low-income communities don't bear a disproportionate burden.

### Lead Agency

Member agency Public Works Departments

### Partner Agencies

- » Member agency Police Departments
- » Napa County Sheriff's Department
- » California Highway Patrol (CHP)
- » Community-based organizations

### Funding Sources

US Department of Transportation funding

### Context

Regional, focused on areas with traffic signs and signal violations or unsafe speed collision trends

### Effectiveness

Automated Enforcement



## Safe Speeds Education Campaign

Continue existing safety education campaign targeting safe speeds. This could include yard signs (similar to what Slow Down Napa has done), wall boards/posters along high-injury corridors and neighborhoods, ads on bus exteriors, radio ads, etc. Safe Speeds is also applicable to those who bike and scooter. On Class I shared-use paths, those who roll should manage speeds to ensure safety for all those using the facility.

### Resources

The California Office of Traffic Safety (OTS) Go Safely California campaign has free resources for local agencies to use in implementing public awareness campaigns.

### Lead Agency

NVTA

### Partner Agencies

- » Member agency Communications Departments
- » Member agency Police Departments
- » Napa County Sheriff's Department
- » California Highway Patrol (CHP)
- » Napa County Public Health Department
- » Local media outlets
- » California Office of Traffic Safety (OTS) Go Safely California Campaign

### Funding Sources

- » NVTA funds
- » California Office of Traffic Safety (OTS) Grants

### Context

Regional, focused on areas with unsafe speed collision trends

### Effectiveness:

Communications and Outreach on Speeding





## Safe Vehicles

### Emerging Technology

Recent advancements in transportation technology have not only introduced new transportation modes and travel patterns, but have also presented opportunities to better understand travel behavior and encourage safe behavior. The summary on the facing page describes how emerging technology and data sources were incorporated into the safety analysis and development of recommendations for this Plan. The following represents a summary of emerging technology trends related to safety.

#### Intelligent Transportation Systems

Some existing and emerging on-board vehicle technologies require investments in public infrastructure in order to function properly. For example, lane departure warning technology common on newer vehicles requires regular maintenance of roadway striping and the use of highly retroreflective materials to maximize effectiveness. Emerging Vehicle-to-Infrastructure (V2I) technologies will likely require integration with existing infrastructure. NVTA's Capital Improvement Plan can facilitate the effectiveness of safe vehicle technology with traffic signal and detection upgrades and systematic resurfacing projects to ensure roadway striping is easily visible.

#### Near Miss Data

Near miss collisions have historically been difficult to study in practical safety applications due to an overall lack of reported information. In the absence of sufficient crash data, near miss data is an important indicator for guiding crash prevention. Video data and incident data from connected vehicles are emerging data sources that can provide key safety insights regarding near misses.

#### Autonomous Vehicle Readiness Planning

Having strategies prepared to meet and address the oncoming challenges posed by autonomous vehicle (AV) technology will be crucial in advancing road safety. Fully automated vehicles have the potential to transform travel behavior and safety outcomes given that AVs are ultimately designed to operate without any human intervention. Some strategies for preparation include educating the public on current and future safety features and limitations, developing signing and striping standards, and conducting reviews of equity implications. Without appropriate research and guidance, AVs could widen accessibility and safety gaps for vulnerable communities.

#### Lead Agency

» Napa County

#### Partner Agencies

» NVTA  
 » Vehicle manufacturers  
 » Data vendors

#### Funding Sources

» NVTA  
 » California Office of Traffic Safety (OTS) Grants  
 » Caltrans Highway Safety Improvement Program (HSIP)

#### Context

Regional



## Post-Crash Care

### Rapid Response Safety Communication Protocol and Multi-Disciplinary Team

Employ an internal, multi-departmental communication strategy in response to severe and fatal collisions. The protocol should outline a path forward for Public Works staff to be a part of the immediate on-the-ground-response to an investigation of severe and fatal collisions, ensuring a multi-disciplinary response team focused both on the behavioral and engineering elements of a collision. Development of this multi-disciplinary team can also support timely data sharing among County departments.

The development of an integrated database with law enforcement collision data and injury surveillance provides can also improve communication protocol. Data integration can help practitioners estimate actual injury costs and costs of treatments for future planning efforts.

#### Lead Agency

- » Office of Emergency Services
- » Napa County

#### Partner Agencies

- » NVTA
- » Member agency Police Departments
- » Napa County Sheriff's Department
- » California Highway Patrol (CHP)
- » Napa County Public Health Department
- » Napa County Fire Department
- » Napa County Public Works

#### Funding Sources

- » Napa County
- » California Office of Traffic Safety (OTS) Grants

#### Context

Regional



# **NVTA VISION ZERO**

**DRAFT**



# 6

## Implementation, Evaluation, and Funding Strategies

This chapter describes the processes that can be used by NVTa to facilitate successful implementation of this Plan, evaluate its success, and quantify its progress. Funding sources for implementation of safety improvements are also identified.

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In terms of implementation, this chapter contains recommendations related to facilitating buy-in and support, and project delivery methods. The evaluation section contains recommendations relating to how and when to update this Plan, establishing metrics and benchmarks, and public communications. These considerations are especially important given NVTa's commitment to eliminating fatalities and severe injuries on Napa Valley's roadway network through the implementation of this Plan, the Vision Zero Action Plan that follows, and ongoing, regular progress monitoring and reporting throughout the process.

## Implementation Considerations

Vision Zero implementation will rely upon various strategies to reach zero deaths and fatalities. The project and program types listed below are expanded upon in the Project List and the Action Plan:

- » **Capital projects** are large, long-term infrastructure projects that require advanced design, engagement, coordination, and permitting. These projects may include mid-block pedestrian crossings, intersection improvements, and traffic calming.
- » **Quickbuild projects** typically have a shorter implementation timeframe and lower cost than capital projects due to their semi-permanent nature. These projects may include spot improvements such as signal timing adjustments, RRFB implementation, and intersection enhancements. Projects will typically have a community engagement component and will be focused on hot spot locations.
- » **Policy updates** may occur at the NVTA Board or local agency level. Policy related updates can include institutional improvements to design standards or reprioritizing funding to promote safety on Napa Valley roadways.
- » **Community education** is crucial, as Vision Zero's success is dependent on the community collectively reaching its goal. Every person that uses the roadway system is critical to its success and requires a paradigm shift in how we view and act on roadway safety. Education begins with the collective awareness around the severity of traffic deaths, educational campaigns to target the identified emphasis areas, and creating a culture that supports both policy and infrastructure changes related to safety.

Implementation of Plan-identified projects and programs is a vital step in the process where identified strategies and projects are executed. To successfully implement programs and projects, partnerships, trust, funding and coordination need to be proactively managed. Successful implementation requires sustained and coordinated support from key stakeholders, elected officials, and NVTA staff.

### Oversight, Accountability, Coordination, and Partnership

To ensure effective delivery of safety projects and programs, NVTA will establish a **Traffic Safety Working Group** that can be comprised from the Technical Advisory and Stakeholder Working Groups. Having the leadership of this group will be a crucial part of maintaining buy-in and support for Vision Zero from not only officials, but the community as well. Some duties of the working group could include conducting briefings and presentations at board and agency meetings, collecting, and sharing information on a regular basis, and updating a public-facing webpage on the NVTA website to inform Vision Zero goal progress, such as the number of projects funded or implemented and the number of collisions over time for comparison purposes.

Having continued communication and transparency with stakeholders and community members can allow for greater trust and support of the Plan's goals. Some other potential strategies include communication across diverse channels beyond the web (e.g. local news, mailers, and social media), actively soliciting and addressing community concerns, regularly publishing or updating more extensive factsheets on plan progress, and regular public meetings using effective community engagement techniques.

Much like the stakeholder input received throughout the creation of this Plan, coordination and partnership amongst diverse stakeholders will be essential for effective delivery of the Plan. Some strategies that the Working Group can implement include regularly informing leaders, community groups, and stakeholders on progress and key milestones, consulting partner agencies early on in the implementation process to gather suggestions and feedback, and ongoing monitoring and coordination of opportunities for partnership via project bundling (e.g. integrating Vision Zero projects with pavement resurfacing and maintenance).

## Policy Support

Projects following the Safe System Approach may often require tradeoffs to be made between on-street parking, vehicle level of service, and pedestrian and bicycle safety and accessibility when funding and/or right of way are limited. NVTA's commitment to this Plan and its goals also establishes that safety considerations be prioritized in all projects throughout Napa Valley. However, the spirit of this overriding consideration must also be built into the day-to-day operations and decision-making of NVTA and its member agencies. Thus, as a follow-on to this Plan, NVTA will review its policies, plans, guidelines, and standards, and update them as necessary to align with the overarching goal of prioritizing safety, and support a Safe System practice. Other complementary policies to this Plan may include a best practices guide for a crosswalk policy or a speed management policy and program. Implementation of these revised policies, plans, guidelines, and standards will be a crucial accompaniment to the implementation strategies within this Plan.

## Institutionalization

In addition to pursuing funding for the priority and systemic projects identified in this Plan via upcoming grant opportunities, consider reactive and project safety project opportunities through:

- » **Rolling safety projects into existing Capital Improvement Projects** by consolidating safety improvements with maintenance efforts such as roadway resurfacing can be cost efficient and speed project implementation and delivery. Review the Capital Investment Plans under NVTA and Napa Valley cities and towns to align implementation with the goals and principles of this Plan.
- » **Conducting Development Impact Review and Mitigation** according to new guidance from the Institute of Transportation Engineers (ITE) that presents opportunities for bringing the Safe System approach into the development review process.

## Evaluation Considerations

NVTA has committed to eliminating traffic deaths and severe injuries, and to form a standing Working Group to monitor progress towards this goal and communicate outcomes to the public. This section identifies possible opportunities to inform future decision-making and allows NVTA to understand how it is doing against the goal of reducing collisions and collision severity in each of its emphasis areas. To this effect, items in the Vision Zero Action Plan include a timeline of when the action would take place and performance targets to monitor implementation strategies and provide transparency on progress.

The following sections present some additional recommendations to this effect.

### Identify Metrics and Measure Performance in Priority Areas

Progress toward achieving NVTA's traffic safety goals will be measured. Performance measures may include monitoring collisions specific to the goals outlined in this Plan and monitoring the number of safety infrastructure improvements installed. Additional regular measurement of goal progress in priority areas can be performed every year.

Safety report cards that are released annually can be a powerful tool for measuring effectiveness, highlighting areas that need further attention and resources, and identifying tasks and deadlines for responsible stakeholder parties. **Figure 24** shows an example of a safety scorecard from the City of Denver prepared by the Denver Streets Partnership.

### Continued Engagement

Efforts around evaluation will include expanding partnership from diverse sources (e.g. officials, agencies, community advocacy groups). Input from identified partners and future partners, along with collected target metrics, could be used to adapt the plan based on community feedback and expert insight as projects and programs are rolled out.

Conducting pre- and post- surveys with community members can measure how their actions and views have shifted after engagement around traffic safety. Local partners can be tasked with disseminating the pre- and post-surveys to residents. Surveys would evaluate whether respondents express a shift in behavior after having participated in traffic safety programming. The metrics for evaluation can also be developed with local partners to improve accessibility for the public.

### Update the Plan Regularly

Regular Plan updates can assist with organizing and directing evaluation efforts. As conditions within Napa Valley could change, it will be necessary to update the Plan in the future.

**Figure 24**  
Denver Vision Zero Action Plan 2019 Progress Report Card

**2019 DENVER VISION ZERO ACTION PLAN**  
**Progress Report Card**



The Denver Streets Partnership issues this report card to honor the people who died in traffic crashes on Denver's streets in 2019 and to hold our City leaders accountable to their Vision Zero commitment to eliminate traffic fatalities and serious injuries.



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Denver did slightly better in 2019 compared to 2018 at meeting their goals for street safety improvements as outlined in the [Vision Zero Action Plan](#). Notably, the City made significant progress on two types of improvements: corridor-level traffic calming on 15th St, 17th St, 32nd Ave, and Park Ave; and street lighting enhancements throughout Denver. However, the City continued to fall well short of their goal to build 14 miles of new sidewalks, and also fell behind on their goal to build 20 miles of new bike lanes, after meeting this goal in 2018. The City also missed critical opportunities to make pedestrian crossing and intersection improvements along the High Injury Network.

CITY GOALS	ACTIONS	LOCATION*	QUALITY**	COMPLETE	SCORE
BUILD 20 MILES OF BIKE LANES	12.5 MILES OF BIKE LANES BUILT	A	A	D	C
BUILD 14 MILES OF SIDEWALKS	4.35 MILES OF SIDEWALKS BUILT	F	C	F	F
IMPLEMENT TRAFFIC CALMING ON 1 CORRIDOR	IMPLEMENTED TRAFFIC CALMING ON 4 CORRIDORS	B+	A	A+	A
REDESIGN 2 INTERSECTIONS TO INCREASE SAFETY	ADDED BUILT OUTS OR BIKE CORRLALS TO 8 INTERSECTIONS	D	A	A+	B-
INSTALL OR UPGRADE 3 PED CROSSINGS	INSTALLED PEDESTRIAN ACTIVATED SIGNALS AT 11 CROSSINGS	D+	A	A+	B
IMPROVE OPERATIONS AT 10 INTERSECTIONS	IMPROVED SIGNALS AT 62 INTERSECTIONS	A	A	A+	A
ENHANCE STREET LIGHTING ON 2 CORRIDORS	CONVERTED 30,500 LIGHTS TO LED ON NUMEROUS CORRIDORS	A	A	A+	A
"SMART CITY" TECHNOLOGIES AT 10 INTERSECTIONS	INSTALLED DATA COLLECTION DEVICES AT 12 INTERSECTIONS AND OTHER LOCATIONS	A	F	F	D

\* Located on the High Injury Network and/or in a Community of Concern?  
\*\* Did the action improve safety for all users?

**FINAL GRADE: C+**

This Report Card focuses specifically on Denver's progress on street safety improvements. Our current street system is dangerous by design, and the City will not achieve zero traffic fatalities or serious injuries without fundamental improvements.

**What is Vision Zero and why does it matter?**  
Denver's Vision Zero Action Plan aims to eliminate traffic fatalities and serious injuries by the year 2030, and outlines actions the City will take in several areas to achieve this goal.



In addition to accelerating implementation of the street safety improvements highlighted in this Report Card, the DENVER STREETS PARTNERSHIP calls on city leaders to enact the following quick policy changes that will immediately make our streets safer:

- 1 Lower speed limits.**  
Twenty miles per hour is plenty on all residential streets, as opposed to the current default of 25 mph, and should also be the maximum in all school zones.
- 2 Ban turns on red downtown & on the High Injury Network.**  
Right-turning drivers look left for a gap in traffic and don't see people walking or biking approaching from the right side.  
Permitting rights on red increases crashes by:  
**60% PEDESTRIAN** **100% BIKE**

- 3 Increase fines for parking in or blocking bike lanes.**  
Denver is stripping more miles of bike lanes on Denver's streets every year, but cars and trucks blocking these lanes render them useless and create a safety hazard by forcing people on bikes to merge into traffic mid-block.
- 4 Eliminate pedestrian "beg buttons" on the High Injury Network.**  
At many traffic signals, people walking must push a button to receive a pedestrian WALK signal, while automated signals provide more timely pedestrian indications and ensure pedestrians always have enough time to safely cross the street.
- 5 Aggressively pursue a state legislative strategy expanding the use of photo speed radar and red light cameras.**  
These are proven techniques used worldwide to reduce traffic injuries and fatalities. Current state law severely restricts where and how these forms of automated enforcement can be used, effectively prohibiting their use on most of Denver's High Injury Network.
- 6 Fully fund planned Vision Zero projects.**  
At current funding levels, this build out will take hundreds of years.  
400 years

**denverSTREETS PARTNERSHIP**  
VISIT: [denverstreetpartnership.org](http://denverstreetpartnership.org)  
People4Streets | BikeWalkBus | People4Streets

The Denver Streets Partnership is a coalition of community organizations advocating for people-friendly streets in Denver.

Source: Denver Streets Partnership

## Funding Considerations

Projects included in this Action Plan can be funded through a wide range of additional sources at the federal, state, and regional levels. The sources listed here may be used to fund a broad scope of projects targeting air quality and sustainability, affordable housing, and transportation. Successful projects often entail creative solutions that address impact areas beyond transportation safety alone.

### Federal Sources

#### Community Development Block Grant (CDBG) Program

The Community Development Block Grant (CDBG) program is a flexible program that provides communities with resources to address a wide range of unique community development needs. Communities often use CDBG funds to construct and repair streets and sidewalks.

*Frequency* Annual funding cycle

#### Congestion Mitigation and Air Quality (CMAQ) Improvement Program

The FAST Act continued the CMAQ program to provide a flexible funding source to State and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act. Funding is available to reduce congestion and improve air quality for areas that do not meet the National Ambient Air Quality Standards for ozone, carbon monoxide, or particulate matter (nonattainment areas) and for former nonattainment areas that are now in compliance (maintenance areas).

*Frequency* Annual funding cycle

#### Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Discretionary Grant Program

This program supports projects that are “road or bridge projects eligible under title 23, United States Code;” and “intermodal projects.” Previously the BUILD grant, this program replaces the TIGER program.

*Frequency* Annual funding cycle

#### Safe Streets for All (SS4A) Grant Program

The Safe Streets for All (SS4A) grant program is a new Federal grant program established by the Bipartisan Infrastructure Law centered around the Department of Transportation’s National Roadway Safety Strategy and its goal of zero deaths and serious injuries on America’s roadways. It will provide \$5 billion in grant funding over the next 5 years to develop and implement Vision Zero safety plans. Current legislation emphasizes funding of planning efforts, but the focus on implementation funding is expected to increase over the next few years.

*Frequency* Annual funding cycle



## State Sources

### Active Transportation Program (ATP)

ATP is a statewide competitive grant application process with the goal of encouraging increased use of active modes of transportation. 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 (SRTS), into a single program with a focus to make California a national leader in active transportation. The ATP is administered by the Division of Local Assistance, Office of State Programs.

*Frequency* Biennial funding cycle

### Clean California Grants

The Clean California Local Grant Program (CCLGP), operated by Caltrans, was created by AB 149 in 2021 to beautify and clean up local streets and roads, tribal lands, parks, pathways, transit centers, and other public spaces. The program will allocate \$296 million in state funds, in grants not to exceed \$5 million, to local and regional public agencies that install beautification measures and art in public spaces and remove litter and debris to enhance communities and improve spaces for walking and recreation. The goals of the CCLGP are to: reduce the amount of waste and debris within public rights-of-way, pathways, parks, transit centers, and other public spaces; enhance, rehabilitate, restore, or install measures to beautify and improve public spaces and mitigate the urban heat island effect; enhance public health, cultural connection, and community placemaking by improving public spaces for walking and recreation; and advance equity for underserved communities.

*Frequency* Three-year cycle

### California Office of Traffic Safety (OTS) Grant Program

OTS administers traffic safety grants in the following areas: Alcohol Impaired Driving, Distracted Driving, Drug-Impaired Driving, Emergency Medical Services, Motorcycle Safety, Occupant Protection, Pedestrian and Bicycle Safety, Police Traffic Services, Public Relations, Advertising, and Roadway Safety and Traffic Records. This funding is primarily geared to enforcement and outreach efforts.

*Frequency* Annual funding cycle

### California Natural Resources Agency Urban Greening Program

This program supports projects that “use natural systems or systems that mimic natural systems to achieve multiple benefits.” Eligible projects include “Non-motorized urban trails that provide safe routes for travel between residences, workplaces, commercial centers, and schools.”

*Frequency* Biennial funding cycle

### California Strategic Growth Council (SGC) Transformative Climate Communities (TCC) Program

The Transformative Climate Communities (TCC) Program empowers the communities most impacted by pollution to choose their own goals, strategies, and projects to reduce greenhouse gas emissions and local air pollution.

*Frequency* Annual funding cycle

### Caltrans Strategic Partnerships Grants

These grants, a subset of Caltrans’ Sustainable Transportation Planning Grant Program, fund multi-modal planning studies, with a focus on transit, of regional, interregional, and statewide significance. Studies are conducted in partnership with Caltrans and must assist in achieving the Caltrans Mission and Grant Program Objectives.

*Frequency* Annual funding cycle



**SB 1 Local Partnership Program (LPP)**

The purpose of this program is to provide local and regional transportation agencies that have passed sales tax measures, developer fees, or other imposed transportation fees with a continuous appropriation of \$200 million annually from the Road Maintenance and Rehabilitation Account to fund road maintenance and rehabilitation, sound walls, and active transportation projects. There is also a competitive grant portion of this project.

*Frequency* Biennial funding cycle

**SB 1 Local Streets and Roads Program (LSRP)**

SB 1 dedicated approximately \$1.5 billion per year in new formula revenues apportioned by the State Controller to cities and counties for basic road maintenance, rehabilitation, and critical safety projects on the local streets and roads system.

*Frequency* Annual funding cycle

**SB 1 Solutions for Congested Corridors Program (SCCP)**

The Solutions for Congested Corridors Program funds projects designed to reduce congestion in highly traveled and highly congested corridors. This statewide, competitive program makes \$250 million available annually for projects that implement specific transportation performance improvements and are part of a comprehensive corridor plan by providing more transportation choices while preserving the character of local communities and creating opportunities for neighborhood enhancement.

*Frequency* Annual funding cycle

**SB 1 State Transportation Improvement Program (STIP)**

The State Transportation Improvement Program (STIP) is the biennial five-year plan for future allocations of certain state transportation funds for state highway improvements, intercity rail, and regional highway and transit improvements.

*Frequency* Biennial funding cycle

**Highway Safety Improvement Program (HSIP)**

California's Local HSIP focuses on infrastructure projects with nationally recognized crash reduction factors (CRFs). Local HSIP projects must be identified based on collision experience, collision potential, collision rate, or other data-supported means. There are opportunities to include systemic safety projects as well.

*Frequency* Biennial funding cycle

**California Natural Resources Agency Environmental Enhancement and Mitigation (EEM) Program**

This program supports projects that "contribute to mitigation of the environmental effects of transportation facilities." According to the program guidelines, projects that fall under the following category can apply: "Mitigation Projects Beyond the Scope of the Lead Agency responsible for assessing the environmental impact of the proposed transportation improvement."

*Frequency* Annual funding cycle

**SGC Affordable Housing and Sustainable Communities (AHSC) Program**

The Affordable Housing and Sustainable Communities (AHSC) Program makes it easier for Californians to drive less by making sure housing, jobs, and key destinations are accessible by walking, biking, and transit.

*Frequency* Annual funding cycle



## Local and Regional Sources

### Measure T Funding

Administered through the NVTA, Measure T provides funding for reconstruction and rehabilitation of local streets and roads, and related transportation improvements such as sidewalks, ADA ramps, curbs, and gutters.

*Frequency* Apportioned annually by NVTA

### Developer Fees

California law allows local governments to establish and charge a fee on residential and non-residential developments to fund public facilities and to service population growth. Public facility fees can be charged to new development based on density and traffic impacts, and can go towards a variety of public facilities, including local roadways.

*Frequency* Not applicable

### Lifeline Transportation Program

The Metropolitan Transportation Commission (MTC) has created the Lifeline Transportation Program to evaluate state and federal funds to provide grants for mobility and accessibility needs in low-income communities across the Bay Area. New guidelines are established for each cycle and the projects must address transportation gaps or barriers identified in community-based transportation plans or other local planning efforts in low-income neighborhoods.

*Frequency* Biennial funding cycle

### One Bay Area Grant 3 (OBAG 3)

OBAG guides how MTC distributes \$375 million from the Federal Highway Administration (FHWA) between 2023-2026. Funding can be used for projects and programs that improve safety, spur economic development, and help the Bay Area meet climate change and air quality improvement goals.

*Frequency* Annual funding cycle

### Program for Arterial System Synchronization (PASS)

PASS delivers financial and technical assistance to cities and counties to enhance signal coordination across jurisdictions. This includes engineering help for local governments seeking to re-time signals, adjustments to existing traffic-responsive timing systems, “flush” plans for managing traffic incidents, and more.

*Frequency* Annual funding cycle

### Transportation Development Act Article 3 (TDA3) Funding

TDA3 provides funding annually for bicycle and pedestrian projects. Each county coordinates a consolidated annual request for projects to be funded in the county. Some counties competitively select projects, while other counties distribute the funds to jurisdictions based on population.

*Frequency* Annual funding cycle

# **NVTA VISION ZERO**

**DRAFT**

# 7

## Project Development and Strategies

A set of safety projects were identified through the collision and contextual data analysis and review of existing plans which are summarized in the previous chapters. Project selection also accounted for community and stakeholder feedback on areas of concern, the number of KSI collisions, and systemic analysis results. A full list of projects can be found in [Appendix B](#).

This chapter outlines ten Representative Projects selected for further project development. Each project summary includes a description of the project, collision trends, what collision profiles are identified by this project, what mode of travel this project targets, and an estimated cost range, as shown in

**Figure 25.** The accompanying graphic identifies the extents of the project and the countermeasures proposed to address these safety trends.

As this Vision Zero Action Plan serves multiple jurisdictions and includes three that have adopted Local Road Safety Plans, regional coordination is imperative to achieving zero deaths and serious injuries on Napa Valley roadways. Improving safety throughout the Valley will not only require close coordination with neighboring agencies, but also with Caltrans to share and analyze data, implement infrastructure-related projects, education and enforcement efforts, and creating a collective culture of safety.

**Figure 25**  
Estimated  
Cost Ranges  
for Projects

\$\$\$\$

Project costs less than \$500,000 in 2023 dollars

\$\$\$\$

Project costs between \$500,000 and \$1,500,000 in 2023 dollars

\$\$\$\$

Project costs between \$1,500,000 and \$3,000,000 in 2023 dollars

\$\$\$\$

Project costs greater than \$3,000,000 in 2023 dollars

Project  
**1**

# American Canyon Road East

from State Route 29 to Newell Drive


The eastern section of American Canyon Road, from State Route 29 to Newell Drive, connects those traveling on I-80 to the City of American Canyon and to SR 29. The segment from SR 29 to Newell Drive primarily serves residential units, but is also a connection to American Canyon High School in the north and Vallejo in the south. There is a Class II bike lane just east of the SR 29 intersection, but continuous bicycle facilities are not present along this section of American Canyon Road East.

With a posted speed limit of 40 miles per hour and average daily traffic of 19,800 vehicles per day, the improvements included as part of this project improves safety for pedestrians and bicyclists. Separated bikeways provide added protection between bicyclists and motorists, and protected intersections provide bicyclists with a dedicated path through the intersection, with right of way over turning motor vehicles. High visibility crosswalks help to make both the crosswalk and pedestrian more visible to motorists, and can even assist users in deciding where to cross.

DRAFT

**COLLISION PROFILES**  
**3 5 6 7 8**

**JURISDICTION**  
**American Canyon**

**MODE**  


**ESTIMATED COST**  
**\$\$\$\$**

**COLLISION HISTORY**

<b>83</b> injury collisions	<b>9</b> KSI collisions
--------------------------------	----------------------------

**TIMELINE**      **ON HIN?**  
**5-10 years**      **Yes**



**STATE ROUTE 29**

Install **protected intersections or roundabouts**, **high-visibility crosswalks** and **daylighting**.



**BROADWAY / SILVER OAK TRAIL**

Install **protected intersections**, **high-visibility crosswalks** and **daylighting**.

Silver Oak Tr

Canyon Oaks ES

Newell Dr

American Canyon HS

SR 29

Broadway



**FLOSDEN ROAD / NEWELL DRIVE**

Install **protected intersections**, **high-visibility crosswalks** and **daylighting**.

Flosden Rd



**CORRIDOR-WIDE**

Install **Class IV separated bikeways** using space from **narrowing lanes**.



Project  
**2**

# Lincoln Avenue

from State Route 128 to Silverado Trail

Lincoln Avenue serves retail, restaurants, and hospitality uses in downtown Calistoga. Lincoln Avenue is co-signed as State Route 29, and the posted speed limit is 25 miles per hour. As such, Lincoln Avenue is unique in that its design currently complements a State Route rather than the main downtown corridor.

Creating a bikeable and walkable downtown area by slowing speeds and enhancing safety for non-motorized users invites both residents and visitors to take alternative modes of travel. Design for the corridor would be adapted to encourage vehicle speeds of 20 or 25 MPH. This could include narrowing travel lanes with consistent edge lines to slow speeds, installing Class II bike lanes, and repainting parking to convert angled parking to parallel parking if right of way is needed, or converting front-in angle parking to back-in parking.

At the intersection of Silverado Trail, squaring up the intersection and installing a signal that includes audible countdown and LPIs would enhance pedestrian safety. Additionally, high visibility crosswalk markings, curb extensions, and daylighting should be added to all intersections. RRFBs would be installed at Myrtle Street and Fair Way, as they are gateway intersections into the City's downtown area.

### COLLISION PROFILES



### JURISDICTION

**Calistoga**

### MODE



### ESTIMATED COST

**\$\$\$\$**

### COLLISION HISTORY

**27**

injury collisions

**5**

KSI collisions

### TIMELINE

**5-10 years**

### ON HIN?




**Yes**

DRAFT









**SILVERADO TRAIL**  
Install **signal** with **LPI** and **audible push buttons**, and **square intersection**


**CORRIDOR-WIDE**  
Install **Class II bike lane** using space created by **narrowing travel lanes** with new edge lines and converting diagonal to parallel parking. Install **high-visibility crosswalks** and **daylighting** at all intersections.

**FAIR WAY**  
Install **RRFBs** and **high-visibility crosswalks**




**MYRTLE STREET**  
Install **RRFBs** and **high-visibility crosswalks**





Project  
**3**

# State Route 128

from Cedar Street/Petrified Forest Road to Pine Street

State Route 128 (SR 128) has a posted speed limit of 35 miles per hour within the project area. This roadway primarily serves residential land uses, with restaurant and hospitality uses along the south side of SR 128. This segment is confined due to right of way constraints. However, slowing speeds is nonetheless essential for this roadway.

Recommendations for speed reduction along SR 128 include adding centerline delimiters at each intersection from Lillie Street to Pine Street and installing RRFBs at two to three location along this segment to increase pedestrian access and slow vehicle traffic flow. As a temporary measure, asphalt curbing berms along either side of the roadway should be installed to delineate sidewalks. As redevelopment or upgrades are made to land uses surrounding SR 128, the City could look for opportunities to install permanent sidewalk or off-street path facilities as part of those developments.

## COLLISION PROFILES

**3 5 6 7 8 9 10**

## JURISDICTION

**Calistoga**

## MODE



## ESTIMATED COST

**\$\$\$\$**

## COLLISION HISTORY

**24**

injury collisions

**5**

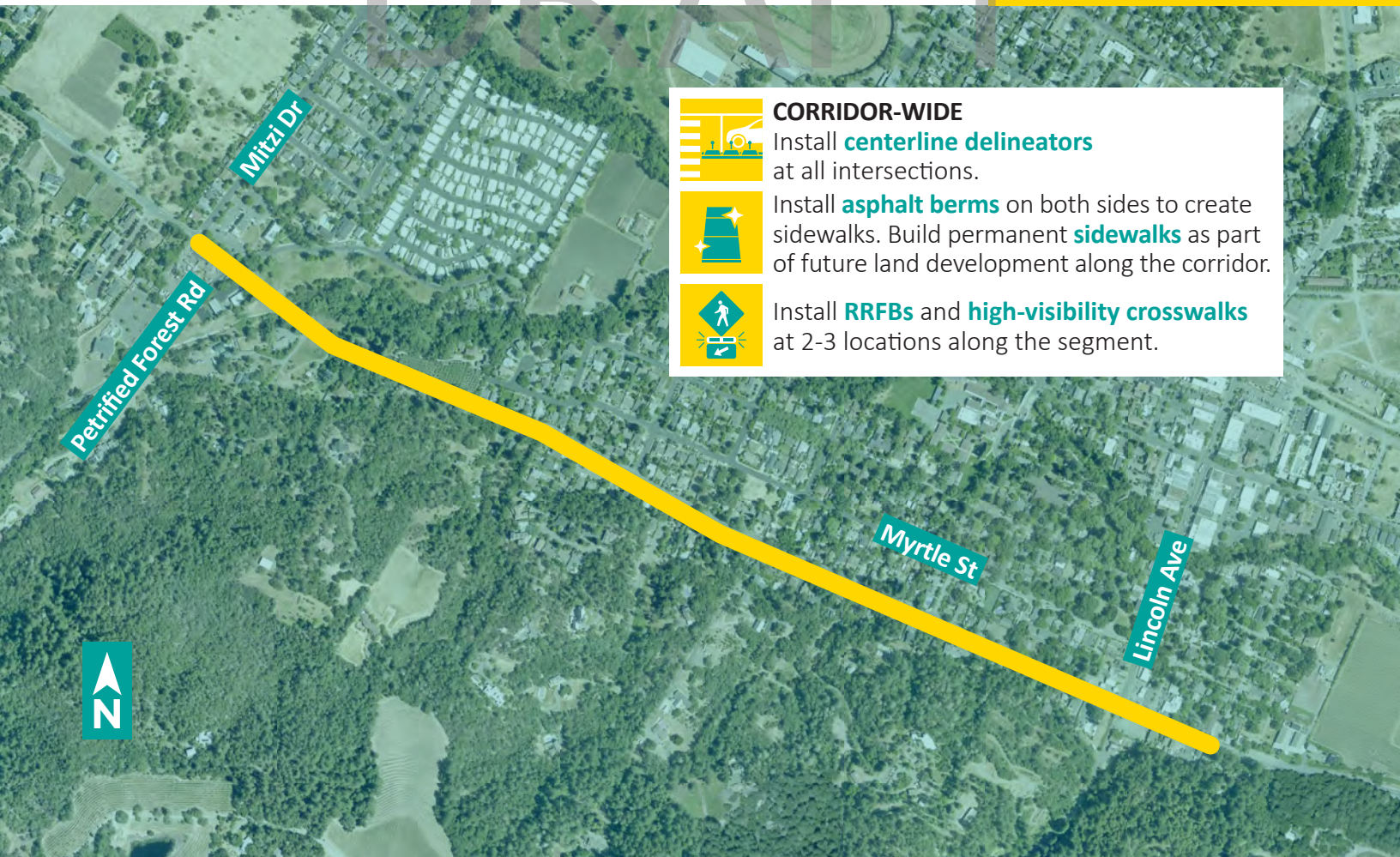
KSI collisions

## TIMELINE

**10+ years**

## ON HIN?

**Yes**



**CORRIDOR-WIDE**

- Install **centerline delineators** at all intersections.
- Install **asphalt berms** on both sides to create sidewalks. Build permanent **sidewalks** as part of future land development along the corridor.
- Install **RRFBs** and **high-visibility crosswalks** at 2-3 locations along the segment.



Project  
**4**

# Deer Park Road/ Sanitarium Road

The southern intersection of Deer Park Road and Sanitarium Road is located in a rural part of Napa County and has a posted speed limit of 35 miles per hour. Deer Park Road is given the free movement and those traveling westbound along Sanitarium Road yield to continue westbound or enter a median crossover to head eastbound. Additionally, Deer Park Road ascends a steep uphill grade just east of the junction, while Sanitarium Road descends a similar downward grade.

The Napa County LRSP recommends a one-lane roundabout at this intersection to improve safety, promote lower speeds, and reduce conflict points, which can also lead to improved operational performance. The installation of a roundabout would be supplemented with necessary signage and restriping of the roadway.

### COLLISION PROFILES

1 3 4 5 8

### JURISDICTION

**Napa County**

### MODE



### ESTIMATED COST

\$\$\$\$

### COLLISION HISTORY

8

injury collisions

### TIMELINE


10+ years

### ON HIN?

Yes

DRAFT



 **DEER PARK ROAD/  
SANITARIUM ROAD**  
Install **roundabout**

Project  
**5**

# Howell Mountain Road

from White Cottage Road to Sunset Drive

Howell Mountain Road extends from Silverado Trail in the south to Pope Valley Road in the north. The roadway is rural, with winding curves, minimal intersection control, steep grades, and no shoulder due to vegetation along the roadway edge. Howell Mountain Road has a posted speed limit of 35 miles per hour, and 15-25 miles per hour along curves.

Upgrading signage and pavement markings and installing centerline rumble strips improves safety for motorists. The corridor is designated as a bike route. Class IIB buffered bike lanes (where feasible), “Bikes May Use Full Lane” signs at key locations, and green conflict striping at intersections can support safer separation in space and time for people biking.

The County is currently working on some upgrades through HSIP funding. Although this corridor is not identified on the HIN, the County identified Howell Mountain Road and Sunset Drive as a key intersection, and completed a systemic review to identify safety enhancements throughout the corridor.

COLLISION PROFILES  
**1 3 4 5 6 7 8**

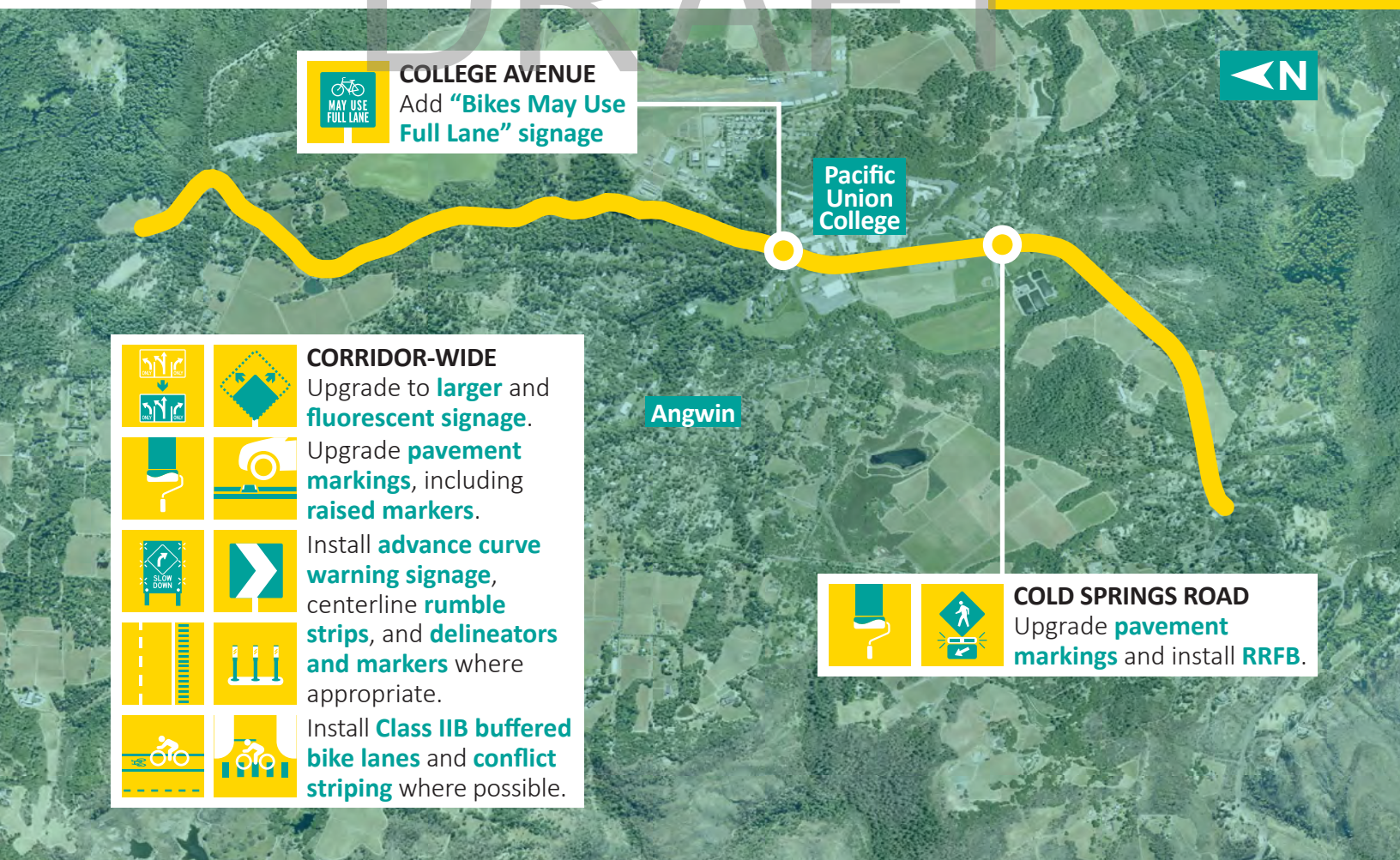
JURISDICTION  
**Napa County**


MODE  
  

ESTIMATED COST  
**\$\$\$\$**

COLLISION HISTORY  
**27** injury collisions  
**4** KSI collisions

TIMELINE  
**1-5 years** ON HIN?  
**No**







 **COLLEGE AVENUE**  
Add “**Bikes May Use Full Lane**” signage

**Pacific Union College**

**Angwin**



**CORRIDOR-WIDE**

-  Upgrade to **larger and fluorescent signage**.
-  Upgrade **pavement markings**, including **raised markers**.
-  Install **advance curve warning signage**, centerline **rumble strips**, and **delineators and markers** where appropriate.
-  Install **Class IIB buffered bike lanes** and **conflict striping** where possible.

  **COLD SPRINGS ROAD**  
Upgrade **pavement markings** and install **RRFB**.

Project  
**6**

# Main Street

Downtown St. Helena from  
Pratt Avenue to Charter Oak Avenue

Main Street serves retail, restaurants, and hospitality uses in St. Helena. It is co-signed as State Route 29 (SR 29) and State Route 128 (SR 128), and the posted speed limit is 25 miles per hour. Main Street is unique in that there are driveways very closely spaced throughout the study area, and there are railroad tracks along the east side of the roadway near the south end.

The lively downtown area and residential uses at the north end of the segment promotes walkability. Striping high visibility crossings, upgrading the sidewalk to included ADA compliant curb ramps, and installing curb extensions enhance pedestrian safety along the corridor. Part of this project is already funded through MTC'S OBAG3 funding and the Community Development Block Grant.

## COLLISION PROFILES

**3 5 6 7 10**

## JURISDICTION

**St. Helena**

## MODE



## ESTIMATED COST

**\$\$\$\$**

## COLLISION HISTORY

**58**

injury collisions

**4**

KSI collisions

## TIMELINE

**1-5 years**

## ON HIN?

**Yes**

DRAFT



**PHASE 2**



**ADAMS STREET TO MITCHELL STREET**

Install **curb extensions** at intersections.

**PHASE 2**



**SPRING STREET**

Install **high-visibility crosswalks** on west and south legs of intersection.

**PHASE 3**



**CORRIDOR-WIDE**

Upgrade signal synchronization

**PHASE 1**



**PINE STREET TO ADAMS STREET**

Upgrade sidewalk with **ADA-compliant ramps** and driveways.

Project  
**7**

# Trancas Street/ Redwood Road

from Dry Creek Road to the Napa River

Redwood Road and Trancas Street are a major east-west corridor through the City of Napa. It serves residential, institutional, retail, and agricultural land uses along the corridor. The roadway varies between four to five lanes and has a posted speed limit of 30-50 miles per hour. Along Redwood Road near Carol Drive, the posted speed limit is 25 miles per hour when children are present. Redwood Road is also a designated truck route, and there are two roadways that parallel SR 29 and are often used for cut through traffic: Dry Creek Road and Linda Vista Avenue.

With high volumes, bicycle and pedestrian safety is critical along this roadway. Installing sidewalk where gaps are present, upgrading ramps to be ADA compliant, installing raised pavement markers and high visibility markings on crosswalks, and upgrading signals to include Leading Pedestrian Intervals (LPIs) and audible signals with countdowns provide enhanced comfort for non-motorized users. As Redwood Road features more residential land uses, on-street parking should remain on both sides, but the roadway cross-section would include separated bike lanes in both directions, one through lane in each direction, and a center two-way left turn lane.

Protected intersections improves the visibility of both pedestrians and bicyclists, and are recommended at Solano Avenue, California Boulevard, Jefferson Street, and Soscol Avenue/Big Ranch Road. A study would identify if a road diet or other safety enhancements is feasible along the segment between Carol Drive to the eastern city limits.

## COLLISION PROFILES

**3 5 6 7 8**

## JURISDICTION

**City of Napa**

## MODE



## ESTIMATED COST

**\$\$\$\$**

## COLLISION HISTORY

**139**

injury collisions

**5**

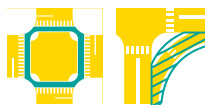
KSI collisions

## TIMELINE

**5-10 years**

## ON HIN?

**Yes**



**DRY CREEK ROAD TO CAROL DRIVE**  
Close or reconfigure slip lane and implement **all-way stop control**.









**DRY CREEK ROAD TO CAROL DRIVE**  
**Road diet** to three lanes, with one vehicle lane in each direction and a center turn lane, **Class IIB buffered bike lanes**, and parallel parking on both sides.





**MACLEOD STREET**  
Install **RRFB** with pedestrian **median refuge**.






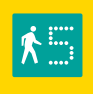



**YOUNG AVENUE**  
Install **RRFB** with pedestrian **median refuge**.

**LINDA VISTA AVENUE**  
Implement **LPI**. Install **pedestrian countdown timers**, **audible push buttons** to signals, **retroreflective tape** on signal heads, and **edge lines**. Trim vegetation to **improve sightlines**.



**LINDA VISTA AVENUE TO CAROL DRIVE**  
Close **sidewalk gaps** on the south side.










**SOLANO AVENUE**  
Implement **LPI**. Install **protected intersection**, **audible push buttons** to signals, **pedestrian countdown timers**, **advanced stop bars**, and **wayfinding** to and from the Vine Trail.



**CAROL DRIVE TO SOLANO AVENUE**  
Feasibility study for **road diet**.



**CALIFORNIA BOULEVARD**  
Install **protected intersection**.

**CORRIDOR-WIDE**  
**Straighten crosswalks** and upgrade to **high-visibility marking** and bi-directional, **ADA-compliant curb ramps**. Convert pavement markers to **high-visibility pavement markings**. Install **bike conflict striping**, **delineators** and **object markers**, and **speed feedback signs**. Upgrade to **fluorescent signage**.



**JEFFERSON STREET**  
Install **protected intersection**.




**SOLANO AVENUE TO SOSCOL AVENUE**  
Install **Class IV separated bikeways** using space from **narrowing lanes**.



**SOSCOL AVENUE**  
Install **protected intersection**.



Project  
**8**

# Soscol Avenue

from Trancas Street to Imola Avenue

Soscol Avenue, also designated as SR 121/221 at the southern end, serves as one of two main gateways into the City of Napa. It differs from other neighborhoods in the City because it primarily serves commercial land uses with small pockets of residential areas. The intersection of Soscol Avenue and Imola Avenue is home to the Napa State Hospital, Napa Valley College Housing, and the South Napa Marketplace. Imola Avenue is also designated as SR 121. The central part of Soscol Avenue has several car dealerships and the South Napa Marketplace. At the north end of the corridor are various retail uses and multifamily housing.

As a multi-use corridor, Soscol Avenue needs to serve all roadway users. Improvements to the roadway system include closing slip lanes to remove additional motor vehicle conflict points, restriping narrower vehicle lanes to accommodate Class IV separated bikeways, and installing protected intersections where feasible. Other enhancements include upgrading signage, striping high visibility crosswalks, installing Pedestrian Hybrid Beacons (PHBs), and striping bike conflict markings to make bicyclists more visible to motorists at areas like driveways, bus stops, and at intersections.

### COLLISION PROFILES

**3 5 6 7 8**

### JURISDICTION

**City of Napa**

### MODE



### ESTIMATED COST

**\$\$\$\$**

### COLLISION HISTORY

**174**

injury collisions

**15**

KSI collisions

### TIMELINE

**5-10 years**

### ON HIN?

**Yes**



**TRANCAS STREET TO LINCOLN AVENUE**  
Upgrade signs to **fluorescent sheeting**. Install **speed feedback signs, delineators and object markers**, and upgrade bike lanes to **Class IV separated bikeways** using space from **narrowing lanes** as the buffer space.

**OLD SOSCOL WAY**  
Install **high-visibility crosswalks** on all legs.

**PUEBLO AVENUE**  
Install **high-visibility crosswalks** on all legs.

**CENTRAL AVENUE**  
Install **PHB** and **high-visibility crosswalks** on all legs.

**LINCOLN AVENUE**  
Install **protected intersection** and **close right-turn pockets**.

**LINCOLN AVENUE TO VALLEJO STREET**  
Upgrade bike lanes to **Class IV separated bikeways** using space from **narrowing lanes** as the buffer space.

**JACKSON STREET**  
Install **PHB** and **high-visibility crosswalks** on all legs.

**IMPERIAL WAY**  
Install **PHB** and **high-visibility crosswalks** on all legs.

**VALLEJO STREET**  
Install **trail crossing**.

**TANEN STREET**  
**Square up intersection** and install **high-visibility crosswalks** on all legs.

**SILVERADO TRAIL**  
Install **high-visibility crosswalks** on all legs. **Square up intersection** and **close or re-configure slip lane**.

**KANSAS AVENUE**  
Install **high-visibility crosswalks** on all legs.

**SILVERADO TRAIL TO IMOLA AVENUE**  
Upgrade bike lanes to **Class IV separated bikeways** using space from **narrowing lanes** as the buffer space. Install **bike conflict striping** and **transit islands**.

**SHETLER AVENUE**  
Install **high-visibility crosswalks** on all legs.

**IMOLA AVENUE**  
**Close or reconfigure slip lanes**.



DRAFT

Project  
**9**

# Finnell Road

from Yount Street to Vista Drive

Finnell Road serves various commercial, community, and residential uses. The Town of Yountville has recently implemented active transportation enhancements such as installing sidewalk, striping high-visibility crossings at Vista Drive and Heritage Way, and installing Class II bike lanes east of the bridge.

To build upon the Town’s efforts, there are enhancements that can be made along this roadway to improve pedestrian and bicycle safety and reduce motor vehicle speeds. Installing bulbouts, removing parking, and painting red curb at intersections and crosswalks to daylight the intersection improves visibility of pedestrians and bicyclists for motorists. Creating continuous sidewalk along both sides of the roadway or installing a crosswalk where sidewalk cannot be continued is also recommended.

COLLISION PROFILES

**6 7 8**

JURISDICTION

**Yountville**

MODE



ESTIMATED COST

**\$\$\$\$**

COLLISION HISTORY

**1**  
injury collisions

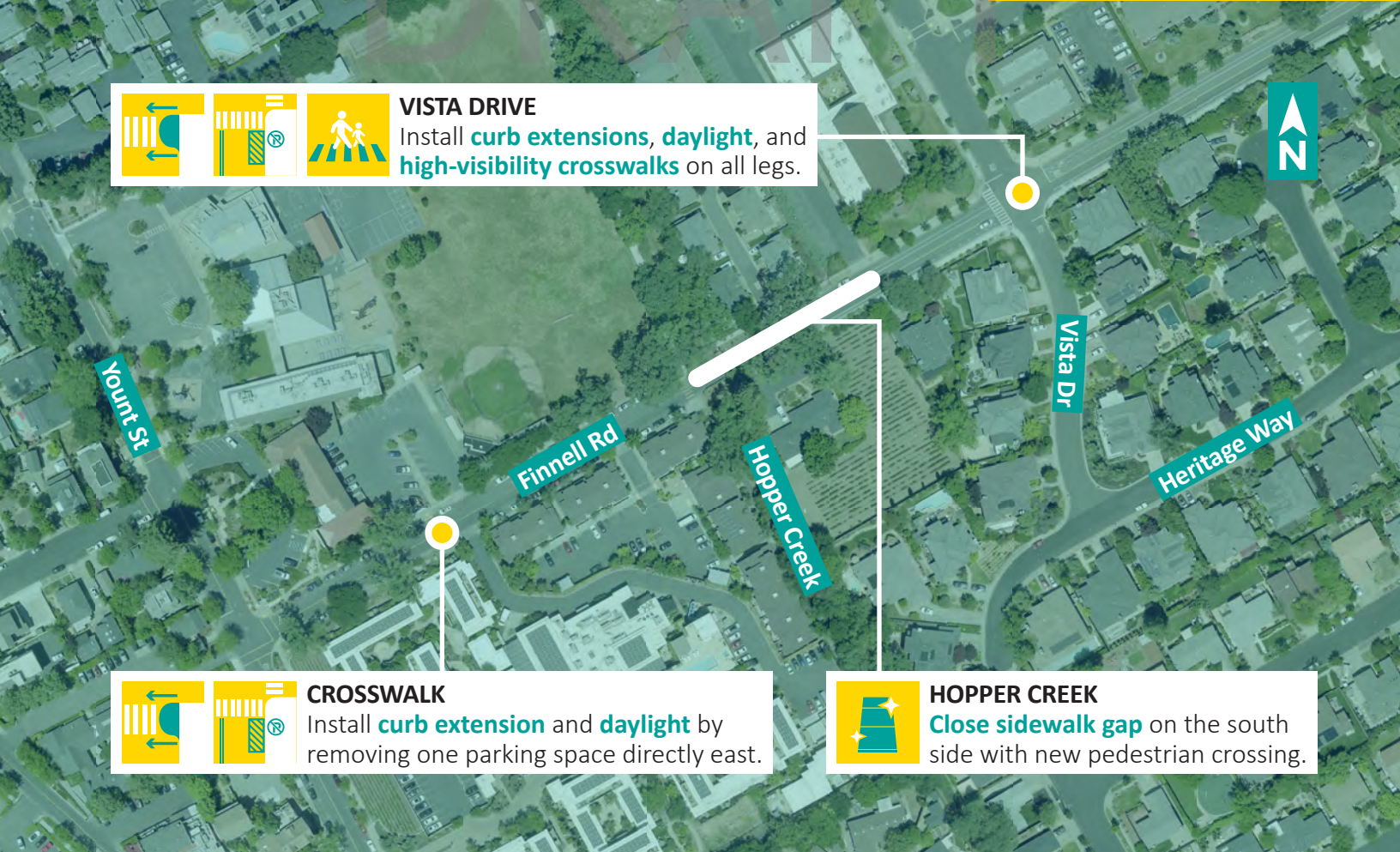
TIMELINE

**1-5 years**

ON HIN?

**Yes**

DRAFT



**VISTA DRIVE**  
Install **curb extensions, daylight,** and **high-visibility crosswalks** on all legs.

**CROSSWALK**  
Install **curb extension** and **daylight** by removing one parking space directly east.

**HOPPER CREEK**  
**Close sidewalk gap** on the south side with new pedestrian crossing.



Project  
**10**

# State Route 29/ Madison Street

Madison Street is one of just two gateways into the Town of Yountville. Just to the north of Madison Street lies numerous wineries and restaurants served by State Route 29, which becomes a controlled-access freeway just south of the intersection and has a fully grade-separated interchange with California Street. The rapid change in character of State Route 29 in this stretch is challenging, especially for northbound motorists, and leads to high instances of speeding and rear-end collisions.

In the near term, split phasing could be implemented along with roadway reconfigurations that include an acceleration lane on the south leg for the southbound direction and westbound reconfiguration to include a dedicated left and right lane, and a shared through-left lane. However, roundabouts prove to have high safety benefits as the number of conflict points are reduced, vehicle speeds are slowed, and vehicle change in trajectory is changed, therefore reducing kinetic energy. Roundabouts are also known to not sacrifice vehicle throughput. A near term recommendation can also include a two-lane roundabout feasibility study. This study would include an environmental study, and future plans for NVTA would be to apply for implementation funding for right-of-way acquisition and construction.

COLLISION PROFILES  
**1 3 4 5 6 7 8 9**

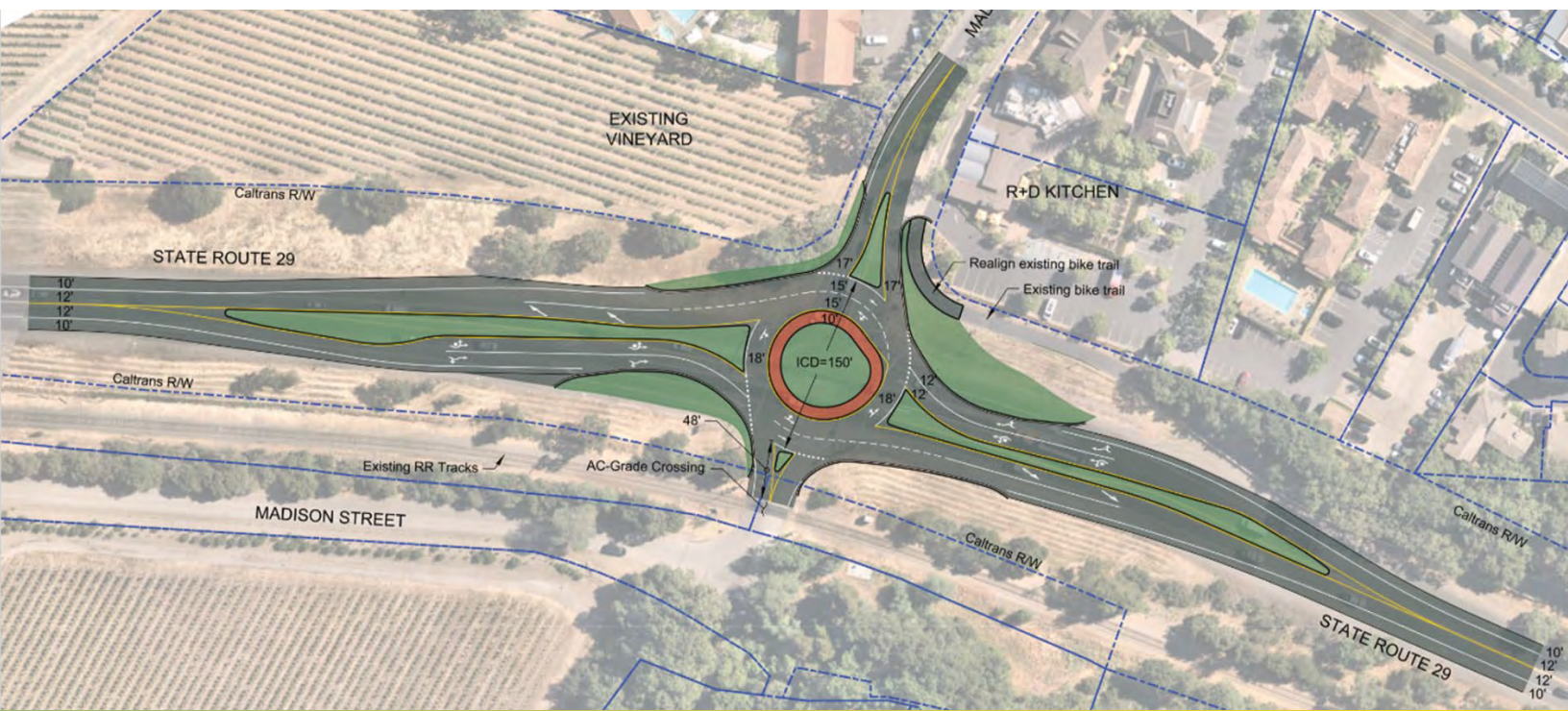
JURISDICTION  
**Yountville**

MODE

ESTIMATED COST  
**\$\$\$\$**

COLLISION HISTORY  
**20** injury collisions  
**3** KSI collisions

TIMELINE **5-10 years**  
ON HIN? **Yes**



# **NVTA VISION ZERO**

**DRAFT**

# 8

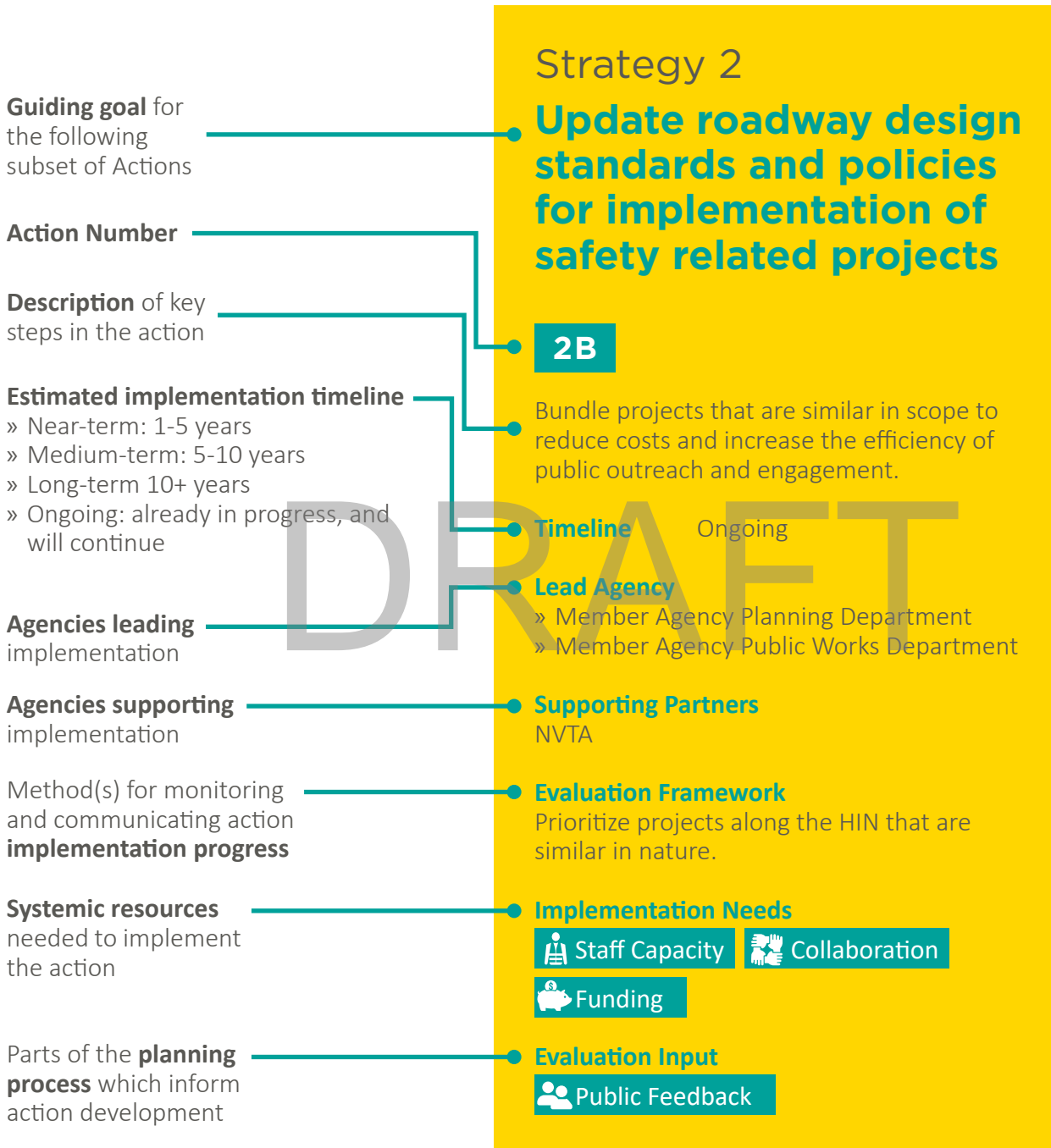
## Reaching Zero Traffic Deaths: A Vision Zero Action Plan

The NVTA Vision Zero Action Plan requires partnerships and collaboration across various jurisdictions, with local organizations, and with the community to be successful. Several strategies have been identified, along with the party/parties responsible for leading and supporting the action. A timeline for implementation is provided, as well as performance metrics. These actions should be periodically revisited, and actions that are successful may be expanded; actions that are not successful will be eliminated and replaced with other strategies. As conditions and strategies evolve, the strategies and supporting elements will evolve as well.

To promote an integrated approach for implementation, evaluation, and funding, the Action Plan is organized around the five Safe System elements: Safe Roads, Safe Road Users, Safe Speeds, Safe Vehicles, and Post-Crash Care. The recommendations included in each category may overlap between the elements; these overlaps create redundancy in the Plan approach and supports the goal of reaching zero deaths and serious injuries on roadways within Napa Valley.



## How to Read This Action Plan



# Safe Roads

Humans make mistakes, and we must design and operate roadways to accommodate these mistakes. A Safe System creates redundancy in the network to accommodate human mistakes and reduce the severity of crashes when they inevitably occur.

## Strategy 1

### Prioritize safety improvements on the HIN

#### 1A

Prioritize and implement safety treatments along the HIN that respond to the identified Emphasis Areas. Roadways with a similar typology should be identified for proactive and systemic improvements.

**Timeline** Near-term

**Lead Agency**

- » Member Agency Public Works Department

**Supporting Partners**

- » NVTA
- » Caltrans

**Evaluation Framework**

- » Near Term: Weave improvements into ongoing or planned projects
- » Mid Term: Identify funding to implement safety treatments

#### 1B

Reevaluate currently-funded general road projects and potentially reallocate funds to prioritize high priority locations identified in the Action Plan, adding safety improvements to project scopes.

**Timeline** Ongoing

**Lead Agency**

- » County Board of Supervisors
- » Member Agency Public Works Department
- » Member Agency Councils

**Supporting Partners**

- » NVTA

**Evaluation Framework**

Review current capital improvements plans and strategically develop future plans to create opportunities for safety improvements with typical CIP projects.

**Implementation Needs**

-  Staff Capacity
-  Collaboration
-  Funding

**Evaluation Input**

-  Emphasis Areas/HIN





## 1C

All projects should be designed to include separation of vulnerable road users in support of reduction in impact severity.

**Timeline** Ongoing

### Lead Agency

- » Member Agency Public Works Department
- » NVTA

### Evaluation Framework

Review all pipeline projects to include designs that separate vulnerable road users from vehicles. Implement a strategy for each agency to commit to a Safe System focused design review for each engineering project.

### Implementation Needs

-  Staff Capacity
-  Collaboration

### Evaluation Input

-  Policy Evaluation



# Safe Roads

## Strategy 2

### Update roadway design standards and policies for implementation of safety related projects

#### 2A

Implement quick build projects to gather community feedback.

**Timeline** Medium-term

#### Lead Agency

- » NVTA
- » Member agency Public Works Department

#### Evaluation Framework

- » Near-term: Review State Law and City codes to adopt policy around quick build projects.
- » Medium-term: Roll out of safety projects as quick builds to gather public and stakeholder feedback and make improvements and/or adjustments before a permanent project is put in place.

#### Implementation Needs

Staff Capacity
 Collaboration

Funding
 Legislation

#### Evaluation Input

Public Feedback

Emphasis Areas/HIN

#### 2B

Bundle projects that are similar in scope to reduce costs and increase the efficiency of public outreach and engagement.

**Timeline** Ongoing

#### Lead Agency

- » Member agency Planning Departments
- » Member agency Public Works Departments

#### Supporting Partners

- » NVTA

#### Evaluation Framework

Prioritize projects along the HIN that are similar in nature.

#### Implementation Needs

Staff Capacity
 Collaboration

Funding

#### Evaluation Input

Public Feedback



**2C**

Integrate safety projects into Public Works Department’s regular maintenance.

**Timeline** Ongoing

**Lead Agency**

Member agency Public Works Departments

**Supporting Partners**

» NVTA

**Evaluation Framework**

Create new standards for typical maintenance that reflect the Vision Zero goals.

**Implementation Needs**

 Staff Capacity

**Evaluation Input**

 Policy Evaluation

**2D**

Update roadway design standards to create flexibility and push innovation with a Safe System lens in mind.

**Timeline** Ongoing

**Lead Agency**

Member agency Public Works Departments

**Supporting Partners**

» NVTA

**Evaluation Framework**

- » Near-term: Use quick build projects to test and receive feedback on design standards.
- » Medium-term: Develop and adopt context-sensitive design guidance and standards.

**Implementation Needs**

 Staff Capacity

 Collaboration

**Evaluation Input**

 Public Feedback

 Emphasis Areas/HIN

 Policy Evaluation

DRAFT

# Safe Roads

## Strategy 2 Update roadway design standards and policies for implementation of safety-related projects

**2E**

Create an internal training program for engineering and planning staff to stay up to date on best practices in Vision Zero, Complete Streets, and Design Standards.

**Timeline** Medium-term

**Lead Agency**  
» NVTA

**Supporting Partners**  
Member agency Public Works Departments

**Evaluation Framework**  
Establish consistent and recurring trainings with people from each member agency to keep up to date on best practices.

**Implementation Needs**  
 Staff Capacity

**Evaluation Input**  
 Emphasis Areas/HIN

 Policy Evaluation

## Strategy 3 Improve roadway and street-scale lighting

**3A**

Develop a strategy to update roadway, intersection, and pedestrian crossing lights with high quality light sources (i.e. LED) while minimizing impacts.

**Timeline** Medium-term

**Lead Agency**  
» Member agency Public Works Departments

**Supporting Partners**  
» NVTA

**Evaluation Framework**  
Create new standards for typical maintenance that reflect the Vision Zero goals.

**Implementation Needs**  
 Staff Capacity  Collaboration  
 Funding

**Evaluation Input**  
 Public Feedback

 Emphasis Areas/HIN





## Strategy 4

# Enable coordination across agencies and departments for project prioritization, implementation, funding, and maintenance

### 4A

Coordinate quarterly meetings with member agencies to coordinate on federal, state, regional, and local funding opportunities.

**Timeline** Ongoing

#### Lead Agency

» NVTA

#### Supporting Partners

- » Member agency Public Works Departments
- » Member agency Planning Departments

#### Evaluate on Framework

Identify staff from Member Agencies to attend and execute quarterly meetings focused on safety funding opportunities.

#### Implementation Needs

- Staff Capacity
- Collaboration

#### Evaluation Input

- Public Feedback
- Emphasis Areas/HIN
- Policy Evaluation

### 4B

Prioritize safety criteria in local funding decision making process, consistent with federal, state, regional funding requirements.

**Timeline** Ongoing

#### Lead Agency

» NVTA

#### Supporting Partners

- » Member agency Public Works Departments
- » Member agency Planning Departments

#### Evaluation Framework

- » Near-term: Prepare Guidance on the decision-making process where projects located on the HIN or other safety enhancements can play a larger role in prioritization
- » Medium-term: Increase transparency and update data on the Data Dashboard regularly

#### Implementation Needs

- Staff Capacity

#### Evaluation Input

- Emphasis Areas/HIN
- Policy Evaluation

DRAFT



## Safe Road Users

Reducing fatalities and serious injuries means improved safety for all road users, or all ages and abilities. Recommendations for Safe Road Users include public education campaigns around traffic safety and integrating quick build projects into Regular Public Works Department maintenance or bundling projects across agencies to create a safer and cohesive network.

### Strategy 5

## Prioritize disadvantaged communities and people who have fewer mobility choices

#### 5A


Establish guidance around clearly designating established pedestrian priority areas or activity center with elements such as public art, benches, and shade.

**Timeline** Medium-term

**Lead Agency**  
» Economic Development Departments

**Supporting Partners**  
» Napa County Public Health Department

**Evaluat on Framework**  
Partner with community-based organizations (CBOs) and Public Health Department to identify pedestrian activity areas using crash data and typology. Work with local artists to create murals or installations.

**Implementation Needs**  
 Funding  
 Collaboration  
 Staff Capacity

**Evaluation Input**  
 Public Feedback

#### 5B

Develop a driver, bicyclist, and pedestrian safety campaign focused on those over the age of 60.

**Timeline** Medium-term

**Lead Agency**  
» Napa County Public Health Department

**Supporting Partners**  
» NVTA

**Evaluation Framework**  
Partner with community-based organizations (CBOs) focused on senior livability and identify Emphasis Areas.

**Implementation Needs**  
 Funding  
 Collaboration  
 Staff Capacity



## 5C

Develop an equity framework to guide and evaluate transportation planning and investments.

**Timeline** Near-term

### Lead Agency

» NVTA

### Supporting Partners

» Member agency Capital Improvement Groups

### Evaluation Framework

Create guidance or a framework to prioritize and evaluate impacts of transportation projects in disadvantaged communities.

### Implementation Needs

 Funding  Collaboration

 Staff Capacity

### Evaluation Input

 Policy Evaluation

DR





## Safe Road Users

### Strategy 6

## Engage people in disadvantaged communities in transportation planning

#### 6A

Develop an equitable engagement strategy for transportation safety-related projects that include multilingual options and consider cultural differences.

**Timeline** Near-term

#### Lead Agency

» NVTA

#### Supporting Partners

- » Member agency Public Works Departments
- » Member agency Planning Departments

#### Evaluation Framework

Create a plan that uses national examples of Vision Zero related equitable engagement strategies that includes types of outreach and thresholds for evaluation.

#### Implementation Needs

 Staff Capacity  Collaboration

#### Evacuation Input

 Public Feedback

#### 6B

Establish a Vision Zero Community Committee to support projects through all phases of development and build a trusted relationship with community leaders in disadvantaged communities.

**Timeline** Ongoing

#### Lead Agency

» NVTA

#### Supporting Partners

- » Member agency Public Works Departments
- » Member agency Planning Departments

#### Evaluation Framework

Establish clear and on-going communication with community leaders through a Committee (elected officials, member agency staff). Identify when the Committee meets (quarterly, bi-annually, etc.).

#### Implementation Needs

 Staff Capacity  Collaboration

#### Evacuation Input

 Public Feedback





## Strategy 7

### Educate all roadway users

#### 7A

Develop a Vision Zero educational campaign.

**Timeline** Near-term

#### Lead Agency

» NVTA

#### Supporting Partners

- » Member agency Public Works Departments
- » Member agency Planning Departments
- » Napa County Public Health Department

#### Evaluation Framework

Work to create an educational campaign with key stakeholders that target all audiences and educate all roadway users on the Safe System Approach and the goals and priorities of the Vision Zero Action Plan.

#### Implementation Needs

Funding Collaboration

Staff Capacity

#### Evaluation Input

Policy Evaluation

Public Feedback

#### 7B

Utilize the data dashboard and project website to provide bi-annual progress updates on Vision Zero safety implementation.

**Timeline** Ongoing

#### Lead Agency

» NVTA

#### Supporting Partners

- » Member agency Public Works Departments
- » Member agency Planning Departments

#### Evaluation Framework

Annual updates on Plan project implementation and crash data to provide transparency on progress.

#### Implementation Needs

Staff Capacity

#### Evaluation Input

Emphasis Areas/HIN

DRAFT



## Safe Road Users

### Strategy 8 Educate all roadway users

#### 8C

Establish a program led by the member agency police departments, using OTS funding as a source, to promote safe biking through educational campaigns and providing safety equipment (helmets, lights, etc.).

**Timeline** Medium-term

#### Lead Agency

- » NVTA
- » Member agency Police Departments
- » Napa County Bicycle Coalition

#### Evaluation Framework

Create safety education campaigns and identify where and how many people received safety equipment.

#### Implementation Needs

Staff Capacity Collaboration

#### 8E

Establish a Vision Zero Task Force responsible for implementing the multi-agency nature of the Action Plan.

**Timeline** Ongoing

#### Lead Agency

- » NVTA
- » Stakeholder and Technical Advisory Working Group

#### 8D

When completing an update for the Vision Zero Action Plan update, release the attitudinal survey to identify if community perceptions have changed.

**Timeline** Medium-term

#### Lead Agency

- » NVTA

#### Evaluation Framework

Develop an updated attitudinal survey to use community feedback as a metric on how safety has shifted in Napa Valley.

#### Implementation Needs

Staff Capacity Collaboration

#### Evaluation Input

Public Feedback

#### Evaluation Framework

Create a standing task force that meets quarterly focused on implementation and decision-making for projects and programs.

#### Implementation Needs

Staff Capacity Funding



**8F**

Develop a workshop for media outlets on how to best communicate traffic crashes and roadway safety to the public.

**Timeline** Medium-term

**Lead Agency**

» LEO

**Supporting Partners**

» Member agency Police Departments  
» California Highway Patrol (CHP)

**Evaluation Framework**

Develop a workshop for media outlets to attend annually that focuses on language around crashes and roadway safety.

**Implementation Needs**

Funding Collaboration

Staff Capacity

**Evaluation Input**

Policy Evaluation

Public Feedback

**8G**

Develop an education campaign targeting specific behaviors identified by the emphasis areas along the HIN.

**Timeline** Near-term

**Lead Agency**

» Member agency Police Departments  
» California Highway Patrol (CHP)

**Supporting Partners**

» NVTA

**Evaluation Framework**

Develop a targeted campaign around the emphasis areas through various promotional outlets.

**Implementation Needs**

Funding Collaboration

Staff Capacity

**Evaluation Input**

Public Feedback

Emphasis Areas/HIN





## Safe Road Users

### Strategy 9 Reduce DUI-related crashes

#### 9A

Work with local businesses to offer overnight parking around restaurants, bars, and entertainment venues.

**Timeline** Near-term

#### Lead Agency

» Member Agency Parking Enforcement

#### Supporting Partners

» Napa County Public Health Department  
» Local businesses

#### Evaluation Framework

Partner with local businesses to identify locations to allow vehicles to park overnight, focusing on areas with high DUI-related crashes.

#### Implementation Needs

Staff Capacity Collaboration

#### Evaluation Input

Public Feedback

Emphasis Areas/HIN

#### 9B

Create programs for additional transit service during holidays, festivals, large events, etc. that include promotional and proactive campaigns, schedules, and rates for fare purchases.

**Timeline** Near-term

#### Lead Agency

» NVTA (with Event Sponsorship)

#### Evaluation Framework

Identify events or times of year with highest rates of DUI-related collisions and offer free or subsidized transit fares, or partner with a private sponsor (e.g. event host, beverage company) to offer safe rides home.

#### Implementation Needs

Funding Collaboration

Staff Capacity

#### Evaluation Input

Public Feedback

Emphasis Areas/HIN



DRAMA





# Safe Speeds

Reducing speed in the presence of vulnerable users is a key Safe System strategy. Reducing speeds reduces the kinetic energy transfer between vehicles and the human body. It also provides additional time for drivers to react and improves visibility for vulnerable road users.

## Strategy 10

### Reduce speeds through policy and design

#### 10A

For members agencies that have not gone through the process in the last year, update traffic calming programs to prioritize the HIN.

**Timeline** Medium-term

**Lead Agency**

- » Member agency Public Works Departments
- » Member agency Planning Departments

**Evaluation Framework**

- » Identify and evaluate national best practices for traffic calming programs with a focus on Vision Zero cities
- » Reevaluate documentation around speed limit setting based on guidance from the latest CA MUTCD
- » Update the traffic calming program with a greater focus on proactive improvements

**Implementation Needs**

Staff Capacity

**Evaluation Input**

Public Feedback

Emphasis Areas/HIN

Policy Evaluation

#### 10B

In areas with high concentration of pedestrians, bicyclists, children, or elderly, prohibit right turn on red where feasible for additional safety or adjust signal phasing to accommodate right turn movements with other phases.

**Timeline** Medium-term

**Lead Agency**

- » Member agency Public Works Departments

**Evaluation Framework**

Prepare guidance and identify priority locations included on the HIN that would benefit from longer cycle lengths for vulnerable roadway users.

**Implementation Needs**

Staff Capacity

**Evaluation Input**

Public Feedback

Emphasis Areas/HIN

Policy Evaluation





## 10C

As part of the Design Standards update in the Safe Roads Strategy 2, include countermeasures and best practices for speed management.

**Timeline** Medium-term

### Lead Agency

- » Member agency Public Works Departments
- » Member agency Planning Departments
- » Caltrans

### Evaluation Framework

Develop context-sensitive design guidance and standards to include in an agency's Design Standards.

### Implementation Needs

Staff Capacity

### Evaluation Input

Public Feedback

Emphasis Areas/HIN

Policy Evaluation

## 10D

Reevaluate speed limits along the HIN to determine if any are candidates for speed limit reductions based on the updated CA MUTCD.

**Timeline** Near-term

### Lead Agency

- » Member agency Public Works Departments
- » Caltrans

### Evaluation Framework

Each member agency completes an Engineering and Traffic Survey for roadways located on the HIN to determine if speed reduction is warranted.

### Implementation Needs

Staff Capacity

Collaboration

### Evaluation Input

Public Feedback

Emphasis Areas/HIN

## 10E

Roll out Valley-wide engineering strategy that changes the roadway landscape to intentionally slow or manage vehicle speeds.

**Timeline** Medium-term

### Lead Agency

- » NVTA Technical Advisory Committee

### Supporting Partners

Member agency Public Works Departments

### Evaluation Framework

Develop a strategy with member agency support to identify where it's feasible to implement roundabouts, road diets, signal progression, etc. Strategy may have phases, where quick build occurs prior to full buildout.



# Safe Speeds

## Strategy 11 Rethinking enforcement

### 11A

Support legislation to allow the use of speed safety cameras to allow for more equitable enforcement.

**Timeline** Ongoing

#### Lead Agency

- » NVTA
- » Member agency Planning Departments

#### Evaluation Framework

Monitor and participate in lobbying efforts in support of speed safety cameras in California.

#### Implementation Needs

- Staff Capacity
- Collaboration
- Legislation
- Evaluation Input**
- Policy Evaluation
- Emphasis Areas/HIN

### 11B

Increase the use of speed feedback signs along HIN corridors and have an accompanying plan for maintenance of signs.

**Timeline** Near-term

#### Lead Agency

- » Member agency Public Works Departments

#### Evaluation Framework

Prioritize roadways along the HIN with speed-related concerns or are designed to accommodate higher speeds.

#### Implementation Needs

- Funding
- Staff Capacity
- Evaluation Input**
- Public Feedback
- Emphasis Areas/HIN





## 11C

Identify equitable fine structures for minor traffic infractions with an identified and agreed upon baseline for all Napa Valley Agencies.

**Timeline** Medium-term

### Lead Agency

- » CHP
- » Member agency Planning Departments

### Evaluation Framework

Evaluate national programs that focus on equitable fine structures and/or establish policies that replaces fines with community service, driver education, etc.

### Implementation Needs

 Staff Capacity  Collaboration

 Funding

### Evaluation Input

 Policy Evaluation



## Safe Vehicles

Vehicle technology is constantly evolving and improving. NVTA and Member Agencies can continue to monitor latest regulations around vehicle design, and create policies around vehicles to minimize severity of crashes and incorporate safety measures using the latest technologies. Recommendations also include incorporating safety devices into the NVTA’s transit fleets.

### Strategy 12 Improve Safety Technology on Public-Owned Vehicle Fleets

Create a plan that identifies how NVTA will continue to monitor and employ safe technology such as Mobileye. Mobileye incorporates comprehensive real-time visual and audible warning and alerts through a single forward-facing vision sensor.

**Timeline** Medium-term

**Lead Agency**  
» Member agencies with large fleet vehicles

**Evaluation Framework** Annually monitor near-miss or collision incidents. Identify baseline and if incidents increase, Vision Zero Committee should identify strategies to reduce incidents.

**Implementation Needs**  
 Staff Capacity  Collaboration  
 Funding  Legislation

**Evaluation Input**  
 Policy Evaluation

### Strategy 13 Explore Partnerships with Microtransit Service Providers

Continue partnerships with micro transit service providers to enable alternative safe modes of travel for late night events or special event services.

**Timeline** Medium-term

**Lead Agency**  
» NVTA

**Evaluation Framework**  
Identify partnerships and identify funding for micro transit service providers. Ridership details from these company show an increase in person use.

**Implementation Needs**  
 Staff Capacity  Collaboration  
 Funding

**Evaluation Input**  
 Policy Evaluation

DRAFT



## Post Crash Care

Post-Crash Care is more than just medical care. It also includes the training of personnel, design of emergency vehicles and roadway infrastructure, reviewing crash data, and providing additional resources to victims and their families.

### Strategy 14

## Identify opportunities for data-driven transparency, and accountability.

#### 14A

Conduct and prepare an annual crash analysis, and periodically update the HIN and Action Plan.

##### Timeline

Ongoing

- » Member Agency Planning Department



##### Evaluation Framework

Annual updates should include crash profiles and comparison of various time periods to better identify trends and progress toward Vision Zero. Analysis should layer available demographic and environmental justice data. Update to the HIN should reflect progress being made to develop new strategies if current actions are not achieving the desired results.

##### Implementation Needs

-  Staff Capacity
-  Collaboration

##### Evaluation Input

-  Public Feedback
-  Emphasis Areas/HIN

#### 14B

Leverage technology to better understand core collision factors and surrogate safety measures.

##### Timeline

Near-term

##### Lead Agency

- » NVTA
- Supporting Partners**
- » Member agency Public Works Departments
- » Member agency Planning Department

##### Evaluation Framework

NVTA identify ways to incorporate and maintain a database for data collection of automated speed data, near-miss analysis, hard breaking hot spots, and hazard/community feedback.

##### Implementation Needs

-  Staff Capacity
-  Collaboration

##### Evaluation Input

-  Public Feedback



## 14C

Maintain the Data Dashboard for increased transparency of crash data and findings

**Timeline** Near-term

**Lead Agency**

» NVTA

**Evaluation Framework**

Identify who/what department is responsible for maintaining the Data Dashboard and prepare annual updates to track progress.

**Implementation Needs**

- Staff Capacity
- Collaboration

**Evaluation Input**

- Policy Evaluation
- Public Feedback

# DR



# **NVTA VISION ZERO**

**DRAFT**

# Appendix A

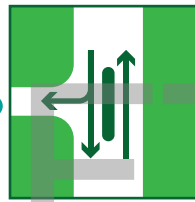
## Engineering Countermeasures Toolbox

The following appendix presents a set of candidate tools for improving transportation safety in Napa Valley. Many of these countermeasures are recommended for the ten collision profiles of emphasis included in this report. Most of the countermeasures are included in the 2020 Caltrans Local Roadway Safety Manual (LRSM) and can be advantageous for use in Caltrans Highway Safety Improvement Program (HSIP) grant funding applications. There are many effective safety countermeasures beyond those listed in the LRSM, and several are included in this toolbox.

### What You'll See in This Toolbox

Countermeasure Category —● **Intersections & Roadways**

Countermeasure Icon



Countermeasure Title

—● **Median Barrier**

Countermeasure Description

—● Barrier in the center of the roadway that physically separates opposing vehicular traffic. Median barriers can also help control access to and from side streets and driveways, reducing conflict points.

Countermeasure cost and the availability of low cost/quick build alternatives

—● **Cost**

**\$\$\$**

*Low Cost / Quick Build alternative available*

Countermeasure code in LRSM (if applicable)

—● **LRSM ID**

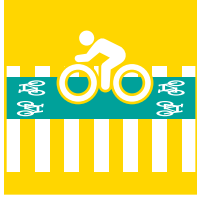
**R03**

Additional reference information (if applicable)

—● **Other Reference Information**

FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads

## BIKEWAYS

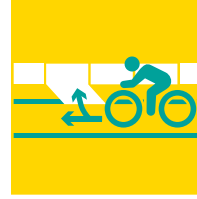


### Bicycle Crossing (Solid Green Paint)

Solid green paint across an intersection that signifies the path of the bicycle crossing. Increases visibility and safety of bicyclists traveling through an intersection.

**Cost**      **\$**  
*Low Cost / Quick Build  
alternative available*

## BIKEWAYS



### Bicycle Ramp

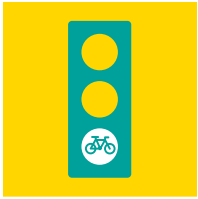
Connects bicyclists from the road to the sidewalk or a shared use path.

**Cost**      **\$**

DRAFT



**BIKEWAYS**

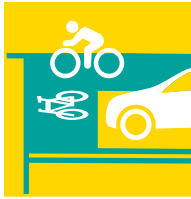


**Bicycle Signal/  
Exclusive Bike Phase**

A traffic signal directing bicycle traffic across an intersection. Separates bicycle movements from conflicting motor vehicle, bus, transit, rail, or pedestrian movements. May be applicable for Class IV facilities when the bikeway is brought up to the intersection.

**Cost**      **\$\$\$**

**BIKEWAYS**



**Bike Box**

A designated area at the head of a traffic lane at a signalized intersection that provides bicyclists with a safe and visible way to get ahead of queuing traffic during the red signal phase.

**Cost**      **\$**  
*Low Cost / Quick Build  
alternative available*

**LRSM ID**      **S20PB**

DRAFT

## BIKEWAYS



### Bike Detection

Bike detection is used at signalized intersections, either through use of push-buttons, in-pavement loops, or by video or infrared cameras, to call a green light for bicyclists and reduce delay for bicycle travel. Discourages red light running by bicyclists and increases convenience of bicycling.

Cost

\$\$

## BIKEWAYS



### Bike-Friendly Drain

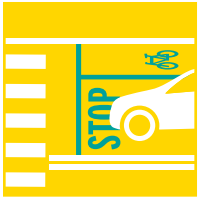
Bike friendly drains avoid placing grating in the right-of-way that may pose a hazard to bicyclists by increasing their risk of falling.

Cost

\$\$

DRAFT

## BIKEWAYS



### Bike Lane

A bike lane provides dedicated street space, typically adjacent to outer vehicle travel lanes, with designated lane markings, pavement legends, and signage. Bike lanes improve safety by reducing conflicts between bicycles and vehicles on the road and by creating a road-narrowing effect with buffers or vertical barriers, which may reduce vehicle speeds.

Cost

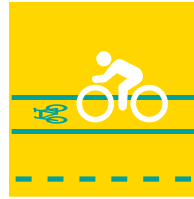
**\$\$**

*Low Cost / Quick Build alternative available*

LRSM ID

**R32PB**

## BIKEWAYS



### Extend Bike Lane to Intersection

In locations where a bike lane is dropped due to the addition of a right turn pocket, the intersection approach may be restriped to allow for bicyclists to move to the left side of right turning vehicles ahead of reaching the intersection.

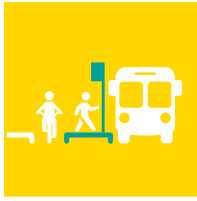
Cost

**\$**

*Low Cost / Quick Build alternative available*

DRAFT

## BIKEWAYS



### Floating Transit Island

An in-street transit boarding island is used in conjunction with a Class IV bike facility, separating transit traffic from bicycle traffic, reducing conflict between the two modes, and lowering the risk of collision.

Cost

**\$\$**

*Low Cost / Quick Build alternative available*

## BIKEWAYS



### Green Conflict Striping

Green conflict striping is green markings painted in a dashed pattern on bike lanes approaching an intersection and/or going through an intersection. Green conflict striping improves safety by increasing the visibility bicyclists and identifying potential conflict points so bicyclists and motorists use caution when traveling toward and through an intersection.

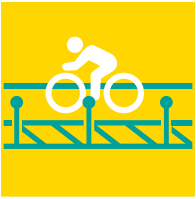
Cost

**\$**

*Low Cost / Quick Build alternative available*

DRAFT

**BIKEWAYS**



**Separated Bikeway**

A separated bikeway provides dedicated street space, typically adjacent to outer vehicle travel lanes, with physical vertical separation from vehicle traffic, designated lane markings, pavement legends, and signage. Physical separation may consist of plastic posts, parked vehicles, or a curb. Separated bikeways improve safety by reducing conflicts between bicycles and vehicles on the road and by creating a road-narrowing effect with buffers or vertical barriers, which may reduce vehicle speeds. A raised barrier of plastic posts and painted pavement is a low-cost/quick build option.

**Cost**

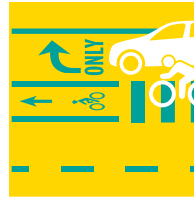
**\$\$\$**

*Low Cost / Quick Build alternative available*

**LRSM ID**

**R33PB**

**BIKEWAYS**



**Mixing Zone**

Places a suggested bike lane within the inside portion of a dedicated motor vehicle turn lane. Lane markings delineate space for bicyclists and motorists within the same lane and indicate the intended path for bicyclists to reduce conflict with turning motor vehicles.

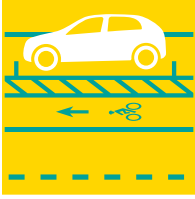
**Cost**

**\$**

*Low Cost / Quick Build alternative available*

DRAFT

## BIKEWAYS



### Parking Buffer

Pavement markings denoting door zone of parked vehicles to help bicyclists maintain safe positioning on the roadway

**Cost**

**\$**

*Low Cost / Quick Build  
alternative available*

## BIKEWAYS



### Shared Sidewalk Sign

Signs communicate to pedestrians that bicyclists may also use the sidewalk and that bicyclists must yield to pedestrians.

**Cost**

**\$**

*Low Cost / Quick Build  
alternative available*

DRAFT

**BIKEWAYS**



**Two-Stage Turn Queue Bike Box**

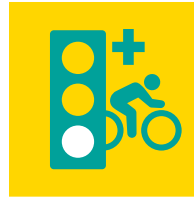
This roadway treatment provides bicyclists with a means of safely making a left turn at a multi-lane signalized intersection from a bike lane or cycle track on the far right side of the roadway. In this way, bicyclists are protected from the flow of traffic while waiting to turn. Usage could be mirrored for right-turns from a one-way street with a left-side bikeway.

**Cost**

**\$**

*Low Cost / Quick Build alternative available*

**BIKEWAYS**



**Extend Green Time For Bikes**

Prolongs the green phase when bicyclists are present to provide additional time for bicyclists to clear the intersection. Can occur automatically in the signal phasing or when prompted with bicycle detection. Topography should be considered in clearance time.

**Cost**

**\$**

**LRSM ID**

**S03**

DRAFT

## BIKEWAYS



### Bicycles May Use Full Lane Sign

A sign placed on roads with lanes that are too narrow to allow safe side-by-side passing to indicate that bicyclists may occupy the full lane. This discourages unsafe passing by motorists.

Cost

\$

*Low Cost / Quick Build alternative available*

## INTERSECTIONS & ROADWAYS



### Rumble Strips

Rumble strips create noise and vibration inside the vehicle that alert a driver as they cross the center or edge line. Often this alert is strong enough to get the attention of a distracted or drowsy driver, who can quickly make a corrective steering action to return to the roadway safely. Rumble strips also alert drivers to the lane limits when conditions such as rain, fog, snow, or dust reduce driver visibility.

DRAFT Cost \$  
LRSM ID R30/R31

#### Other Reference Information

FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads



## INTERSECTIONS & ROADWAYS



### All-Way Stop Control

An all-way stop-controlled intersection requires all vehicles to stop before crossing the intersection. An all-way stop controlled intersection improves safety by removing the need for motorists, bicyclists, and pedestrians on a side-street stop-controlled intersection to cross free-flowing lanes of traffic, which reduces the risk of collision. An “ALL WAY” sign should be placed under the octagonal stop sign at all-way stop-controlled intersections as required by the California Manual on Uniform Traffic Control Devices (MUTCD).

**Cost**      **\$**

**LRSM ID**      **NS02**

## INTERSECTIONS & ROADWAYS



### Centerline Hardening

Centerline hardening is a technique to make intersections safer for pedestrians by encouraging drivers to make left turns at slower speeds.

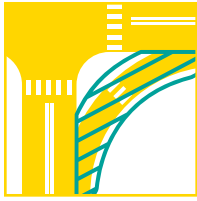
**Cost**

**\$**

*Low Cost / Quick Build  
alternative available*

DRAFT

## INTERSECTIONS & ROADWAYS



### Close Slip Lane

Modifies the corner of an intersection to remove the sweeping right turn lane for vehicles provided truck and bus movements can still be made. Results in shorter crossings for pedestrians, reduced speed for turning vehicles, better sight lines, and space for landscaping and other amenities.

Cost **\$\$\$**

## INTERSECTIONS & ROADWAYS



### Directional Median Openings to Restrict Left Turns

A directional median opening restricts specific turning movements, such as allowing a left-turn from a major street but not from a minor street. A directional median opening to restrict left turn improves safety by reducing the number of conflict points.

Cost **\$\$**  
*Low Cost / Quick Build alternative available*  
LRSM ID **S14**

DRAFT

#### Other Reference Information

FHWA Pedestrian Safety Guide and Countermeasure Selection System.  
[http://www.pedbikesafe.org/PEDSAFE/countermeasures\\_detail.cfm?CM\\_NUM=24](http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=24)

## INTERSECTIONS & ROADWAYS



### Improved Pavement Friction

A roadway must have an appropriate level of pavement friction to ensure that drivers are able to keep their vehicles safely in the lane. Poor pavement conditions, especially wet pavement, have been identified as one of the major contributing factors in roadway departure crashes. When a pavement surface is wet, the level of pavement friction is reduced, and this may lead to skidding or hydroplaning. Pavement friction is critical for changing vehicle direction and ensuring the vehicle remains in its lane. Traditional friction courses or high friction surface treatments should be considered for curves with numerous wet weather crashes or severe curves with higher operating speeds.

**Cost**      **\$\$**

**LRSM ID**      **R21**

#### Other Reference Information

FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads

## INTERSECTIONS & ROADWAYS



### Safety Edge

When a vehicle leaves the traveled way and encounters a pavement-shoulder drop-off, it can be difficult for the driver to return safely to the roadway. A safety edge is a treatment intended to minimize drop-off-related crashes. With this treatment, the shoulder pavement edge is sloped at an angle (30-35 degrees) to make it easier for a driver to safely reenter the roadway after inadvertently driving onto the shoulder. This treatment is designed to be a standard policy for any overlay project.

**Cost**      **\$**

#### Other Reference Information

FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads

## INTERSECTIONS & ROADWAYS



### Guardrail

Guardrail redirects a vehicle away from embankment slopes or fixed objects and dissipates the energy of an errant vehicle. Guardrail is installed to reduce the severity of lane departure crashes. However, guardrail can reduce crash severity only for those conditions where striking the guardrail is less severe than going down an embankment or striking a fixed object.

Cost

\$\$

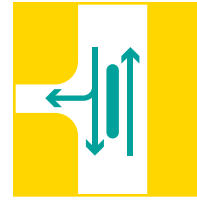
LRSM ID

R04

#### Other Reference Information

FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads

## INTERSECTIONS & ROADWAYS



### Median Barrier

Barrier in the center of the roadway that physically separates opposing vehicular traffic. Median barriers can also help control access to and from side streets and driveways, reducing conflict points.

Cost

\$\$\$

*Low Cost / Quick Build alternative available*

LRSM ID

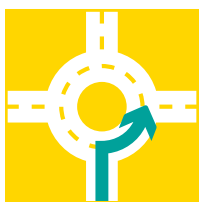
R03

#### Other Reference Information

FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads

DRAFT

## INTERSECTIONS & ROADWAYS



### Roundabout

A roundabout is a type of circular intersection in which road traffic is permitted to flow in one direction around a central island, and priority is typically given to traffic already in the junction. The types of conflicts that occur at roundabouts are different from those occurring at conventional intersections; namely, conflicts from crossing and left-turn movements are not present in a roundabout. The geometry of a roundabout forces drivers to reduce speeds as they proceed through the intersection; the range of vehicle speeds is also narrowed, reducing the severity of crashes when they do occur. Pedestrians only have to cross one direction of traffic at a time at roundabouts, thus reducing the potential for vehicle/pedestrian conflicts.

#### Cost

**\$\$\$**

*Low Cost / Quick Build  
alternative available*

#### LRSM ID

**S16/NS04**

## INTERSECTIONS & ROADWAYS



### Signal

Traffic signals at intersections control the flow of traffic. Traffic signals have the potential to reduce the most severe type crashes but will likely cause an increase in rear-end collisions. A reduction in overall injury severity is likely the largest benefit of traffic signal installation.

#### Cost

**\$\$\$**

#### LRSM ID

**NS03**

#### Other Reference Information

Currently the CMF Clearinghouse has only one reference for ped/vehicle collisions which indicates an increase in crash likelihood. However, a majority of references for all crash types show a decrease in collisions. See additional reference: FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads

## INTERSECTIONS & ROADWAYS



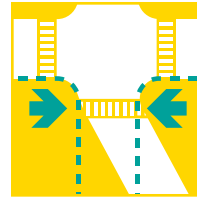
### Superelevation at Horizontal Curve Locations

Superelevation is the rotation of the pavement on the approach to and through a horizontal curve and is intended to assist the driver in negotiating the curve by counteracting the lateral acceleration produced by tracking. In other words, the road is designed so that the pavement rises as it curves, offsetting the horizontal sideways momentum of the approaching vehicle.

Cost

\$\$

## INTERSECTIONS & ROADWAYS



### Intersection Reconstruction and Tightening

Irregular intersections can be overbuilt and confusing, presenting safety hazards to all users. “Squaring up” an intersection as close to 90 degrees as possible involves intersection reconstruction to provide better visibility for all road users, also reducing high speed turns and reducing pedestrian crossing length.

Cost

\$\$\$

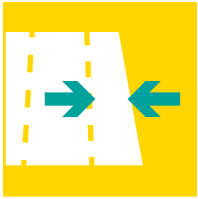
*Low Cost / Quick Build alternative available*

DRAFT

#### Other Reference Information

FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads

## INTERSECTIONS & ROADWAYS

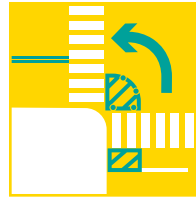


### Lane Narrowing

Lane narrowing reduces lane widths to encourage motorists to travel at slower speeds. Lane Narrowing improves safety by lowering the risk of collision among bicyclists, pedestrians, and other motorists.

Cost      \$

## INTERSECTIONS & ROADWAYS



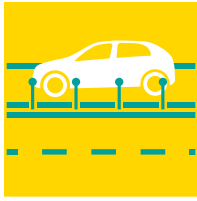
### Left Turn Enhanced Daylighting/Slow Turn Wedge

Uses paint and bollards to extend the curb and slow left turns at intersections of one-way to one-way or two-way streets. Widening the turning radii of left-turning vehicles expands the field of vision for drivers and increases the visibility of pedestrians.

Cost      \$  
*Low Cost / Quick Build alternative available*

DRAFT

## INTERSECTIONS & ROADWAYS



### Paint and Plastic Median

A painted median with plastic posts between the two directions of travel. Reduces vehicular speeding and discourages risky turning movements, increasing pedestrian safety.

**Cost**

**\$**

*Low Cost / Quick Build  
alternative available*

## INTERSECTIONS & ROADWAYS



### Paint and Plastic Mini Circle

Mini circles use paint and soft hit posts to replace stop-controlled intersections with a circular design that slows traffic and eliminates left turns, also reducing conflict points with pedestrians. Also helps traffic flow more efficiently.

**Cost**

**\$**

*Low Cost / Quick Build  
alternative available*

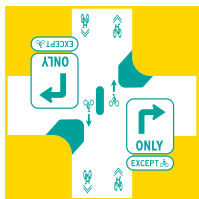
DRAFT

#### Other Reference Information

FHWA Pedestrian Safety Guide and Countermeasure Selection System.  
[http://www.pedbikesafe.org/PEDSAFE/countermeasures\\_detail.cfm?CM\\_NUM=34](http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=34)



## INTERSECTIONS & ROADWAYS



### Partial Closure/ Diverter

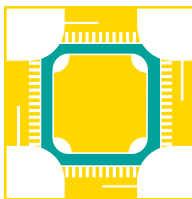
A roadway treatment that restricts through vehicle movements using physical diversion while allowing bicyclists and pedestrians to proceed through an intersection in all directions.

Cost

\$

*Low Cost / Quick Build  
alternative available*

## INTERSECTIONS & ROADWAYS



### Protected Intersection

Protected intersections use corner islands, curb extensions, and colored paint to delineate bicycle and pedestrian movements across an intersection. Slower driving speeds and shorter crossing distance increase safety for pedestrians. Separates bicycles from pedestrians. Implement only if emergency vehicles, buses, and trucks can still make needed turning movements.

Cost

\$\$\$

*Low Cost / Quick Build  
alternative available*

DRAFT

#### Other Reference Information

Evolution of the Protected Intersection, Alta Planning and Design, December 2015. [https://altaplanning.com/wp-content/uploads/Evolution-of-the-Protected-Intersection\\_ALTA-2015.pdf](https://altaplanning.com/wp-content/uploads/Evolution-of-the-Protected-Intersection_ALTA-2015.pdf)

## INTERSECTIONS & ROADWAYS



### Raised Crosswalk

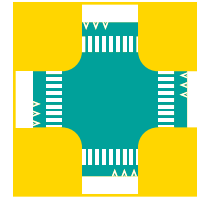
A Raised Crosswalk is a pedestrian crosswalk that is typically elevated 3-6 inches above the road or at sidewalk level. A Raised Crosswalk improves safety by increasing crosswalk and pedestrian visibility and slowing down motorists.

**Cost**            **\$\$**

**LRSM ID**        **R36PB**

DRAFT

## INTERSECTIONS & ROADWAYS



### Raised Intersection

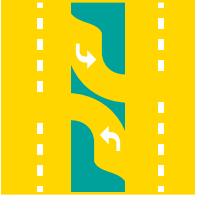
Elevates the intersection to bring vehicles to the sidewalk level. Serves as a traffic calming measure by extending the sidewalk context across the road.

**Cost**            **\$\$\$**

#### Other Reference Information

Note: some studies in CMF Clearinghouse show an increase in crashes. See additional source below showing decrease. (1) Perkins+Will Consultant Team. "Pedestrians at Multi-Modal Intersections." Better Market Street Existing Conditions & Best Practices, Part Two: Best Practices 36-58, City & County of San Francisco, San Francisco. <http://www.bettermarketstreetsf.org/about-reports-existing-conditions.html> (2) Bhatt, Shailen, Natalie Barnhart, Mark Luszcz, Tom Meyer, & Michael Sommers. "Delaware Traffic Calming Design Manual." Delaware Department of Transportation, State of Delaware, Dover, DE. [https://nacto.org/wp-content/uploads/2015/04/DE-Trafc-Calming-Manual\\_2012.pdf](https://nacto.org/wp-content/uploads/2015/04/DE-Trafc-Calming-Manual_2012.pdf) (3) King, Michael R, Jon A Carnegie, and Reid Ewing. "Pedestrian Safety through a Raised Median and Redesigned Intersections." Journal of the Transportation Research Board 1828 (1), 56-66, Transportation Research Board, Washington, DC. <https://trid.trb.org/view/663867> (4) Fitzpatrick, Kay, Mark D Wooldridge, and Joseph D Blaschke. "Urban Intersection Design Guide: Volume 1—Guidelines." Texas Transportation Institute, Texas A&M University System, Texas Department of Transportation, Austin, TX. <https://static.tti.tamu.edu/tti.tamu.edu/documents/0-4365-P2.pdf>

## INTERSECTIONS & ROADWAYS



### Raised Median

Curbed sections in the center of the roadway that are physically separated from vehicular traffic. Raised medians can also help control access to and from side streets and driveways, reducing conflict points.

**Cost**                **\$\$**  
*Low Cost / Quick Build  
 alternative available*

**LRSM ID**        **S12/NS14/R08**

## INTERSECTIONS & ROADWAYS



### Refuge Island

A Raised Median, or Refuge Island, is a raised barrier in the center of the roadway that can restrict certain turning movements and provide a place for pedestrians to wait if they are unable to finish crossing the intersection. A Raised Median improves safety by reducing the number of potential conflict points with designated zones for vehicles to turn, and a pedestrian refuge island improves safety by reducing the exposure time for pedestrians crossing the intersection. Pedestrian refuge areas constructed from paint and plastic may be implemented as part of a low-cost/quick build project.

**Cost**                **\$\$**  
*Low Cost / Quick Build  
 alternative available*

**LRSM ID**        **NS19PB**

## INTERSECTIONS & ROADWAYS



### Reduced Left-Turn Conflict Intersection

Geometric designs that alter how left-turn movements occur can simplify decisions and minimize the potential for related crashes. Two highly effective designs that rely on U-turns to complete certain left-turn movements are known as the restricted crossing U-turn (RCUT) and the median U-turn (MUT).

Cost

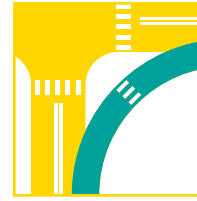
\$\$\$

LRSM ID

NS16

DRAFT

## INTERSECTIONS & ROADWAYS



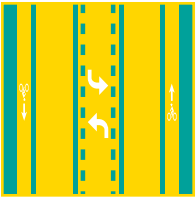
### Right Turn Slip Lane

A right turn slip lane is a traffic lane provided at an intersection to allow vehicles to turn right without actually entering it and interfering with through traffic. Where the main intersection is controlled by traffic signals, a slip lane is often controlled by yield or stop sign.

Cost

\$\$\$

## INTERSECTIONS & ROADWAYS



### Road Diet

A Road Diet exchanges roadway space dedicated to vehicle travel lanes to create room for bicycle facilities, wider sidewalks, or center turn lanes. A Road Diet improves safety by reducing vehicle speeds and creating designated space for all road users.

**Cost**      **\$\$**  
*Low Cost / Quick Build  
 alternative available*

**LRSM ID**      **R14**

## INTERSECTIONS & ROADWAYS



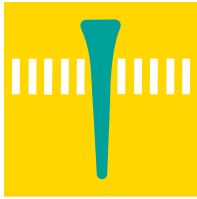
### Speed Table

These traffic calming devices use vertical deflection to raise the entire wheelbase of a vehicle and encourage motorists to travel at slower speeds to avoid damage to the undercarriage of an automobile while allowing safety vehicles with larger wheelbases through without damage or slowing response time.

**Cost**      **\$**

DRAFT

## INTERSECTIONS & ROADWAYS



### Splitter Island

A raised area that separates the two directions of travel on the minor street approach at an unsignalized intersection or roundabout. Helps channelize traffic in opposing directions of travel. Typically installed at skewed intersections or where speeds on minor roads are high. Provides a refuge for pedestrians.

Cost

**\$\$**

*Low Cost / Quick Build  
alternative available*

LRSM ID

**NS13**

DRAFT

## INTERSECTIONS & ROADWAYS



### Straighten Crosswalk

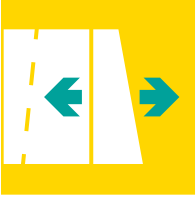
Straightening crosswalks improves sight lines, making pedestrians more visible to oncoming drivers, and may shorten the crossing distance, reducing the length of time required for pedestrians to cross an intersection.

Cost

**\$\$**

*Low Cost / Quick Build  
alternative available*

## INTERSECTIONS & ROADWAYS



### Widen/Pave Shoulder

Widened and paved shoulders, which may also include flattening the slopes along the sides of the roadway, create a separated space for bicyclists and also provide motor vehicle safety benefits, such as space for inoperable vehicles to pull out of the travel lane. The addition of a paved shoulder to an existing road can help to reduce run-off-road crashes. Benefits can be realized for high risk rural roads without paved shoulders, regardless of existing lane pavement width. Adding paved shoulders within horizontal curve sections may help agencies maximize benefits of the treatment while minimizing costs as opposed to adding paved shoulders to an entire corridor.

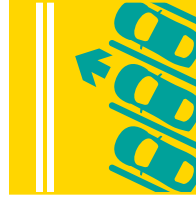
**Cost**      **\$\$**

**LRSM ID**      **R15**

#### Other Reference Information

FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads

## OTHER



### Back-In Angled Parking

Back-In Angled Parking requires motorists to back into an angled on-street parking spot and to drive forward when exiting a parking spot. Back-in angled parking improves safety by increasing visibility of passing vehicles and bicycles while exiting a spot, particularly if large adjacent vehicles obstruct sight, and allows trunk unloading to happen on the curb instead of in the street.

**Cost**

**\$**

*Low Cost / Quick Build alternative available*

DRAFT

**OTHER**



## Access Management/ Close Driveway

Vehicles entering and exiting driveways may conflict with pedestrians and with vehicles on the main road, especially at driveways within 250 feet of intersections. Closing driveways near intersections with high collision rates related to driveways may reduce potential conflicts.

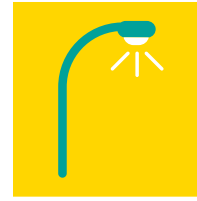
Cost      **\$\$**

DRAFT

### Other Reference Information

The CMF Clearinghouse has limited research related to vehicle/pedestrian crashes. See additional reference: FHWA Pedestrian Safety Guide and Countermeasure Selection System. [http://www.pedbikesafe.org/PEDSAFE/countermeasures\\_detail.cfm?CM\\_NUM=20](http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=20)

**OTHER**



## Intersection Lighting

Lighting is added at an intersection. Adding intersection and/or pedestrian-scale lighting at intersections improves safety by increasing visibility of all road users. This countermeasure is most effective at reducing or preventing collisions at intersections at night.

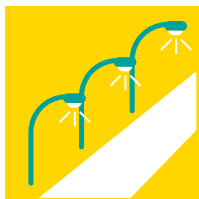
Cost      **\$\$**

LRSM ID      NS01

### Other Reference Information

Pedestrian-Level Lighting: FHWA Pedestrian Safety Guide and Countermeasure Selection System. [http://www.pedbikesafe.org/PEDSAFE/countermeasures\\_detail.cfm?CM\\_NUM=8](http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=8)



**OTHER****Segment Lighting**

Providing roadway lighting improves safety during nighttime conditions by increasing driver awareness, increasing sight distance, and improving visibility of pedestrians and bicyclists.

**Cost**            **\$\$**

**LRSM ID**        **R01**

**OTHER****Create or Increase Clear Zone**

A clear zone is an unobstructed, traversable roadside area that allows a driver to stop safely or regain control of a vehicle that has left the roadway. The width of the clear zone should be based on risk (also called exposure). Key factors in assessing risk include traffic volumes, speeds, and slopes. Clear roadsides reduce risk from fixed objects (such as utility poles) as well as terrain that may increase the likelihood of a rollover. Creating or increasing clear zones within horizontal curve sections may help agencies maximize benefits of the treatment while minimizing costs, as opposed to providing a clear zone throughout an entire corridor.

**Cost**            **\$\$**

**Other Reference Information**

FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads

**OTHER**



## Curbside Management

Curbside management can better prioritize reliable transit and safe bicycling infrastructure, freight deliveries, passenger pick-ups/drop-offs, green stormwater infrastructure, public spaces, and parking management for safer functionality for all users at the curb.

Cost

\$

**OTHER**



## Far-Side Bus Stop

Far-side bus stops are located immediately after an intersection, allowing the bus to pass through the intersection before stopping for passenger loading and unloading. Far-side stops encourage pedestrians to cross behind the bus for greater visibility and can improve transit service reliability.

Cost

\$

DRAFT

**OTHER**



## Delineators, Reflectors, and/or Object Markers

Delineators, reflectors and/or object markers are intended to warn drivers of an approaching curve or fixed object that cannot easily be removed. They are generally less costly than Chevron Signs as they don't require posts to place along the roadside, avoiding an additional object with which an errant vehicle can crash into.

**Cost**

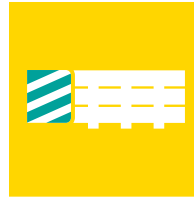
**\$**

*Low Cost / Quick Build alternative available*

**LRSM ID**

**R27**

**OTHER**



## Impact Attenuators

Impact attenuators bring an errant vehicle to a more-controlled stop or redirect the vehicle away from a rigid object. Impact attenuators are typically used to shield rigid roadside objects such as concrete barrier ends, steel guardrail ends and bridge pillars from oncoming automobiles. Attenuators should only be installed where it is impractical for the objects to be removed.

**Cost**

**\$\$**

**LRSM ID**

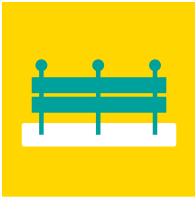
**R05**

DRAFT

**Other Reference Information**

FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads

**OTHER**



## Median Guardrail

The installation of median guardrail is most suitable for use in traversable medians having no or little change in grade and cross slope. While these systems may not reduce the frequency of crashes due to roadway departure, they can help prevent a lane-departure crash from becoming a head-on collision.

Cost

\$\$

**OTHER**



## Speed Limit Reduction

Setting speed limits to reflect the surrounding context of the roadway and that meet with driver expectations can help improve driver respect for speed limits. Speed limits that appear inconsistent may be ignored by the majority of drivers and this may contribute to lack of respect for speed limit and other traffic laws.

Cost

\$

DRAFT

### Other Reference Information

TRB Study on Setting Speed Limits; also Richard, C. M., Magee, K., Bacon-Abdelmoteleb, P., & Brown, J. L. (2018, April). Countermeasures that work: A highway safety countermeasure guide for State Highway Safety Offices, Ninth edition (Report No. DOT HS 812 478). Washington, DC: National Highway Traffic Safety Administration.

**OTHER**



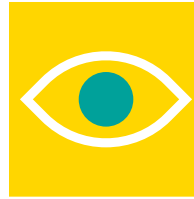
**Relocate Select Hazardous Utility Poles**

Relocating or removing utility poles from within the clear zone alleviates the potential for fixed-object crashes. If utility poles cannot be completely eliminated from within the clear zone, efforts can be made to either relocate the poles to a greater offset from the road or delineated.

**Cost**

**\$\$\$**

**OTHER**



**Remove Obstructions For Sightlines**

Remove objects that may prevent drivers and pedestrians from having a clear sightline. May include installing red curb at intersection approaches to remove parked vehicles (also called “daylighting”), trimming or removing landscaping, or removing or relocating large signs.

**Cost**

**\$**

*Low Cost / Quick Build alternative available*

**LRSM ID**

**NS11**

DRAFT

**Other Reference Information**

FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads

**Other Reference Information**

FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads

**OTHER**



### **Upgrade Lighting to LED**

Upgrading Lighting to LED replaces high-pressure sodium light bulbs with LED light bulbs in street lights. Upgrading Lighting to LED improves safety by increasing the visibility of pedestrians in crosswalks through greater color contrast and larger areas of light distribution.

**Cost**

**\$\$**

**OTHER**



### **Red Light Camera**

A red light camera enforces traffic signal compliance by capturing the image of a vehicle that has entered an intersection in spite of the traffic signal indicating red. The automatic photographic evidence is used by authorities to enforce traffic laws and issue traffic violation tickets.

**Cost**

**\$\$**

**DRAFT**

## PEDESTRIAN FACILITIES



### Audible Push Button Upgrade

Push buttons must comply with the Americans with Disability Act (ADA) standards for accessibility. Pushbuttons should be visible and conveniently located for pedestrians waiting at a crosswalk. Accessible pedestrian signals, including audible push buttons, improve access for pedestrians who are blind or have low vision. DIB 82-06 includes accessibility design guidance.

Cost      \$\$

**Other Reference Information**  
 Audible Push Button Upgrade and Extended Time Pushbutton: FHWA Pedestrian Safety Guide and Countermeasure Selection System. [http://www.pedbikesafe.org/PEDSAFE/countermeasures\\_detail.cfm?CM\\_NUM=52](http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=52)

## PEDESTRIAN FACILITIES



### Add Sidewalk

Adding sidewalks provides a separated and continuous facility for people to walk along the roadway. Adding sidewalks improves safety by minimizing collisions with pedestrians walking in the road.

Cost      \$\$

LRSM ID      R34PB

DRAFT

**Other Reference Information**  
 Data in the CMF Clearinghouse is currently limited to bicycle/vehicle collisions. See additional reference: FHWA Pedestrian Safety Guide and Countermeasure Selection System. [http://www.pedbikesafe.org/PEDSAFE/countermeasures\\_detail.cfm?CM\\_NUM=1](http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=1)

## PEDESTRIAN FACILITIES



### Install/Upgrade Pedestrian Crossing at Uncontrolled Locations (Signs and Markings Only)

A pedestrian crossing at an intersection or on a segment provides a formalized location for people to cross the street, reducing the risk of people crossing outside crosswalks where drivers are not expecting them. Crosswalk striping, signs, and other enhanced safety features alert drivers that there may be a pedestrian crossing.

**Cost**

**\$**

*Low Cost / Quick Build alternative available*

**LRSM ID**

**R35PB**

## PEDESTRIAN FACILITIES



### Co-locate Bus Stops and Pedestrian Crossings

Place bus stops and pedestrian crossings in close proximity to allow transit riders to cross the street safely.

**Cost**

**\$**

*Low Cost / Quick Build alternative available*

DRAFT



## PEDESTRIAN FACILITIES



### Curb Extensions

A curb extension is a traffic calming measure which widens the sidewalk for a short distance to enhance the pedestrian crossing. This reduces the crossing distance and allowing pedestrians and drivers to see each other when parked vehicles would otherwise block visibility. Paint and plastic curb extensions are a low-cost/quick build option.

**Cost**      **\$\$**

*Low Cost / Quick Build alternative available*

**LRSM ID**      **NS21PB**

DRAFT

#### Other Reference Information

(1) Application of Pedestrian Crossing Treatments for Streets and Highways, NCHRP, 2016. <https://www.nap.edu/catalog/24634/application-of-pedestrian-crossing-treatments-for-streets-and-highways> (2) Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments, NCHRP, 2017. <https://www.nap.edu/catalog/24627/development-of-crash-modification-factors-for-uncontrolled-pedestrian-crossing-treatments> (3) Evaluation of Pedestrian-Related Roadway Measures, Pedestrian and Bicycle Information Center, 2014. [http://www.pedbikesafe.org/cms/downloads/PedestrianLitReview\\_April2014.pdf](http://www.pedbikesafe.org/cms/downloads/PedestrianLitReview_April2014.pdf)

## PEDESTRIAN FACILITIES



### Extended Time Pushbutton

A pushbutton that can be pressed to request extra time for using the crosswalk, beyond the standard crossing time. Ideal near senior-serving land uses.

**Cost**      **\$**

#### Other Reference Information

Audible Push Button Upgrade and Extended Time Pushbutton: FHWA Pedestrian Safety Guide and Countermeasure Selection System. [http://www.pedbikesafe.org/PEDSAFE/countermeasures\\_detail.cfm?CM\\_NUM=52](http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=52)

## PEDESTRIAN FACILITIES



### High-Visibility Crosswalk

A high-visibility crosswalk has a striped pattern with ladder markings made of high-visibility material, such as thermoplastic tape, instead of paint. A high-visibility crosswalk improves safety by increasing the visibility of marked crosswalks and provides motorists a cue to slow down and yield to pedestrians.

Cost

\$

*Low Cost / Quick Build alternative available*

LRSM ID

**S18/NS20**

## PEDESTRIAN FACILITIES



### Pedestrian Countdown Timer

Displays “countdown” of seconds remaining on the pedestrian signal. Countdown indications improve safety for all road users, and are required for all newly installed traffic signals where pedestrian signals are installed.

Cost

\$\$

LRSM ID

**S17PB**

DRAFT

## PEDESTRIAN FACILITIES



### Pedestrian Hybrid Beacon

A pedestrian-hybrid beacon (PHB) is used at unsignalized intersections or mid-block crosswalks to notify oncoming motorists to stop with a series of red and yellow lights. Unlike a traffic signal, the PHB rests in dark until a pedestrian activates it via pushbutton or other form of detection.

Cost **\$\$\$**

LRSM ID **NS23PB**

## PEDESTRIAN FACILITIES



### Landscape Buffer

Separating drivers from bicyclists and pedestrians using landscaping provides more space between the modes and can produce a traffic calming effect by encouraging drivers to drive at slower speeds, lowering the risk of crashing.

Cost **\$\$**

DRAFT

## PEDESTRIAN FACILITIES



### Leading Pedestrian Interval and Pedestrian Recall

At intersection locations that have a high volume of turning vehicle and have high pedestrian vs. vehicle crashes, a leading pedestrian interval gives pedestrians the opportunity to enter an intersection 3 - 7 seconds before vehicles are given a green indication. With this head start, pedestrians can better establish their presence in the crosswalk before vehicles have priority to turn left or right.

Cost

\$

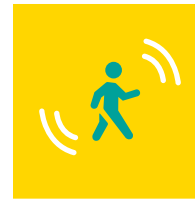
LRSM ID

S21PB

#### Other Reference Information

Pedestrian Phase Recall: Evaluation of Pedestrian-Related Roadway Measures, Pedestrian and Bicycle Information Center, 2014. [http://www.pedbikeinfo.org/cms/downloads/PedestrianLitReview\\_April2014.pdf](http://www.pedbikeinfo.org/cms/downloads/PedestrianLitReview_April2014.pdf)

## PEDESTRIAN FACILITIES



### Pedestrian Detection

An intersection treatment that relies on sensors to detect when a pedestrian is waiting at a crosswalk and automatically triggers the pedestrian "WALK" phase. Reduces crossings at inappropriate times and ensures that pedestrians have enough time to safely cross the roadway.

Cost

\$\$

DRAFT

#### Other Reference Information

FHWA Pedestrian Safety Guide and Countermeasure Selection System. [http://www.pedbikesafe.org/PEDSAFE/countermeasures\\_detail.cfm?CM\\_NUM=11](http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=11)

## PEDESTRIAN FACILITIES



### Remove Crossing Prohibition

Removes existing crossing prohibitions and provides marked crosswalk and other safety enhancements for pedestrians to cross the street where there are a high number of pedestrians crossing or where there are nodes with long distances between crossings. Prohibition should be removed in areas where it is necessary to keep pedestrians from crossing in dangerous zones and pointing them to cross at safer locations.

Cost

\$

*Low Cost / Quick Build alternative available*

## PEDESTRIAN FACILITIES



### Restripe Crosswalk

Periodic restriping of crosswalks is necessary to ensure the traffic markings are visible. Crosswalk may be restriped with high visibility markings.

Cost

\$

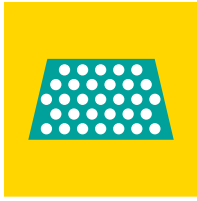
*Low Cost / Quick Build alternative available*

DRAFT

#### Other Reference Information

FHWA Pedestrian Safety Guide and Countermeasure Selection System.  
[http://www.pedbikesafe.org/PEDSAFE/countermeasures\\_detail.cfm?CM\\_NUM=4](http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=4)

## PEDESTRIAN FACILITIES



### Upgrade Curb Ramp

Tactile warning devices must be detectable to visually impaired pedestrians. Curb ramps must follow the DIB 82-06 design guidelines.

Cost

\$\$

## PEDESTRIAN FACILITIES



### Widen Sidewalk

Widening sidewalks provides a more comfortable space for pedestrians, particularly in locations with high volumes of pedestrians, and provides space to accommodate people in wheelchairs. Widening sidewalks improves safety by minimizing collisions with pedestrians walking in the road.

Cost

\$\$

DRAFT

#### Other Reference Information

FHWA Pedestrian Safety Guide and Countermeasure Selection System.  
[http://www.pedbikesafe.org/PEDSAFE/countermeasures\\_detail.cfm?CM\\_NUM=3](http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=3)

## PEDESTRIAN FACILITIES



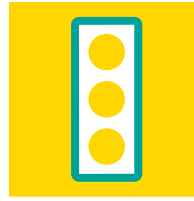
### Rectangular Rapid Flashing Beacon

A rectangular rapid flashing beacon (RRFB) is a pedestrian-activated flashing light with additional signage to alert motorists of a pedestrian crossing. An RRFB improves safety by increasing the visibility of marked crosswalks and provides motorists a cue to slow down and yield to pedestrians.

Cost **\$\$**

LRSM ID **NS22PB**

## SIGNALS



### Retroreflective Tape on Signals

Retroreflective borders enhance the visibility of traffic signals for aging and color vision impaired drivers enabling them to understand which signal indication is illuminated. Retroreflective borders may also alert drivers to signalized intersections during periods of power outages when the signals would otherwise be dark, and non-reflective signal heads and backplates would not be visible.

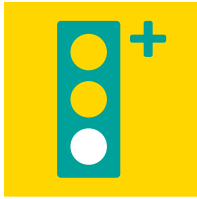
Cost **\$**

*Low Cost / Quick Build alternative available*

LRSM ID **S02**

DRAFT

### SIGNALS



## Supplemental Signal Heads

Additional signal heads allow drivers to anticipate signal changes farther away from intersections. Supplemental traffic signals may be placed on the near side of an intersection, far-left, far-right, or very high.

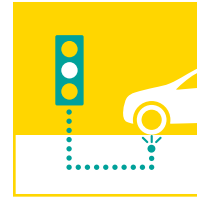
Cost      **\$\$**

LRSM ID

**S02**

DRAFT

### SIGNALS



## Advanced Dilemma Zone Detection

The Advanced Dilemma-Zone Detection system adjusts the start time of the yellow-signal phase (i.e. earlier or later) based on observed vehicle locations and speeds. The Advanced Dilemma-Zone Detection system improves safety by minimizing the number of drivers that are faced with the dilemma of determining if they should stop at the intersection or drive through the intersection based on their speed and distance from the intersection.

Cost      **\$\$**

LRSM ID

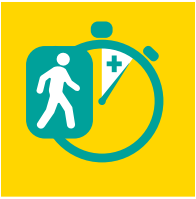
**S04**

### Other Reference Information

FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads



**SIGNALS**



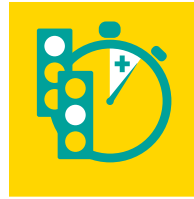
**Extend Pedestrian Crossing Time**

Increases time for pedestrian walk phases, especially to accommodate vulnerable populations, such as children and the elderly.

**Cost**                    **\$**  
*Low Cost / Quick Build alternative available*

**LRSM ID**                **S03**

**SIGNALS**



**Extend Yellow and All Red Time**

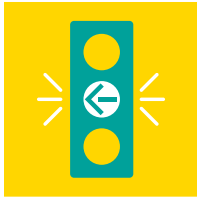
Extending yellow and all red time increases the time allotted for the yellow and red lights during a signal phase. Extending yellow and all red time improves safety by allowing drivers and bicyclists to safely cross through a signalized intersection before conflicting traffic movements are permitted to enter the intersection.

**Cost**                    **\$**  
*Low Cost / Quick Build alternative available*

**LRSM ID**                **S03**

DRAFT

## SIGNALS

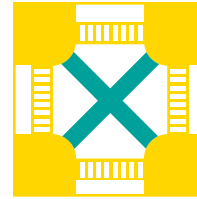


### Flashing Yellow Turn Phase

Flashing yellow turn arrow alerts drivers to proceed with caution and decide if there is a sufficient gap in oncoming traffic to safely make a turn. To be used only when a pedestrian walk phase is not called. Protected-only phases should be used when pedestrians are present.

Cost      \$\$

## SIGNALS



### Pedestrian Scramble

A form of pedestrian “WALK” phase at a signalized intersection in which all vehicular traffic is required to stop, allowing pedestrians to safely cross through the intersection in any direction, including diagonally.

Cost      \$

LRSM ID      S03

DRAFT

## SIGNALS



### Prohibit Left Turn

Prohibitions of left turns at locations where a turning vehicle may conflict with pedestrians in the crosswalk or where opposing traffic volume is high. Reduces pedestrian interaction with vehicles when crossing.

Cost

\$

*Low Cost / Quick Build  
alternative available*

LRSM ID

**S15/NS16**

## SIGNALS



### Prohibit Turns During Pedestrian Phase

Restricts left or right turns during the pedestrian crossing phase at locations where a turning vehicle may conflict with pedestrians in the crosswalk. This restriction may be displayed with a blank-out sign.

Cost

\$

DRAFT

**SIGNALS**



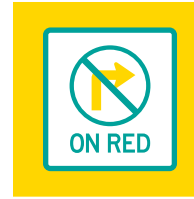
**Protected Left Turns**

A protected left turn can be implemented at signalized intersections (with existing left turns pockets) that currently have a permissive left-turn or no left-turn protection that have a high frequency of angle crashes involving left turning, opposing through vehicles, and non-motorized road users. Left turns are widely recognized as the highest-risk movements at signalized intersections. Providing protected left-turn phases for signalized intersections significantly improve the safety for left-turn maneuvers by removing the need for the drivers to navigate through gaps in oncoming/opposing through vehicles.

**Cost**      **\$\$**

**LRSM ID**      **S06/S07**

**SIGNALS**



**Prohibit Right-Turn-on-Red**

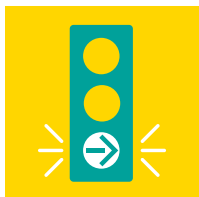
Prohibiting right-run-on-red movements should be considered at skewed intersections, or where exclusive pedestrian “WALK” phases, Leading Pedestrian Intervals (LPIs), sight distance issues, or high pedestrian volumes are present. Can help prevent crashes between vehicles turning right on red from one street and through vehicles on the cross street, and crashes involving pedestrians.

**Cost**      **\$**  
*Low Cost / Quick Build alternative available*

**Other Reference Information**

Currently the CMF Clearinghouse does not include specific studies; however, permitting right-turns-on-red shows an increase in ped/vehicle crashes. Additional information is available at the FHWA Pedestrian Safety Guide and Countermeasure Selection System. [http://www.pedbikesafe.org/PEDSAFE/countermeasures\\_detail.cfm?CM\\_NUM=49](http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=49)

**SIGNALS**



**Separate Right-Turn Phasing**

Provides a green arrow phase for right-turning vehicles. Avoids conflicts between right-turning traffic and bicyclists or pedestrians crossing the intersection on their right.

**Cost**      **\$\$\$**

**SIGNALS**



**Shorten Cycle Length**

Traffic signal cycle lengths have a significant impact on the quality of the urban realm and consequently, the opportunities for bicyclists, pedestrians, and transit vehicles to operate safely along a corridor. Long signal cycles, compounded over multiple intersections, can make crossing a street or walking even a short distance prohibitive and frustrating. Short cycle lengths of 60–90 seconds are ideal for urban areas.

**Cost**      **\$**  
*Low Cost / Quick Build alternative available*

DRAFT

**Other Reference Information**

(1) Evaluation of Pedestrian-Related Roadway Measures, Pedestrian and Bicycle Information Center, 2014. [http://www.pedbikeinfo.org/cms/downloads/PedestrianLitReview\\_April2014.pdf](http://www.pedbikeinfo.org/cms/downloads/PedestrianLitReview_April2014.pdf) (2) FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads

**Other Reference Information**

FHWA Pedestrian Safety Guide and Countermeasure Selection System. [http://www.pedbikesafe.org/PEDSAFE/countermeasures\\_detail.cfm?CM\\_NUM=45](http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=45)

## SIGNALS



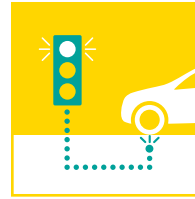
### Signal Interconnectivity and Coordination / Green Wave

Certain timing, phasing, and control strategies can produce multiple safety benefits. Sometimes capacity improvements come along with the safety improvements and other times adverse effects on delay or capacity occur. The emphasis of improving signal coordination for this countermeasure is to provide an opportunity for slow speed signal coordination. Coordinating signals to allow for bicyclist progression, also known as a 'green wave,' gives bicyclists and pedestrians more time to safely cross through the 'green wave' intersections.

**Cost**                **\$\$**

**LRSM ID**           **S03**

## SIGNALS



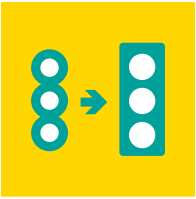
### Speed Sensitive Rest in Red Signal

At certain hours (e.g. late night) a signal remains red for all approaches or certain approaches until a vehicle arrives at the intersection. If the vehicle is going faster than the desired speed, the signal will not turn green until after vehicle stops. If the vehicle is going the desired speed the signal will change to green before the vehicle arrives. This signal timing provides operational benefit to drivers traveling at the desired speed limit. Can be paired with variable speed warning signs.

**Cost**                **\$\$**

**LRSM ID**           **R26**

## SIGNALS



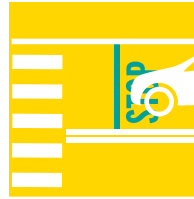
### Upgrade Signal Head

Upgrading Signal Heads replaces existing 8-inch signal heads with 12-inch signal heads to comply with the California MUTCD’s 2014 guidelines. Upgrading signal heads improves safety by providing better visibility of intersection signals and by aiding drivers’ advanced perception of upcoming intersections.

**Cost**                 **\$**

**LRSM ID**           **S02**

## SIGNING & STRIPING



### Advance Stop Bar

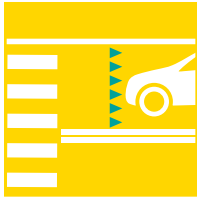
An advanced stop bar is a horizontal stripe painted ahead of the crosswalk at stop signs and signals to indicate where drivers should stop. An advanced stop bar improves safety by reducing instances of vehicles encroaching on the crosswalk. Creating a wider stop bar or setting the stop bar further back may be appropriate for locations with known crosswalk encroachment issues.

**Cost**                 **\$**

**LRSM ID**           **S20PB**           *Low Cost / Quick Build alternative available*

DRAFT

## SIGNING & STRIPING



### Advance Yield Markings

Yield lines are placed 20 to 50 feet in advance of multi-lane pedestrian crossings to increase visibility of pedestrians. They can reduce the likelihood of a multiple-threat crash.

Cost

\$

*Low Cost / Quick Build alternative available*

DRAFT

## SIGNING & STRIPING



### Curve Advance Warning Sign

A curve advance warning sign notifies drivers of an approaching curve and may include an advisory speed limit as drivers navigate around the curve. This warning sign is ideally combined with other infrastructure that alerts drivers of the curve, such as chevron signs, delineators, and flashing beacons. A curve advance warning sign improves safety by giving drivers additional time to slow down for the curve.

Cost

\$

*Low Cost / Quick Build alternative available*

LRSM ID

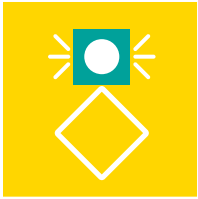
**R24**

#### Other Reference Information

FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads



## SIGNING & STRIPING



### Flashing Beacon as Advance Warning

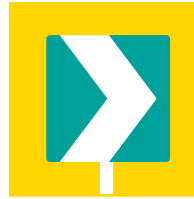
A flashing beacon as Advanced Warning is a blinking light with signage to notify motorists of an upcoming intersection or crosswalk. A flashing beacon improves safety by providing motorists more time to be aware of and slow down for an intersection or yield to pedestrians crossing a crosswalk.

**Cost**            **\$\$**

**LRSM ID**        **S10**

**Other Reference Information**  
 FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads

## SIGNING & STRIPING



### Chevron Signs on Horizontal Curves

Post-mounted chevrons are intended to warn drivers of an approaching curve and provide tracking information and guidance to the drivers. They can be beneficial on roadways that have an unacceptable level of crashes on relatively sharp curves during periods of light and darkness.

**Cost**            **\$**

*Low Cost / Quick Build alternative available*

**LRSM ID**        **R23**

**Other Reference Information**  
 FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads

DRAFT

## SIGNING & STRIPING



### LED-Enhanced Sign

An LED-Enhanced Sign has LED lights embedded in the sign to outline the sign itself or the words and symbols on the sign. The LEDs may be set to flash or operate in a steady mode. An LED-enhanced sign improves safety by improving the visibility of signs at locations with visibility limitations or with a documented history of drivers failing to see or obey the sign (e.g. at STOP signs).

Cost

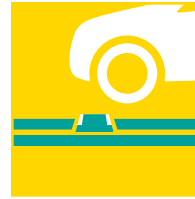
\$

*Low Cost / Quick Build  
alternative available*

LRSM ID

**NS08**

## SIGNING & STRIPING



### Painted Centerline and Raised Pavement Markers at Curves on Residential Streets

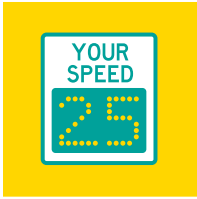
A raised pavement marker is a small device attached to the road and used as a positioning guide for drivers.

Cost

\$

*Low Cost / Quick Build  
alternative available*

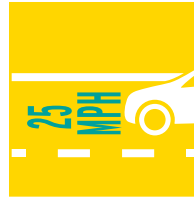
DRAFT

**SIGNING & STRIPING****Speed Feedback Sign**

A speed feedback sign notifies drivers of their current speed, usually followed by a reminder of the posted speed limit. A speed feedback sign improves safety by providing a cue for drivers to check their speed and slow down, if necessary.

**Cost****\$**

*Low Cost / Quick Build  
alternative available*

**SIGNING & STRIPING****Speed Legends on Pavement at Neighborhood Entries**

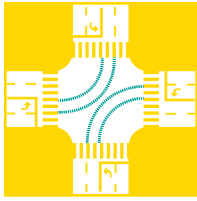
Speed legends are numerals painted on the roadway indicating the current speed limit in miles per hour. They are usually placed near speed limit signposts.

**Cost****\$**

*Low Cost / Quick Build  
alternative available*

DRAFT

## SIGNING & STRIPING



### Striping Through Intersection

Adding clear pavement markings can guide motorists through complex intersections. Intersections where the lane designations are not clearly visible to approaching motorists and/or intersections noted as being complex and experiencing crashes that could be attributed to a driver's unsuccessful attempt to navigate the intersection can benefit from this treatment.

Cost

\$

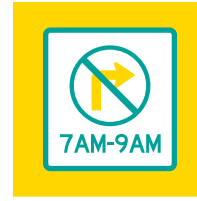
*Low Cost / Quick Build alternative available*

LRSM ID

**S09**

DRAFT

## SIGNING & STRIPING



### Time-Based Turn Restriction

Restricts left-turns or right-turns during certain time periods when there may be increased potential for conflict (e.g., peak periods, school hours).

Cost

\$

*Low Cost / Quick Build alternative available*

## SIGNING & STRIPING



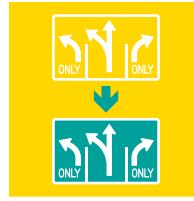
### Upgrade Intersection Pavement Markings

Upgrading intersection pavement marking can include “Stop Ahead” markings and the addition of centerlines and stop bars. Upgrading intersection pavement markings can improve safety by increasing the visibility of intersections for drivers approaching and at the intersection.

**Cost**            **\$**  
*Low Cost / Quick Build alternative available*

**LRSM ID**        **NS07**

## SIGNING & STRIPING



### Upgrade Signs with Fluorescent Sheeting

Upgrading signs with fluorescent sheeting replaces existing signs with new signs that can clearly display warnings by reflecting headlamp light back to vehicles. Upgrading signs with fluorescent sheeting improves safety by increasing visibility of signs to drivers at night.

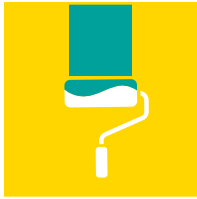
**Cost**            **\$**  
*Low Cost / Quick Build alternative available*

**LRSM ID**        **R22**

DRAFT

**Other Reference Information**  
 FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads

## SIGNING & STRIPING



### Upgrade Striping

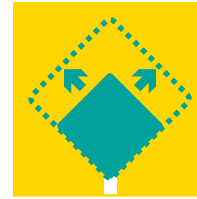
Restripe lanes with reflective striping to improve striping visibility and clarify lane assignment, especially where the number of lanes changes.

**Cost**

**\$**

*Low Cost / Quick Build  
alternative available*

## SIGNING & STRIPING



### Upgrade to Larger Warning Signs

Upgrading to larger warning signs replaces existing signs with physically larger signs with larger warning information. Upgrading to larger warning signs improves safety by increasing visibility of the information provided, particularly for older drivers.

**Cost**

**\$**

*Low Cost / Quick Build  
alternative available*

DRAFT

**LRSM ID**

**NS06**

## SIGNING & STRIPING

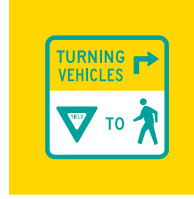


### Wayfinding

A network of signs that highlight nearby pedestrian and bicycle facilities. Can help to reduce crossings at locations with poor sight distance or limited crossing enhancements.

Cost \$

## SIGNING & STRIPING



### Yield To Pedestrians Sign

“Yield Here to Pedestrians” signs alert drivers about the presence of pedestrians. These signs are required with advance yield lines. Other sign types can be placed on the centerline in the roadway.

Cost \$  
*Low Cost / Quick Build alternative available*

DRAFT

LRSM ID

NS06

# **NVTA VISION ZERO**

**DRAFT**



# Appendix B

## List of Safety Projects

DRAFT

Project Name	Status	Timeline	Jurisdiction	On HIN?	Existing Resources	Caltrans facility?	Cost Estimate	Details
American Canyon Road West from Wetlands Edge Road to SR 29	Proposed	5-10 years	American Canyon	Yes	American Canyon LRSP American Canyon Speed Survey Countywide Bike Plan	Yes (at SR 29 intersection)	\$\$\$	Convert the two outside travel lanes to Class I paths or Separated Bikeways from Wetlands Edge Road to James Road. Install cycle tracks between James Road and SR 29 by narrowing lanes. Install protected intersections at Elliot Drive and James Road.
American Canyon Road East from SR 29 to Newell Drive	Proposed	5-10 years	American Canyon	Yes	American Canyon LRSP American Canyon Speed Survey	Yes (at SR 29 intersection)	\$\$\$	Install Separated Bikeway between SR 29 and Newell Road by narrowing lanes between SR 29 and Silver Oak Trail, and potential median removal east of Silver Oak Trail. Install protected intersections at Broadway and Newell Drive. Upgrade existing marked crosswalks to high visibility school crossings at Via Firenze.
Benton Way from Wetlands Edge Road to Donaldson Way/Elliott Drive	Proposed	1-5 years	American Canyon	No	American Canyon LRSP, CSSA, American Canyon Speed Survey	No	\$	Install/upgrade pedestrian crossing (with enhanced features), install dynamic/variable speed warning signs. Stripe high visibility on west & south legs at Chaucer Lane. Install curb extensions on west leg & daylight intersection. Consider green conflict markings for bike lanes when they cross the minor streets. Reduce speed limits to 15 mph near schools. Speed limit signage will be updated in Summer 2023.
Flosden Road/Canyon Creek Drive	Proposed	1-5 years	American Canyon	No	American Canyon LRSP	No	\$	Improve signal timing (coordination, phases, red, yellow, or operation), Improve signal hardware: lenses, backplates with retroreflective borders, mounting, size, and number. Modify signal phasing to implement an LPI, audible signals with countdown. Add high visibility striping and directional curb ramps.
Flosden Road/Daniel Drive	Recently Completed	-	American Canyon	No	American Canyon LRSP	No	\$	Evaluate and improve sight distance to intersection, Install pedestrian crossing (new signs and markings only)
Flosden Road from Daniel Drive to South City Limit	Proposed	1-5 years	American Canyon	No	American Canyon LRSP	No	\$	Install dynamic/variable speed warning signs, Install delineators, reflectors and/or object markers. Add high visibility striping at crosswalks. Complete a feasibility study for a road diet.
Flosden Road/Via Bellagio	Proposed	1-5 years	American Canyon	No	American Canyon LRSP	No	\$	Improve signal timing (coordination, phases, red, yellow, or operation), Improve signal hardware: lenses, backplates with retroreflective borders, mounting, size, and number. Modify signal phasing to implement an LPI and audible signals with countdown. Add high visibility striping and directional curb ramps.

Project Name	Status	Timeline	Jurisdiction	On HIN?	Existing Resources	Caltrans facility?	Cost Estimate	Details
Newell Drive from Silver Oak Trail to American Canyon Road	Recently Completed	-	American Canyon	No	American Canyon LRSP Countywide Transportation Plan	No	\$	Install dynamic/variable speed warning signs. Reduce the speed limit to 30 mph and 25 mph near American Canyon High School. Add high visibility crosswalks throughout.
Paoli Loop Road from SR 29 to SR 29 Overpass	Proposed	1-5 years	American Canyon	No	American Canyon LRSP NVTA CTP 2045 NVTA SR29 CMCP	Yes	\$\$	Install dynamic/variable speed warning signs and centerline rumble strips; Complete an SR 29 access study - Option 1: close the Paoli Loop Road/SR 29 intersection & create a better connection to south intersection; Option 2: Redesign the Paoli Loop Road/ SR 29 intersection to account for the higher speeds along SR 29 vehicle have to merge into.
Rio Del Mar/Los Altos Place	Proposed	5-10 years	American Canyon	No	American Canyon LRSP	No	\$	Evaluate conversion to mini roundabout
Rio Del Mar/Rio Grande	Proposed	1-5 years	American Canyon	No	American Canyon LRSP	No	\$	Relocate existing school crossing, Install/upgrade pedestrian crossing at uncontrolled locations (with enhanced safety features), Install continuous sidewalks to the park, high visibility school crossings, directional curb ramps, and daylight intersections on all legs.
Silver Oak Trail from American Canyon Road to Newell Drive	Proposed	1-5 years	American Canyon	No	American Canyon LRSP	No	\$	Install/upgrade pedestrian crossing (with enhanced features), install dynamic/variable speed warning signs. Add edge lines - mark an 11-foot travel lane in each direction. Convert existing marked crosswalks to high visibility crosswalks, daylight existing crosswalks, and put curb extensions in at existing marked crosswalks. Install an RRFB and high visibility school crossings at Shenandoah Drive. Install
West American Canyon Road from James Road to SR 29	Proposed	1-5 years	American Canyon	Yes	American Canyon LRSP	Yes (at SR 29 intersection)	\$\$	Evaluate sight distance at driveways. Replace raised pavement markers with pavement markings. Narrow vehicle lanes to 11 feet wide. Update bike lanes to be five feet wide plus two-foot painted buffer. Put bike conflict markings across driveways. Remove southbound outer most receiving lane on SR 29.
Guardrail Set-Aside Phase 1	Completed	-	Calistoga & St. Helena	Yes	Napa County LRSP		\$\$	Upgrade 3 guardrail sections along Silverado Trail from Meadowood Lane to Fawn Park Road and 10 guardrail sections along Petrified Forest Road from Franz Valley School Road to Rancho Juan Inez Road.

Project Name	Status	Timeline	Jurisdiction	On HIN?	Existing Resources	Caltrans facility?	Cost Estimate	Details
Lincoln Avenue from SR 128 to Silverado Trail	Proposed	5-10 years	Calistoga	Yes	NVTA CTP 2045	Yes	\$\$	Install Class II bike lanes - obtain space by narrowing travel lanes and, where needed, converting angled to parallel parking. Convert existing front-in angle parking to back-in angle (consistent with Class III facility) - or convert all spaces to parallel parking. Add consistent edge lines to visually narrow the vehicle lane throughout corridor. Aim for design speed limit of 20 or 25 mph. Square up and signalize the intersection of Lincoln Avenue and Silverado Trail. Signal installation should include audible signal with countdown and LPI. Add curb extensions and paint missing crosswalk legs throughout the corridor. Install RRFBS at Myrtle Street and Fair Way. Add high visibility crosswalk markings and consistent daylighting approaching crosswalks at existing crosswalks.
SR 128 through Calistoga from Cedar Street to Pine Street	Proposed	10+ years	Calistoga	Yes	Countywide Transportation Plan	Yes	\$	Add centerline delineators at each intersection from Lillie Street to Pine Street. Potential implementation: add berms along either side of roadway to delineate sidewalks, install RRFBS at 2-3 east-west crosswalks along this roadway segment - intersections to consider: Lillie Street, Silver Street, Berry Street, Spring Street. Look for opportunities to fill in sidewalk gaps with new/updated development. Consider an all way stop control at Berry Street.
SR 29 and Silverado Trail	Proposed	10+ years	Calistoga	Yes		Yes	\$	Add streetlights, delineators, reflectors, and/or object markers along SR 29 and Silverado Trail. Complete a feasibility study for a roundabout and realign the intersection to intersect closer to 90-degrees.
Deer Park Road/Sanitarium Road Roundabout	Proposed	10+ years	Napa County	Yes	Napa County LRSP	Yes	\$\$\$	Install roundabout at Deer Park Road/Sanitarium Road
Devlin/Sosol Ferry Roundabout	Project Funded	1-5 years	Napa County	Yes		Yes	\$\$\$	Construct a single lane modern roundabout - construction of grading and excavation, asphalt pavement, curb, gutter, sidewalk, drainage systems and electrical systems, including other minor work

Project Name	Status	Timeline	Jurisdiction	On HIN?	Existing Resources	Caltrans facility?	Cost Estimate	Details
Howell Mountain Road from (1/4 miles west of White Cottage Road to Sunset Drive)	Proposed	1-5 years	Napa County - Angwin	Yes		No	\$\$	Implement high visibility and speed slowing mitigations on the curves. Add centerline rumble strips, green conflict striping, curve delineation, "curve ahead" warning signage, and object markers. Upgrade existing warning signs to meet retroreflective standards at the intersection with White Cottage Road. At Pope Valley Road and College Avenue, include "Bikes May Use Full Lane" Signage. Where feasible, include buffered bike lanes. At Cold Springs Road, restripe high-visibility pavement markings and an RRFB.
Imola East Revitalization	Proposed	5-10 years	Napa County	Yes	County of Napa LRSP Imola Avenue Corridor Complete Streets Improvement Plan	Yes	\$	Between Soscol Avenue and 4th Avenue: Emphasize pedestrian safety and reduce vehicular conflicts for students walking to Napa Community School from the north side of Imola Avenue. Improve the shoulder along the south side of the roadway and implement traffic calming. Create partnerships with the City and Caltrans to maintain continuity for a shared-use path. Install bike lanes and upgrade pedestrian crossings at Parrish Road and Coronado Avenue
Napa County Roundabouts	Proposed	10+ years	Countywide	Yes	Napa County LRSP		\$\$\$\$	Convert these unsignalized intersections to roundabouts:  Silverado Trail at Oak Knoll Avenue: Install flashing beacons as advanced warning, install a southbound right-turn lane on Silverado Trail, convert the two-way left turn lane on Silverado Trail into an acceleration lane, install a right turn lane on Oak Knoll Avenue, and install/upgrade warning signs.  Silverado Trail / Zinfandel Lane: Install flashing beacons as advanced warning and install/upgrade warning signs. Chiles Pope Valley Road / Howell Mountain Road
Valley Floor Signage	Proposed	5-10 years	Countywide	Yes	Napa County LRSP		\$\$	Upgrade regulatory and warning signs on 52 roadway segments on the Valley Floor of Napa County with new fluorescent sheeting, as well as replacing existing object markers and reflectors. HSIP funding cannot be applied for before 2025.
Valley Floor Striping	Project Funded	1-5 years	Countywide	Yes	Napa County LRSP		\$\$\$	High-visibility striping. HSIP Cycle 10 funded project.
Strawberry Patch - Silverado Trail (0.25-0.5 miles north of Trancas St)	Proposed	5-10 years	East of the City of Napa	Yes	Napa County LRSP	No	\$	Install flashing beacons as advanced warning, install a southbound right-turn lane, install a southbound acceleration lane, install a northbound left-turn lane, and install/upgrade intersection warning signs.

Project Name	Status	Timeline	Jurisdiction	On HIN?	Existing Resources	Caltrans facility?	Cost Estimate	Details
SR 121/Monticello Road near County line	Proposed	5-10 years	Napa County	Yes		Yes	\$\$	Complete a feasibility study for removal of both slip lanes and realigning the southern approach to the east.
SR 128 from Wragg Canyon Road to Greaves Road	Proposed	5-10 years	Napa County	Yes		Yes	\$	Implement high visibility and speed slowing mitigations on the curves. Add centerline rumble strips, curve delineation and object markers. Upgrade existing warning signs to be sure meet retroreflective standards.
SR 221/Basalt Road Traffic Signal	Project Funded	1-5 years	Napa County	Yes	Napa County Jail Project EIR	No	\$\$\$	Install a three-leg traffic signal at the intersection of SR221 and Basalt Road required by the County's Replacement Jail Project. To eliminate conflicts between the protected southbound left-turn movement and northbound right turns, the free right-turn lane shall be converted to a standard right-turn lane. Similarly, the westbound right-turn lane shall be converted to a standard turn lane to bring this movement under signal control. Right-turn overlap phasing shall be provided between the southbound left turn and westbound right turn. Adequate right-of-way is available to accommodate this improvement and adequate spacing (i.e., more than 2,000 feet) is available between this signal and the nearest signal.
Browns Valley Road	Project in Planning Pipeline	Plans Being Prepared	Napa	Yes	City of Napa LRSP NVTA CTP 2045	Yes	\$\$	City is preparing plans for Browns Valley Road improvements: project limits are along Browns Valley Rd/First Street from Freeway Drive to McCormick Lane; Intersection of First Street/Freeway Drive is Caltrans.
California Boulevard at Pueblo Avenue	Proposed	1-5 years	Napa	Yes	City of Napa LRSP	No	\$	Non-Signalized Intersection Improvements: Install High Visibility Crosswalk, Install/Upgrade Larger or Additional STOP Signs or other Intersection Regulatory/Warning Signs, and Improve Intersection Pavement Markings. Complete a feasibility study to check signal warrants.

Project Name	Status	Timeline	Jurisdiction	On HIN?	Existing Resources	Caltrans facility?	Cost Estimate	Details
Imola Avenue Corridor from Foster Road to Eastern City Limits	Proposed	5-10 years	Napa	Yes	City of Napa LRSP Imola Avenue Corridor Complete Streets Improvement Plan	Yes	\$\$\$\$	<p>Install high-visibility crosswalk, rectangular rapid flashing beacons, dynamic/variable speed warning signs, update signal timings to include LPIs, audible signals with countdown, and bike signals.</p> <p>Between Foster Road and Jefferson Street: Simplify turning movements and freeway ramps at SR 29 to reduce pedestrian and bicycle conflicts. Maintain on-street parking between Foster Road and Golden Gate Drive. Narrow vehicle lane widths (currently look like they vary around 13 to 14 feet wide) to 11 feet. Reallocate space to add a buffer for bicycles. Alternatively, widen and add sidewalk to create Class I facility so bikes can have more separation from cars. Upgrade existing sidewalk and close gaps in bicycle network east of Golden Gate Drive.</p> <p>Between Jefferson Street and Soscol Avenue: Install separation for westbound bicyclists where possible. Consider removing decel/accel lane on Imola Ave between Jefferson and Cabot and instead maintain continuity of a bike lane. Create a mobility hub at Soscol Avenue or Gasser Drive. Square up intersections west of Jefferson Street. Install a separated bike facility with vehicle crossings for retail access. Create a mobility hub in open space at Lernhart Street and Minahen Street. Extend the shared-use path and provide a separated bikeway for bicyclists turning west off of Soscol Avenue. Provide high quality connection to the Napa Vine Trail and riverfront, creating a linear park and preserving growth opportunities for Napa Valley College.</p>
Jefferson Street Corridor Complete Streets Improvement Plan	Planned Project Previously Identified	Study Being Prepared	Napa	Yes	City of Napa LRS	Yes	\$	As part of the SS4A Grant Cycle 1, the City of Napa received funding to study the Jefferson Street corridor. Once the plan is completed, the City will need to apply for funding for implementation of improvements. Intersection of Jefferson Street and Imola Avenue is Caltrans.

Project Name	Status	Timeline	Jurisdiction	On HIN?	Existing Resources	Caltrans facility?	Cost Estimate	Details
Lincoln Avenue	Proposed	5-10 years	Napa	Yes	City of Napa LRSP	Yes	\$\$\$	<p>From Yajome Street to Silverado Trail: Install/upgrade signs with fluorescent sheeting, install delineators/reflectors/object markers, improve pavement friction, and install high visibility crosswalks, rectangular rapid flashing beacons, and dynamic/variable speed warning signs.</p> <p>At the intersections with Soscol Avenue and Silverado Trail, raise pavement markers, improve pavement friction, improve signal hardware and timing, modify signal to include a leading pedestrian interval, install advance stop bar, and install pedestrian countdown signal heads. Complete a feasibility study for implementing a road diet with a center turn lane. Add consistent daylighting at intersections. Add pedestrian refuge islands at uncontrolled crosswalks. Realign crossings to orthogonal directions if applicable. SR 29 ramps and Silverado Trail intersections are Caltrans.</p>
Main Street from Lincoln Avenue to 3rd Street	Proposed	1-5 years	Napa	Yes	City of Napa LRSP	No	\$	<p>Add curb extensions at Lincoln Avenue, Yount Street, Vallejo Street, Napa Street, Caymus Street, and Clinton Street. Install RRFBs at Yount Street (consider all-way stop if warrants can be met due to adjacence to park and school) and Vallejo Street. Stripe all missing crosswalk legs with high-visibility striping at H Street, G Street, Jackson Street, Yount Street, and Vallejo Street. Realign crossings to orthogonal directions if applicable. Install consistent edge lines where parking T's are not provided. Consider intersections north of Napa Street/Main Street</p>



Project Name	Status	Timeline	Jurisdiction	On HIN?	Existing Resources	Caltrans facility?	Cost Estimate	Details
Redwood Road/Trancas Street from Dry Creek Road to Eastern City Limit	Proposed	5-10 years	Napa	Yes	City of Napa LRSP City of Napa CSSA	No	\$\$\$\$	<p>Upgrade existing marked crosswalks to high visibility markings. Realign crossings to orthogonal directions if applicable. All curb ramps should be bi-directional if applicable. Replace raised pavement markers with pavement markings throughout the corridor. Incorporate consistent use of green pavement markings for areas where there are conflicts between bike and vehicle movements.</p> <p>Dry Creek Road to Carol Drive: At Dry Creek Road remove slip lane and convert to AWSC. Road diet to three lanes, with bike lanes (Class IIb) and on-street parking on both sides of the street.</p> <p>Install a marked mid-block crossing with RRFB, high visibility markings, and pedestrian crossing refuge either at Macleod Street and Young Avenue.</p> <p>Linda Vista Avenue: Install LPI, audible signals with countdown, and retro reflective tape on traffic signal, refresh pavement markings and realign crosswalks to be orthogonal, trim vegetation on south leg, and install edge lines on all approaches. Fill sidewalk gap between Linda Vista Avenue and Carol Drive.</p> <p>Carol Drive to Solano Avenue: At Carol Drive, reconstruct curb ramps and realign crosswalk to be orthogonal. Complete road diet feasibility study for this segment.</p> <p>Solano Avenue: Install LPI, audible signals with countdown, and pedestrian countdown signal heads, improve signal timing, enhance pavement markings for bike crossings, install advance stop bar, improve wayfinding to Vine Trail</p> <p>Add protected intersections at Solano Avenue, California Boulevard, Jefferson Street, and Soscol Avenue/Big Ranch Road. Stripe narrow vehicle lanes along the whole corridor and use the space to create a buffer for bike lanes. 450 feet east of Dry Creek Rd to Eastern City Limit: install/upgrade signs with fluorescent sheeting, install delineators/reflectors/object markers, improve pavement friction, install high visibility crosswalks, install rectangular rapid flashing beacons, and install dynamic/variable speed warning signs.</p>

Project Name	Status	Timeline	Jurisdiction	On HIN?	Existing Resources	Caltrans facility?	Cost Estimate	Details
Salvador Avenue from SR 29 to Jefferson Street	Planned Project Previously Identified	Plans Being Prepared	Napa	Yes	NVTA CTP 2045 City of Napa LRSP NVTA Countywide Bicycle Plan City of Napa CSSA	Yes	\$\$\$	<p>Install bike lanes along Salvador Avenue, close sidewalk gaps, install directional curb ramps, and update crossing at Moffitt Drive. Upgrade existing marked crosswalks to high visibility markings. Make all curb ramps bi-directional if applicable. Incorporate consistent use of green pavement markings for areas where there are conflicts between bike and vehicle movements. Realign crossings to orthogonal directions if applicable. Entire segment from SR29 to Jefferson Street: Install Class II bike lane. Install 5-ft bike lane with 2-ft buffer.</p> <p>SR 29: Install LPI and audible signals with countdown. Install median refuge for Pedestrian Push Button on north leg.</p> <p>Byway East: Install curb extensions and upgrade existing crosswalk to high-visibility on south leg, Stripe advanced yield lines and install advanced warning signs on east and west legs.</p> <p>Segment from Escuela Drive to Morse Court: Install sharrow.</p> <p>Hermosa Drive: Fill sidewalk gaps and install curb ramps.</p> <p>Encina Drive: Fill sidewalk gaps and install curb ramps, Install new high-visibility crosswalk on north leg.</p> <p>Morse Court: Install new high-visibility crosswalks on north, east, and west legs, Upgrade existing crosswalk on south leg to high-visibility striping, Stripe red curb on all legs to daylight the intersection, Stripe advanced yield lines and install advanced warning signs on east and west legs.</p> <p>Moffitt Drive: Install new high-visibility crosswalk to the west leg, Upgrade existing crosswalk on north leg to high-visibility striping, Remove crosswalk on east leg, Install curb extension on the south leg (adjacent to church), Stripe red curb on all legs to daylight the intersection, Stripe advanced yield lines and install advanced warning signs to east and west legs.</p> <p>Dale Drive: Install new high-visibility crosswalk to south leg.</p> <p>Springwood Drive: Install new high-visibility crosswalks on all legs, Install curb extensions on</p>

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Project Name	Status	Timeline	Jurisdiction	On HIN?	Existing Resources	Caltrans facility?	Cost Estimate	Details
								<p>all legs, Stripe red curb on all legs to daylight intersection, Stripe advanced yield lines and install advanced warning signs on east and west legs.</p> <p>Jefferson Street: Install new high-visibility crosswalks on all legs, Install curb extensions on all legs, Stripe red curb on all legs to daylight intersection, Stripe advanced yield lines and install advanced warning signs on east and west legs, Install new curb ramps on southeast corner, Remove eastbound right turn pocket and rebuild curb to tighten up the intersection, Install RRFB and advanced warning signs on east leg. Intersection of SR 29/Salvador Avenue is Caltrans.</p>
Silverado Trail from Northern City Limit to Soscol Avenue	Proposed	5-10 years	Napa	Yes	City of Napa LRSP	Yes	\$\$	<p>Northern City Limit to Soscol Avenue: roadway segment improvements - Install/upgrade signs with fluorescent sheeting, install delineators/reflectors/object markers, and improve pavement friction, install high visibility crosswalks, install RRFBs, and install dynamic/variable speed warning signs. Add centerline rumble strips on Silverado Trail north of Lincoln Avenue/Clark Street intersection. Realign crossings to orthogonal directions if applicable.</p> <p>Lincoln Avenue/Clark Street: Signalized intersection improvements- raised pavement markers, and improve pavement friction, improve signal hardware and timing, modify signal to include a LPI, install audible signals with countdowns, install advance stop bar, and install pedestrian countdown signal heads. Improve channelized island to serve as a pedestrian refuge. Change the EBR lane to run through the signal. Add high visibility crosswalk markings and realign crossing to orthogonal directions.</p>
Solano Avenue from Lincoln Avenue to Trower Avenue	Proposed	1-5 years	Napa	Yes	City of Napa LRSP	No	\$\$	<p>Roadway segment improvements: Install/upgrade signs with fluorescent sheeting, install delineators/reflectors/object markers, and improve pavement friction, Install high visibility crosswalks, install RRFBs, and install dynamic/variable speed warning signs. Complete a corridor planning study focused on safety. Realign crossings to orthogonal directions if applicable.</p>

Project Name	Status	Timeline	Jurisdiction	On HIN?	Existing Resources	Caltrans facility?	Cost Estimate	Details
Soscol Avenue from Trancas Street to Imola Avenue	Proposed	5-10 years	Napa	Yes	City of Napa LRSP	Yes	\$\$\$\$	<p>Trancas Street to Lincoln Avenue: Install/upgrade Signs with fluorescent sheeting, install delineators/reflectors/object markers, improve pavement friction, and install high visibility crosswalks, rectangular rapid flashing beacons, and dynamic/variable speed warning signs along the roadway segment. Stripe narrow vehicle lanes along the whole corridor to slow speeds and use space to create buffer for bike lanes. Stripe high visibility crosswalks at all missing crosswalk legs at Old Soscol Way, Pueblo Avenue, and Central Avenue. Install PHB at Central Avenue. At Lincoln Avenue, install a protected intersection and close all right turn pockets.</p> <p>Lincoln Avenue to 3rd Street: Stripe narrow vehicle lanes between Lincoln Avenue and McKinstry Street and use space to create buffer for bike lanes. Install PHBs and high-visibility crosswalks at Jackson Street and Imperial Way. Install a trail crossing at Vallejo Street. Stripe high visibility crosswalks at missing crosswalk legs at Tanen Street, McKinstry Street, and Pearl Street. Realign crossings to orthogonal directions if applicable.</p> <p>Gasser Drive to Imola Avenue: Close slip lane and square intersection at SR 121/Silverado Trail and Imola Avenue - if capacity is needed, turn the slip lane into a long right-turn pocket. Stripe narrow vehicle lanes throughout and use space to create buffer for bike lanes to upgrade them to Class IV bike lanes. Stripe bike conflict markings for where the bike lane breaks for driveways, bus stops, etc. Stripe high visibility crosswalks at all missing crosswalk legs at SR 121/Silverado Trail, Kansas Avenue, and Shetler Avenue. Install protected intersection at Imola Avenue. Remove slip lanes throughout. Add bike conflict markings.</p>
South Freeway Drive/Golden Gate Drive and Imola Avenue	Proposed	1-5 years	Napa	Yes	City of Napa LRSP	No	\$	Complete an intersection control evaluation to determine whether the intersection should be AWSC, signal or a roundabout.

Project Name	Status	Timeline	Jurisdiction	On HIN?	Existing Resources	Caltrans facility?	Cost Estimate	Details
SR 29 Roadway and Intersection Improvements	Proposed	5-10 years	Napa	Yes	City of Napa LRSP City of Napa CSSA	Yes	\$\$\$	<p>Roadway Segment Improvements between northern City Limits and Sierra Avenue: Install/upgrade signs with fluorescent sheeting, install delineators/reflectors/object markers, and improve pavement friction, install high visibility crosswalks, install RRFBs, and install dynamic/variable speed warning signs. Realign crossings to orthogonal directions if applicable.</p> <p>Salvador Avenue: Signalized intersection improvements - raised pavement markers, and improve pavement friction, improve signal hardware and timing, modify signal to include an LPI, and install audible signals with countdown. Install median refuge for pedestrian push button on north leg.</p> <p>Wine County Avenue: Signalized Intersection Improvements - raised pavement markers, and improve pavement friction, improve signal timing, modify signal to include an LPI, and audible signals with countdown. Implement protected signal phasing. Add high visibility markings.</p> <p>Trower Avenue: Signalized intersection improvements: raised pavement markers, and improve pavement friction, improve signal timing, modify signal to include an LPI, and audible signals with countdown. Complete a roundabout feasibility study.</p> <p>SR 12: Signalized intersection improvements - raised pavement markers, improve pavement friction, and improve signal timing. Complete a roundabout feasibility study.</p>
SR 29 at Oakville Cross Road	Proposed	5-10 years	Oakville NVTA/Caltrans	Yes	Napa Forward	Yes	\$\$\$	Prepare designs for a one-lane roundabout that includes bicycle and pedestrian facilities
SR 29 at Rutherford Road	Proposed	5-10 years	Rutherford NVTA/Caltrans	Yes	Napa Forward	Yes	\$\$\$	Install a signal that includes a buildout of sidewalk at the southeast corner of the intersection and high-visibility crosswalks along the north, east, and south legs. Signal installation should include an LPI and audible signal with countdown. Roadway redesign along SR 29 would also occur - northbound direction would include dedicated left, through, and right lanes, and the southbound direction would include a dedicated left, through, and shared through-left lane.

Project Name	Status	Timeline	Jurisdiction	On HIN?	Existing Resources	Caltrans facility?	Cost Estimate	Details
Main Street from Pratt Avenue to Charter Oak Avenue	Proposed	1-5 years	St. Helena	Yes	Cultivate St. Helena Countywide Transportation Plan OBAG3 Application Permanent Improvements Spring Street/Highway 29 intersection Community Development Block Grant	Yes	\$\$\$\$	Paint missing high visibility crosswalk, install traffic calming devices, and upgrade signal synchronization throughout the corridor.  Phase 1A: Pine St. to Adams - Sidewalk upgrade replacement with upgraded ADA ramps and ADA driveways.  Phase 1B: Adams to Mitchell - Install curb extensions along SR 29. At Spring Street, remove existing crosswalk on east leg and install high-visibility crosswalks on west and south legs.
Finnell Road Traffic Calming	Proposed	1-5 years	Yountville	Yes	NVTA Countywide Pedestrian Master Plan	No	\$	Install bulb out at the southern school crosswalk and remove the one parking space just north of the crosswalk along the north side of the road. At Vista Drive, install bulb outs along the north, south and west legs, and daylight the west leg with red curb. Just south of Vista Drive, continue sidewalk implementation along the east side of the road with a pedestrian bridge over the creek or identify a crossing where the sidewalk currently ends.
SR29 at Madison Street	Proposed	5-10 years	Yountville	Yes	Napa Forward	Yes	\$\$\$\$	Complete a feasibility study for a roundabout at SR 29 and Madison Street, or near-term split phasing.

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# **NVTA VISION ZERO**

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# Appendix C

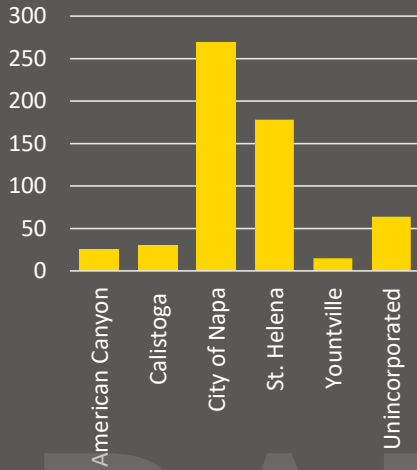
## Attitudinal Survey Responses

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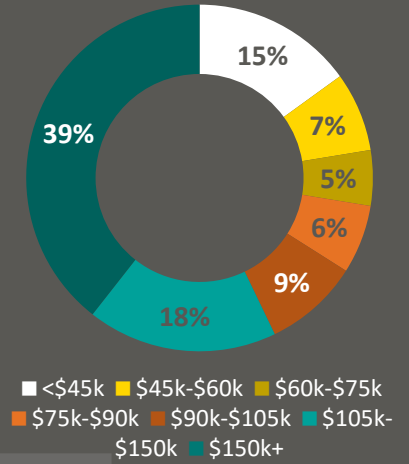
**584**

survey responses recorded

Respondents are from across Napa Valley.

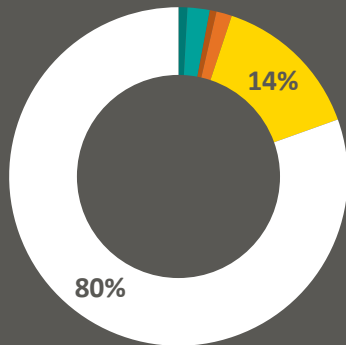


Residents are from across the income level spectrum.

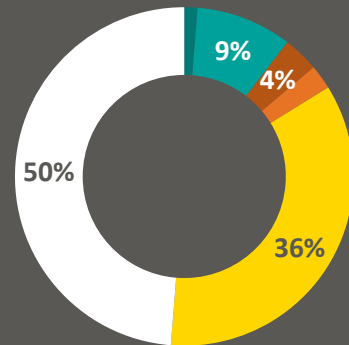


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Race/Ethnicity of Respondents (self-identification in survey)

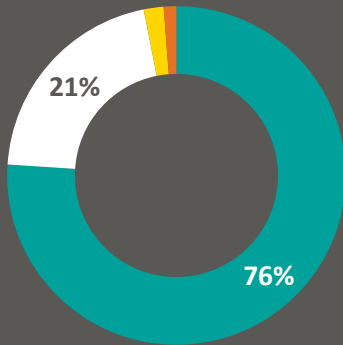


Race/Ethnicity of People in Napa Valley (2020 Census Data)



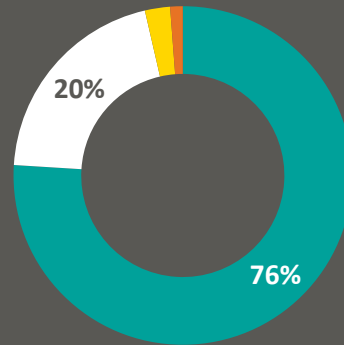
Native American Asian Black White Hispanic/Latinx Two or More Races

I support the goal of eliminating traffic fatalities and serious injuries on roads and streets in Napa Valley.



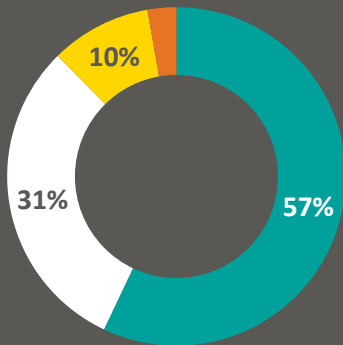
■ Strongly Agree   ■ Agree   ■ Disagree   ■ Strongly Disagree

When making decisions about road or street design, safety should be the top priority.



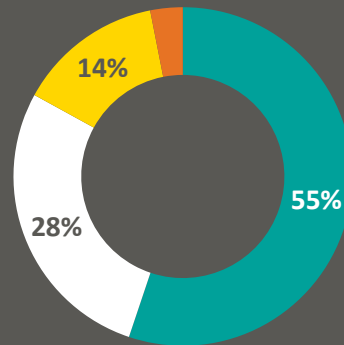
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Intersection changes that reduce the possibility of crashes should be prioritized over those that reduce delay.

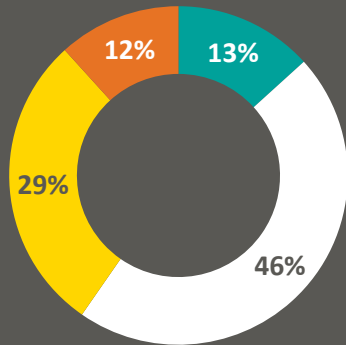


■ Strongly Agree   ■ Agree   ■ Disagree   ■ Strongly Disagree

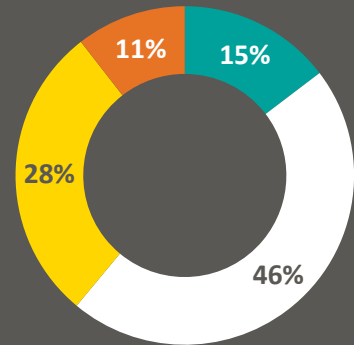
In downtowns or commercial corridors, space to walk, bike, and cross the street safely should be prioritized over parking.



I feel safe walking along or crossing roadways in downtown areas with my family.



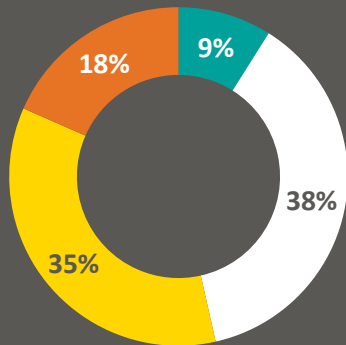
I feel safe walking along or crossing neighborhood streets with my family.



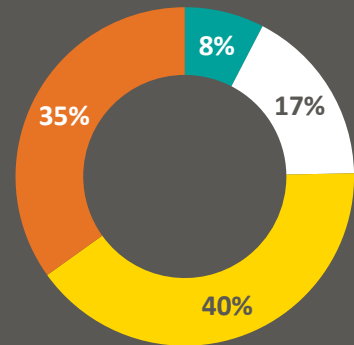
Strongly Agree    Agree    Disagree    Strongly Disagree

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I feel safe walking along or crossing rural roadways with my family.

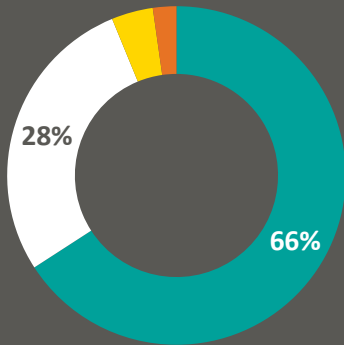


I feel safe walking along or crossing highways with my family.



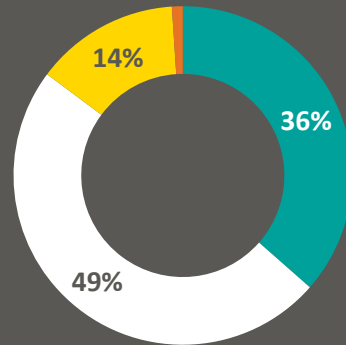
Strongly Agree    Agree    Disagree    Strongly Disagree

I am willing to change my behavior when driving to help reduce the risk of fatality or severe injury.



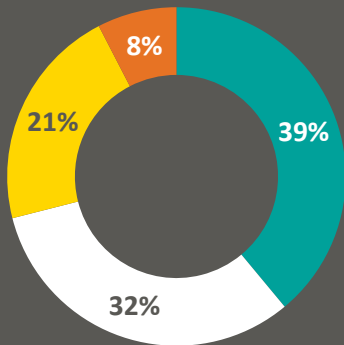
■ Strongly Agree   ■ Agree   ■ Disagree   ■ Strongly Disagree

When I drive, I travel at or below the speed limit.



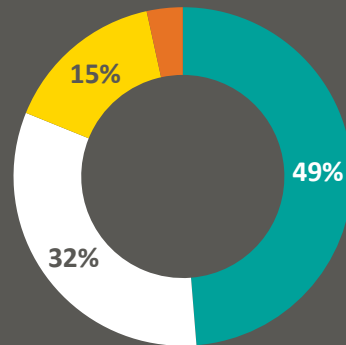
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I am willing to reduce my speed to 35 MPH on two-lane rural or country roads.

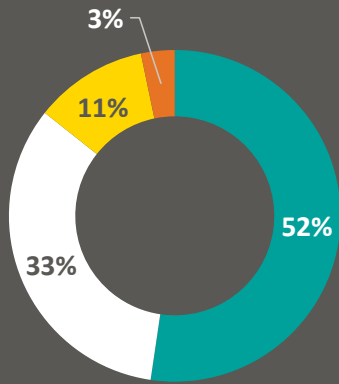


■ Strongly Agree   ■ Agree   ■ Disagree   ■ Strongly Disagree

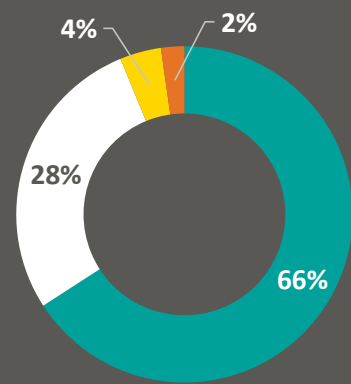
In areas where children or elderly may be present, the roadway should be designed for cars to drive 20 MPH or slower.



I believe it is possible to eliminate traffic fatalities and serious injuries on roads and streets in Napa Valley

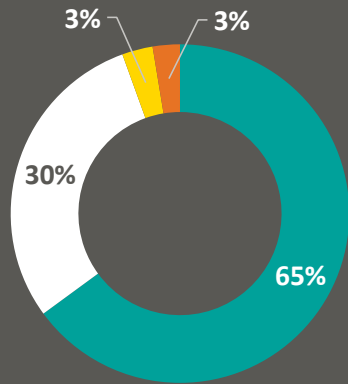


I am willing to change my behavior when driving to help reduce the risk of fatally or seriously injuring myself or another person.

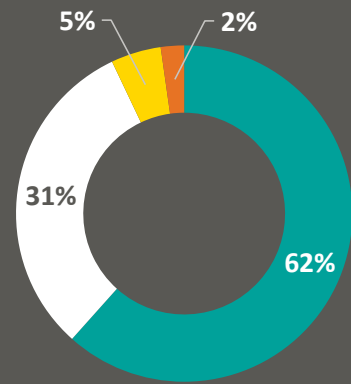


Strongly Agree    Agree    Disagree    Strongly Disagree

I am willing to change my behavior when walking to help reduce the risk of fatally or seriously injuring myself or another person.

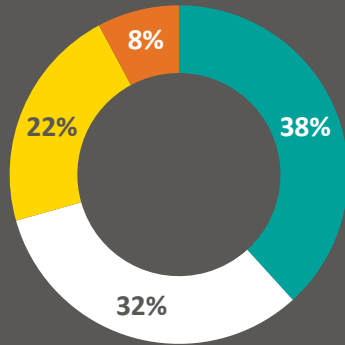


Roadway or street lighting should be used to improve nighttime visibility in downtowns or suburban areas.

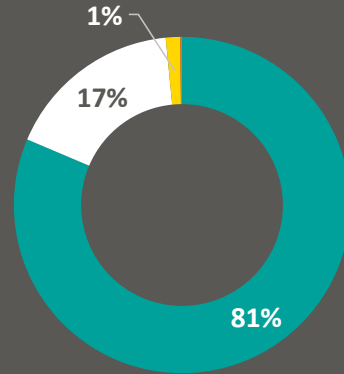


Strongly Agree    Agree    Disagree    Strongly Disagree

Roadway or street lighting should be used to improve nighttime visibility in rural areas.



I do not drive while under the influence of alcohol or drugs.



■ Strongly Agree   
 ■ Agree   
 ■ Disagree   
 ■ Strongly Disagree

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If I have been drinking, I use the following ways to get home.

- Ride Hailing Service
- Call a friend or family
- I do not drink
- Walk
- Public Transit or Shuttle
- Designated Driver
- Other
- Multiple of the above

