ATTACHMENT 1

DRAFT
VISION ZERO ACTION PLAN
&
LOCAL ROAD SAFETY PLAN

VISION ZERO

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City of Mountain View

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1 Introduction

On December 10, 2019, the Mountain View City Council unanimously adopted a Vision Zero Policy to eliminate fatal traffic crashes in Mountain View by 2030. The adopted policy built on over two years of work by the community, City staff, and elected officials to elevate the topic of transportation safety in Mountain View.

Mountain View's Vision Zero commitment sets a goal to eliminate fatal traffic crashes by 2030.[1] The Policy sets an interim goal of working to decrease severe injuries and crashes by 15% every three years.[2] By 2030, the City of Mountain View's goal is to decrease severe crashes by 50%[3] and eliminate fatal traffic crashes.

The Mountain View Vision Zero Action Plan / Local Road Safety Plan (VZAP/LRSP) provides guidance on future actions and potential projects to improve transportation safety based on analysis of crash history, engagement, and community demographics such as age, gender and race. The actions and projects include both infrastructure recommendations and non-infrastructure programmatic and policy recommendations organized by the emphasis areas. The combination of the two plans addresses crashes systemically and recommend infrastructure and non-infrastructure improvements.

WHAT IS A VISION ZERO ACTION PLAN (VZAP?)?

The VZAP, policies, plans, programs, and approaches related to engineering/infrastructure, education, enforcement, emergency response, encouragement, engagement, equity, and evaluation (the "E's") are used to reduce the risk of fatality and serious injury on a community's streets (**Error! Reference source not found.**). This plan provides a framework to identify and prioritize strategies to prevent severe injury and fatal crashes based on a data driven approach that focuses on the high injury network (Figure 2).

Figure 1 Vision Zero "7E"s

[1] City of Mountain View Vision Zero Policy, December 2019.

[2] The baseline 3-year average calculated in 2018 is 19 people, averaged from crashes in 2014, 2015, and 2016 due to an 18-month delay in the availability of statewide data.

[3] Fifty percent reduction is from a 2016 baseline of 15 crashes.

Figure 2 High Injury Network, 2014-2019

Since the adoption of the initial Vision Zero policy in December 2019, the following actions have been implemented:

- Established the Vision Zero Working Group and improved interdepartmental communication and coordination on various transportation safety issues;
- Analyzed Pedestrian Quality of Service and Bicycle Level of Traffic Stress as part of AccessMV;
- Prioritized and funded safety improvements along the City's High Injury Network (including complete streets projects on El Camino Real, Shoreline Boulevard, Middlefield Road, and California Street) as part of the Capital Improvement Program (CIP) and grant efforts;
- Resumed and expanded the Mountain View Safe Routes to School program;
- Analyzed and expanded the City's crossing guard program from 9 guards in 2019 to 21 in 2023;
- Initiated the development of the Active Transportation Plan (underway); and
- Started work on a Vision Zero Outreach, Marketing and Engagement project (underway).

WHAT IS A LOCAL ROAD SAFETY PLAN (LRSP)?

A Local Road Safety Plan (LRSP)provides a framework to systematically identify, analyze, and prioritize safety measures for local roadways based on California Department of Transportation (Caltrans) guidance and statewide Strategic Highway Safety Plan (SHSP). It produces a prioritized list of infrastructure countermeasures to be considered and the locations to consider implementing these measures in order to reduce risk of future fatal and severe injury crashes. Local jurisdictions are required have an adopted LRSP to be eligible for state funding opportunities through the Highway Safety Improvement Program (HSIP). The City has used past HSIP grants help fund complete street improvements aimed at enhancing safety.

The LRSP process for the City of Mountain View follows the four-step process developed by the Federal Highway Administration:[4]

1. **Identify stakeholders:** coordinate with Vision Zero Working Group (VZWG);
2. **Use safety data:** identify crash types, roadway and land use factors;
3. **Choose proven solutions**: determine emphasis areas and select candidate countermeasures ; and
4. **Implement solutions:** screen and prioritize candidate locations for safety countermeasures, prioritize and advance projects through engineering feasibility evaluation, design and construction.

STAKEHOLDER AND COMMUNITY ENGAGEMENT

Throughout the VZAP/LRSP process, the project team engaged with the Vision Zero Inter-Departmental Working Group (VZWG) and the Bicycle/Pedestrian Advisory Committee (BPAC). The team also engaged with the broader Mountain View community to seek feedback on major project milestones.

Vision Zero Working Group (VZWG)

The VZWG typically meets twice a year to discuss and review components of the Vision Zero Action Plan. VZWG includes staff from:

[4] Federal Highway Administration. Local Road Safety Plans Website. https://safety.fhwa.dot.gov/LRSPDIY/safety-data.cfm

- **Public Works** (*Transportation Planning, Traffic Engineering, Civil Infrastructure, Land Development, Streets Maintenance, and Construction Engineering Division sections*)
- **Community Development** (*Planning and Economic Development*)
- **Police** (*Traffic Enforcement and Analysis*)
- **City Manager** (*Sustainability and* Communications and Outreach)
- **Fire** (*Office of Emergency Services)*
- **Community Services** (*Parks and Open Space, Urban Forestry, Recreation)*)
- **Library**

Bicycle/Pedestrian Advisory Committee (BPAC)

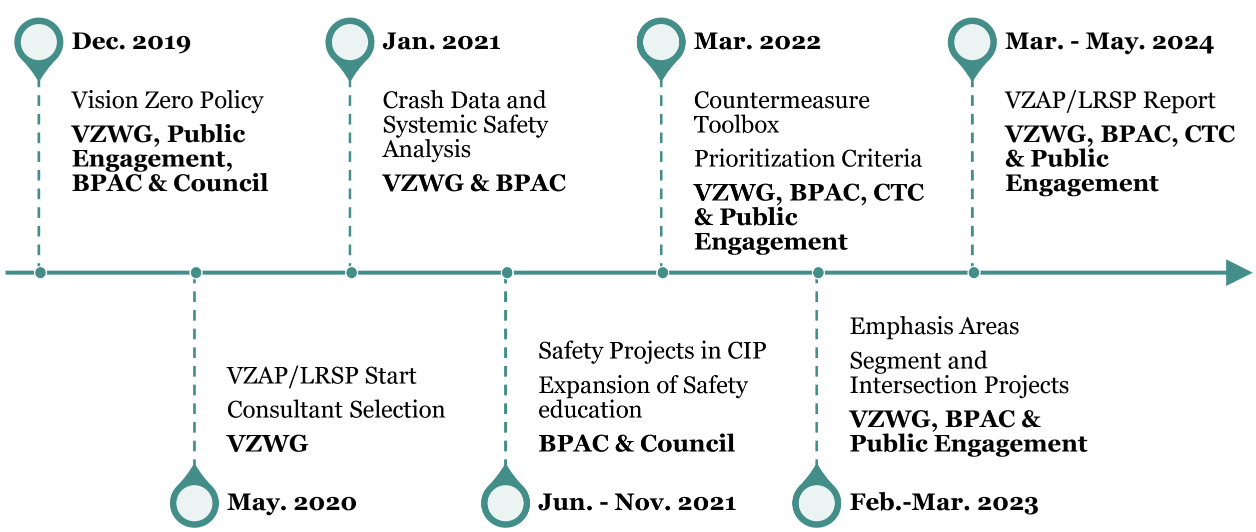
The Mountain View Bicycle Pedestrian Advisory Committee (BPAC) is a five-member committee of Council-appointed residents that advise the City Council and staff on active transportation policies, projects and programs. BPAC reviewed elements of the VZAP at their meetings on January 27, 2021, March 30, 2022, February 22, 2023, and March 27, 2024.

Additionally, BPAC has reviewed various programs or projects related to, or arising from, Vision Zero analysis including Safe Routes to School and El Camino Real Pedestrian and Bicycle Improvements project.

Community Engagement

On March 24, 2022, a community meeting was held to review crash analysis, countermeasures and prioritization criteria as well as solicit community input on traffic safety issues. A second community meeting was held on March 27, 2023, to review the VZAP prioritization process, emphasis areas, priority locations and non-infrastructure strategies. In addition, several community meetings have been held to advance specific actions including projects that have been included in the capital improvement program (CIP) as a result of Vision Zero data analysis. **Error! Reference source not found.** shows the integrated VZAP/LRSP process.

Figure 3 VZAP/LRSP Process



2 Systemic Safety Analysis

Understanding the transportation safety risks is a fundamental piece of the VZAP/LRSP and is required of the City to be eligible to apply for Highway Safety Improvement Program (HSIP) funding.

A systemic safety analysis focuses on understanding the factors associated with historic crashes to support citywide investments in countermeasures that could prevent crashes from happening at the same or similar locations. It is simultaneously a preliminary site analysis and a systemic approach. This systemic safety analysis includes identifying risk factors associated with multiple crashes, which could be addressed to enhance safety. A systemic analysis applies not only to infrastructure changes but also programming and policy items.

The systemic safety analysis for this integrated VZAP/LRSP examined California Statewide Integrated Traffic Record System (SWITRS) data from 2014 through 2019 via the Transportation Injury Mapping System (TIMS) developed by SafeTREC at the University of California, Berkeley. This data was examined to identify the who, what, where, when, and why of crashes, particularly serious injury or fatal crashes. Data on crashes that took place at railroad intersections was provided by Caltrain and the Federal Railroad Administration (FRA) and is not part of the analyzed dataset.[5] Three additional years (2019 to 2022) were added to provide an update to the overall crash analysis.

The detailed Systemic Safety Analysis is presented in **Appendix A**. Key findings are listed in the sections below.

Overall Crash Trends and Demographics

The analysis found that crashes in which someone was killed or severely injured (KSI) increased over the nine years for which the City has data, with a dip in the first year of the pandemic (Figure 4 and Figure 5).

In relation to transportation mode, almost all crashes involved people driving, however, bicyclists and pedestrians are overrepresented as crash victims. Specifically, a majority of those killed or seriously injured (KSIs) in crashes were involved in driver-bicyclist and driver-pedestrian crashes (61% of KSIs). People walking and biking were therefore disproportionately affected compared to their mode share (Figure 6).

In terms of demographics, young people, men, Black people and Latinos are overrepresented in crashes. Young adults represent 7% of the City's population yet are involved in 12% of crashes. Males represent 53% of the City's population yet are involved in 76% of the bicycle crashes and 57% of the vehicle crashes. Black people represent 2% of the City's population, but 4% of the crashes. And Latinos represents 18% of Mountain View's population but are involved in 22% of all crashes.

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[5] Consistent with the analysis carried out by the City of Mountain View in 2019 in support of their Vision Zero Policy, the analysis includes only those crashes that occurred on local streets and on State roads where the City has enforcement, access, or maintenance authority. Therefore, crashes that took place on El Camino Real and Central Expressway are included but crashes on U.S. 101, SR 85, and SR 237 are excluded. Crashes that took place at the intersection of a local street with a ramp leading to U.S. 101, SR 85, or SR 237 are also included. Data associated with crashes at road crossings is restricted to location, date, number of fatalities, and number of injuries and is therefore excluded from some of the analysis.

Figure 4 Fatal and Severe Injury Crashes per 100,000 people by year with 3-year average, 2014-2022

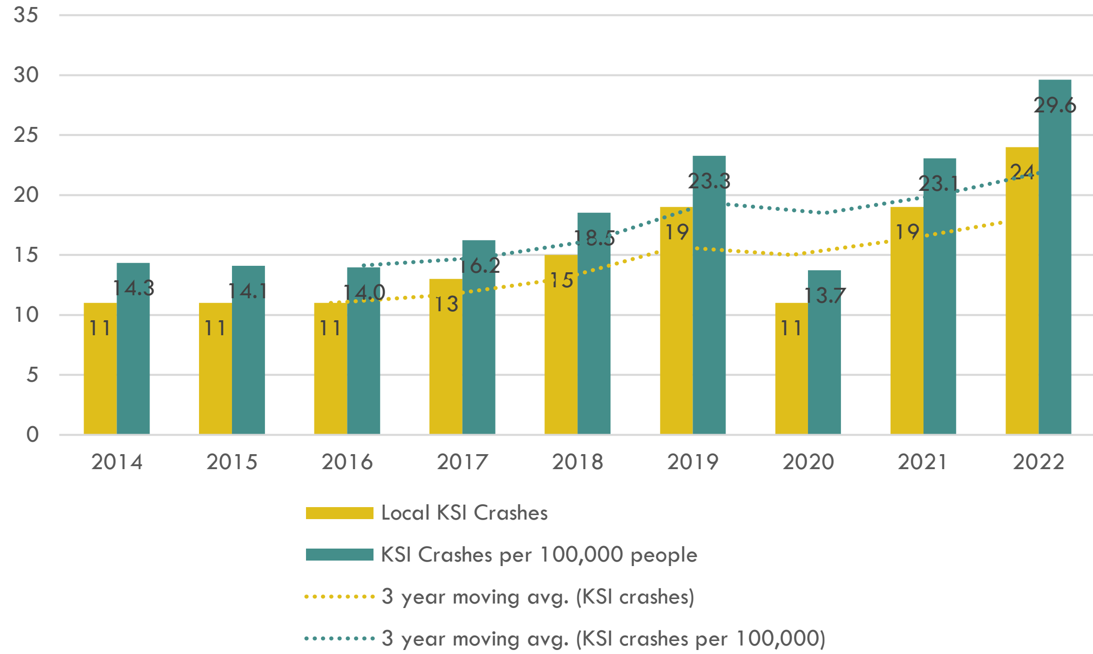
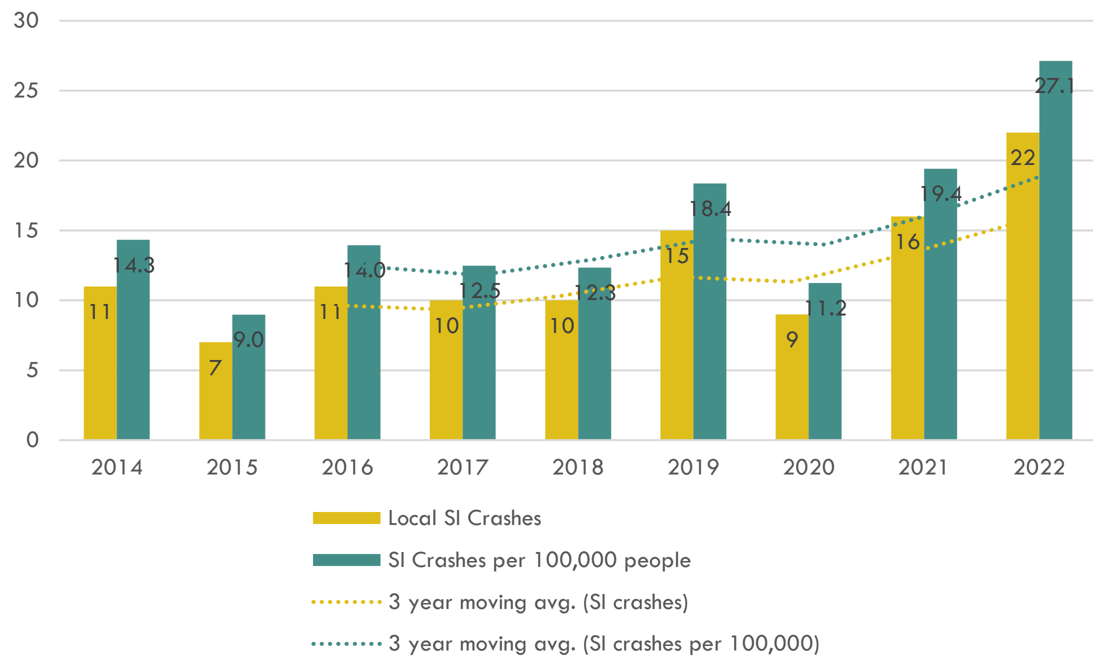
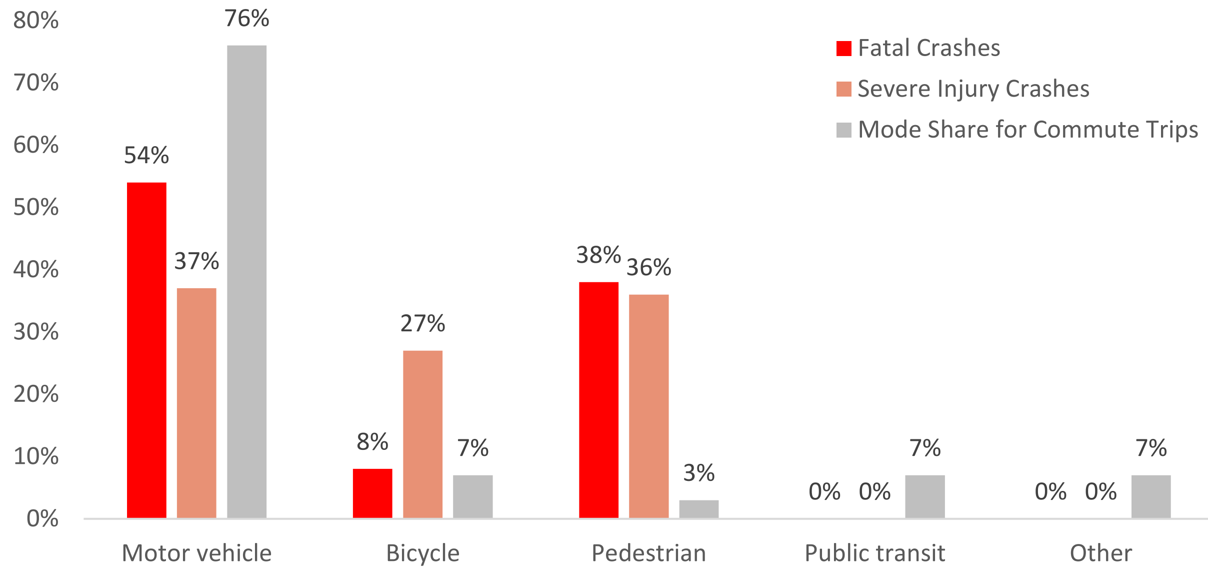


Figure 5 Severe Injury Crashes per 100,000 people by year with 3-year average, 2014-2022



Mountain View total population from US Census American Community Survey 5-year estimates for 2014-2021, and 1-year estimates for 2022, Table DP05, with 2022 provisional crash data.

Figure 6 Fatal and Severe Injury Crashes by Mode, 2014-19



High Injury Network and Safety Corridors

The Systemic Safety Analysis found that crashes were concentrated Downtown and on the High Injury Network (Figure 2). Within this network, El Camino Real is consistently the highest injury corridor. Other corridors on the City's High Injury Network include Shoreline Boulevard, Rengstorff Avenue, Middlefield Road, Central Expressway, California Street, El Monte Avenue, Old Middlefield Way, Ellis Street, and San Antonio Road.

Based on the California Vehicle Code (CVC),[6] a Safety Corridor is a roadway segment within an overall roadway network where the highest number of serious injury and fatality crashes occur. Mountain View's process for identifying the High Injury Network (HIN) under the VZAP / LRSP is consistent with the CVC Safety Corridor definition and includes the following corridors within Mountain View City limits:

1. Rengstorff Avenue from El Camino Real to Garcia Avenue/Charleston Road;
2. Shoreline Boulevard from El Camino Real to North Road;
3. California Street from San Antonio Road to Hope Street;
4. Ellis Street from Middlefield Road to Manila Avenue; and
5. El Monte Avenue from Springer Road to El Camino Real;
6. San Antonio Road from El Camino Real to Central Expressway.
7. Middlefield Road from western city limit (400 feet east of San Antonio Road) to Central Expressway;
8. Old Middlefield Way from Middlefield Road to US-101;

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[6] California Vehicle Code (CVC) Section 22358.7(a)(1) instructs Caltrans to define safety corridors in the revised California Manual on Uniform Traffic Control Devices (CA-MUTCD) based on considerations regarding the number of serious injuries and fatalities.

El Camino Real and Central Expressway are listed on the City's High Injury Network, but do not meet Safety Corridor criteria because they are not within the authority of the City of Mountain View. These roads are within Caltrans and Santa Clara County jurisdictions, respectively.

Segments identified as Safety Corridors represent approximately 7% percent of Mountain View's roadway network, which is well within the 20 percent maximum established under the CVC.

Roadway and Environmental Characteristics

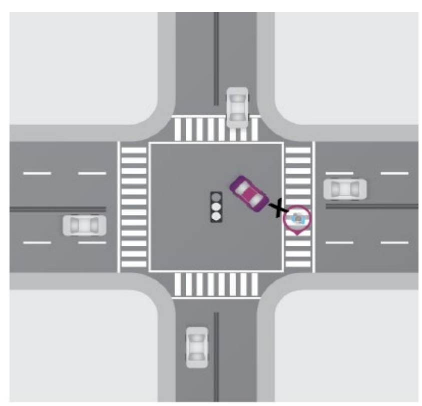
The Systemic Safety Analysis identified several key roadway and environmental characteristics that were associated with fatal and severe injury crashes. Specifically, arterial roads with a posted speed limit of above 35 mph represent 20% of the City's streets (per linear miles) and 73% of KSI crashes in Mountain View. Additionally, intersections of roadways with a posted speed limit (PSL) of 35 mph with roadways with a PSL 25 mph represent 50% of KSI crashes. Other key roadway factors include vehicular volume: Roadways with higher traffic volumes (10,000 to 20,0000 average daily trips or ADT) represent 7% of City roadways (per linear mile) and 38% of fatal crashes. Also, a majority (53%) of KSI crashes occurred at intersections.

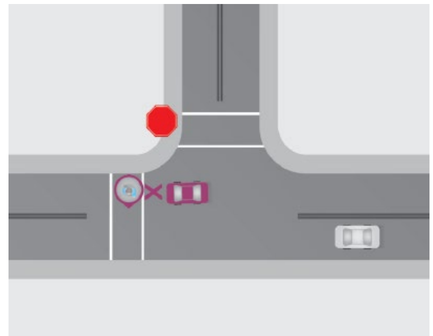
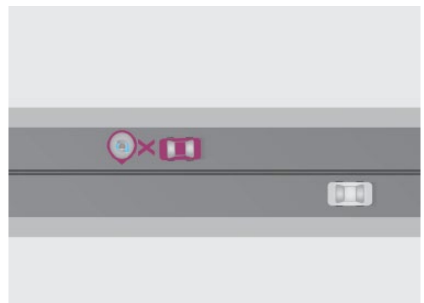
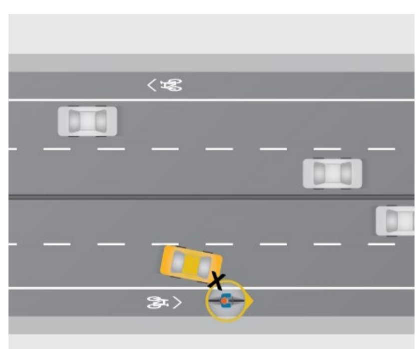
In terms of environmental and land use factors, crashes occurred more frequently during the evening peak hours from 3 P.M to 6 P.M. Almost half (44%) of all crashes occurred within ¼-mile of a school, and crashes near schools or parks were more likely to involve children. Additionally, 14% of total crashes took place within 100 feet of a transit stop, and crashes near transit disproportionately affected pedestrians and bicyclists.

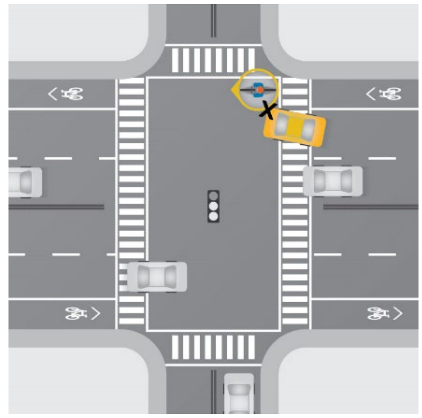
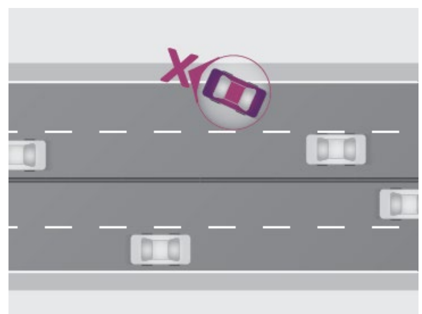
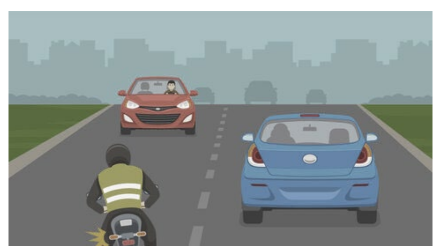
Key Maneuvers and Crash Factors

Based on the analysis, eight key maneuvers were involved in KSI crashes in Mountain View, including failure to yield to pedestrian and automobile right of way, pedestrian violation, unsafe speed and driving or bicycling under the influence of alcohol or drugs. The most typical types of maneuvers involved in KSI crashes are listed in Figure 7 below.

Figure 7 Key Maneuvers Involved in KSI Crashes, 2014-2019

Crash Maneuver Type	Illustration
Driver making left turn and pedestrian crossing in a crosswalk at a signalized intersection without protected left turns	

Crash Maneuver Type	Illustration
Driver proceeding straight and pedestrian in a crosswalk at a one- or two-way, stop-controlled intersection	
Driver proceeding straight and pedestrian crossing between intersections	
Bicyclist proceeding straight broadsided by a driver at a signalized intersection	
Bicyclist involved between intersections (e.g. sideswipe)	

Crash Maneuver Type	Illustration
Driver turning right, bicyclist crossing (e.g. right hook)	
Driver hits driver (broadside) between intersections (e.g. driveway t-bone)	
Driver runs off road (e.g. fixed object) and/or the wrong side of the road (e.g. wrong way)	
Driver or rider operating on the wrong side of the road (e.g. wrong way)	

3 Emphasis Areas

WHAT ARE EMPHASIS AREAS?

Emphasis areas represent topics that need to be addressed to achieve Vision Zero goals. The emphasis areas were identified through the crash and systemic analysis and vetted through stakeholder and community engagement (as described in Chapter 1).

The emphasis areas further define Mountain View's Vision Zero goals and align with Council's 2019 Vision Zero Policy. The areas also complement state-level safety planning goals and Challenge Areas identified in the California Strategic Highway Safety Plan (CA SHSP), an important consideration for future planning and funding. The overall goal for each of the eight emphasis areas are outlined in Figure 8.

Figure 8 VZAP/LRSP Emphasis Areas

Emphasis Area	Goal Based on Crash Analysis
High Injury Network	Achieve Vision Zero policy goals of reducing severe injury crashes and eliminating fatalities
Equity Priority Location	Improve traffic safety for members of the Spanish speaking community throughout the city
School and Senior Center Routes	Reduce crashes and KSIs along school routes and routes to the senior center
Pedestrian Crossings	Reduce pedestrian crashes at existing intersections and midblock crossing locations
Bicycle Safety	Reduce bicycle crashes throughout the city
Driver Behavior	Increase driver attention to the roadways
Speed Management	Reduce prevailing speeds by roadway design on streets in Mountain View
Data and Technology	Increase transportation safety through use of data and future thinking including identifying data gaps in current data system, develop city policies that addresses emerging technology such automated vehicles

4 Engineering Countermeasures

The countermeasure toolbox provides an overview of infrastructure improvements that are best suited and demonstrated to address the specific types of fatal and severe crashes. The main sources for countermeasures include the Federal Highway Administration (FHWA)'s Proven Safety Countermeasures, other FHWA guidance such as FHWA Clearinghouse. The implementation of safety countermeasures will require further engineering analysis, feasibility study and design evaluation.

Appendix B provides a toolbox of safety countermeasures including a description of each countermeasure recommended for Mountain View, along with supporting documentation, feasibility considerations, and candidate locations that might be appropriate for their application. This information is an essential part of a LRSP in order to be completed in accordance with Caltrans requirements. Most of the listed safety countermeasures have already been used in some contexts in Mountain View.

Error! Reference source not found. and the following section summarizes common crash types and the safety countermeasures that can be used to address them. These countermeasures can be generally categorized as pedestrian improvements, bicycle improvements, and other multimodal improvements.

Pedestrian improvements that are recommended to enhance safety include the following:

- Pedestrian signal improvements such as leading pedestrian intervals (LPIs) and decreased walking speed for pedestrian clearance intervals;
- Protected left turns and separated phases for large multi-lane intersections;
- Curb radius reductions;
- Curb extensions;
- High-visibility crosswalks;
- Medians and pedestrian refuge islands;
- Rectangular rapid flashing beacons (RRFBs);
- Pedestrian hybrid beacons (PHBs); and
- Access management such as consolidation of driveways.

Bicycle improvements for enhancing safety include the following:

- Bike signal phasing;
- Bike treatments at intersections such as green bike boxes, and two-stage turn queue boxes;
- Protected intersections;
- Class IV protected bikeways;
- Road diets and roadway configuration changes such as reducing the number or width of travel lanes, widening sidewalk and slip lane removal; and
- Bicycle boulevard treatments.

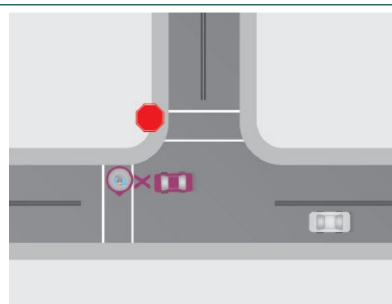
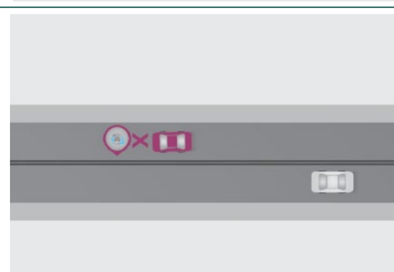
Other multimodal improvements to enhance safety include the following:

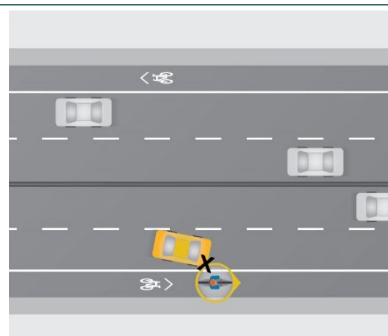
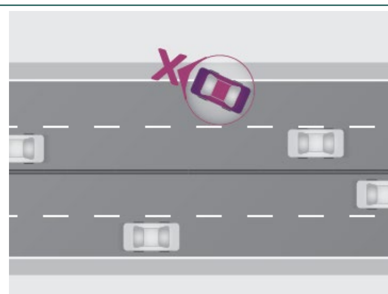
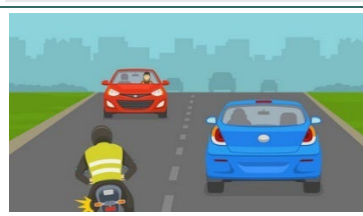
- Enhanced delineation such as pavement markings, and enhanced reflectivity of signage;
- Improved intersection and crosswalk lighting, extension lines, and signage;

- Operational improvements such as no right turn on red restrictions and speed management by design;
- Traffic calming measures including but not limited to:
  - Horizontal deflections such as chicane, traffic circles, and roundabouts,
  - Vertical deflections such as speed humps, speed tables, and raised crosswalks,
  - Narrowing such as reductions in travel lane widths and roadway widths, and
  - Trees in the public park strip or frontage; and
- Speed feedback signs.

Error! Reference source not found. provides a quick reference guide of the most common fatal and severe crash types in Mountain View and the countermeasures that could be used to address them.

Figure 9 Summary of Common Fatal and Severe Crash Types and Potential Countermeasures

Common KSI Crash Types in Mountain View	Crash Type Illustration	Potential Safety Countermeasures
Driver making left turn hits pedestrian crossing in crosswalk at signalized intersection		▪ Pedestrian signal improvements ▪ Protected left turns (signalized intersection) ▪ Curb radius reduction or curb extensions ▪ High-visibility crosswalks ▪ Median and crossing islands ▪ Protected intersections
Driver proceeding straight hits pedestrian in crosswalk at one or two-way stop-controlled intersection		▪ Curb radius reductions or curb extensions ▪ High-visibility crosswalks ▪ Median and crossing islands ▪ Rectangular Rapid Flashing Beacons on uncontrolled approach ▪ Pedestrian hybrid beacons ▪ Access management
Driver proceeding straight hits pedestrian crossing between intersections		▪ New or improved mid-block crossing elements such as: ▪ Curb extensions ▪ High-visibility crosswalks ▪ Median and crossing islands ▪ Rectangular Rapid Flashing Beacons ▪ Pedestrian hybrid beacons ▪ Road diets ▪ Traffic calming

Common KSI Crash Types in Mountain View	Crash Type Illustration	Potential Safety Countermeasures
Driver proceeding straight at signalized intersection hits bicyclist proceeding straight (broadside)		▪ Median and crossing islands ▪ Bike signal phasing ▪ Bike treatments at intersections ▪ Protected intersections
Driver hits bicyclist between intersections		▪ Class IV protected bikeways ▪ Road diets ▪ Bicycle boulevards ▪ Access management ▪ Speed management
Driver hits driver (broadside) between intersections		▪ Road diets ▪ Access management ▪ Speed management ▪ Traffic calming ▪ Improved visibility of conflicting traffic
Driver runs off road (e.g. fixed object) and/or the wrong side of the road (e.g. wrong way)		▪ Enhanced delineation such as pavement markings; and ▪ Improved intersection, lighting and signage
Driver or rider operating on the wrong side of the road (e.g. wrong way)		▪ Improved lighting, extension lines and signage

5 Candidate Locations

This section summarizes candidate locations for safety interventions based on the findings of the crash data analysis. Candidate locations are identified based on:

- The presence of roadway and land use factors associated with fatal and severe crashes in the city (LRSP methodology); or
- A history of crashes, especially fatal and severe injury crashes, in that particular location (VZAP methodology).

The two methods will allow Mountain View to select the highest priority locations for improvement from a list of potential projects that includes places where crashes have already occurred, and places where there is opportunity to proactively and systemically enhance safety to prevent fatal and severe crashes in the future.

This section also describes the prioritization method that was used to select the five highest priority locations for design and funding.

ROADWAY AND LAND USE FACTORS

The following roadway and land use characteristics were associated with a high incidence of fatal and severe injury crashes in Mountain View from 2014 through 2019. Locations with these characteristics are mapped in Figure 10.

- Streets with posted speed of 35 mph or above, which represent 20% of streets (per linear mile) and 73% of KSI crashes in Mountain View;
- Intersections of 35 mph streets with 25 mph streets, which represent 50% of KSI crashes;
- Signalized intersections, which represent 30% of KSI crashes;
- Two-way-stop controlled intersections, which represent 18% of all KSI crashes and 45% of KSI crashes involving people walking; and
- Commercial areas and Precise Plan zones, including Downtown Mountain View, which represent 60% of crashes, about 40% of land area. (The Castro Pedestrian Mall program was not implemented at the start of this study.)

Figure 10 Locations of Roadway and Land Use Factors Associated with Fatal and Severe Crashes

HIGH CRASH LOCATIONS

The City of Mountain View Vision Zero Working Group identified a High Injury Network. Figure 11 identifies the specific segments of that network that have the highest rate per mile of fatal and severe crashes, roadway and land use factors, and common crash types. Note that crash data used for this plan is prior to Castro Pedestrian Mall implementation, which was implemented summer 2020.

Figure 11 High Crash Street Segments (Top Ten from 2014-2019 based on KSI Crashes per Mile)

Location	Total Crashes	KSI Crashes	KSI Crashes per Mile	Roadway and Land Use Factors	Common Crash Types in this Location
East El Camino Real (east of Grant Rd)	61	9	10.04	▪ 40 mph ▪ Commercial / Precise Plan	▪ Driver right turn with pedestrian ▪ Driver left turn (motor vehicle only)
Ellis St (E Middlefield Rd to Manila Ave)	16	4	5.68	▪ 40 mph ▪ Commercial / Precise Plan	▪ Driver ran off road ▪ Motorcycle involved
N Rengstorff Ave (Central Expwy to Middlefield Rd)	45	3	4.69	▪ 35 mph ▪ Commercial / Precise Plan	▪ Driver left turn with bicyclist or pedestrian ▪ Pedestrian crossing between intersections
Amphitheatre Pkwy (Garcia Ave to Shoreline Blvd)	23	3	4.45	▪ 35 mph	▪ Driver proceeding straight with bicyclist (sideswipe)
N Shoreline Blvd (Central Expwy to Middlefield Rd)	33	3	4.42	▪ 35 mph ▪ Commercial / Precise Plan	▪ Driver ran off road ▪ Driver left turn with bicyclist
El Monte Ave (Full Extent in Mountain View)	13	2	4.34	▪ 35 mph ▪ Commercial / Precise Plan	▪ Pedestrian crossing in crosswalk and driver proceeding straight
California St (Rengstorff Ave to Shoreline Blvd)	34	4	4.31	▪ 35 mph	▪ Bicycle involved
S Rengstorff Ave (El Camino Real to Central Expwy)	44	2	3.55	▪ 35 mph ▪ Commercial / Precise Plan	▪ Bicycle involved
San Antonio Rd (Full Extent in Mountain View)	30	2	3.48	▪ 35 mph ▪ Commercial / Precise Plan	▪ Bicycle or pedestrian at signalized intersection
Castro St (Central Expressway to Miramonte Ave /Marilyn Dr)	54	4	3.46	▪ Commercial / Precise Plan	▪ Pedestrian crossing between intersections

Data analysis conducted for the Local Road Safety Plan found that people walking and biking suffer from fatal and severe crashes at a disproportionately high rate in Mountain View compared to their mode share. During the period from 2014-2019 the City's highest-crash intersections for people walking and biking include El Camino Real/Sylvan, Showers/Latham, Rengstorff/Latham, Charleston/Huff, El Monte/Marich, El Camino Real/Dale, San Antonio/Fayette, Ortega/Latham and Shoreline/Villa. Figure 12 lists these locations along with information on total crashes, total fatal and severe crashes, and roadway and land use factors.

Four intersections have been upgraded since the analysis period: Showers/Latham crosswalk was upgraded from in-pavement flashers to RRFBs; El Monte/Marich was upgraded to an LED-enhanced crosswalk with pedestrian refuge island; Shoreline/Villa was reconfigured with a new marked crosswalk, protected left turns, and slip lane removal; and Charleston/Huff was converted to a 8-phase signal to eliminate left turn conflicts. Additional improvements are in design for Rengstorff/Latham.

Figure 12 Crash Intersections for People Walking and Biking (Top Ten, Ranked by Total Injury Crashes)

Location	Ped/Bike Crashes	KSI Crashes	Roadway and Land Use Factors	Crash Types
El Camino Real and Sylvan Ave / The Americana*	3	2	▪ Signalized ▪ 40 mph with 25 mph posted speed limits ▪ Commercial/ Precise Plan	▪ Driver right turn with bicyclist proceeding straight
Showers Dr and Latham St	6	1	▪ Three-way intersection (2023 RRFB on Latham and Stop control on Showers) ▪ 35 mph with 25 mph posted speed limits ▪ Commercial/ Precise Plan	▪ Driver and bike proceeding straight (broadside) ▪ Pedestrian in crosswalk with driver left turn or straight
Rengstorff Ave and Latham St	5	1	▪ Signalized ▪ 35 mph with 25 mph posted speed limits	▪ Driver left turn with pedestrian
Charleston Rd and Huff Ave	5	1	▪ Signalized ▪ 35 mph with 25 mph posted speed limits ▪ Commercial/ Precise Plan	▪ Driver left turn with pedestrian in crosswalk
El Monte Ave and Marich Way	4	1	▪ Three-way intersection (2019 LED enhanced crosswalk on El Monte Ave and stop control on Marich Way) ▪ 35 mph with 25 mph posted speed limits	▪ Pedestrian crossing in crosswalk
El Camino Real and Dale Ave*	3	1	▪ Three-way intersection (Stop controlled on Dale) ▪ 30 mph with 40 mph posted speed limits ▪ Commercial/ Precise Plan	▪ Driver right turn with pedestrian in crosswalk
San Antonio Rd and Fayette Dr	3	1	▪ Signalized ▪ 35 mph with 25 mph posted speed limits ▪ Commercial/ Precise Plan	▪ Bike-involved
Ortega Ave and Latham St	3	1	▪ Commercial/ Precise Plan	▪ Driver left turn with pedestrian in crosswalk
Shoreline Blvd and Villa St	9	0	▪ Signalized (2022 reconfiguration and slip lane removal) ▪ 35 mph with 30 mph posted speed limits	▪ Driver left turn with bicyclist or pedestrian

*Intersections not owned by City of Mountain View

Figure 13 lists the top ten intersections for motor-vehicle-only crashes in the 2014-2019 analysis period. These include SR237/Middlefield, Moffett/Central Avenue, Rengstorff/Old Middlefield, California/Franklin, El Camino Real/Shoreline, Plymouth/Joaquin, El Camino Real;/Phyllis, Central Expressway/Rengstorff, Rengstorff/Latham, and Shoreline/Villa. Most fatal and severe crashes involving motor vehicles took place between intersections during this study period.

Since the analysis period, safety enhancements have been implemented at Shoreline/Villa, and California/Franklin. Additional improvements are being planned or designed for SR 237/Middlefield, Moffett/Central Ave, El Camino Real/Shoreline, El Camino Real/Phyllis, Central Expressway/Rengstorff, and Rengstorff/Latham.

Figure 13 Crash Intersections for Motor Vehicles (Top Ten, Ranked by Total Injury Crashes)

Location	Total Motor Vehicle Crashes	Motor Vehicle KSI Crashes	Roadway and Land Use Characteristics	Crash Types
SR 237 on/off ramps and Middlefield Rd*	43	2	▪ Signalized ▪ ramps speed not available	▪ Broadside ▪ Signal violation
Moffett Blvd and Central Ave	6	1	▪ Signalized ▪ 35 mph with 25 mph posted speed limits	▪ Broadside ▪ Signal or ROW violation
Rengstorff Ave and Old Middlefield Way	5	1	▪ Signalized ▪ 35 mph with 35 mph posted speed limits	▪ Broadside ▪ Signal violation
California St and Franklin St	10	0	▪ Two-way stop (2020) ▪ 35 mph with 25 mph posted speed limits	▪ Broadside ▪ ROW violation
El Camino Real and Shoreline Blvd*	10	0	▪ Signalized ▪ 35 mph with 35 mph posted speed limits	▪ Broadside ▪ Signal violation
Plymouth Street and Joaquin Ave	8	0	▪ Four-way stop ▪ 25 mph with 25 mph posted speed limits	▪ Broadside ▪ ROW violation
West El Camino Real and Phyllis Ave*	8	0	▪ Signalized ▪ 35 mph with 25 mph posted speed limits	▪ Unsafe speed/Rear end ▪ Signal violation/Broadside
Central Expwy and Rengstorff Ave*	7	0	▪ Signalized ▪ 45 mph with 35 mph posted speed limits	▪ Broadside ▪ Signal or ROW violation
Rengstorff Ave and Latham St	6	0	▪ Signalized ▪ 35 mph with 25 mph posted speed limits	▪ Broadside ▪ Signal or ROW violation
Shoreline Blvd and Villa St	6	0	▪ Signalized (2022 reconfiguration and slip lane removal) ▪ 35 mph with 30 mph posted speed limits	▪ Broadside ▪ Signal or ROW violation

*Intersections not owned by City of Mountain View

High crash intersections for walking, biking and motor vehicles as well as high KSI roadway segments and the high injury network are displayed in Figure 14.

Figure 14 Top 10 Crash Locations, All Modes

PRIORITIZATION METHOD

In conjunction with community members and BPAC, the project team developed three criteria to prioritize key street segments and intersections for the installation of countermeasures. These criteria include:

- History and severity of crashes,
- Equity, and
- Proximity to key destinations.

More detailed information on the criteria and prioritization method is provided in **Appendix 3**.

The above criteria were applied to twenty-seven key segments and twenty-two key intersections in the City in order to develop a prioritized list of segments and intersections. The candidate segments and intersections were identified through the systemic safety analysis. As displayed in Figure 15, Figure 16, and Figure 17, each key segment was evaluated, with a total score that reflects a combination of the three key criteria.

Based on this analysis, Rengstorff Avenue corridor emerged as the highest VZAP/LRSP priority in the City. Other high priority segments include portions of El Camino Real, Shoreline Boulevard, California Street, El Monte Avenue, San Antonio Road, Middlefield Road, Latham Street, Grant Road, and Villa Street.

Many of these segments are associated with safety enhancements that have been implemented since the study period; have funding through construction in the next two years through the City Capital Improvement Program (CIP); or have Council approved conditions of approval for improvements that would be implemented by private development in the next five years. Locations with implemented, funded or conditioned improvements that fully address the respective maneuvers were not carried forward in the prioritization process.

Figure 15 Total Score and Project Information for Key Segments

Corridor	Segment	Score	Projects Constructed since 2019 or Fully Funded for Construction
S Rengstorff Ave	El Camino Real – Central Expressway	11	-
W El Camino Real*	Rengstorff Ave – Castro St	10	CIP 20-61 High Visibility Crossings, Pedestrian Hybrid Beacon (Pettis), Protected Bikeways
N Shoreline Blvd	Central Expressway – Middlefield Rd	10	CIP 17-41 Protected Intersection at Montecito, Protected Bikeways from Montecito to Middlefield.
N Rengstorff Blvd	Central Expressway – Middlefield Rd	10	-
California St	Rengstorff Ave – Shoreline Blvd	10	CIP 21-40 Pilot Road Diet, High Visibility Crossings, Midblock Crossings, Parking Protected Bikeways, and Protected Intersections
S Shoreline Blvd	El Camino Real – Central ExpressWay	9	CIP 21-37 Shoreline Pathway from Wright to Villa, CIP 16-27 Shoreline/Villa High Visibility Crossings, Slip Lane Removal
E El Camino Real*	East of Grant Rd	9	CIPs 20-61 & 22-29 High Visibility Crossings, Pedestrian Hybrid Beacon (Crestview), Protected Bikeways

Corridor	Segment	Score	Projects Constructed since 2019 or Fully Funded for Construction
El Monte Ave	Full Extent	8	CIPs 19-61 & 21-38 Road Diet, High Visibility Crossings, Buffered Bike Lanes, Green Street Elements, Slip Lane Removal, Protected Intersections (where feasible) pending additional funding
San Antonio Rd	Full Extent (in Mountain View)	8	-
E Middlefield Rd	East of SR 85	7	CIP 24-28 High-visibility crossings, protected bikeways, and protected intersections on Middlefield Road from Moffett Boulevard to Bernardo Avenue.
Latham St	West of Shoreline Blvd	7	High Visibility Crosswalks (completed)
Grant Rd	Southern City Limits – El Camino Real	7	CIP 21-39 Pedestrian Hybrid Beacon (Grant/Sleeper)
Villa St	Full Extent	7	High Visibility Crossings (Shoreline), Speed Humps
California St	West of Rengstorff Ave	7	CIP 21-40 California Complete Streets Pilot (from Shoreline to Showers) – Road Diet, High Visibility Crossings, Midblock Crossings, Parking Protected Bikeways & Protected Intersections.
N Rengstorff Ave	North of Middlefield Rd	7	-
Central Expressway*	Shoreline Blvd – Bernardo Ave	7	Managed and maintained by Santa Clara County
Old Middlefield Way	Full Extent	7	-
E Evelyn Ave	Full Extent	6	-
Amphitheater Pkwy	Full Extent	6	Protected bikeways from Bill Graham to Shoreline, protected intersection treatments at Shoreline/Amphitheater
N Whisman Road	Central Expressway – Fairchild Dr	6	-
Miramonte Ave	El Camino Real – Southern City Limits	6	CIP 20-01 Rectangular Rapid Flashing Beacon and Bulbouts at Miramonte/Hans, Road Diet and Buffered or Protected Bikeways from Cuesta to Castro, Landscaped Medians Hans to Castro, Sidewalk Gap Closure Starr to Barbara
Sierra Vista Ave	Full Extent	6	CIP xx All-way stop at Sierra Vista/Colony
Cuesta Dr	Miramonte Ave – Grant Rd	6	Buffered bike lanes from Springer to Miramonte
E Dana St	Calderon Ave – Moorpark Ave	5	-
Garcia Ave	Bayshore Blvd – Amphitheater Pkway	4	-

*Intersections not owned by City of Mountain View

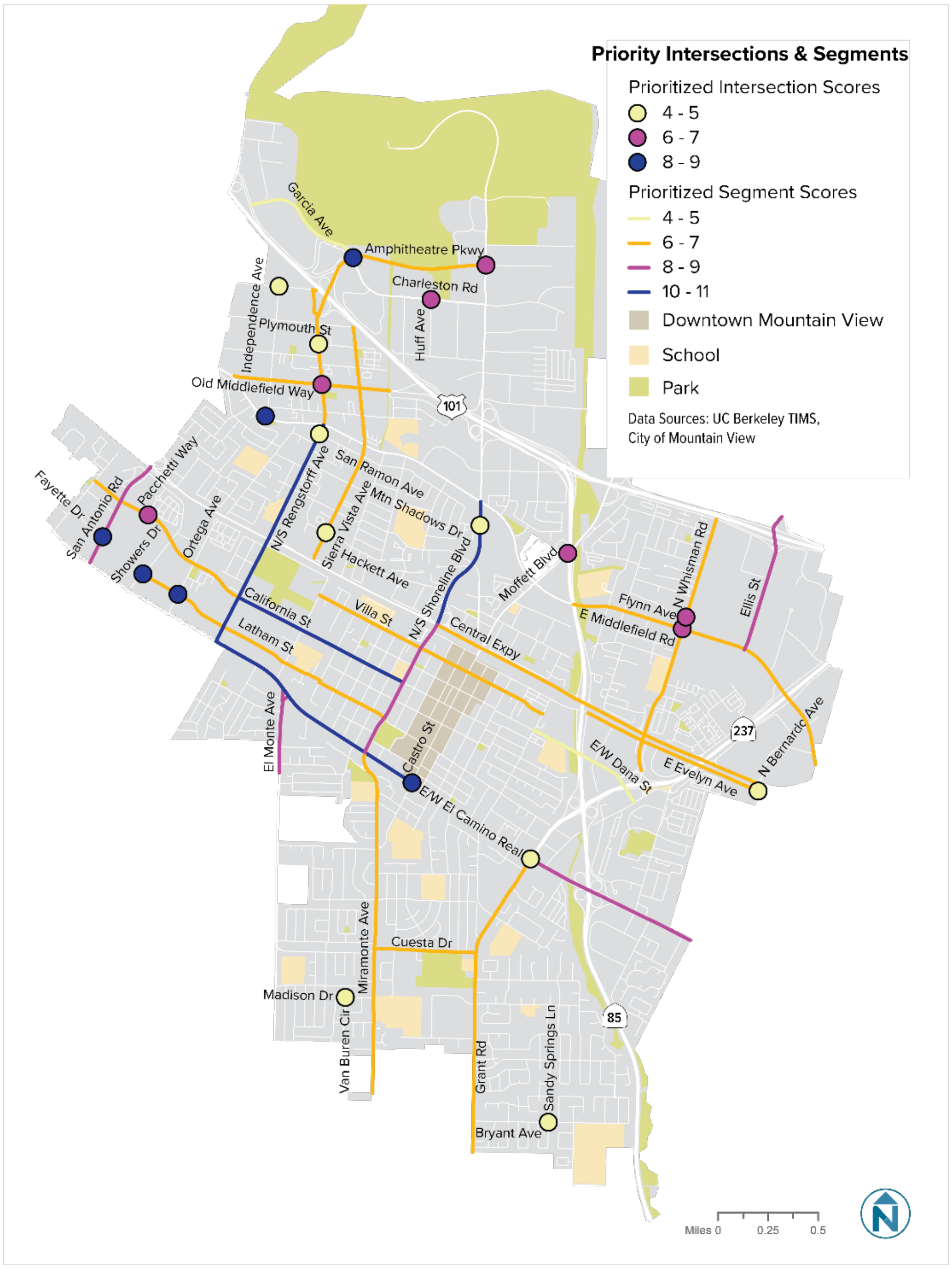
The same scoring and screening process was applied to the twenty-two candidate intersections. Intersections that emerged as the highest priorities include El Camino Real/Castro, Showers/Latham, Middlefield/Independence, Charleston/Amphitheater, Ortega/Latham, San Antonio/Fayette, Moffett/SR-85, Rengstorff/Old Middlefield, California/Pacchetti, and Whisman/Middlefield. These intersections as well as scoring results and funded projects are listed in Figure 16.

Figure 16 Total Score and Project Information per Key Intersection

Street 1	Street 2	Score	Completed and Funded Project through Construction
El Camino Real	Castro St	9	CIPs 20-61 & 22-29 High Visibility Crossings, Protected Bikeways
Showers Dr	Latham St	8	RRFB Crossing Showers
Middlefield Rd	Independence Ave	8	LED Enhanced Crosswalk
Charleston Rd	Amphitheater Pkwy	8	CIP 16-59 (Huff Ave to Salado Dr) Protected bikeways, protected intersections, sidewalks, and dedicated transit lanes
Ortega Ave	Latham St	8	
San Antonio Rd	Fayette Dr	8	Partial Signal Upgrade
Charleston Rd	Huff Ave	7	High Visibility Crossings, Transit Lanes Traffic signal upgrade (protected left signal)
Moffett Blvd	SR 85	7	High Visibility Crossings
Rengstorff Ave	Old Middlefield Way	7	
California Street	Pacchetti Way	7	Traffic signal upgrade to eliminate the left turn conflicts with peds crossing California by implementing split phasing in the northbound and southbound direction
Whisman Rd	Middlefield Rd	6	CIP 24-28 High Visibility Crossing, Protected Intersection
Whisman Rd	Flynn Ave	6	
Shoreline Blvd	Amphitheater Pkwy	6	Protected Intersection (southside)
E El Camino Real	Grant Rd	5	Bike lanes on El Camino Real in 2024
Sierra Vista Ave	Hackett Ave	5	
Mountain Shadows Dr	Shoreline Blvd	5	
Rengstorff Ave	San Ramon Ave	5	
Charleston Rd	Independence Ave	5	
Bryant Ave	Shady Spring Ln	4.5	
Rengstorff Ave	Plymouth St	4	
Evelyn Ave	Bernardo Ave	4	
Madison Dr	Van Buren Circ	4	

The geographic distribution of the scored segments and intersections is illustrated in Figure 17.

Figure 17 Geographic Distribution of Scored Key Segments and Intersections



In addition to the three prioritization criteria, additional criteria related to the proven effectiveness of the countermeasures, engineering feasibility, opportunities to coordinate improvements with repaving or utility work, and the availability and timing of grant or other funds will be considered when projects are proposed during the capital improvement program (CIP) process. In general, City staff only applies for grant funds for projects that have already been identified as priorities through Council-approved plans processes (such as AccessMV, the VZAP/LRSP, and the forthcoming Active Transportation Plan) and are expected to perform competitively in the respective grant program.

6 Recommendations

The output of an VZAP/LRSP is a list of recommended prioritized projects to improve road safety in a community. These projects may be both infrastructure and non-infrastructure projects, which is the case for the recommendations presented in this section. The recommendations are aligned with the goals of the City of Mountain View Vision Zero Policy as well as current and future priority planning and programming efforts.

INFRASTRUCTURE RECOMMENDATIONS

As discussed in Chapter 2, the following safety corridors within Mountain View City limits have been identified through the VZAP/LRSP process:

1. Rengstorff Avenue from El Camino Real to Garcia Avenue/Charleston Road;
2. Shoreline Boulevard from El Camino Real to North Road;
3. California Street from San Antonio Road to Hope Street;
4. Ellis Street from Middlefield Road to Manila Avenue; and
5. El Monte Avenue from Springer Road to El Camino Real;
6. San Antonio Road from El Camino Real to Central Expressway;
7. Middlefield Road from western city limit (400 feet east of San Antonio Road) to Central Expressway; and
8. Old Middlefield Way from Middlefield Road to US-101.

Based on Caltrans guidance for developing a LRSP, more specific infrastructure recommendations and priorities are provided below. Note that all recommendations still require further engineering review to determine design adequacy and feasibility.

Prioritized Corridor Segments and Intersections

The following are the prioritized corridor segments and intersections for infrastructure improvements. These lists account for prioritization criteria related to crash history, equity and proximity to destinations. In addition, the lists account for planned network improvements that are funded and included in the City's approved capital improvement program (CIP).

Recommended improvements indicated in Figure 18 and Figure 19 reflect key crash concerns and City plans and subject to further engineering feasibility analysis. Additionally, recommended improvements may be subject to approval by another agency such as Caltrans which owns and regulates State Routes including El Camino Real; the County of Santa Clara which owns and regulates Central Expressway; and Valley Water which oversees waterways such as Stevens Creek Trail at Middlefield Road.

Figure 18 Recommended Safety Corridor Projects

ID	Corridor	Segment / Location	Recommended Improvements beyond FY2023-24[7]	Other Supporting Documents
S-1	Rengstorff Ave	El Camino Real – Middlefield Rd	Rengstorff Avenue Green Complete Streets (Appendix D)	CIP 27-xx Rengstorff GCS Study
S-2	El Camino Real	Intersections of Escuela, El Monte, Shoreline, Calderon, Sylvan	Protected Intersections (CIP 22-29 ECR/Escuela/El Monte, 27-xx El Camino Real Construction)	El Camino Real Streetscape Plan
S-3	Shoreline Blvd	El Camino Real – Middlefield Rd	Protected Bikeways from El Camino Real to Montecito	Shoreline Boulevard Corridor Study
S-4	California St	Showers Drive – Shoreline Blvd	Permanent Installation – pending pilot results (26-xx California Construction Showers-Shoreline)	21-40 California Complete Street Pilot and evaluation
S-5	El Monte Ave	City Limits to El Camino Real	El Monte Corridor Improvements (21-38 pending additional funding)	El Monte Corridor Improvements (19-61) & El Camino Real Streetscape Plan
S-6	Ellis St	Full Extent	Protected Bikeways	
S-7	San Antonio Rd	Full Extent (in Mountain View)	Complete Streets Overpass (by Caltrain with County of Santa Clara & City of Palo Alto).Project schedule to be determined.	-
S-8	E Middlefield Rd	East of SR 85	Midblock Crossing at LRT and Sidewalk over SR 85 and Stevens Creek Trail	East Whisman Precise Plan & CIP 25-xx Middlefield Road Across SR85, Feasibility Study
S-9	Latham St	West of Shoreline Blvd	Sharrows, Curb Extensions or Splitters, Advance Stop Bar, High Visibility Crosswalks, Bike Boulevard Signs and Markings and Speed Humps West of Escuela St	16-38 Latham/Church Bike Boulevard (pg. 26-27, 33-35)
S-10	Grant Rd	City Limits – El Camino Real	High Visibility Crosswalks, New Bikeways (Martens-El Camino Real)	-
S-11	Central Expressway	Shoreline Blvd – Bernardo Ave	High Visibility Crosswalks, Protected Bikeways (by County of Santa Clara)	SCC Active Transportation Plan (underway)
S-12	Old Middlefield Way	Full Extent	High Visibility Crossings, Protected Bikeways	Bicycle Transportation Plan
S-13	E Evelyn Ave	Full Extent	Bikeways (CIP 25-xx & 27-xx Evelyn Bikeway Design, Construction)	MV Transit Center Master Plan
S-14	Amphitheater Pkwy	Full Extent	Protected Bikeways	North Bayshore Circulation Study Table 1

[7] CIP References are based on the FY2023-24 Budget as outlined in the June 13, 2023 City Council Item 6.2 Attachment 1

ID	Corridor	Segment / Location	Recommended Improvements beyond FY2023-24[7]	Other Supporting Documents
S-15	N Whisman Road	Central Expressway – Fairchild Dr	Complete Streets	East Whisman Precise Plan Table 19
S-16	Miramonte Ave	El Camino Real – City Limits	Complete Streets Upgrades Castro to El Camino Real (23-31) & Southern City Limits to Cuesta	Measure B funded Miramonte Phase 2 Feasibility Study
S-17	Sierra Vista Ave	Full Extent: Silverwood Ave – Rengstorff Ave	Bike Boulevard Treatments	Bicycle Transportation Plan
S-18	Cuesta Dr	Miramonte Ave – Grant Rd	Potential Road Diet (where feasible), Hi Viz Crossings, Protected Bikeways from Miramonte to Grant	Pedestrian Master Plan, Bicycle Transportation Plan
S-19	E Dana St	Calderon Ave – Moorpark Ave	Speed reduction, Potential Road Diet, Curb radii reduction, Hi Viz Crossing, Slip Lane Removal, Protected bikeways over SR 85	Bicycle Transportation Plan, Safe Routes to School Suggested Maps
S-20	Garcia Avenue	Bayshore Blvd – Amphitheater Parkway	Protected Bikeways	North Bayshore Circulation Study

Figure 19 Recommended Safety Intersection Projects

Rank	Street 1	Street 2	Recommended Improvements beyond FY2023-24[8]	Source Document
I-1	El Camino Real	Castro Street	Protected Intersection (CIP 25-xx, ECR/Castro)	El Camino Real Streetscape Plan
I-2	Middlefield Rd	Independence Ave	Median crossing island, pedestrian hybrid beacon, and improved intersection lighting	
I-3	Charleston Rd	Amphitheater Pkwy	High Visibility Crossing, Protected Intersection	North Bayshore Circulation Study
I-4	Ortega Ave	Latham St	Curb extension, high-visibility crosswalk, traffic calming with traffic circle	Latham Bike Boulevard Council Direction
I-5	Moffett Blvd	SR 85	Protected Bikeways (24-03)	One Bay Area Grant 3 (OBAG3)
I-6	Rengstorff Ave	Old Middlefield Way	High Visibility Crossing	CIP 27-xx Rengstorff GCS Study
I-7	California Street	Pacchetti Way	Pedestrian Signal Modification, High Visibility Crosswalk, Median Crossing, Curb Radius Reduction, Bike Signal Phasing, Bike Treatment at intersection	San Antonio Precise Plan

[8] CIP References are based on the FY2023-24 Budget as outlined in the June 13, 2023 City Council Item 6.2 Attachment 1

Rank	Street 1	Street 2	Recommended Improvements beyond FY2023-24[8]	Source Document
I-8	Whisman Rd	Middlefield Rd	High Visibility Crossing, Protected Intersection	OBAG3 Projects
I-9	Whisman Rd	Flynn Ave	High Visibility Crossing	East Whisman Precise Plan
I-10	Shoreline Blvd	Amphitheater Pkwy	Curb ramp and hydrant relocation to clear bikeway	North Bayshore Precise Plan
I-11	E El Camino Real	Grant Rd	High visibility crosswalk, Reduced curb radius, Curb extensions, Green-colored dashed bike lanes, Pedestrian signal heads, Adjusted signal timing, Pedestrian refuge islands, bike box, Right-turn-on-red restrictions	El Camino Streetscape Plan (pg. 23)
I-12	Sierra Vista Ave	Hackett Ave	High Visibility Crossing, Bi-directional Ramp, Traffic Circle	
I-13	Mountain Shadows Dr	Shoreline Blvd	Pedestrian hybrid beacon	
I-14	Rengstorff Ave	Junction Ave (near San Ramon Ave)	Pedestrian Hybrid Beacon at Junction Avenue	CIP 27-xx Rengstorff GCS Study
I-15	Charleston Rd	Independence Ave	Pedestrian Refuge Islands & High Visibility Crossings	
I-16	Bryant Ave	Shady Spring Ln	High Visibility Crossing	
I-17	Rengstorff Ave	Plymouth St	Pedestrian hybrid beacon or other improvement	CIP 27-xx Rengstorff GCS Study
I-18	Evelyn Ave	Bernardo Ave	High Visibility Crossing	Bernardo Undercrossing
I-19	Madison Dr	Van Buren Circ	Curb Extension	

In order to support grant applications for a limited number of high priority projects, potential project descriptions, including the corridor context, crash types addressed, recommended improvements, and associated emphasis areas are provided in Appendix D.

Potential grant sources include the FHWA Highway Safety Improvement Program (HSIP), Caltrans Active Transportation Program (ATP), and US DOT Safe Streets and Roads for All (SS4A) Program as well as more local programs such as VTA Measure B programs, BAAQMD Transportation For Clean Air (TFCA) fund and Transportation Development Act Cycle 3 (TDA3).

NON-INFRASTRUCTURE RECOMMENDATIONS

Non-infrastructure recommendations focus on policy and programming activities that can be implemented by the city and/or community partners to improve road safety for all road users. Programs and policies may focus on community awareness and understanding of the rights and rules of the road of all travelers regardless of mode; enforcement efforts that focus on behaviors known to be associated with fatal and severe injury crashes, such as speed and yielding; and education on the benefits of roadway improvements and travel mode choices on safety, sustainability and livability in Mountain View. Lastly, the non-infrastructure recommendations include policy and organizational efforts to support Vision Zero, regular monitoring and communications regarding crash data and evaluation of road improvement projects to assess progress towards the three stated goals in the 2019 Vision Zero Policy.

The non-infrastructure recommendations were developed using the eight VZAP/LRSP emphasis areas and cover the other "Es" of education, encouragement, engagement, enforcement, emergency response and evaluation (Figure 20). In accordance with the FHWA Safe System Approach, non-infrastructure recommendations are presented in relation to the five elements:

- Safe Road Users (RU) - Safety of all road users, including those who walk, bike, drive, ride transit, and travel by other modes.
- Safe Roads (SR) – Roads designed to accommodate human mistakes and injury tolerances can greatly reduce the severity of crashes that do occur.
- Safe Speeds (SP) – Speed reduction can accommodate human injury tolerances in three ways: reducing impact forces, providing additional time for drivers to stop, and improving visibility.
- Safe Vehicles (VE) - Vehicles are designed and regulated to minimize the occurrence and severity of crashes using safety measures that incorporate the latest technology and
- Post-Crash Care (CC) - When a person is injured in a crash, they rely on emergency first responders to quickly locate them, stabilize their injury, and transport them to medical facilities. Post-crash care also includes forensic analysis at the crash site, traffic incident management, and other activities.

Figure 20 Non-Infrastructure Project List

ID	Segment / Location	Timeline	Dept	Status
Safe Road Users				
RU-1	Continue Safe Routes to School (SRTS) program with a focus on traffic safety training for students walking, biking, taking transit and driving*	Annual	PW	Underway
RU-2	Strengthen SRTS collaboration and partnerships with parents, schools and students to encourage safe walking, biking and school access	Annual	PW	Underway
RU-3	Provide helmet giveaways and bicycle repairs at City or community events such as food pantries, back to school events or Monster Bash	Annual	PW/PD	Underway
RU-4	Conduct multilingual Vision Zero Marketing, Outreach and Engagement with behavior change campaigns and targeted media buys on emphasis areas	2024-25	PW/CMO	Planning
RU-5	Lead community-promoted walk / bike tours in different areas of the City with a focus on encouragement and training for new users	Biannual	PW	Underway
RU-6	Support traffic safety workshop or walk tour at Senior Center to identify issues and provide individualized trip planning/tips for changing abilities	Biannual	PW	TBD
RU-7	Encourage community-based bicycle education and safety classes covering basic skills, network awareness, laws, rules, and safety tips	Annual	PW	TBD

ID	Segment / Location	Timeline	Dept	Status
RU-8	Implement programs, workshops, or trainings to empower youth and address high risk behaviors such as riding against traffic, midblock turns and not wearing helmets	2024-25	PW/PD	Planning
RU-9	Conduct high-visibility enforcement on speed, distracted/impaired driving, yield compliance, red light running, and key maneuvers on HIN and school routes	Ongoing	PD	Underway
RU-10	Implement multilingual ambassador program related to blocked bike lanes and red zones where parking in such locations introduces safety concerns	TBD	PW/PD	TBD
RU-11	Periodically review the crossing guard program to optimize its effectiveness	Biannual	PW/PD	Underway
RU-12	Provide universal graphics and/or multilingual communications regarding high visibility enforcement activities	Annual	PD/CMO	TBD
RU-13	Encourage residential transportation demand management strategies including orientation on getting around without a car	TBD	PW	Planning
RU-14	Support state legislation to incorporate pedestrian/bicycle safety training into state education standards	TBD	PW/CMO	TBD
Safe Roads				
SR-1	Implement Impaired Driving Policies*		PD	TBD
SR-2	Prioritize capital projects on the HIN, school routes and equity priority locations as part of the capital improvement program (CIP) process	Biannual	PW	Underway
SR-4	Obtain grants to accelerate implementation of priority capital projects to enhance safety of all road users	Biannual	PW	Underway
SR-3	Advance SRTS walk audits observations into improvement recommendations	Annual	PW	Underway
SR-5	Provide staff training on VZAP / LRSP	2024-25	PW	TBD
SR-6	Provide staff training on defensive driving in City vehicles	2024-25	PW	TBD
SR-7	Provide staff training on Safe Systems Approach and safety countermeasures	2024	PW	TBD
SR-8	Coordinate periodic site visits of VZ best practices with or without regional partners	Annual	PW	Underway
SR-9	Adopt NACTO, PROWAG and/or other best practice guidance to inform engineering judgment	2025	PW	Underway
SR-10	Update City standard details to reflect Vision Zero best practices	2026	PW	TBD

ID	Segment / Location	Timeline	Dept	Status
SR-11	Provide multilingual VZ-informed outreach on capital projects and programming	2024-25	PW/CMO	Underway
SR-12	Update VZAP every five years	Every five years	PW	TBD
SR-13	Support state legislation to address potential safety enhancements	TBD	PW/CMO	TBD
SR-14	Review City protocols to improve consistency with Vision Zero policy	TBD	PW	TBD
SR-15	Provide training to relevant staff to be well versed on VZ countermeasures	TBD	PW	TBD
SR-16	Provide input on projects that aligns Vision Zero goals	TBD	PW	TBD
Safe Speeds				
SP-1	Conduct Vision Zero marketing that encompasses speed management campaign	2024	PW	TBD
SP-2	Share Neighborhood Traffic Management Program (NTMP) ineligible study results and study data with Mountain View's SRTS Coordinator	TBD	PW	TBD
SP-3	Conduct high-visibility traffic enforcement on speed along the HIN	Ongoing	PD	TBD
SP-4	Implement speed limit reductions in accordance with AB 43	2025	PW	Planning
SP-5	Track AB 645 automated enforcement pilot and support state legislation to expand the permanent program to all California cities	2025	CMO/PW	Underway
Safe Vehicles				
VE-1	Conduct public education campaign on benefits of pedestrian friendly vehicles such as compacts cars	TBD	PW	TBD
VE-2	Support free bicycle repair events	2024	PW	Underway
VE-3	Provide education for decision makers on vehicle size and design impacts	TBD	CMO/PW	TBD
VE-4	Support state legislation for vehicle technology that addresses key crash factors	TBD	CMO/PW	TBD
Post-Crash Care				
CC-1	Provide multilingual emergency response teams for empathetic engagement with victims' families	TBD	FD/PD	
CC-2	Provide continuing ed for emergency responders to understand travel behavior, decisions and lived experience of local pedestrians/bicyclists	TBD	PD	Underway
CC-3	Establish protocols for best practice communications to encourage accurate and agency-based narratives in media stories on crashes	TBD	CMO/PW/PD	

ID	Segment / Location	Timeline	Dept	Status
CC-4	Explore opportunities for acknowledgment and/or remembrance program	TBD	CMO/PD	
CC-5	Establish a rapid response crash team (MVRRT) to examine factors associated with crashes on HIN and potential solutions	TBD	FD/PD/PW	
CC-6	Establish requirement to share fatal and serious injury crash reports with Traffic and Transportation staff in a timely manner	2024	PD/PW	Underway
CC-7	Improve consistency of reporting for vehicle-pedestrian and vehicle-bicycle crashes	2024	PD/PW	Underway
CC-8	Monitor crash data on a scheduled basis to measure progress toward VZ goals	Biannual	PD/PW	Underway
CC-9	Conduct quarterly Vision Zero Working Group meetings addressing recent activities, debriefing on recent crashes, and progress toward goals	2024	PW+	Underway
CC-10	Collect before and after data when infrastructure improvements are made to measure behavior change	TBD	PW	TBD

* See Appendix E: Countermeasures for more information on these topics

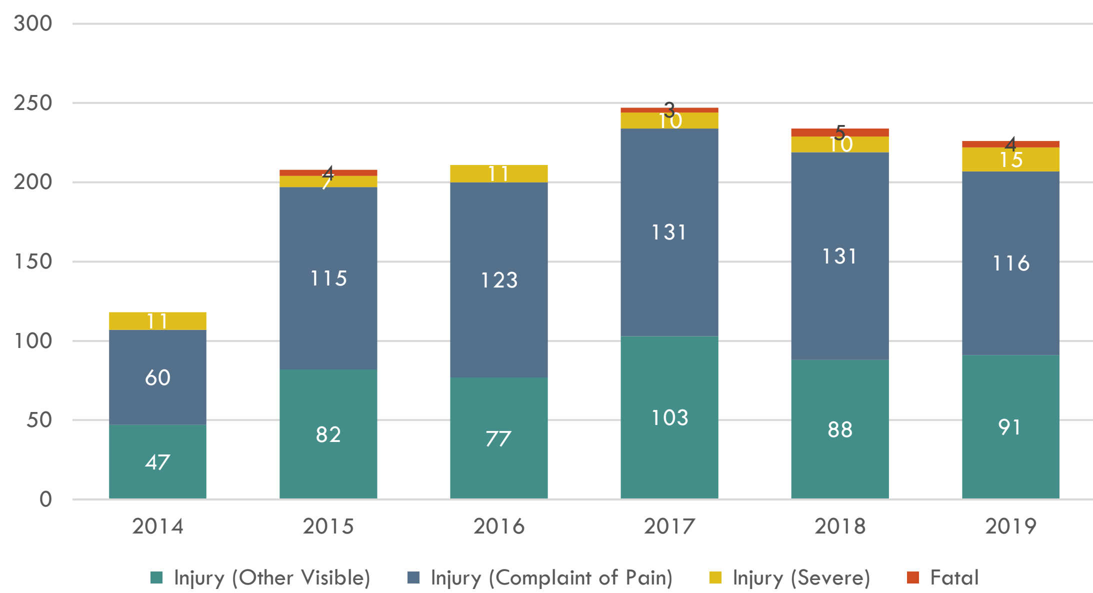
APPENDICES

Appendix A: Systemic Safety Analysis

OVERALL CRASH TRENDS

There were 1,244 crashes on Mountain Views streets from 2014 through 2019 for which the injury severity was reported. Sixteen of these were fatal, and 64 resulted in severe injury. Injury severity by year is show in Figure 21.

Figure 21 Crashes by Year and Severity, 2014-2019



Fatal and Severe Injury Crashes Increased

Over the extended-year study period from 2014 to 2022, fatal and severe injury crashes and severe injury crashes alone trended up both in total numbers and when normalized by the population of Mountain View, with a dip from 2019 to 2022 during the COVID-19 pandemic, as shown in Figure 22 and Figure 23.

Figure 22 Fatal and Severe Injury Crashes per 100,000 people by year with 3-year average, 2014-2022

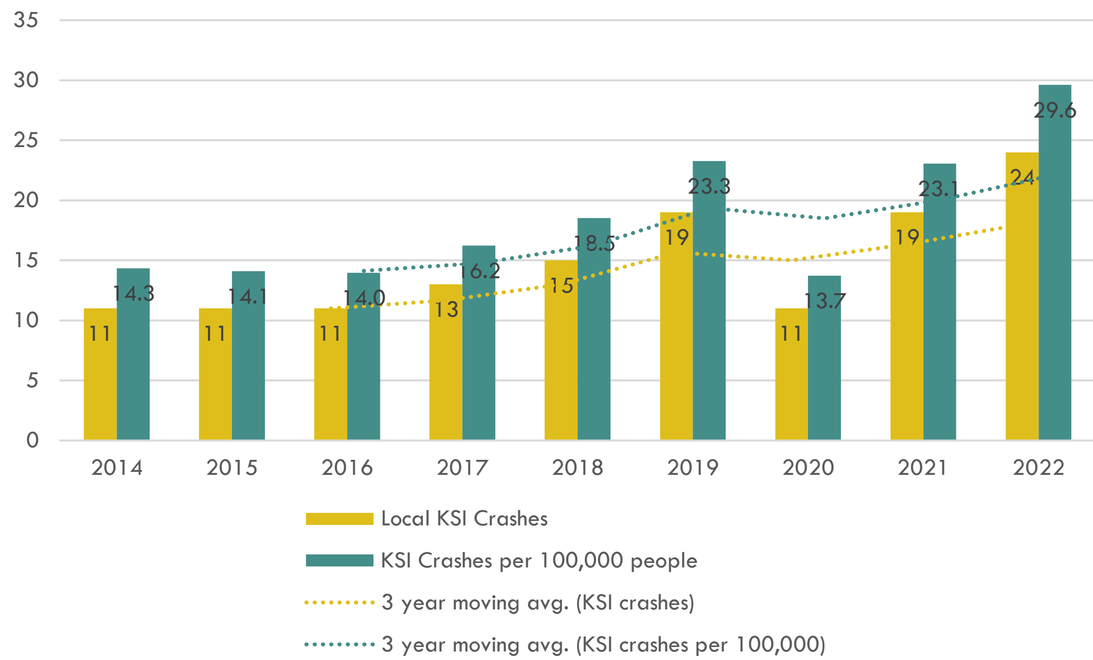


Figure 23 Severe Injury Crashes per 100,000 people by year with 3-year average, 2014, 2022

Mountain View total population from US Census American Community Survey 5-year estimates, Table DP05.

Crashes Were Concentrated Downtown and on High Injury Network

Figure 24 shows the overall spatial distribution of crashes in the City of Mountain View in the form of a heat map with a grid of equally-sized hexagons. Between 2014 and 2019, crashes were concentrated in downtown, and along El Camino Real and other major streets including Shoreline Blvd and Rengstorff Ave. These roads are consistent with the previously identified high injury network as described further on page A-19.

Figure 24 Local Road Crash Density, 2014-2019

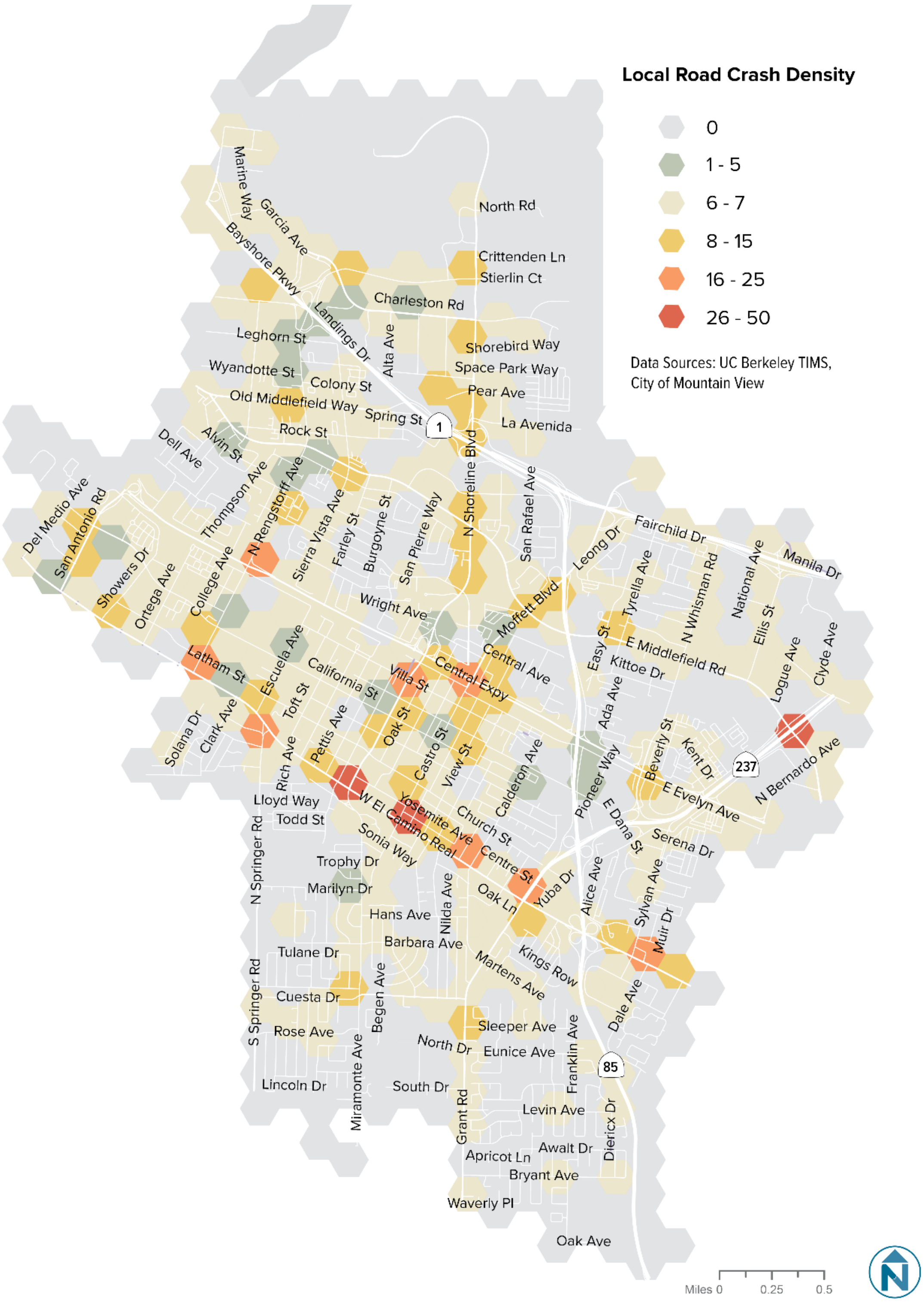
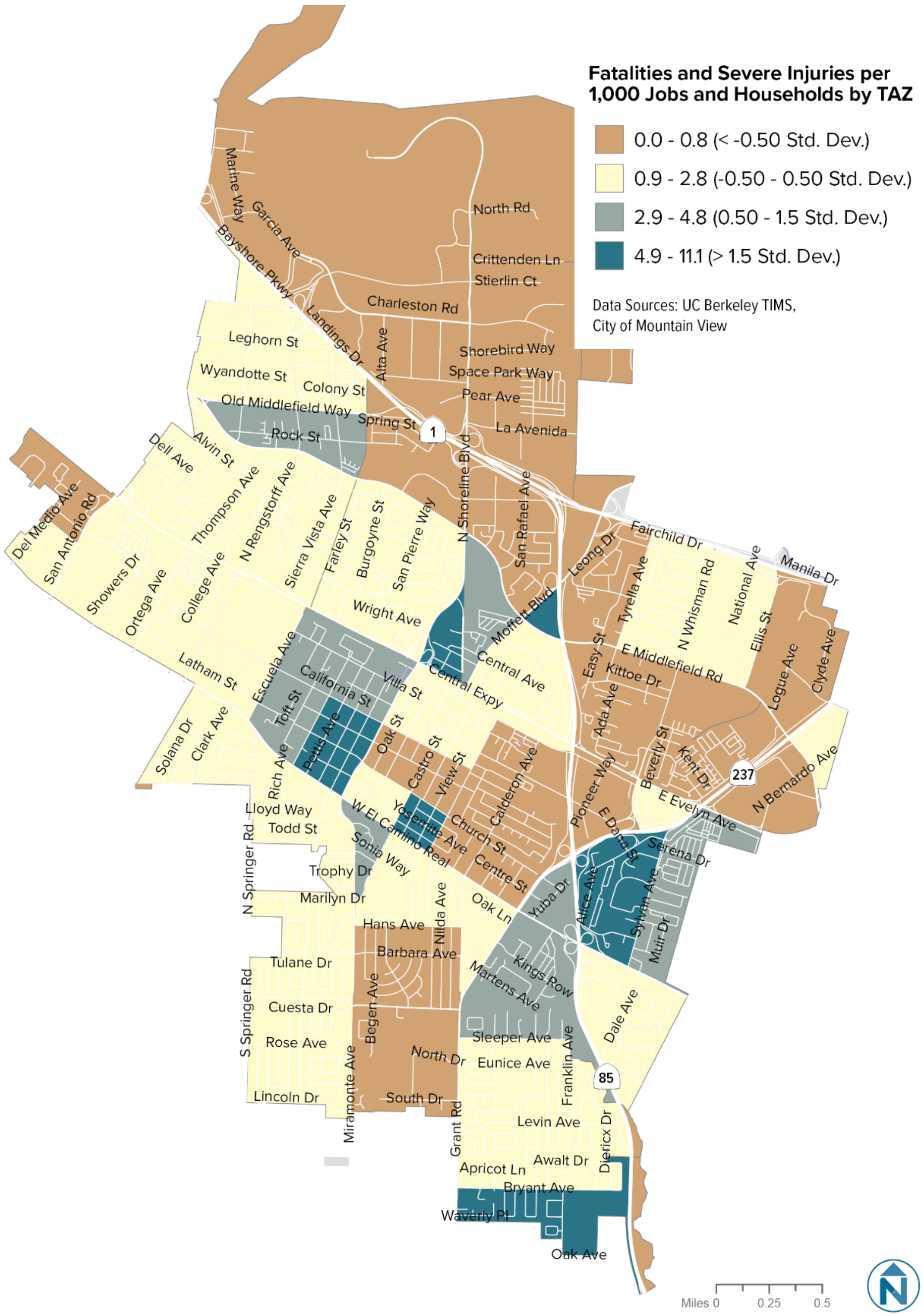


Figure 25 KSI per 1,000 Jobs and Households by Transportation Analysis Zone, 2014-2019



CRASHES BY MODE OF TRANSPORTATION

Almost All Crashes Involved People Driving

Almost all 1,244 crashes that resulted in an injury in Mountain View from 2014 to 2019 involve people driving motor vehicles as one of the involved parties. In fact, most crashes involve motor vehicles only. Among the 77 KSI crashes, 40.2% involve motor vehicles, whereas the majority involve pedestrians or bicycles.

The eight (8) crashes between 2014 and 2019 that did not involve a motor vehicle, bicycle, or pedestrian, involved a train. No people riding public transit were killed or injured by crashes during the study period (or prior analysis periods).

People Walking and Biking were Disproportionately Affected

People walking and biking are disproportionately represented among crashes in Mountain View compared the respective mode share. US Census American Community Survey data shows that Mountain View residents walk and bike for less than 10% of their commute trips, yet 36% of all crashes involved someone walking or biking.

When it comes to fatal and severe crashes, people walking are especially over-represented. Pedestrians represent 3% of the commute trips, yet people walking are involved in 12.8% of all crashes, 35.9% of severe crashes and 50.0% of fatal crashes. While 3.9% of motor vehicle only crashes result in a fatality or severe injury, 19.5% of pedestrian crashes do, meaning pedestrian crashes were about five times more likely to result in a fatality or severe injury. Figure 26 summarizes injury severity of all crashes by mode and Figure 27 compares the number of fatal and severe injury crashes by mode share. Fatal and severe injury crashes are sometimes referred to as "killed or severely injured" and abbreviated as KSI. The maps in Figure 28 and Figure 29 show the locations of all crashes, symbolized by mode, and fatal and severe crashes involving people walking and biking, respectively.

Figure 26 Injury Severity by Mode, 2014-2019

Mode	Fatal	Severe Injury	Other Injury	Percent of all crashes	Percent of all KSI crashes	KSI as percent of mode
Motor Vehicle Only	7	24	770	64.4%	38.8%	3.9%
Vehicle-Bicycle	1	17	266	22.8%	22.5%	6.3%
Vehicle-Pedestrian	8	23	128	12.8%	38.8%	19.5%
Grand Total	16	64	1165	100.0%	100.0%	6.4%

Figure 27 Fatal and Severe Injury Crashes by Mode, 2014-19

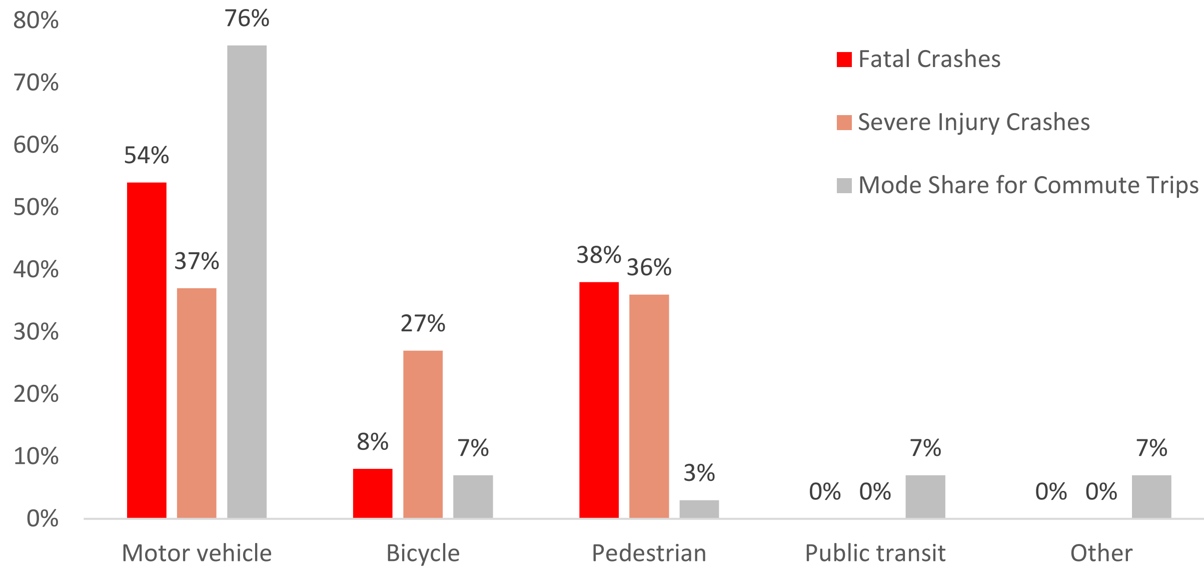


Figure 28 Local Crashes by Mode

Figure 29 Fatal and Severe Crashes Involving Someone Walking or Biking

DEMOGRAPHICS

Age, gender identity and race/ethnicity data were examined from the crashes that occurred in Mountain View from 2014 through 2019.

Young Adults were Over-Represented in Crashes

The analysis found that people aged 18 to 24 were slightly over-represented in the universe of all crashes (Figure 30), and also pedestrian and bicycle crashes, when compared to 18- to 24-year olds in Mountain View overall (Figure 31 and Figure 32). Individuals under 18 were under-represented in total crashes and pedestrian crashes, but over-represented in bicycle crashes, while those 65 and above were over-represented in pedestrian crashes (Figure 33).

Figure 30 Age Distribution of People Involved in Crashes Relative to Mountain View Population, 2014-19

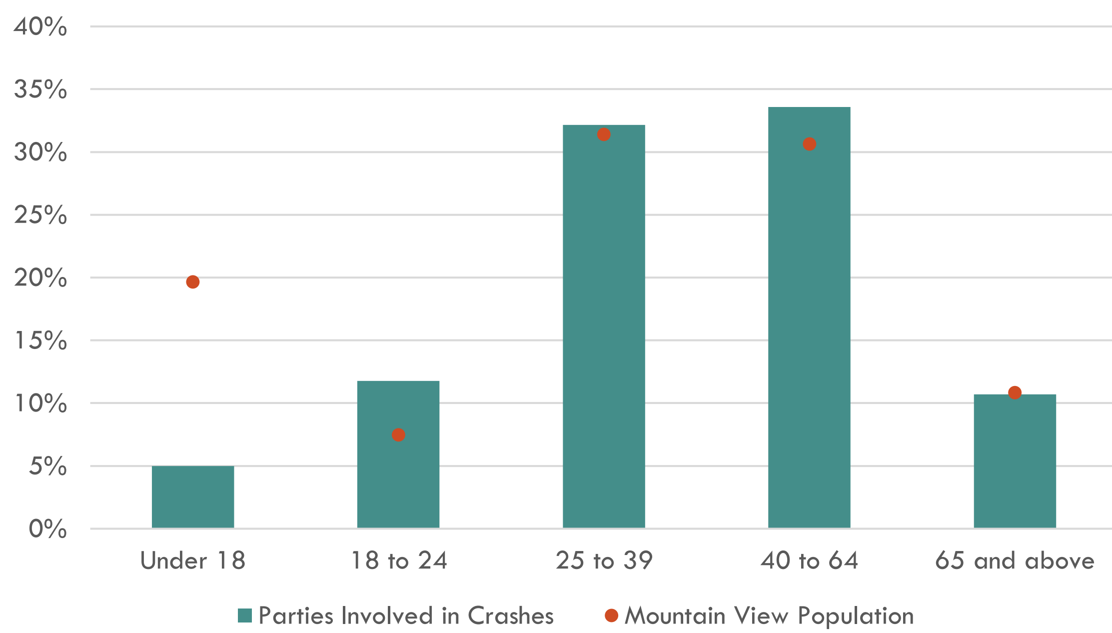


Figure 31 Age Distribution of Bicyclists Involved in Crashes Relative to Mountain View Population

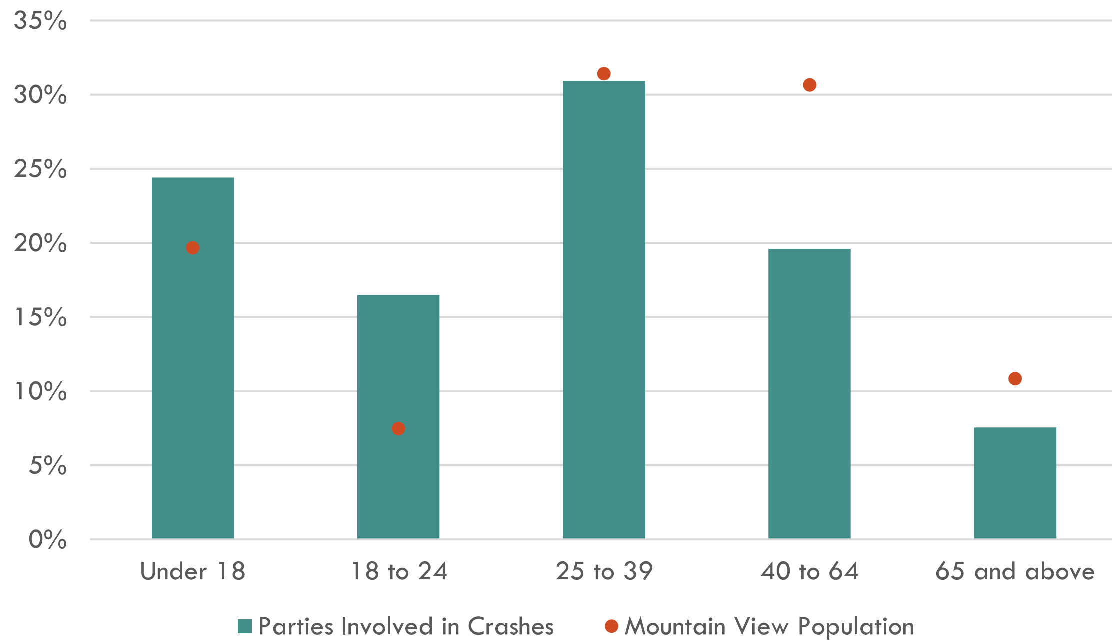


Figure 32 Age Distribution of Pedestrians Involved in Crashes Relative to Mountain View Population

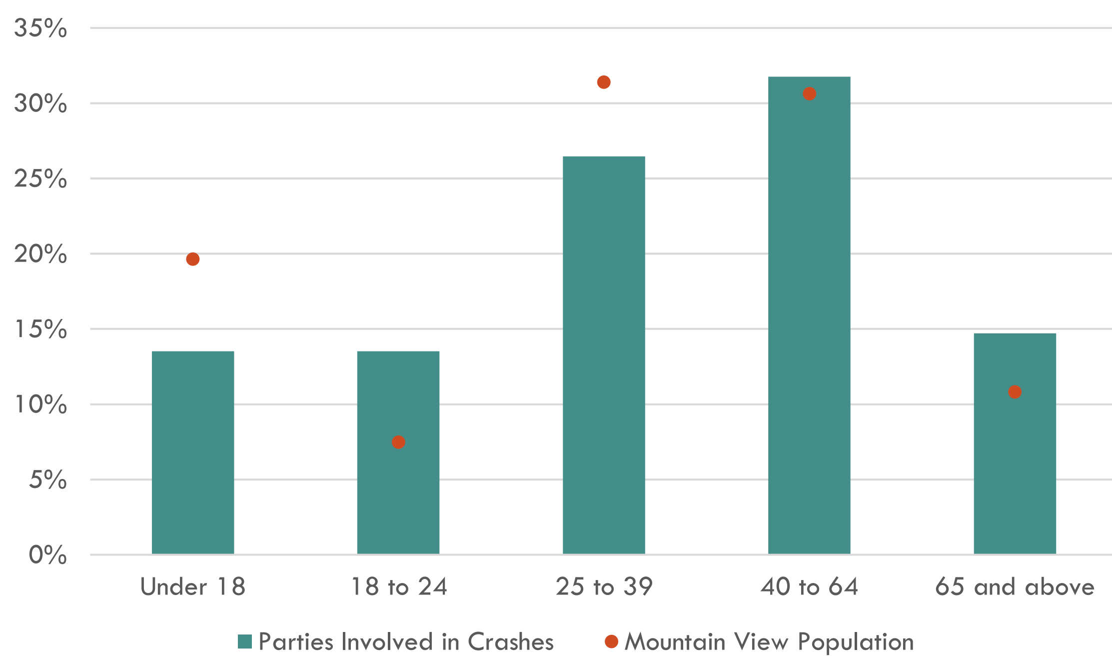
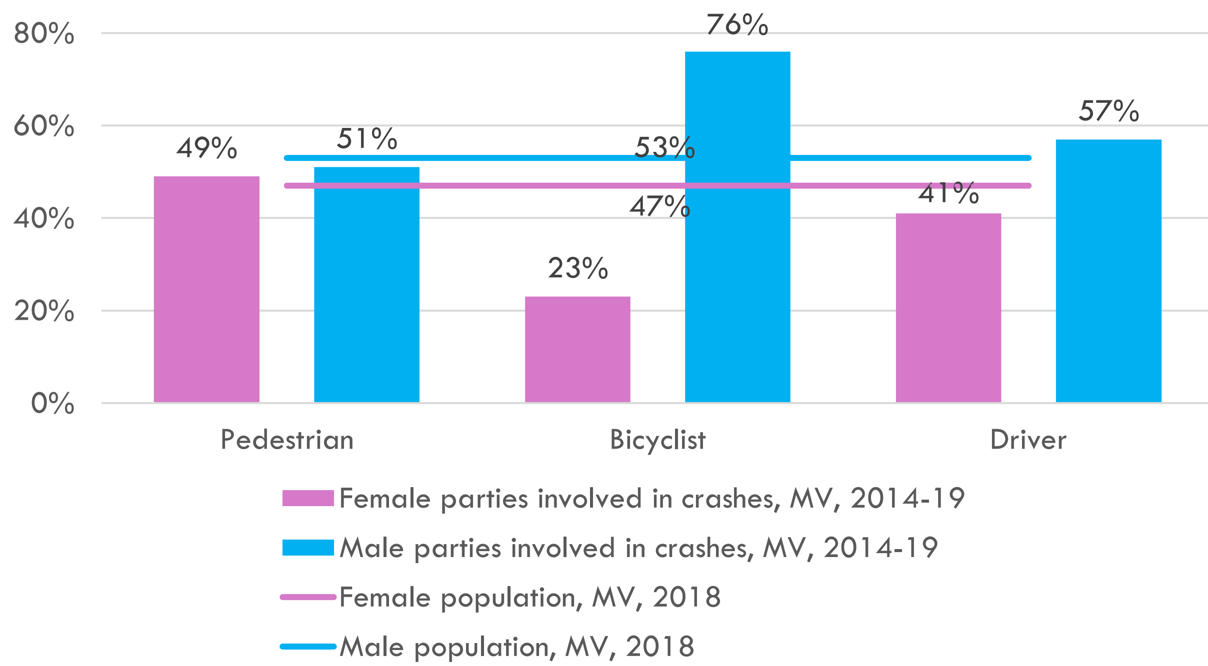


Figure 33 Crashes Involving Seniors (age 65+) Pedestrian or Bikers

Males were Over-Represented in Crashes

As is the case in many communities, males were disproportionately represented as bicyclists and drivers in crashes in Mountain View (Figure 34)

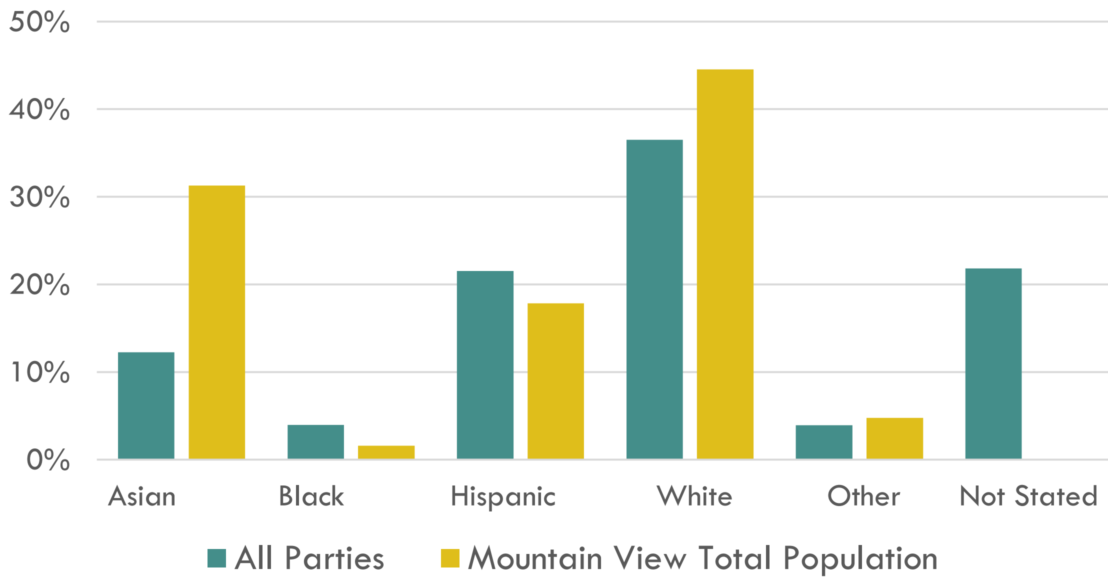
Figure 34 Gender of Parties involved in Crashes by Mode, 2014-19



Black and Hispanic Populations were Over-Represented in Crashes

While race and ethnicity data collected during crash incident reporting does not align exactly with US Census Race and Ethnicity categories, the following charts compare the reported race of people involved in crashes in Mountain View with race and ethnicity as reported by the US Census American Community Survey. The comparison suggests that Black and Hispanic/Latino people were disproportionately represented in crashes in Mountain View, particularly while walking and biking (Figure 35, Figure 36, and Figure 37).

Figure 35 Race of Parties Involved in All Crashes, 2014-19



Mountain View Total Population estimates shown here come from American Community Survey 2018 5-year estimates Table B03002, Hispanic or Latino Origin by Race.

Figure 36 Race of Parties Involved in all Vehicle-Pedestrian Crashes, 2014-19

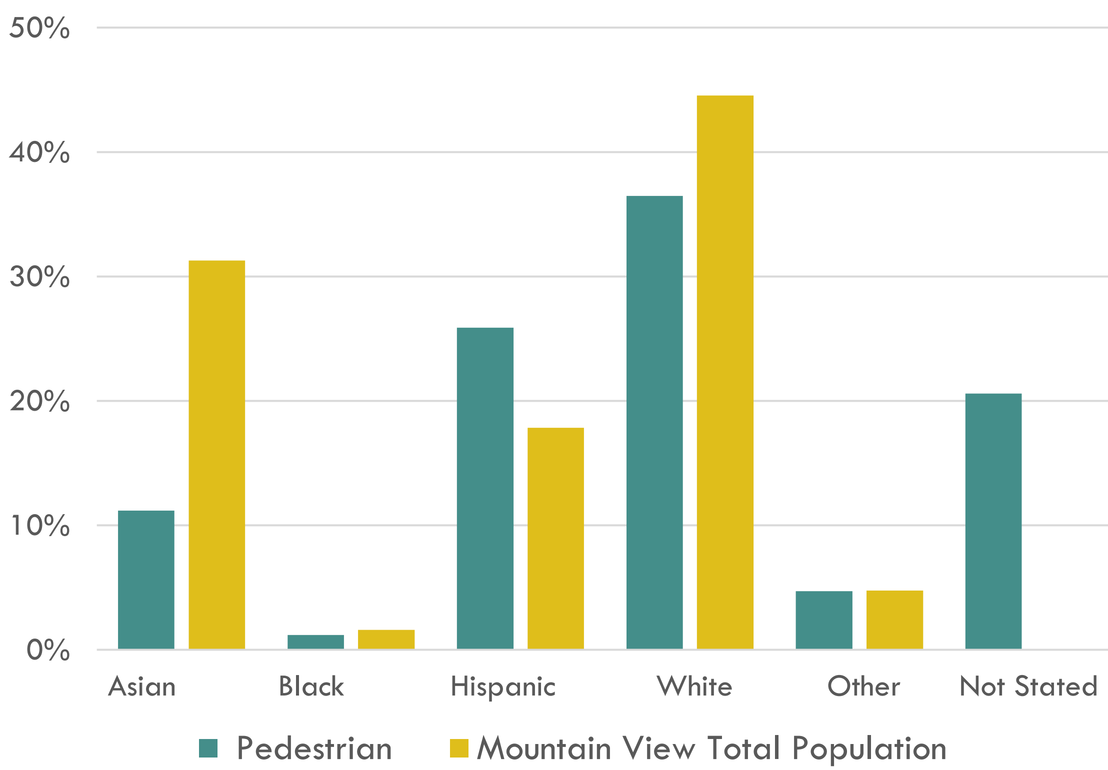
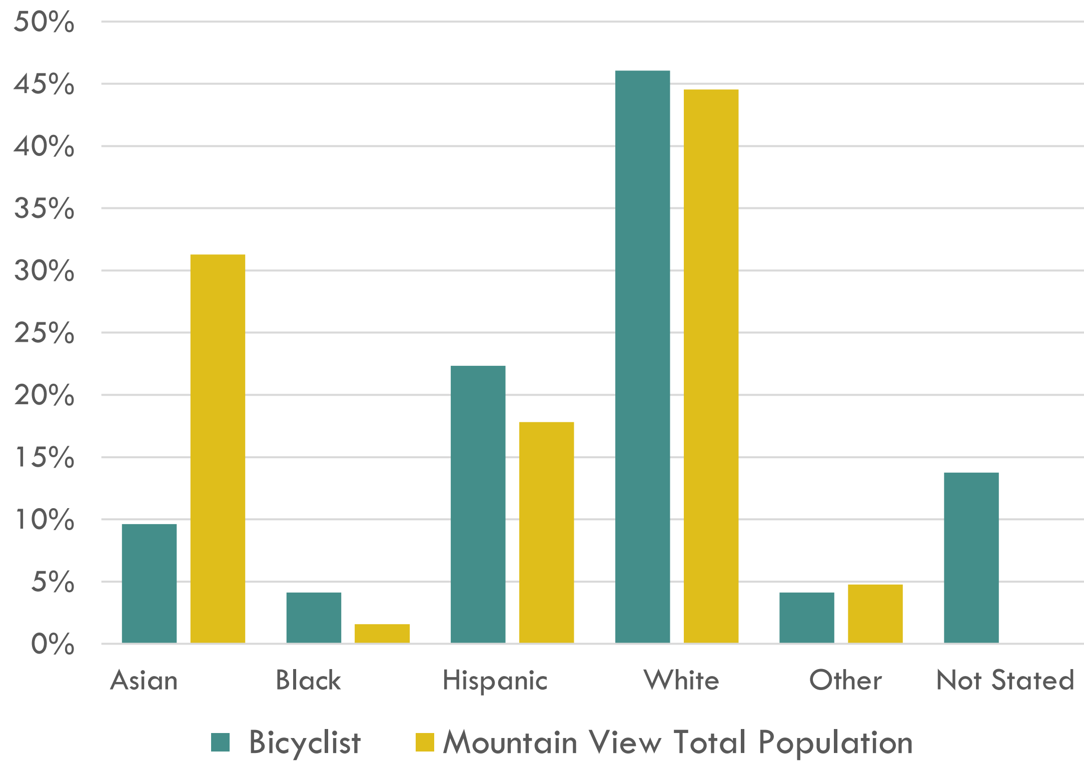


Figure 37 Race of Parties Involved in all Vehicle-Bicycle Crashes, 2014-19

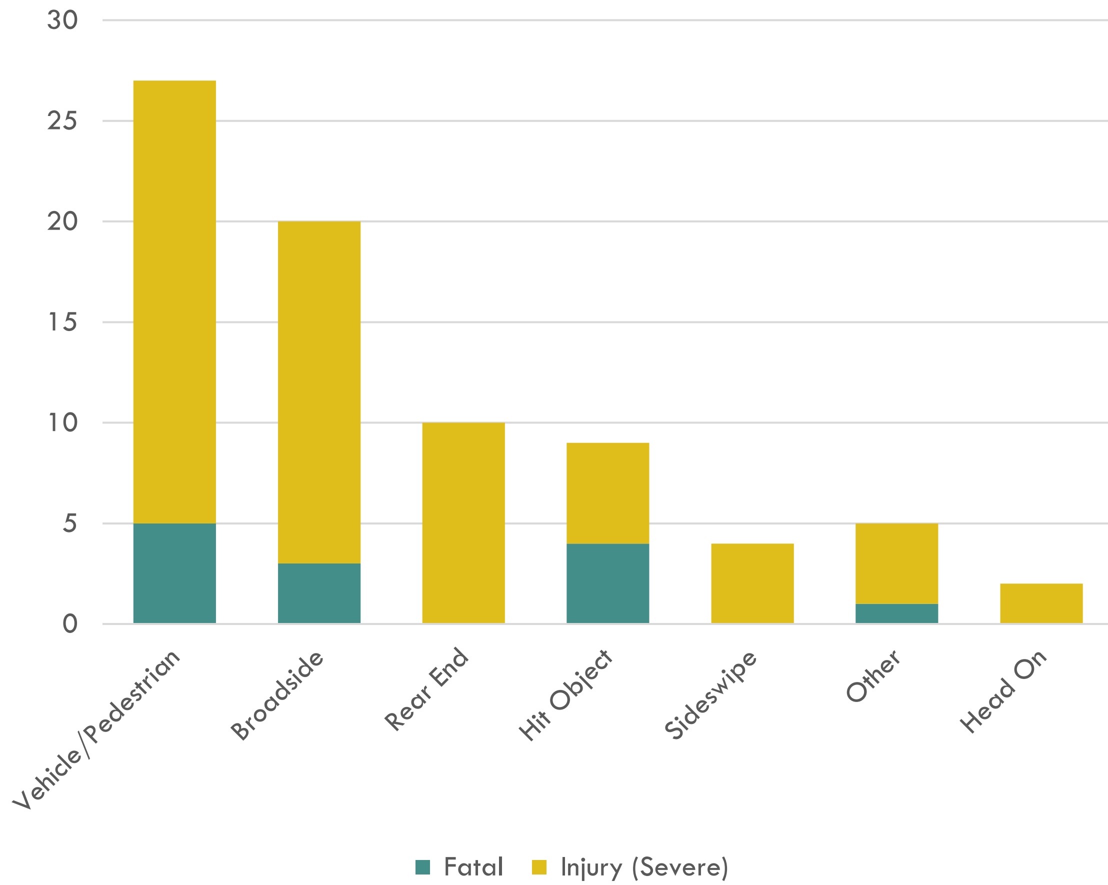


CRASH TYPE

Crash type describes the basic nature of the crash. Crashes involving someone walking are categorized as vehicle/pedestrian, while crashes involving motor vehicles only, or motor vehicles and people biking, are categorized by the way the vehicles collided with each other, such as broadside, rear end, and hit object.

Consistent with the finding that people walking were overrepresented in fatal and severe crashes, vehicle/pedestrian was the most common type of crash, followed by broadside, rear end, and hit object (Figure 38).

Figure 38 Crash Type of Fatal and Severe Injury Crashes, All Modes

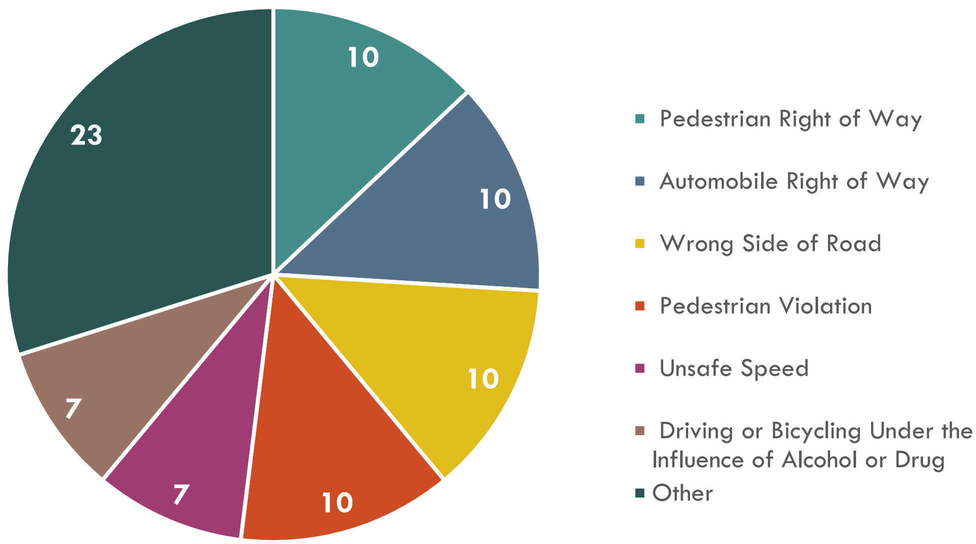


PRIMARY CRASH FACTOR

The primary crash factor describes the violation of traffic rules that was determined to be the primary reason the crash occurred according to the crash Police report. As shown in Figure 39, the top six primary violation categories reported for fatal and severe injury crashes included violations of pedestrian right-of-way, automobile right-of-way, operating on the wrong side of the road, pedestrian violations, unsafe speed and operating under the influence of drugs or alcohol. A pedestrian right of way violation means the driver fails to yield when the person walking has the right of way (such as when crossing the street in a crosswalk). Similarly, an automobile right of way violation indicates failure to yield to a driver who has right of way.

Prior analyses of primary crash factors conducted as part of the Vision Zero Policy process included many of these factors, with a different order of occurrence (DUIs and speed ranked higher) as well as other factors that were less common in the current reporting period (such as improper turns). This variability may reflect random variability, differences in reporting choices, or trends over time. Additionally, other factors such as driver distraction are not provided as a standard option on incident report forms and may therefore not appear as frequently.

Figure 39 Primary Crash Factor Violation Category for Fatal and Severe Injury Crashes



SEGMENT CRASH RATES AND HIGH INJURY NETWORK

The High Injury Network (HIN) is the subset of roads that see the highest rate of fatal and severe crashes. The City of Mountain View identified the HIN as part of the Vision Zero Policy analysis based on data from 2006 to 2016. It included both those corridors that see the greatest number of fatal and severe crashes, and those that see the highest rate of fatal and severe crashes per mile.

El Camino Real Remained the Highest Injury Corridor

Data from 2014 to 2019 displayed the same pattern, with the following corridors continuing to be identified as the High Injury Network (Figure 41):

- El Camino Real
- Shoreline Boulevard
- Rengstorff Avenue
- Middlefield Road
- Central Expressway
- California Street
- El Monte Avenue
- Old Middlefield Way
- Ellis Street
- San Antonio Road

Figure 40 summarizes the number and rate of crashes for street segments in the HIN.

Figure 40 High Injury Network Crashes by Street Segment

Street (Segment)	Total crashes	KSI crashes	KSI crash per mile	KSI crash per year	KSI per year per mile
E El Camino Real (east of Grant Rd)	61	9	10.04	1.50	1.67
Ellis St	16	4	5.68	0.67	0.95
N Rengstorff Ave (Central Expwy to Middlefield)	45	3	4.69	0.50	0.78
N Shoreline Blvd (Central Expwy to Middlefield)	33	3	4.42	0.50	0.74
El Monte Ave	13	2	4.34	0.33	0.72
California St (Rengstorff to Shoreline)	34	4	4.31	0.67	0.72
S Rengstorff Ave (El Camino Real to Central Expwy)	44	2	3.55	0.33	0.59
San Antonio Rd	30	2	3.48	0.33	0.58
N Rengstorff Ave (North of Middlefield)	49	3	2.78	0.50	0.46
Old Middlefield Way	24	2	2.56	0.33	0.43
W El Camino Real (Rengstorff to Castro)	79	3	2.46	0.50	0.41
California St (West of Rengstorff)	36	2	2.12	0.33	0.35
E Middlefield Rd	75	3	1.89	0.50	0.31
Central Expy (Shoreline to Bernardo)	45	3	1.66	0.50	0.28
N Shoreline Blvd (North of Middlefield)	57	4	1.57	0.67	0.26

Figure 41 High Injury Network (2006-2016)

ROADWAY CHARACTERISTICS

An essential feature of the systemic safety analysis is a review of roadway, environmental, and land use characteristics that are associated with a high number of crashes and a high rate of fatal and severe crashes to position the City of Mountain View to proactively address locations that have not had crash concentrations in the past but have similar features as those currently experiencing high levels of crashes. This section examines roadway characteristics such as posted speed, average daily traffic (where available), and design elements of intersections that are associated with crashes in Mountain View.

High Speed Arterials were Over-Represented in Crashes

Nearly 70% of streets in Mountain View have a posted speed limit of 25 mph, but the majority of crashes occurred on arterials with a posted speed of 35 mph (Figure 43). In addition to higher speeds, these roadways also have wider rights-of-way, more travel lanes, and higher traffic volumes than other streets suggesting collinearity between multiple factors including speed, volume and roadway design. Fatalities and severe injuries were also disproportionately located on arterials with posted speeds of 35 to 45 mph (Figure 42). In total, streets with speeds of 35 mph and above represent 20% of local road centerline miles in Mountain View but are the site of 73% of fatal and severe crashes.

Figure 42 Crash Severity by Posted Speed of Primary Roadway

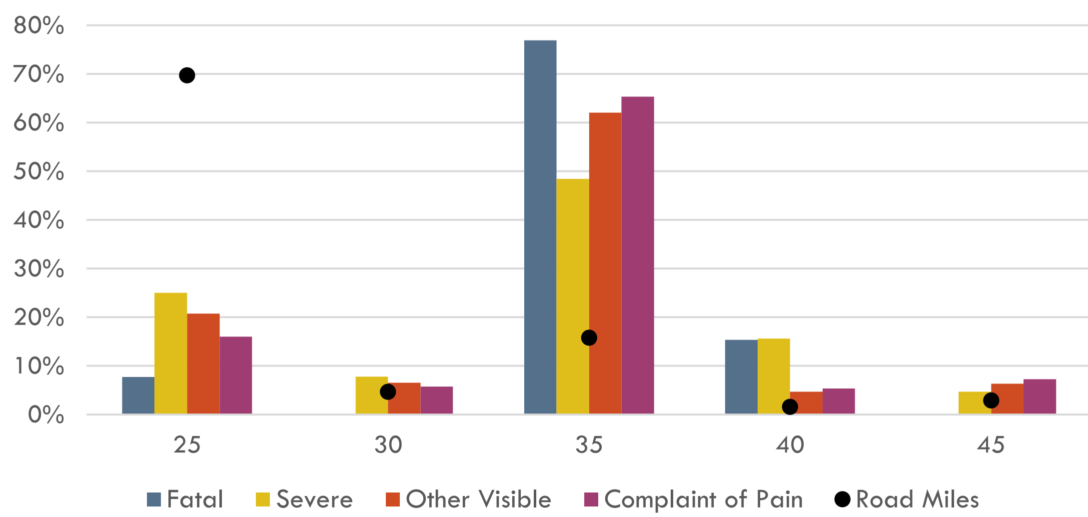
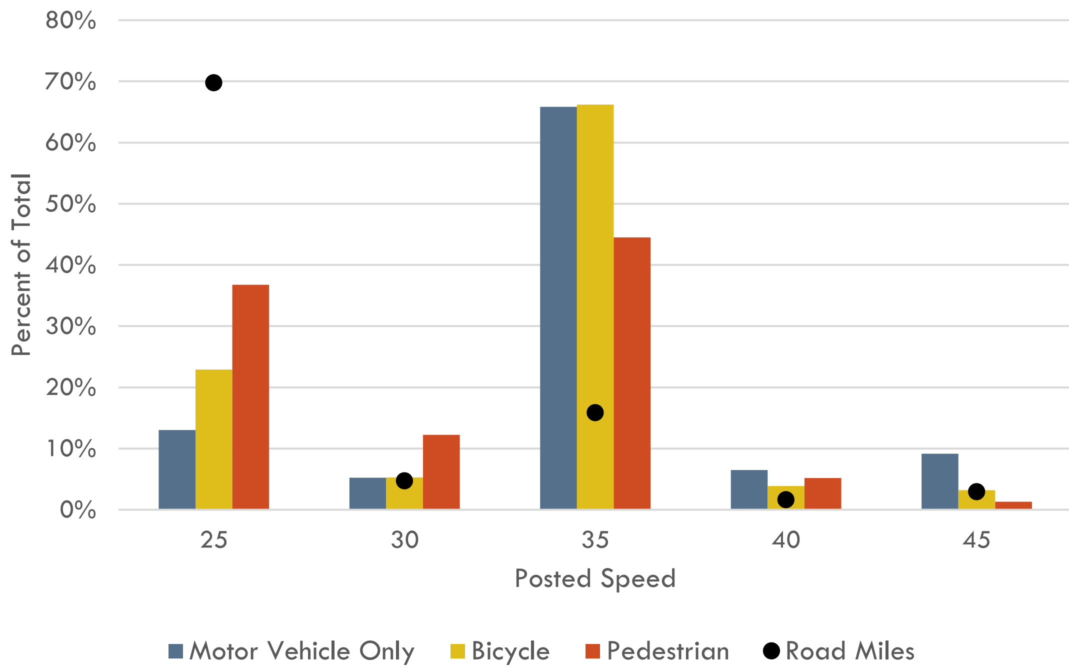


Figure 43 Crashes and Road Miles by Posted Speed

Posted Speed	KSI Crashes	Total Crashes	Percent of total KSI	Percent of total crashes	Percent of Road Miles
25	17	226	22.1%	18.2%	69.7%
30	5	76	6.5%	6.1%	4.7%
35	41	784	53.2%	63.3%	15.8%
40	12	71	15.6%	5.7%	1.6%
45	3	83	3.9%	6.7%	2.9%

Figure 44 **Crash Mode by Posted Speed of Primary Roadway**



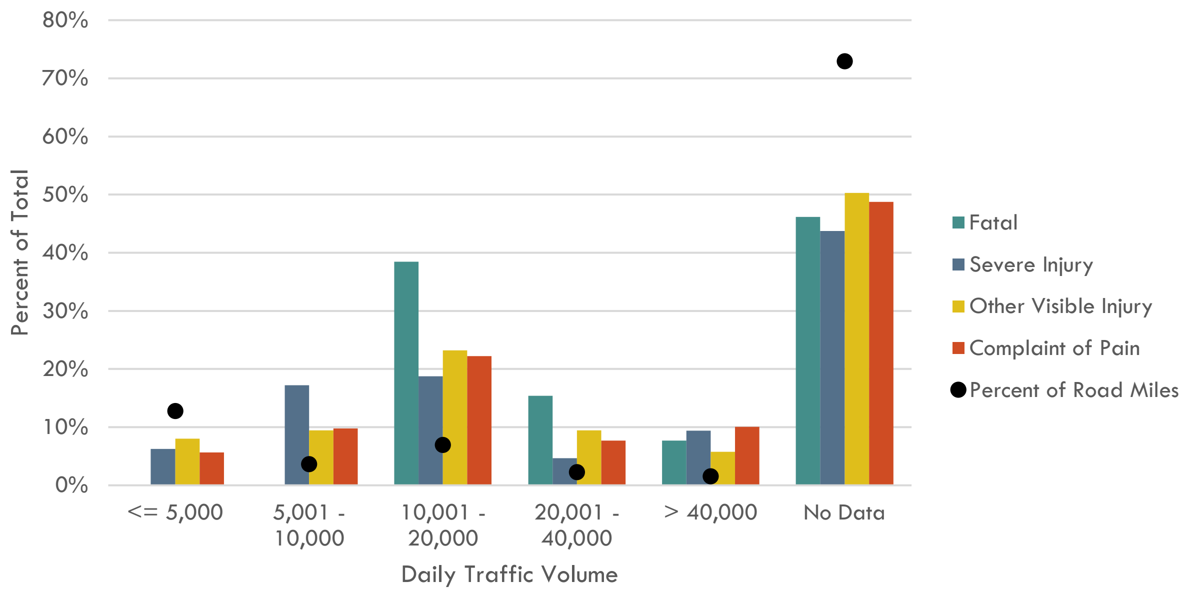
Streets with a posted speed of 35 mph were disproportionately represented among crashes affecting all modes (Figure 44). People walking were more likely to be involved in crashes on streets with posted speeds of 25 mph than other modes. These lower speed streets include most residential streets in Mountain View.

The City of Mountain View has traffic volume data for a portion of the local streets that are included in this crash analysis. Traffic volumes Note major streets for which traffic volumes were not available include Central Expressway, El Camino Real west of Boranda Ave, and California Street west of Escuela Ave.

Heavy Traffic Roadways were Over-Represented in Crashes

Just over half (51%) of all crashes in Mountain View took place on a street segment for which traffic volume data was available. It should also be noted that traffic volume data is not up to date throughout the City, and some data was collected as long as 20 years ago. However, all of the streets with daily traffic volumes greater than 5,000 had more recent data, collected between 2009 and 2019.

Figure 45 Crash Severity by Daily Traffic Volume



Streets with traffic volumes above 5,000 vehicles per day were disproportionately represented in crashes at all injury levels, including fatal and severe (Figure 45). There were no fatalities on streets with known traffic volumes of less than 10,000 vehicles per day. Streets with volumes above 40,000 vehicles per day saw the greatest disproportion. Those heavy volume streets saw 9% of all fatal and severe crashes even though they make up an estimated 1.5% of the centerline mileage in Mountain View (Figure 46).

Figure 46 Crashes by Traffic Volume

Daily Traffic Volume	KSI Crashes	Total Crashes	Percent of KSI crashes	Percent of all crashes	Percent of Road Miles
<= 5,000	4	81	5.2%	6.5%	12.8%
5,001 – 10,000	11	123	14.3%	9.9%	3.6%
10,001 – 20,000	17	280	22.1%	22.6%	6.9%
20,001 – 40,000	5	103	6.5%	8.3%	2.3%
> 40,000	7	103	9.1%	8.3%	1.5%
No Data	34	608	44.2%	49.1%	72.9%
Grand Total	77	1239			

CRASHES AT INTERSECTIONS

SWITRS data defines an intersection narrowly, as the area between the lines that extend from the curb line into the intersecting street. In order to include crashes that take place in crosswalks, this analysis categorized a crash at "at intersection" if the data indicates that it is within 25 feet of the intersection. This includes all of the crashes in which the crash report indicates that a person walking was "crossing at intersection."

Most KSI Crashes Occurred at Intersections

Just over half of fatal and severe crashes occurred at intersections during the study period (Figure 47). Of those, a greater number took place at signalized intersections than at intersections with stop signs or no traffic control. Locations treated with traffic signals, also tend to be more complex intersections, with wider rights of way, more travel lanes and higher traffic volume.

When looked at as a percent of the total crashes at that type of intersection, fatal and severe crashes occurred at a slightly higher rate at intersections with one or two-way stop control (Figure 48).

Figure 47 Fatal and Severe Crashes at Locations

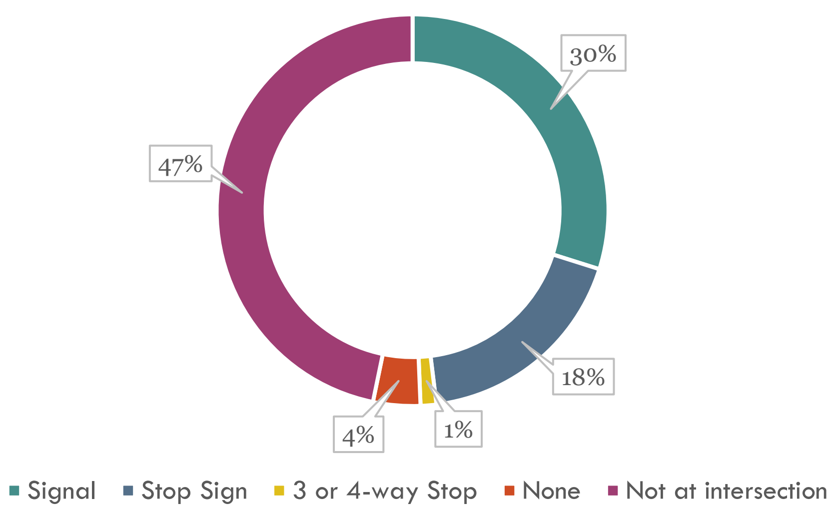


Figure 48 Crash Frequency and Severity by Intersection Control Type (percent of total)

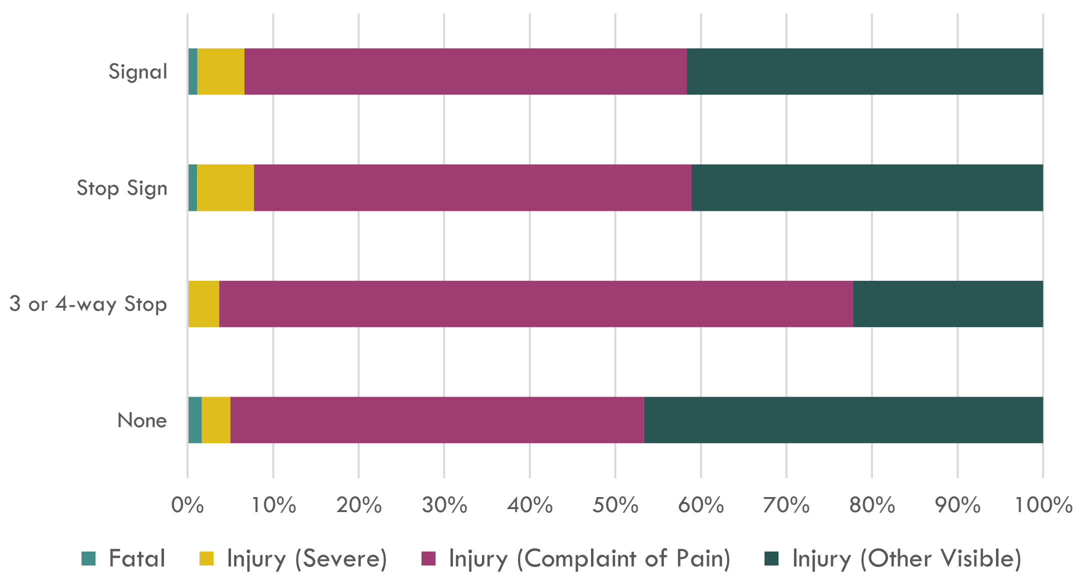
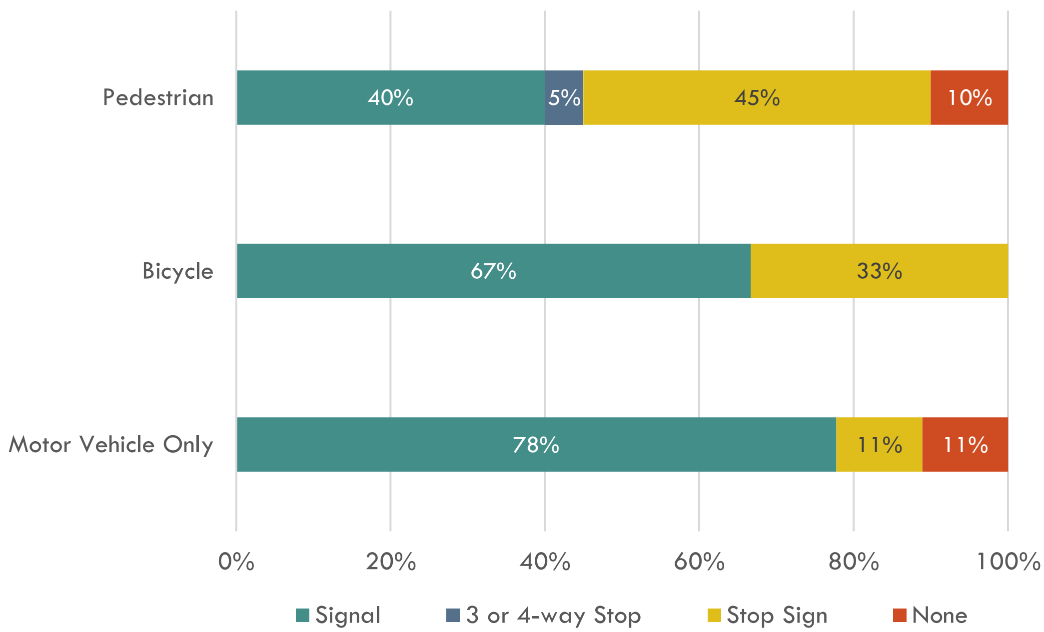
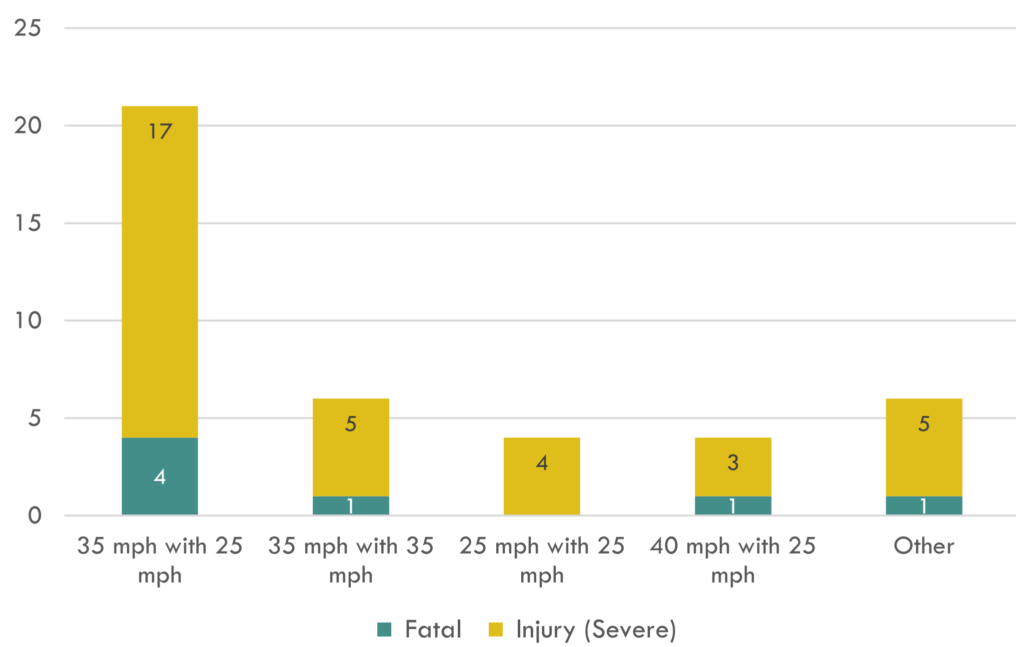


Figure 49 Mode of Fatal and Severe Crashes by Intersection Control Type



The majority of motor vehicle-only crashes and crashes involving people biking that occurred at an intersection took place at a signal (Figure 49). People walking were more likely to be involved in a fatal or severe crash at a one or two-way stop. Half of fatal and severe crashes at intersections took place where a 35 mph street meets a 25 mph street (Figure 50).

Figure 50 Speed Limit at Intersections Where Fatal and Severe Crashes Occur



ENVIRONMENT CHARACTERISTICS

This section presents data on the lighting conditions, time of day, and day of week associated with crashes in Mountain View.

Crashes Occurred More Frequently During the Evening Peak Hours

As shown in the following figures, crashes were most frequent during the evening rush hour on weekdays (Figure 52). Fatal and severe crashes were distributed across the day more than crashes overall (Figure 53). The 3-6 pm time period was still the most frequently represented (21% of KSI crashes) but was followed closely by the morning peak period of 6-9 am (19% of KSI crashes) and the later evening between 9 pm and midnight (18% of KSI crashes).

Figure 51 Lighting Conditions by Injury Severity

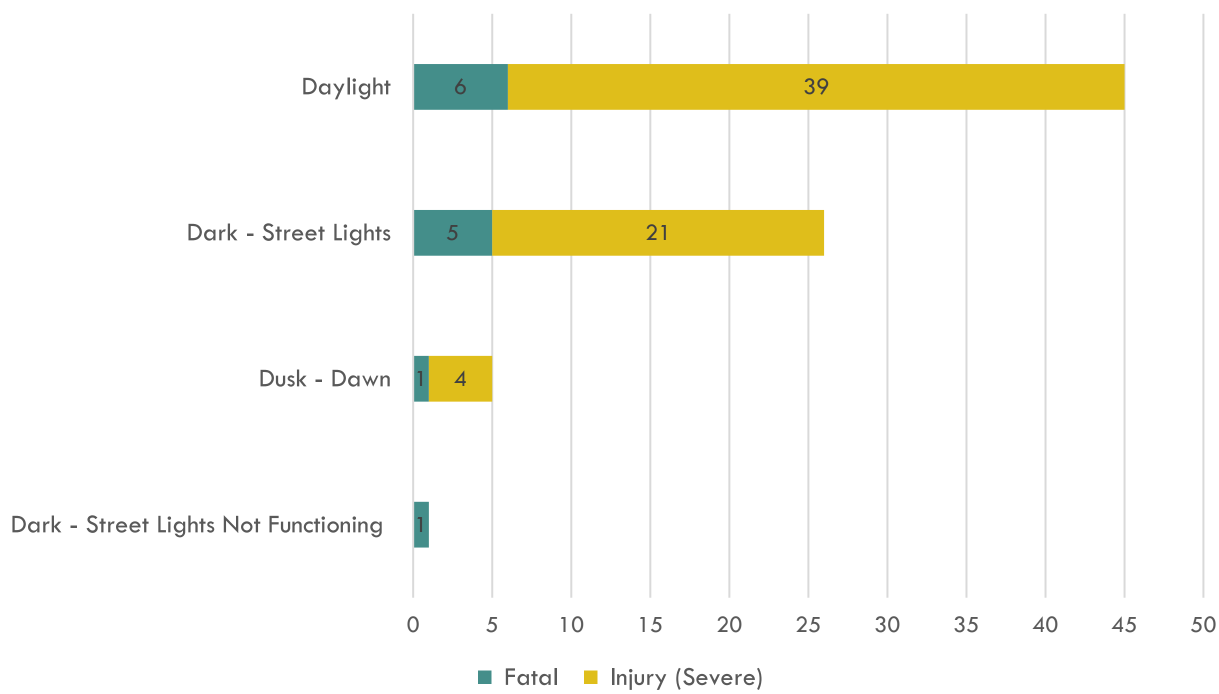


Figure 52 Time of Day and Day of Week of All Crashes

Time of Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Grand Total
12 am - 3 am	3	5	2	6	5	10	12	43
3 am - 6 am		4	1			2	5	12
6 am - 9 am	20	24	33	31	32	9	6	155

9 am - 12 pm	28	36	40	39	39	14	17	213
12 pm - 3 pm	25	32	27	26	36	29	23	198
3 pm - 6 pm	45	46	51	50	47	22	23	284
6 pm - 9 pm	43	36	46	39	38	18	22	242
9 pm - 12 am	8	16	15	21	15	12	8	95
Grand Total	172	199	215	212	212	116	116	1242

Figure 53 Time of Day and Day of Week of KSI Crashes

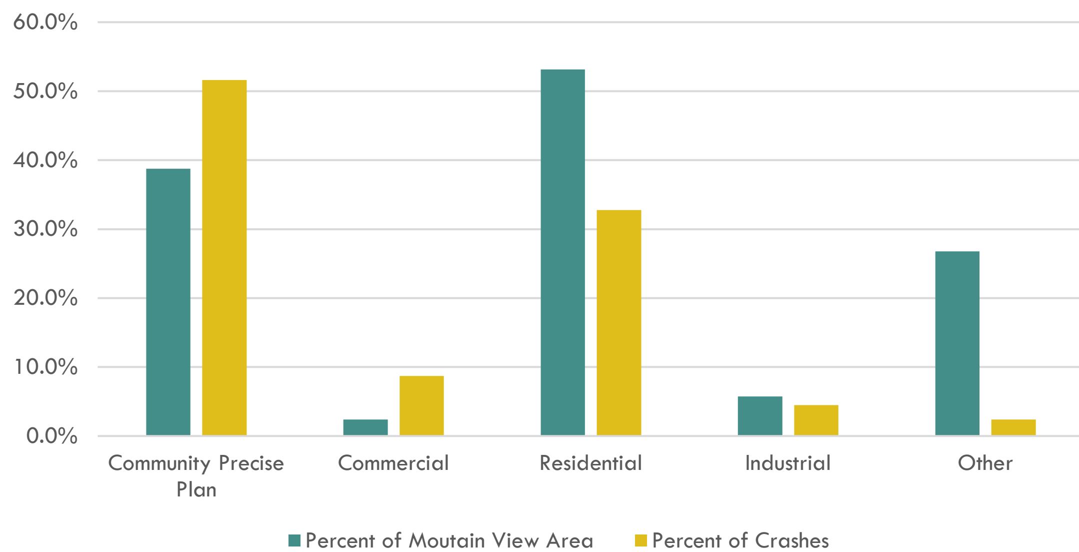
Time of Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Grand Total
12 am - 3 am	1			2		1	1	5
3 am - 6 am		1				1		2
6 am - 9 am	4	1	6	2	1		1	15
9 am - 12 pm	2	1		2		1		6
12 pm - 3 pm	1	1		3	1	2		8
3 pm - 6 pm	2	2	2	1	4	4	1	16
6 pm - 9 pm	4	1	1	2	2	1		11
9 pm - 12 am	1	2		7	1	2	1	14
Grand Total	15	9	9	19	9	12	4	77

RELATIONSHIP TO LAND USE AND DESTINATIONS

This section describes adjacent land use and proximity to destinations to crashes in Mountain View. This section also looks at age and the mode of crashes near schools and parks, and the mode and actions of crashes near transit stops.

As shown below, crashes were most likely to take place in commercial areas and areas with Precise Plan zoning, which are usually commercial areas or corridors, compared to the percent of city area (Figure 54).

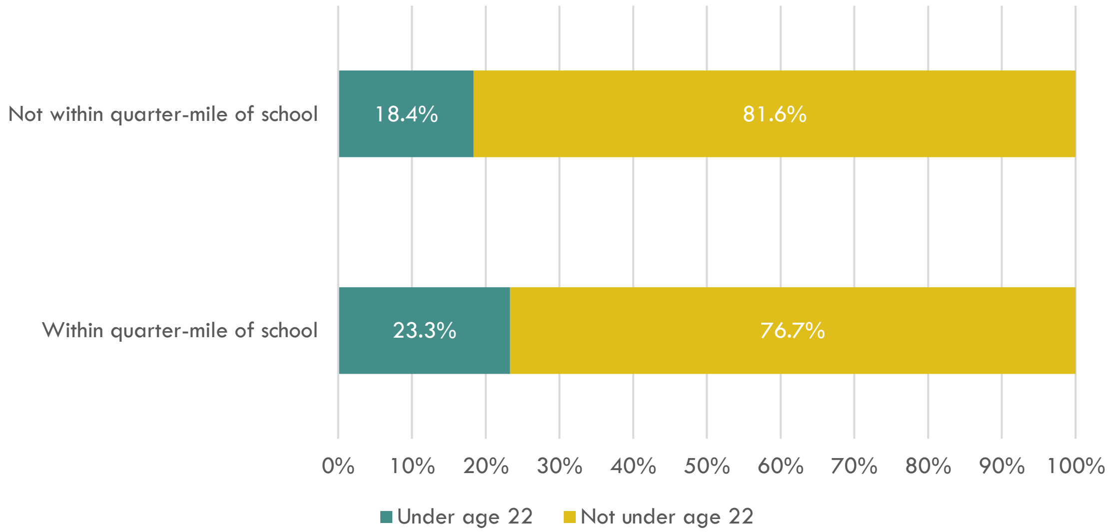
Figure 54 Primary Adjacent Zoning at Crash Locations



Almost Half of all Crashes Occurred Near a School

During the study period, 44% of local road crashes in Mountain View took place within ¼-mile of a school. Crashes near schools (Figure 55) were slightly more likely to involve someone age 21 or younger.

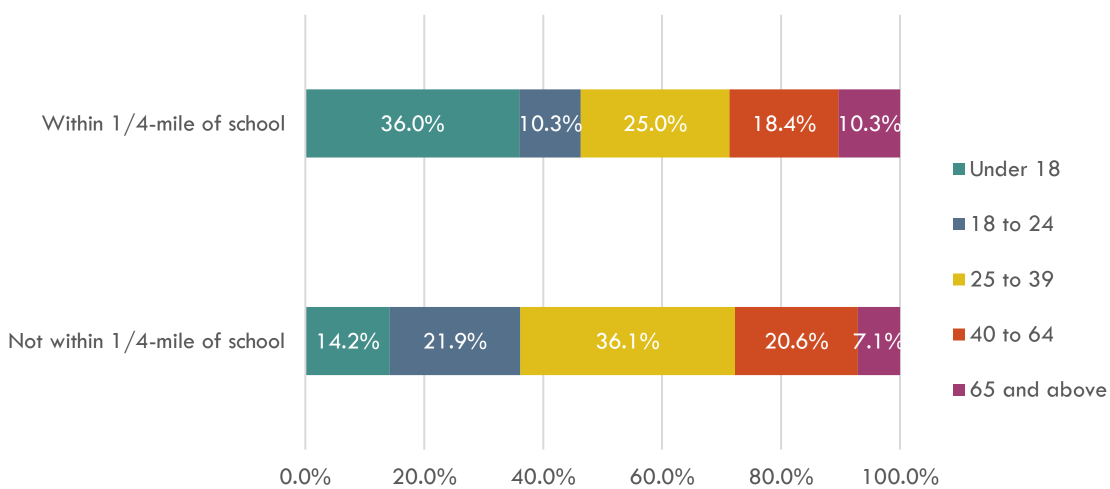
Figure 55 Crash Proximity to School and Youth Involvement



Crashes Near Schools were More Likely to Involve Children

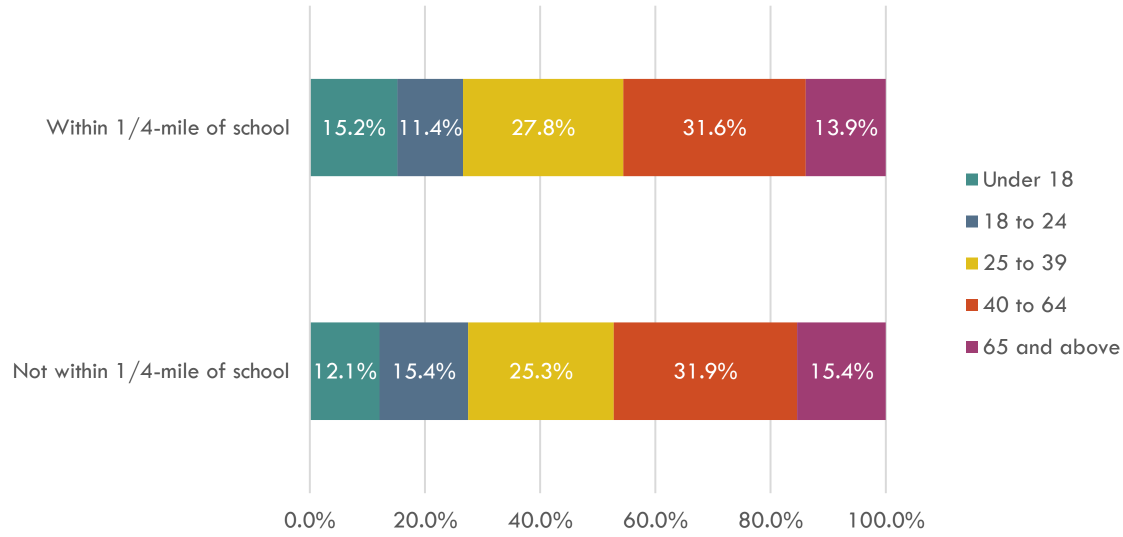
As a percent of the total in Figure 56, more than twice as many bicyclists under the age of 18 were involved in crashes near schools (36%) than were involved in crashes that were further from a school (14%).

Figure 56 Age of People Biking Involved in Crashes Near Schools



In Figure 57, a higher proportion of pedestrians involved in crashes near schools were under the age of 18 (15.2%) than for crashes further from schools (12.1%).

Figure 57 Age of People Walking Involved in Crashes Near Schools



Crashes Near Parks were More Likely to Involve Children

In Figure 58 and Figure 59, people walking and biking who were involved in crashes near parks were also more likely to be under 18 (14.7% and 25.8%) than for crashes that took place further from parks (9.8% and 20.3%).

Figure 58 Age of People Biking Involved in Crashes Near Parks

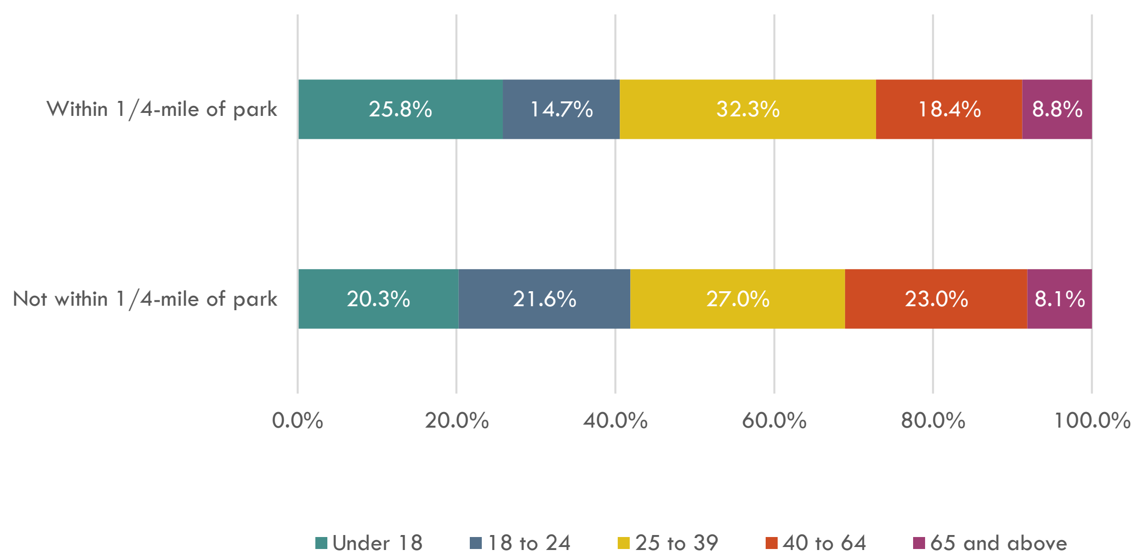
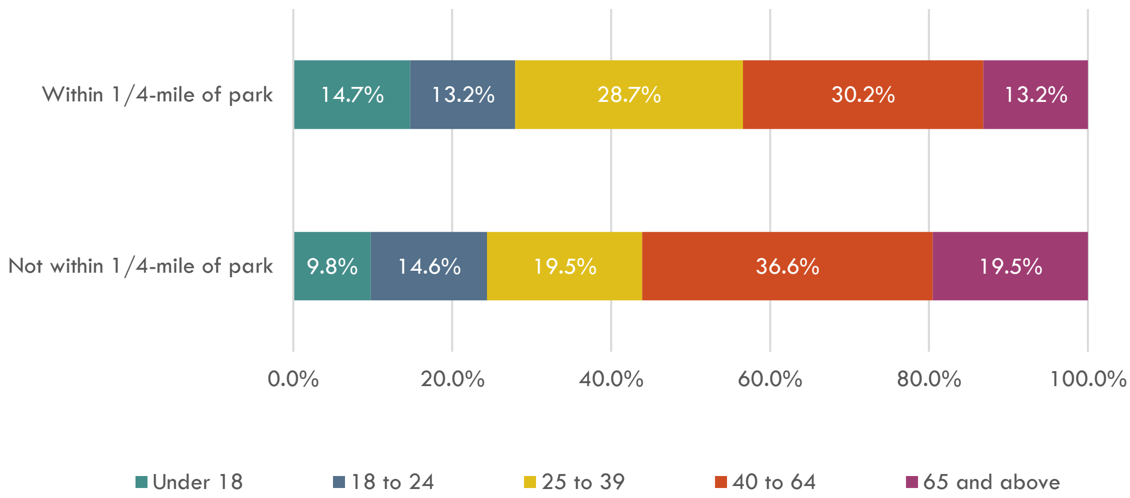


Figure 59 Age of People Walking Involved in Crashes Near Parks



Crashes Near Transit Disproportionately Affected Pedestrians and Bicyclists

There were 175 crashes, or 14% of the total crashes, took place within 100 feet of a transit stop. Crashes in close proximity to a transit stop were more likely to involve someone walking or biking (Figure 60).

Figure 60 Proximity to Transit Stop by Mode

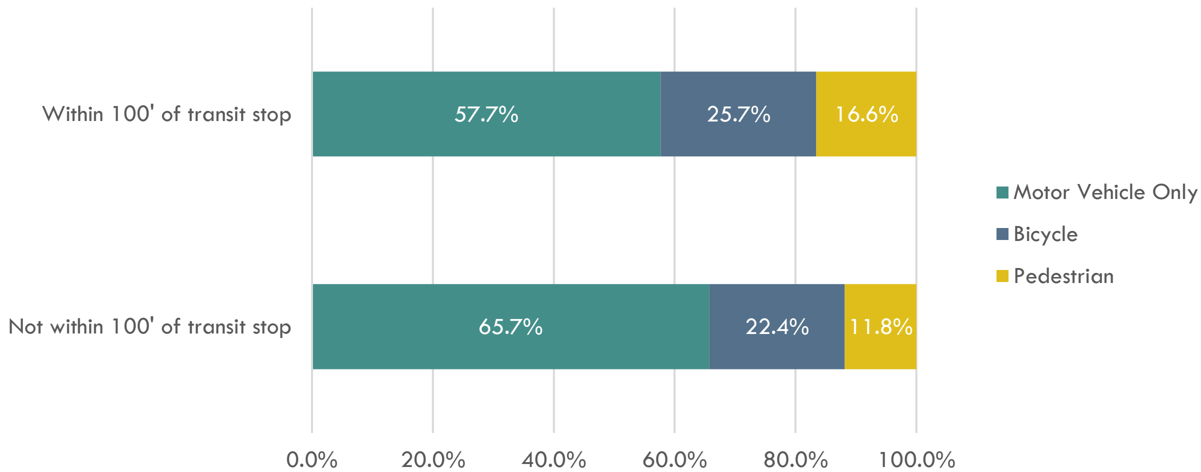
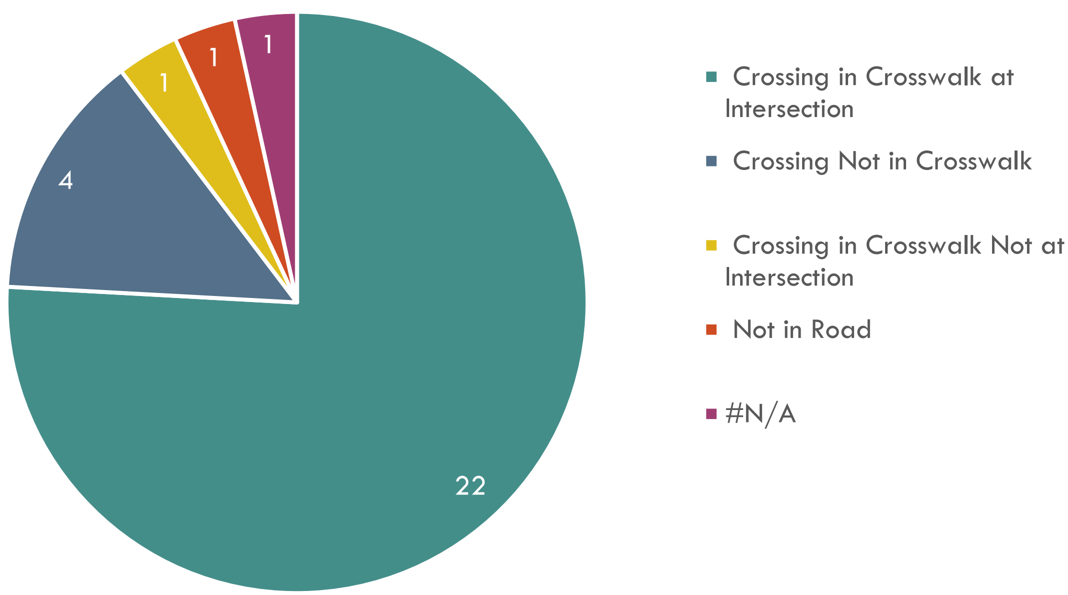


Figure 61 Pedestrian Action Preceding Crash Near Transit Stop



Over 75% of the people walking who were involved in a crash near a transit stop were crossing the street in a crosswalk at an intersection (Figure 61).

MANEUVERS

A more detailed look at what types of actions precede crashes, particularly fatal and severe crashes, helps inform the types of countermeasures that will be most effective at preventing them in the future.

Majority of the Crashes Involving Driver-Pedestrian Occurred At An Intersection

In most crashes involving people walking, the person walking was crossing the street in the crosswalk at an intersection when the crash occurred (Figure 62). The top four maneuvers for fatal and severe crashes were the same as for all crashes (Figure 63): driver turning left hit pedestrian in crosswalk; driver proceeding straight hit pedestrian in crosswalk; driver proceeding straight hit pedestrian crossing not in crosswalk; and driver turning right hit pedestrian in crosswalk.

Figure 62 Driver and Pedestrian Actions Prior to Vehicle-Pedestrian Crashes, 2014-19

Motor Vehicle Action	Pedestrian Action											
	Crossing in Crosswalk at Intersection		Crossing in Crosswalk Not at Intersection		Crossing Not in Crosswalk		In Road, Including Shoulder		Not in Road		Total	
Proceeding Straight	21	14%	6	4%	18	12%	7	5%	6	4%	58	38%
Making Left Turn	36	23%	2	1%	6	4%	3	2%	1	1%	48	31%
Making Right Turn	23	15%	0	0%	0	0%	2	1%	8	5%	33	21%
Backing	1	1%	0	0%	2	1%	1	1%	2	1%	6	4%
Other	4	3%	2	1%	1	1%	2	1%	4	3%	13	8%
Total	85	55%	10	6%	27	18%	14	9%	18	12%	154	100%

Figure 63 Driver and Pedestrian Action Prior Fatal and Severe Injury Vehicle-Pedestrian Crashes, 2014-19

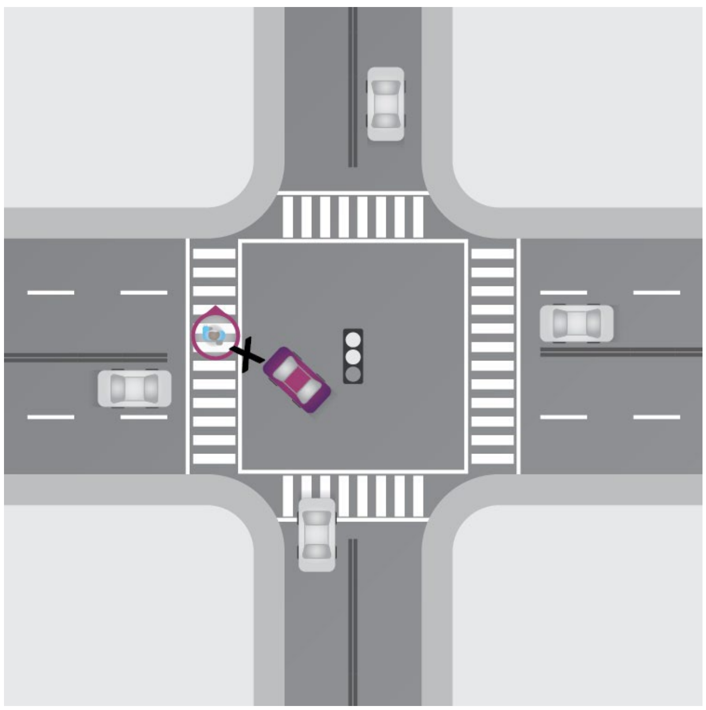
Motor Vehicle Action	Pedestrian Action											
	Crossing in Crosswalk at Intersection		Crossing in Crosswalk Not at Intersection		Crossing Not in Crosswalk		In Road, Including Shoulder		Not in Road		Total	
Proceeding Straight	4	14%	0	0%	4	14%	2	7%	2	7%	12	43%
Making Left Turn	4	14%	1	4%	2	7%	1	4%	0	0%	8	29%
Making Right Turn	3	11%	0	0%	0	0%	0	0%	0	0%	3	11%

Parked	0	0%	0	0%	0	0%	1	4%	2	7%	3	11%
Backing	0	0%	0	0%	0	0%	1	4%	1	4%	2	7%
Other	2	7%	0	0%	1	4%	0	0%	0	0%	3	11%
Total	13	46%	1	4%	7	25%	4	14 %	3	11 %	28	100%

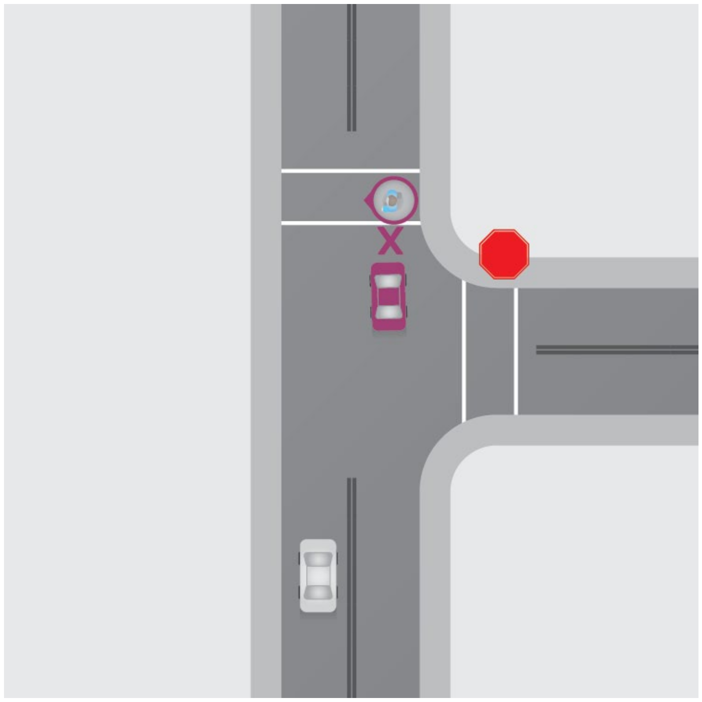
Three fatal crashes involving people walking took place at railroad crossings and the pedestrian movement preceding the crash is unknown

Key Vehicle-Pedestrian Crashes

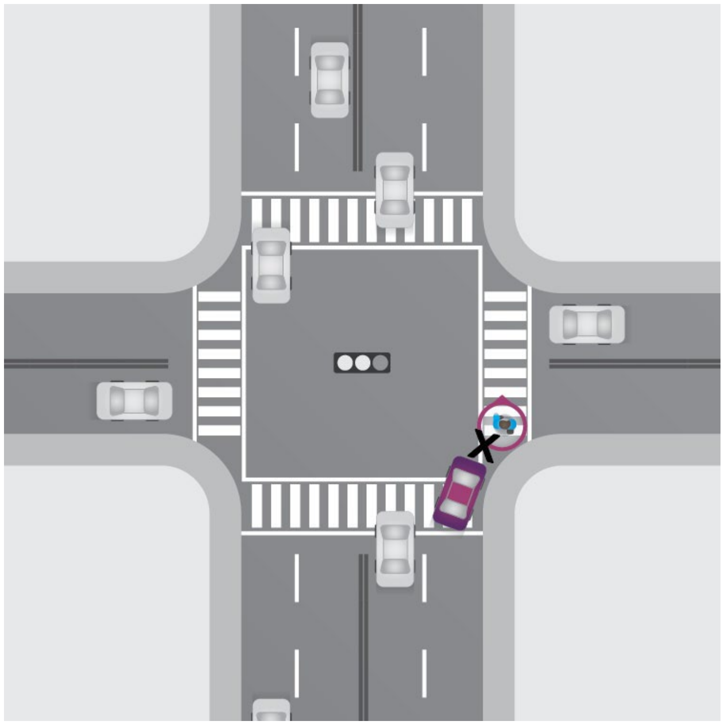
For crashes that occurred when a motorist was making a left turn at an intersection (Figure 62), 23% of these crashes involved someone walking in a crosswalk. For fatal and severe injury crashes involving pedestrians (Figure 63), 14% of these crashes involved a motorist making a left turn who hit a person walking across the road in a crosswalk at an intersection. These crashes typically occurred at signalized intersection of an arterial road with a local street.



For crashes that occurred when a motorist was proceeding straight at an intersection (Figure 62), 14% of these crashes involved someone walking in a crosswalk. For fatal and severe injury crashes involving pedestrians (Figure 63), 14% of these crashes involved a motorist proceeding straight who hit a person walking across the road in a crosswalk at an intersection. These crashes typically occurred at an intersection of two local streets with a one-way or two-way stop control.



For crashes that occurred when a motorist was turning right at an intersection (Figure 62), 15% of these crashes involved someone walking in a crosswalk. For fatal and severe injury crashes involving pedestrians (Figure 63), 11% of these crashes involved a motorist turning right who hit a person walking across the road in a crosswalk at an intersection. These crashes typically occurred at a signalized intersection of an arterial road with a local street. Right-turn crashes were also most common on El Camino Real and other High Injury Network thoroughfares.



As discussed previously, most crashes involving pedestrians occurred on the high injury network and downtown (Figure 64).

Figure 64 Locations of Most Common Crash Types Involving People Walking

Among the 285 Vehicle-Bicycle crashes (Figure 65), 146, or 51%, of them occurred at intersections. The top three known maneuvers for fatal and severe crashes were: driver proceeding straight hit bicyclist proceeding straight; driver turning left hit bicyclist proceeding straight; and driver turning right hit bicyclist proceeding straight (Figure 66). A driver proceeding straight hit bicyclist turning left or right accounted for 17% of KSI crashes at an intersection.

Figure 65 Driver and Bicyclist Actions Prior to Vehicle-Bicycle Crashes, 2014-19

	Bicyclist Action													
Motorist Action	Proceeding Straight		Left turn		Changing lanes		Traveling wrong way		Right turn		Other		Total	
Proceeding Straight	71	25%	13	5%	9	3%	5	2%	2	1%	10	4%	110	39%
Right turn	62	22%	3	1%	0	0%	12	4%	0	0%	3	1%	80	28%
Left turn	33	12%		0%	0	0%	0	0%	0	0%	3	1%	36	13%
Other	47	16%	2	1%	0	0%	3	1%	3	1%	4	1%	59	21%
Total	213	75%	18	6%	9	3%	20	7%	5	2%	20	7%	285	100%

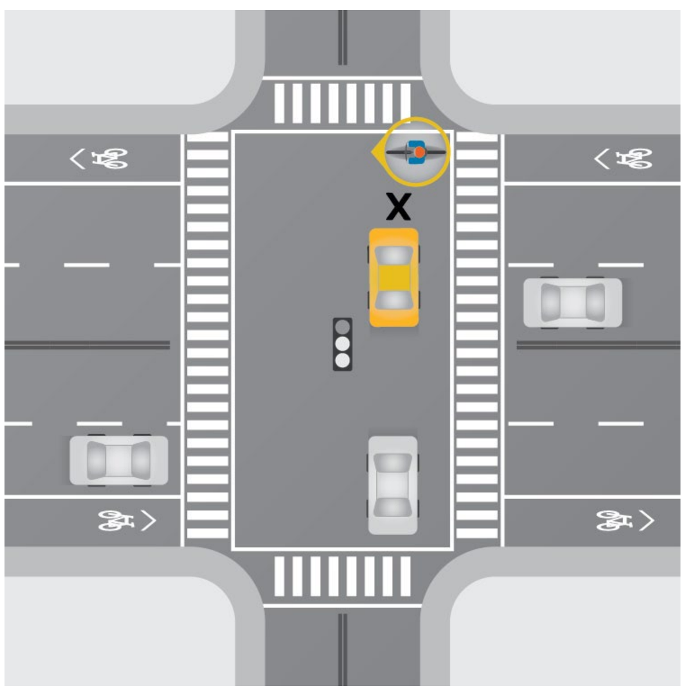
Figure 66 Driver and Bicyclist Actions Prior to Fatal and Severe Injury Vehicle-Bicycle Crashes at an Intersection, 2014-19

	Bicyclist Action													
Motorist Action	Proceeding Straight		Left turn		Changing lanes		Traveling wrong way		Right turn		Other		Total	
Proceeding Straight	2	17%	1	8%	0	0%	0	0%	1	8%	1	8%	5	42%
Right turn	1	8%	0	0%	0	0%	0	0%	0	0%	1	8%	2	17%
Left turn	2	17%	0	0%	0	0%	0	0%	0	0%	1	8%	3	25%
Other	2	17%	0	0%	0	0%	0	0%	0	0%	0	0%	2	17%
Total	7	58%	1	8%	0	0%	0	0%	1	8%	3	25%	12	100%

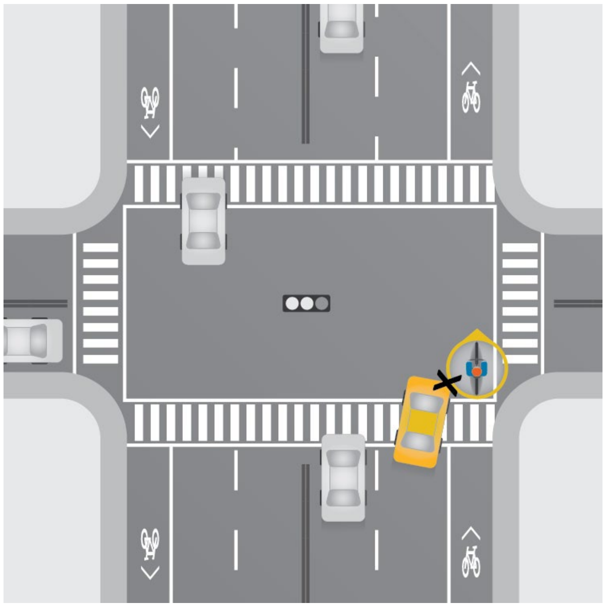
Key Vehicle-Bicycle Crashes

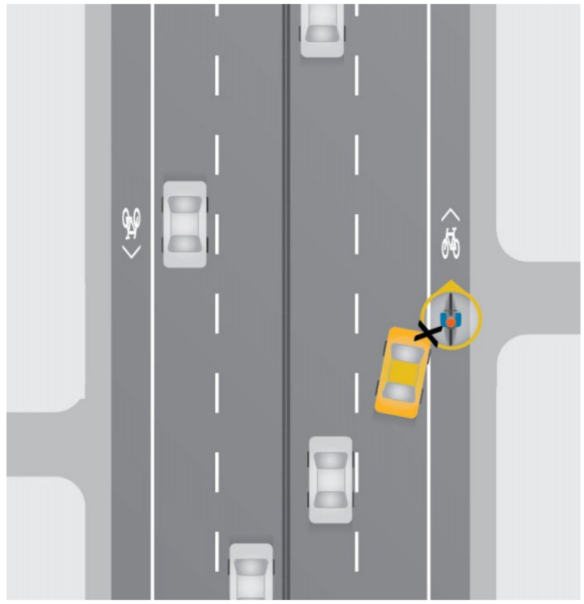
For crashes that occurred when a motorist was turning left at an intersection or otherwise (Figure 65), 12% of these crashes involved someone biking. For fatal and severe injury crashes involving bicyclists at an intersection (Figure 66), 17% of these crashes involved a motorist turning left who hit a person biking straight. These crashes typically occurred at a signalized intersection of an arterial road with a local street or at a major driveway such as for businesses.

For crashes that occurred when a motorist was proceeding straight at an intersection or otherwise (Figure 65), 25% of these crashes involved someone biking. For fatal and severe injury crashes involving bicyclists at an intersection (Figure 66), 17% of these crashes involved a motorist proceeding straight who hit a person biking who was proceeding straight. About half of these crashes occurred at an intersection. For crashes that did not occur at intersections, the most common violation categories were operating on the "wrong side of the road" and "automobile right of way".



For crashes that occurred when a motorist was turning right at an intersection or otherwise (Figure 65), 22% of these crashes involved someone biking straight. For fatal and severe injury crashes involving bicyclists at an intersection (Figure 66), 8% of these crashes involved a motorist turning right who hit a person biking straight. These crashes (known as right hooks) were common at signalized intersections. Many of these crashes also occurred between intersections and are assumed to involve drivers turning in and out of major driveways.

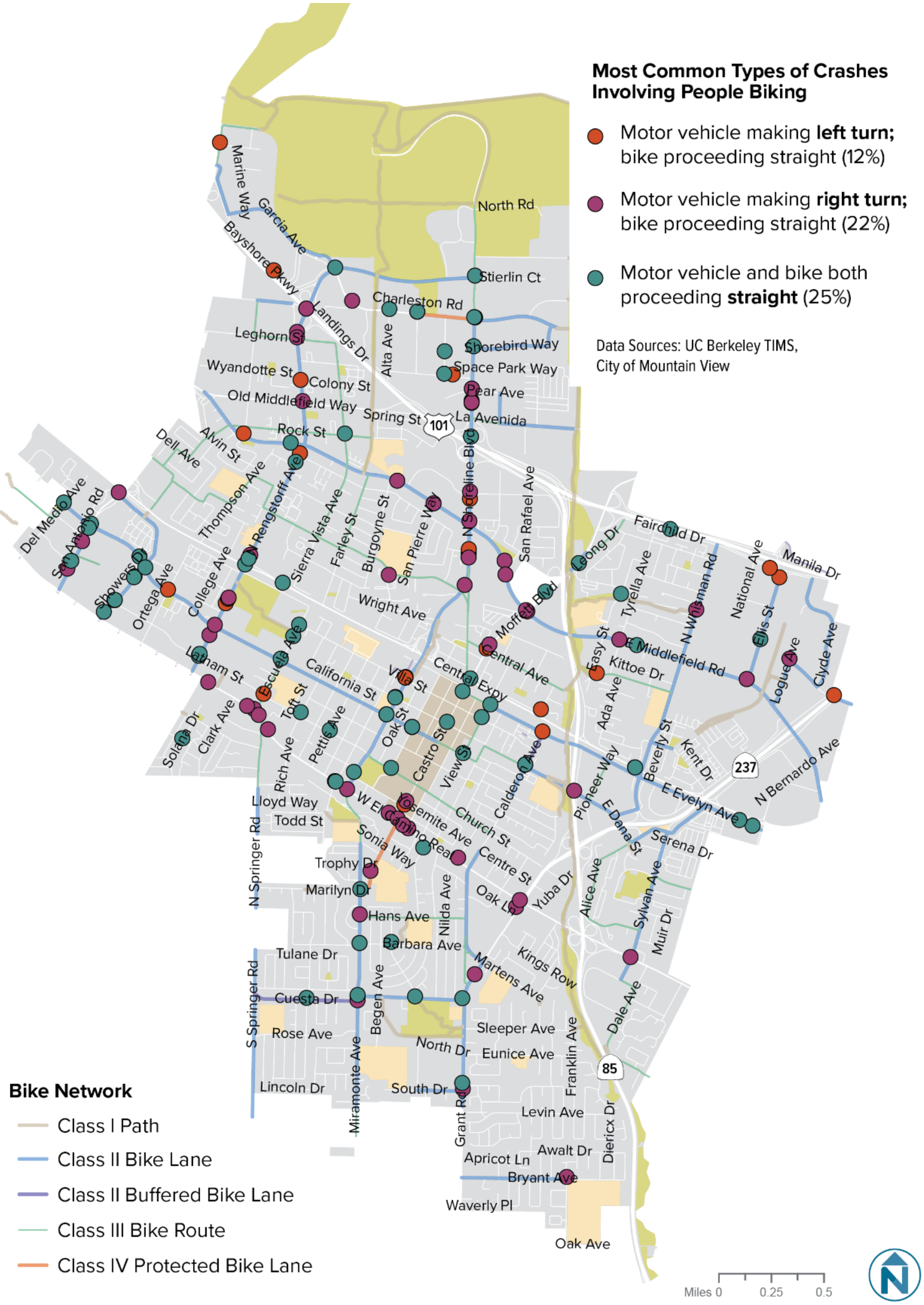




Most Vehicle-Bike Crashes Occurred on the High Injury Network

Most crashes involving people biking took place on the bike network, particularly on major streets with bike lanes (Figure 67). About 2/3 of right hook crashes occurred on the High Injury Network including a concentration on El Camino Real, which has no bike facility.

Figure 67 Locations of Most Common Crash Types Involving People Biking



Most Fatal or Severe Injury Vehicle Only Crashes Involved Motorists Running off the Road

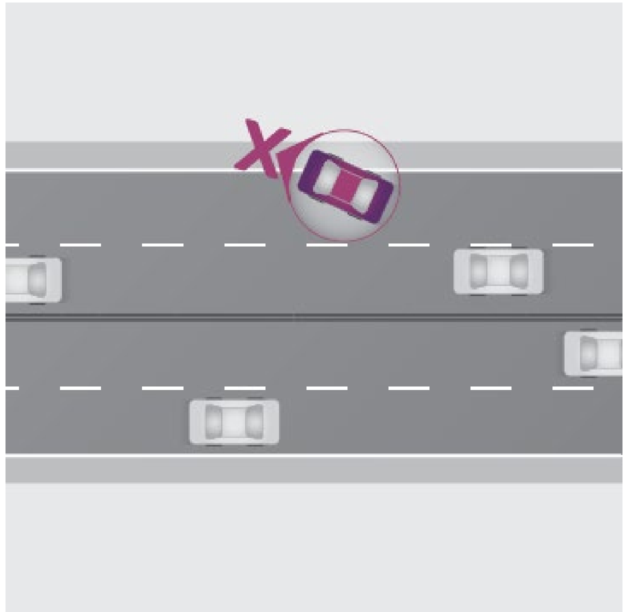
Among all crashes, 86% involved 1 to 2 parties. Among these crashes, the ones that occurred when the vehicle ran off the road accounted for 11% (Figure 68). However, single vehicle crashes with the vehicle running off the road represented the highest percentage of KSI crashes (Figure 69) only involving motor vehicles in Mountain View (39%). Impairment by alcohol, drugs or fatigue was a factor in the majority of these crashes.

Figure 68 Driver Actions Prior to Vehicle Only Crashes, 2014-19

Vehicle Movement	Proceeding Straight	Making Left Turn	Stopped	Making Right Turn	Changing Lanes	Passing Other Vehicle	N/A (Only 1 vehicle)	Total
Proceeding Straight	163	64	105	10	8	1	30	381
Ran Off Road	2	0	1	0	0	0	49	52
Making Right Turn	3	0	2	1	0	1	10	17
Slowing/Stopping	6	0	11	1	0	0	1	19
Entering Traffic	12	0	0	0	1	0	1	14
Total	186	64	119	12	9	2	91	483

Figure 69 Driver Actions Prior to Fatal and Severe Injury Motor Only Crashes

Vehicle Movement	Proceeding Straight	Making Left Turn	Stopped	Making Right Turn	Changing Lanes	Passing Other Vehicle	N/A (Only 1 vehicle)	Total
Proceeding Straight	5	4	3	1	1	1	1	16
Ran Off Road	0	0	0	0	0	0	12	12
Making Right Turn	0	0	0	0	0	0	1	1
Slowing/Stopping	0	0	1	0	0	0	0	1
Entering Traffic	1	0	0	0	0	0	0	1
Total	6	4	4	1	1	1	14	31



Crashes involving Impaired Drivers were Far More Likely to Result in Death or Severe Injury Compared to Non-Impaired Drivers

Among all crashes involving motor vehicles in Mountain View (1,244), the share of total drivers who were alcohol or drug impaired (101) was 8.1%. When impairment was involved, crashes were far more likely to result in death or severe injury – 17% compared to 5% of crashes that do not involve alcohol or drug impairment (Figure 70 and Figure 71).

Figure 70 Severity of Crashes with Impairment

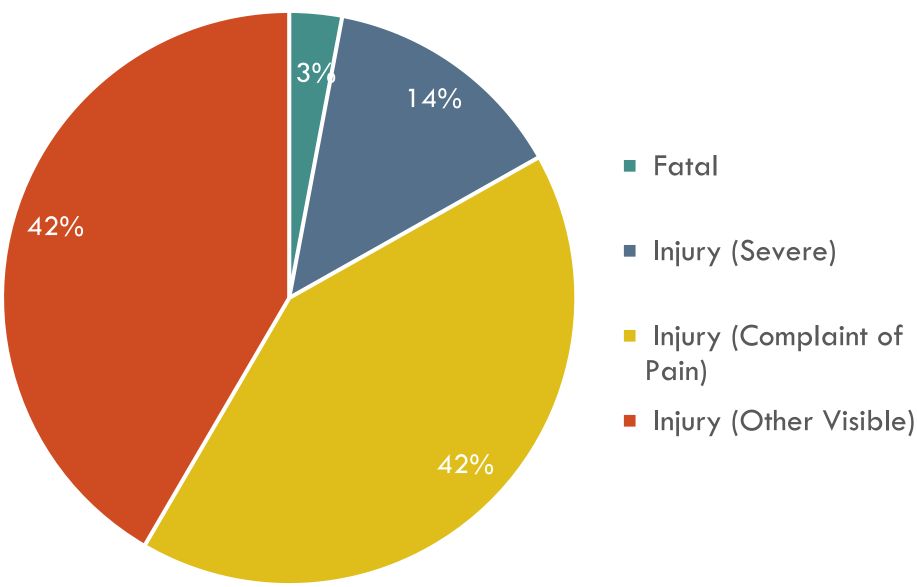
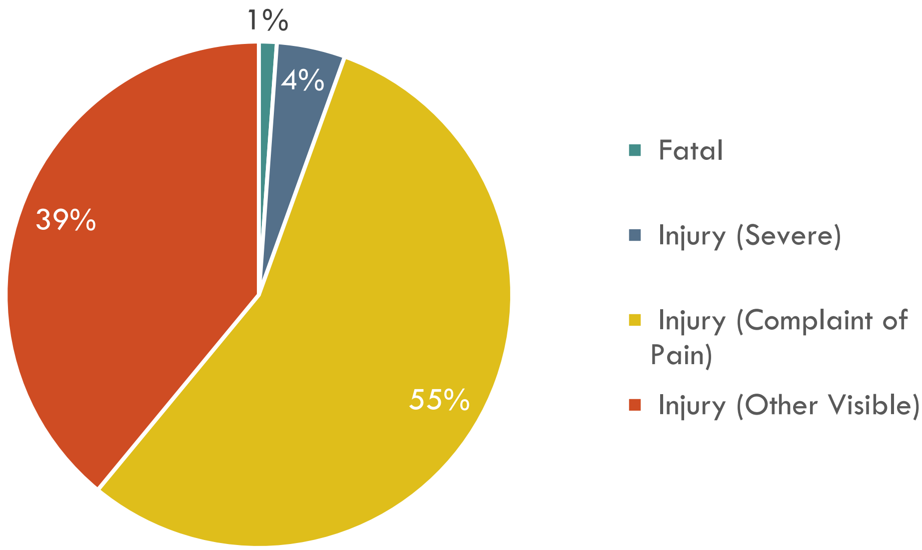


Figure 71 Severity of Crashes without Impairment



Appendix B: Toolbox of Safety Countermeasures

The countermeasures below are from FHWA's Proven Countermeasure Toolbox and FHWA Clearing House Toolbox, Pedestrian and Safety Guide and Countermeasure Selection System (PEDSAFE), Caltrans Pedestrian Safety Countermeasure Toolbox and Bicycle Safety Guide and Countermeasure Selection System. All countermeasures listed are general and each application would need site specific engineering review to determine appropriateness.

PEDESTRIAN SIGNAL OPERATIONS MODIFICATIONS

Pedestrian signal operations modifications give more time for pedestrians to cross, reduce pedestrian wait times at signals, and provide clearer communication for both pedestrians and drivers. Potential improvements include leading pedestrian intervals and reduced standard walking speed.

A **leading pedestrian interval** (LPI) gives people walking a 3 to 10 second head start when entering an intersection by presenting the "walk" sign while motor vehicle traffic has a red light in all directions. This provides pedestrians an opportunity to begin crossing before motor vehicles proceed and to establish a presence in the crosswalk, which increases their visibility to drivers and reduces conflicts with turning vehicles. The California Manual on Uniform Traffic Control Devices (CAMUTCD) provides guidance on implementation in Chapter 4E.06.19.[9]

Historically, a standard **walking speed** of 4.0 feet per second has been used to calculate the minimum pedestrian clearance interval for signals. The CAMUTCD provides guidance that a slower walking speed of 3.5 feet per second should be used, and 2.8 feet per second should be considered where pedestrians who are older or who have disabilities routinely use the crosswalk.[10]

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[9] Caltrans. CAMUTCD 2014 Edition Chapter 4E: Pedestrian Control Features, Chapter 4E.06.19. https://dot.ca.gov/-/media/dot-media/programs/safety-programs/documents/ca-mutcd/rev8/camutcd2014-rev8-all.pdf

[10] Caltrans. CA-MUTCD 2014 Edition Chapter 4E: Pedestrian Control Features, Chapter 4E.06.7 and 4E.06.10-10a. https://dot.ca.gov/programs/safety-programs/camutcd/camutcd-files.

Effects

FHWA classifies leading pedestrian intervals as a *Proven Safety Countermeasure* and reports that LPIs reduce crashes involving people walking at intersections by 13%.[11]

Considerations

These pedestrian signal modifications should be considered in conjunction with accessible pedestrian signals (APS) to notify visually impaired pedestrians when to begin crossing. Designers may also analyze the feasibility of increasing the pedestrian clearance interval based on each signal's cycle length and phase splits. There is also potential to consider restrict right-turn-on-red at locations with LPIs to minimize conflicts between pedestrians and right turning vehicles

Crash Type Addressed

- Driver turning left and pedestrian crossing in crosswalk at signalized intersection

PROTECTED LEFT TURNS

Protected left turns give a separate signal phase for vehicles to turn left at an intersection. When the signal displays a green left-turn signal, oncoming traffic has a red light and pedestrians are not permitted to cross with the conflicting turn.

Effects

FHWA reports that protected left-turn phases prevent conflicts between people walking and left-turning vehicles almost completely, reducing crashes by as much as 99%.[12] The Crash Modification Factors (CMF) FHWA Clearinghouse likewise notes that converting a permitted to a protected left turn can reduce angle crashes by 99%.[13]

Considerations

The benefits of protected left turns should be weighed against their safety effects on both signal cycle lengths and pedestrian crossing distance. Caltrans' Pedestrian Safety Countermeasures Toolbox also emphasizes the importance of reducing pedestrian crossing distance for pedestrian safety. However, protected left turns require a designated left-turn only lane or pocket, which increases crossing distance if a left-turn lane does not already exist. Protected left turns may also require longer mast arms and intersection operational impacts.

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[11] FHWA. Leading Pedestrian Interval (LPI) Countermeasure Tech Sheet. Safe Transportation for Every Pedestrian. October 2019. FHWA-SA-19-040. and FHWA. Safety Evaluation of Protected Left-Turn Phasing and Leading Pedestrian Intervals on Pedestrian Safety. October 2018. FHWA-HRT-18-044.

[12] Federal Highway Administration. 2008. Toolbox of Countermeasures and Their Potential Effectiveness for Pedestrian Crashes. <https://safety.fhwa.dot.gov/ped_bike/tools_solve/ped_tctpepc/>

[13] Crash Modification Factors Clearinghouse. 2008. <http://www.cmfclearinghouse.org/index.cfm>

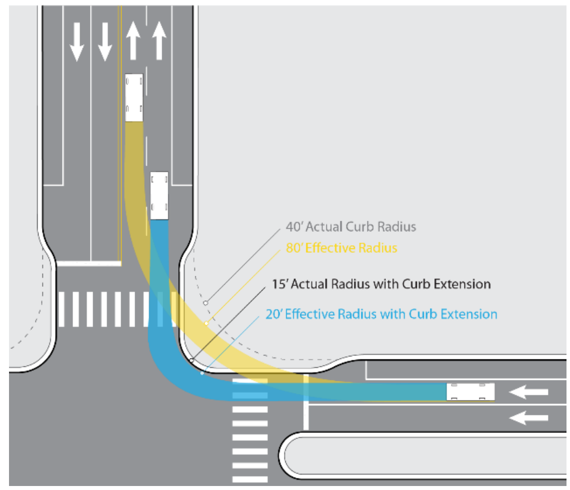
Crash Types Addressed

- Driver turning left and pedestrian crossing in crosswalk at signalized intersection
- Bicyclist proceeding straight broadsided by motor vehicle at signalized intersection

CURB RADIUS REDUCTIONS

Larger curb radii result in higher turning speeds for motor vehicles, while smaller radii can improve safety because they require motorists to reduce vehicle speed by making sharper turns.

The Institute of Transportation Engineers (ITE) guidance on Designing Walkable Urban Thoroughfares recommends a curb return radius of 5 to 15 feet where there are high pedestrian volumes, low vehicle volumes, bicycle or parking lanes are present, and large vehicles constitute a very low proportion of turning vehicles. Turning templates should be used in the design of facilities to identify curb return radius and required pavement width to avoid vehicle encroachment into opposing travel lanes. [14]



Source: Nelson\Nygaard – ITE Implementing Context Sensitive Design for Multimodal Thoroughfares

Effects

FHWA's PEDSAFE Guide also recommends tighter corner radii of 5 to 10 feet to reduce crossing distances and slow traffic.[15] Likewise, the *Unsignalized Intersection Improvement Guide* sponsored by FHWA includes reducing intersection curb radii to reduce crashes involving bicyclists and pedestrians.[16].

Considerations

Turning templates should be used in the design of facilities to identify curb return radius and required pavement width to avoid vehicle encroachment into opposing travel lanes. Implementation curb radius reductions should consider accommodating the turning radii of larger vehicles along certain routes such as designated freight routes. Larger curb radii may also be to accommodate emergency vehicles, garbage trucks, turning buses, van, truck, or oversized delivery truck into the opposing lane is not acceptable.

Drainage is an important consideration when implementing curb radius reductions especially where tighter corners involve relocation of drainage inlets.

Crash Types Addressed

- Unsafe turning speed
- Driver proceeding straight and pedestrian in crosswalk at two-way stop controlled intersection

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[14] ITE. 2010. Designing Walkable Urban Thoroughfares: A Context Sensitive Approach, pp.

[15] Federal Highway Administration. 2013. Curb Radius Reduction. <http://pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=28>

[16] The Institute of Transportation Engineers. 2014. Unsignalized Intersection Improvement Guide. <http://toolkits.ite.org/uiig/treatments/46%20Reduce%20Curb%20Radius.pdf>

CURB EXTENSIONS

Wide roadways can create difficult crossing situations for pedestrians. Not only do pedestrians need more time to cross the roadway (with more exposure to traffic), but wider roadway widths encourage motorists to speed or take turns quickly.

Curb extensions improve safety because they increase visibility, reduce the speed of turning vehicles, encourage pedestrians to cross at designated locations, shorten pedestrian crossing distance, and prevent vehicles from parking at corners.

Effects

PEDSAFE from FHWA states curb extensions improve visibility of and for pedestrians.[17]

Considerations

This strategy is most appropriate where there are on-street parking spaces or loading zones. However, curb extensions may not be appropriate along certain routes such as designated freight routes where there is a need to accommodate the turning radii of emergency vehicles and larger vehicles. The design of curb extensions may also need to be integrated with bus stops and buffered or protected bike lanes at corners.

Crash Types Addressed

- Driver proceeding straight and pedestrian in crosswalk at two-way stop controlled intersection
- Driver proceeding straight and pedestrian crossing between intersections (mid-block crossing)
- Driver turning left and pedestrian crossing in crosswalk at signalized intersection
- Unsafe speed

[17] Federal Highway Administration. 2013. Curb Extensions. <http://pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=5>

HIGH-VISIBILITY CROSSWALKS

High-visibility striped crosswalks make pedestrian crossing locations more visible to people driving and increase driver awareness of people walking.

Other visibility enhancements for crosswalks can include lighting, advance or in-street warning signage, pavement markings.

Source: Ria Hutabarat Lo, Mountain View, California

Effects

FHWA classifies PHBs as a *Proven Safety Countermeasure* and the crosswalk visibility enhancements can reduce crashes by 25-42%[18].

Considerations

Implementation of high visibility crosswalks should consider roadway context. For example, on their own, unsignalized high visibility crossings do not provide sufficient safety for pedestrians on multi-lane roadways with greater than 10,000 AADT. At these locations, additional treatments such as refuge islands, rectangular rapid flashing beacons, or pedestrian hybrid beacons should also be used. Marked crosswalks should be placed using engineering judgement and should not be placed indiscriminately.

When installing midblock crossings, block length and proximity to existing marked crosswalks should also be considered. With an optimal distance of 400 to 600 feet between crosswalks where determined appropriate by engineering review.

Crash Type Addressed

- Driver proceeding straight and pedestrian in crosswalk at two-way stop controlled intersection
- Driver proceeding straight and pedestrian crossing between intersections (mid-block crossing)
- Driver making left turn and pedestrian crossing in crosswalk at signalized intersection

[18] Federal Highway Administration. 2018. Crosswalk Visibility Enhancements. <https://safety.fhwa.dot.gov/ped_bike/step/docs/TechSheet_VizEnhancemt_508compliant.pdf>

MEDIANS AND CROSSING ISLANDS

Median pedestrian and bicycle refuge islands make roadway crossings easier and safer by limiting exposure to through moving vehicles; enabling crossings to commence when there are gaps in traffic from one direction at a time; and providing a safe stopping place in the middle of the roadway for pedestrians who are not able to make the complete street crossing during the pedestrian phase. These countermeasures may be used at signalized and unsignalized intersections or midblock.

Effects

FHWA classifies Medians and Pedestrian Crossing Islands in Urban and Suburban areas as a *Proven Safety Countermeasure*. FHWA reports that pedestrian islands can reduce pedestrian crashes by 46% for raised medians and 56% reduction in pedestrian crashes for pedestrian crossing islands [19].

Considerations

Median refuge islands can be used in conjunction with beacons (such as RRFBs and PHBs), additional signage and pavement markings at unsignalized intersections or midblock crossings. The design should also be considered in the context of available right-of-way and pavement width. For example, refuge islands require at least 4 feet in width, with wider islands of up to 8 feet being desirable. On designated freight routes, medians and crossing islands should accommodate the turning radii of larger vehicles. Other considerations include proximity to existing marked crosswalks (if installing a new crossing) and driveway access.

Crash Type Addressed

- Driver proceeding straight and pedestrian in crosswalk at two-way stop-controlled intersection
- Driver proceeding straight and pedestrian crossing between intersections (new mid-block crossing)
- Driver making left turn and pedestrian crossing in crosswalk at signalized intersection
- Bicyclist proceeding straight broadsided by motor vehicle at signalized intersection

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[19] Federal Highway Administration. 2018. Pedestrian Refuge Island. <https://safety.fhwa.dot.gov/ped_bike/step/docs/techSheet_PedRefugeIsland2018.pdf>

RECTANGULAR RAPID FLASHING BEACONS

The Rectangular Rapid Flashing Beacon (RRFB) is a device using LED flashing beacons in combination with pedestrian and bicycle warning signs, to provide a high-visibility strobe-like warning to drivers when pedestrians and bicyclists use a crosswalk. They can be installed at mid-block crossings or uncontrolled intersections of major streets.

Effects

NCHRP Research Report 841 found the installation of RRFBs can reduce pedestrian crashes by 47%[20]. According to the CMF Clearinghouse, installing an enhanced RRFB pedestrian crossing at mid-block crossing locations can reduce vehicle-pedestrian crashes by 36%.[21]

Considerations

Installation of RRFBs should be based on a study of the location with a focus on the number of lanes, presence of a median, ADT, and posted speed limit. The FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations[22] provides guidance for when RRFBs are most appropriate based on these conditions. RRFBs are suitable for roads with a posted speed limit of less than 35 mph or an Annual Average Daily Traffic volume (AADT) up to 15,000 vehicles.

Crash Type Addressed

- Driver proceeding straight and pedestrian in crosswalk at two-way stop-controlled intersection
- Driver proceeding straight and pedestrian crossing between intersections

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[20]Rectangular Rapid-Flashing Beacon (RRFB). 2017 http://pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=54

[21] FHWA Crash Modification Factors Clearinghouse. 2008. <http://www.cmfclearinghouse.org/index.cfm>

[22] Federal Highway Administration. Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations. 2018. < https://safety.fhwa.dot.gov/ped_bike/step/docs/STEP_Guide_for_Improving_Ped_Safety_at_Unsig_Loc_3-2018_07_17-508compliant.pdf> Please see Table 1 for a summary of where to apply pedestrian safety countermeasures.

PEDESTRIAN HYBRID BEACONS

A pedestrian hybrid beacon (PHB) is a traffic control device that makes drivers aware of pedestrians crossing the street at uncontrolled marked crosswalk locations. It is activated by pedestrians when needed and is black when not in use.

Effects

FHWA classifies PHBs as a *Proven Safety Countermeasure*. FHWA reports PHBs can result in a 55% reduction in pedestrian crashes, 29% reduction in total crashes, and 15% reduction in serious injury and fatal crashes.[23]

Considerations

PHBs are relatively new traffic control devices. Therefore installation should be accompanied by an education and outreach effort to ensure that users understand how to behave with this device.

Design of PHBs should also consider proximity to existing traffic signals. The CA MUTCD provides guidance for activity warrants and recommends that PHBs be located at least 100 feet away from other intersections.[24]

Crash Type Addressed

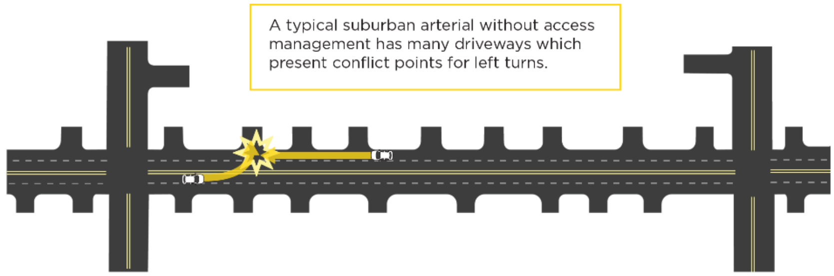
- Driver proceeding straight and pedestrian in crosswalk at two-way stop-controlled intersection
- Driver proceeding straight and pedestrian crossing between intersections

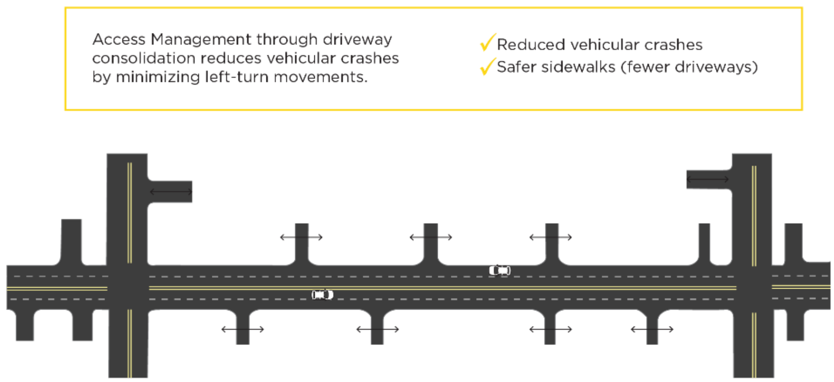
[23] FHWA. 2019. Pedestrian Hybrid Beacons. <https://safety.fhwa.dot.gov/provencountermeasures/ped_hybrid_beacon/>

[24] California Manual on Uniform Traffic Control Devices (CA MUTCD). < https://dot.ca.gov/programs/safety-programs/camutcd>

ACCESS MANAGEMENT

Corridor access management can reduce the frequency and magnitude of conflict points at intersections and driveways by altering access patterns. Access management can be achieved through driveway consolidation, driveway narrowing, and medians that restrict access to right-in and right-out turning movements.





Source: NN, ITE Implementing Context Sensitive Design for Multimodal Thoroughfares

Effects

The Highway Safety Manual reports that reducing the driveway density can reduce crashes by up to 31 percent[25].

The AASHTO Green Book states each additional access point per mile increases the crash rate by approximately 3%.

FHWA does not yet classify access management as a Proven Safety Countermeasure, however various access management strategies are listed in the CMF Clearinghouse.

Considerations

Key considerations for access management are opportunities for shared parking, driveway consolidation, and placement of driveways away from intersections. Additionally, potential traffic diversion as well as emergency and large vehicle access needs should be considered.

Crash Type Addressed

- Motor vehicle broadside between intersections (assumed to be at driveways)
- Bicyclist involved between intersections
- Driver proceeding straight and pedestrian in crosswalk at two-way stop-controlled intersection

[25] American Association of State Highway and Transportation Officials. Highway Safety Manual. 2010.

BIKE SIGNAL PHASING

Bike signal phases provide separate control of bicycle movements at intersections. These separate phases reduce the number of conflicts between turning vehicles and bikes traveling straight, reducing the incidence of "right-hook" crashes for bikes.

NACTO's guide, *Don't Give Up at the Intersection*, details alternative signal configurations for reducing conflicts between bikes and turning vehicles including leading bike intervals, bike scrambles, and protected bike signal phases.

Effects

The City and County of San Francisco compared 6 mixing zones to 2 separated bike signals and found that conflicts between bikes and vehicles dropped from 41% for mixing zones to 2% for bike signals.[26] The same study found on average, people biking complied with the signals 86% of the time and vehicles complied 95% of the time.

Considerations

Installation of bicycle signal phasing should consider the intersection geometry (such as whether the intersection is a typical intersection or a protected intersection) and the number of turning vehicles that could conflict with bikes travelling straight (for concurrent bike phases only). Signal operations, ped volumes,

Crash Type Addressed

- Bicyclist proceeding straight broadsided by turning motor vehicle at signalized intersection

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[26] SFMTA. Bike Signals and Mixing Zones. 2019. <https://www.sfmta.com/sites/default/files/reports-and-documents/2019/05/bike_signals_factsheet_final.pdf>

BIKE TREATMENTS AT INTERSECTIONS

A **bike box** is 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.

Two-stage turn queue boxes offer bicyclists a safe way to make left turns from a right-side bike lane, or right turns from a left side cycle track or bike lane. Two-stage turn queue boxes may be used at signalized or unsignalized intersections and are typically applied where two bike facilities intersect. Multiple positions are available for queuing boxes, depending on intersection configuration.

Effects

A study of bike boxes in Portland, Oregon found that they decreased bike and vehicle encroachment in crosswalks. Additionally, the number of conflicts between vehicles and bikes at the bike box locations decreased.[27]

Considerations

Installation of bike boxes and two stage queue boxes should consider available right-of-way and pavement width at intersections to ensure bicyclists are kept clear of vehicle travel paths during opposing movements. Installation will also require bicycle detection loops and relocation of vehicle detection loops. This treatment may also have operational implications for restricting right-turns-on-red and eliminating protected right turn phases. It may also be advisable to implement education for people riding bikes on how to use bike boxes through signage or other materials.

Crash Type Addressed

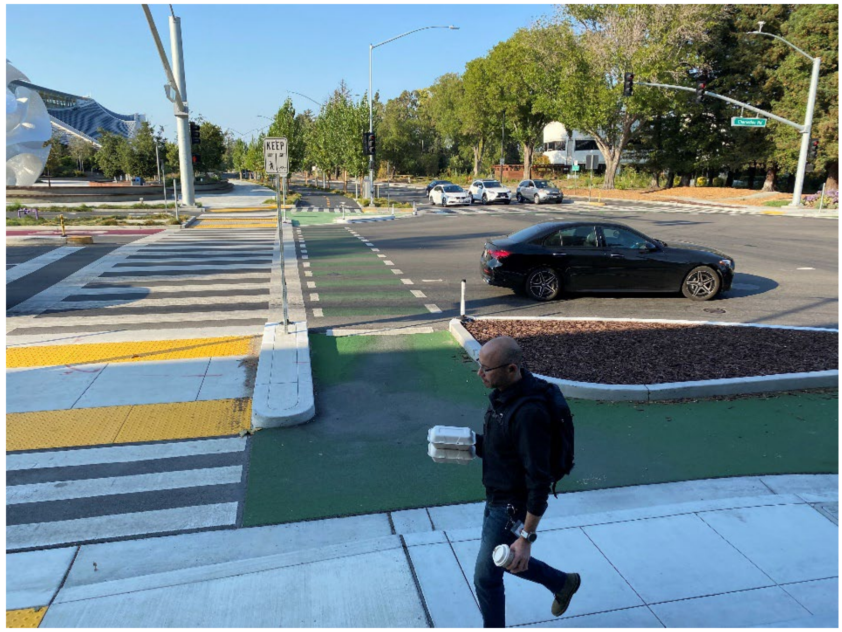
- Bicyclist proceeding straight broadsided by motor vehicle at signalized intersection.

[27] Dill, J., Monsere, C., McNeil, N. Evaluation of Bike Boxes at Signalized Intersections. 2011.<https://ppms.trec.pdx.edu/media/project_files/OTREC-RR-11-06_Final.pdf>

PROTECTED INTERSECTION

Protected intersections have been implemented across North America as cities have expanded their protected bikeway networks. Also known as Dutch, setback or offset intersections, this design keeps bicycles physically separate from motor vehicles up until the intersection, providing a high degree of comfort and safety for people of all ages and abilities.

This design can reduce the likelihood of highspeed vehicle turns, improve sightlines, and dramatically reduce the distance and time during which people on bikes are exposed to conflicts.



Effects

In San Francisco, a protected intersection design resulted in 98% of drivers yielding to people on bikes, and 100% yielding to people walking. A study in New York found that protected intersections had fewer vehicle-bike conflicts than even a dedicated turn lane with a dedicated bike signal phase.[28]

The City of Berkeley conducted an analysis of a proposed protected intersection. The study found that the protected intersection decreased vehicle turning speed and, as a result, decreased severe injury risk for pedestrians by 50%.[29]

FHWA does not yet classify a protected intersection as a Proven Safety Countermeasure, and it is listed as in *Improving Intersection for Pedestrians and Bicyclists* information guide by FHWA.

Considerations

Design and installation of protected intersections requires careful consideration of geometric constraints at the intersection. Design should also address emergency and large vehicle turning movements, which should be permitted to encroach into the next lane, as well as signal timing and operations.

Crash Type Addressed

- Bicyclist proceeding straight broadsided by motor vehicle at signalized intersection
- Driver turning left and pedestrian crossing in crosswalk at signalized intersection

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[28] NACTO. Protected Intersections. *Don't Give Up at the Intersection*. https://nacto.org/publication/dont-give-up-at-the-intersection/protected-intersections/

[29] City of Berkeley. King Safe Routes to School: Hopkins / The Alameda. 2017. <https://www.berkeleyside.com/wp-content/uploads/2017/06/2017_18May_Hopkins_Alameda_-1-1.pdf>

CLASS IV PROTECTED BIKEWAYS

Protected bikeways provide an attractive and safe bicycle facility for people with a range of riding abilities through the physical separation from motor vehicle traffic using on street parking, curb, and delineators or landscaping. Protected bike lanes may be one-way or two-way, and are sometimes referred to as cycle tracks or separated bike lanes.

Effects

Analysis for the FHWA Separated Bike Lane Planning and Design Guide found that the per capita crash rates for people riding bikes decreased on facilities after separated bike lanes were installed.[30]

FHWA does not yet classify protected bike lanes as a Proven Safety Countermeasure, however they are listed in the CMF Clearinghouse. FHWA Publication FHWA-HRT-21-012 indicates that adding bike lanes results in a crash modification factor of 0.514 to 0.649.[31] FHWA-HRT 23-078 indicates that protected bikeways that use flex posts have a crash reduction factor of 0.50.[32]

Considerations

Key considerations for design and installation of protected bikeways include available right-of-way and potential impacts of repurposing travel lanes or parking lanes. Parking impacts will, in turn, be affected by driveway spacing and access. Design should also consider ADA access to curbs, loading and unloading access, integration with transit stops, drainage, green infrastructure and signal operations. Longer term considerations include maintenance operations to ensure that strategies are in place to allow for sweeping and ongoing maintenance (e.g. through use of contract sweeping or a narrower street sweeper).

Crash Type Addressed

- Bicyclist involved between intersections

[30] Federal Highway Administration. 2015. Separated Bike Lane Planning and Design Guide. <https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/separatedbikelane_pdg.pdf>

[31] Federal Highway Administration. 2021. Developing Crash Modification Factors for Bicycle-Lane Additions While Reducing Lane and Shoulder Widths. <https://www.fhwa.dot.gov/publications/research/safety/21012/21012.pdf>

[32] Federal Highway Administration. 2023. Developing Crash Modification Factors for Separated Bicycle-Lanes. <https://highways.dot.gov/sites/fhwa.dot.gov/files/FHWA-HRT-23-078.pdf>

ROAD DIETS

Road diets (also known as lane reductions) are used to reallocate available pavement between curbs to accommodate expected traffic volumes and users in fewer mixed purpose motor vehicle lanes. A typical road diet reduces the number of through lanes while maintaining intersection capacity for the target level of service for all modes. With a goal of increasing safety and available transportation choices on a street, the reduction of lanes can allow for new bike lanes, wider sidewalks, pedestrian refuge islands, transit stops, parking and/or additional landscaping.

4- to 2- lane road diet on Castro Street near Church between 1965 and 2023. Source: Mountain View Historical Association (top), Mountain View, California.

Effects

FHWA reports 4-lane to 3-lane road diets can reduce total crashes by 19-47%[33].

In 2013, the City of Los Angeles installed a 4- to 3-lane road diet on Rowena Avenue, which had an AADT of 25,000 vehicles per day. A 5-year post project analysis found that crashes decreased, crashes caused by unsafe speeds decreased by 65%, and peak hour counts of bicycles on the new bike lanes increased from 14 to 71, while traffic volumes remained consistent.[34]

Considerations

Key considerations for road diets are prevailing traffic volumes, intersection operations, and vehicle speed.

Crash Type Addressed

- Bicyclist involved between intersections (when combined with class IV protected bike lanes)
- Motor vehicle broadside between intersections (assumed to be at driveways)
- Unsafe speed

[33] Federal Highway Administration. 2017. Road Diets. <https://safety.fhwa.dot.gov/provencountermeasures/road_diets/>

[34] Federal Highway Administration. 2017. Case Study: High-Volume Road Diet Success in Los Angeles. <https://safety.fhwa.dot.gov/ped_bike/step/resources/docs/step_case_studies_LADOT_roaddiet.pdf>

BICYCLE BOULEVARDS

Bicycle boulevards are a type of Class III bike route installed on streets that are, or are planned to be, low volume and low speed.

On bicycle boulevards, shared lane markings, wayfinding signs, and traffic calming communicate to residents and through traffic that vulnerable roadway users such as pedestrians and bicyclists are the priority on these streets. At intersections with larger roads, traffic diverters and enhanced crossings maintain connectivity for vulnerable roadway users and maintain low traffic volumes by discouraging or restricting cut through motor vehicle traffic. Bioswales and landscaping amenities enhance water retention capabilities and shade.

Effects

A study in Berkeley, CA found that crash rates on the city's bike boulevards were 8 times lower than those on parallel, adjacent arterial routes.[35]

A study from Portland State University found that 54% of men and 44% of women felt very comfortable biking along a bike boulevard compared to only 16% of men and 10% of women felt very comfortable biking on a 30-35 mph road with a striped bike lane.[36]

FHWA does not yet classify protected bike lanes as a Proven Safety Countermeasure, however they are listed in the CMF Clearinghouse. Per the CMF Clearinghouse, installing a bicycle boulevard can reduce bicycle-vehicle crashes by 63%.[37]

Considerations

Key considerations for bicycle boulevards are street connectivity, vehicle diversions, and access needs for emergency vehicles or large vehicles. Bicycle boulevard design should also consider traffic volumes and speeds as well as crossing design at major roadways. In Mountain View, traffic calming devices are subject to the Neighborhood Traffic Management Program.

Crash Type Addressed

- Bicyclist involved between intersections (on bike routes or low-speed streets)
- Unsafe speed

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[35] Minikel, E. Cyclist Safety on Bicycle Boulevards and Parallel Arterial Routes in Berkeley, California. 2012 <https://doi.org/10.1016/j.aap.2011.07.009>

[36] Dill, J. A Case for Bike Boulevards. 2019. <https://jenniferdill.net/2019/06/27/a-case-for-bike-boulevards/>

[37] Crash Modification Factors Clearinghouse. 2008. <http://www.cmfclearinghouse.org/index.cfm>

IMPROVED LIGHTING, EXTENSION LINES, AND SIGNAGE

Source: Google Maps

The combination of sufficient lighting, extension lines for turning vehicles, and roadway signage can improve visibility and driver awareness of medians.

Roadway lighting can provide better visibility of crosswalks, medians, and other vehicles at an intersection. Recommended lighting levels are outlined in the FHWA Lighting Handbook.[38]

The addition of **extension lines** for turn lanes can visually direct vehicles from approach lanes into the appropriate receiving lane, while installation of **signage on medians** at side street approaches and intersections can direct drivers to the correct side of the median. Extension lines and signage on medians ("Stay Right" and "One Way") are included in the CA MUTCD.[39]

This suite of treatments aims to reduce crashes caused by driving on the wrong side of the road, especially along median divided roads.

Effects

FHWA does not classify these measures as *Proven Safety Countermeasures,* however, they are included in the Crash Modification Factor (CMF) Clearinghouse. Per the CMF Clearinghouse, installing intersection lighting can reduce nighttime crashes by 11.9%.[40]

Considerations

Lighting, extension lines and signage design should consider roadway context, including roadway width and traffic operations, presence of a median, existing signage and possible sign clutter, as well as existing underground utility infrastructure. Lighting design should be based on photometric analysis.

Crash Type Addressed

- Wrong side of road

[38] FHWA. FHWA Lighting Handbook. 2012. < https://safety.fhwa.dot.gov/roadway_dept/night_visib/lighting_handbook/pdf/fhwa_handbook2012.pdf>

[39] California Manual on Uniform Traffic Control Devices. 2014. <https://dot.ca.gov/programs/safety-programs/camutcd>

[40] Crash Modification Factors Clearinghouse. 2008. <http://www.cmfclearinghouse.org/index.cfm>

OPERATIONAL IMPROVEMENTS: NO TURN ON RED

Source: Google Maps

Operational improvements include changes to traffic signal operations to facilitate, separate or coordinate certain movements. Currently, the law allows drivers to turn right on red after coming to a stop at a signalized intersection. A "No Turn On Red" (NTOR) prohibits drivers from making right turns during a red signal. The tool improves driver awareness of their surroundings, increases pedestrian and bicyclist visibility, and prevents right-turning motorists from blocking crosswalk.

Effects

FHWA does not yet classify traffic calming as a *Proven Safety Countermeasure,* however, it is included in the Crash Modification Factor (CMF) Clearinghouse. According to the CMF Clearinghouse, traffic calming can reduce crashes by 3%.[48]

In fall 2021, San Francisco Municipal Transportation Agency (SFMTA) posted NRTOR signs at over 50 intersections to study how they can make streets safer to cross[41] Findings from a before/after study reveal that NRTOR restrictions can keep crosswalks clear and reduce close calls on major intersections. Specifically, 92% of motorists demonstrated compliance with the restriction, and close calls for vehicle-pedestrians decreased from 5 close calls before NRTOR signs were posted to 1 close call after restrictions were in place. Additionally, there was a more than 70% reduction in motorists blocking or encroaching onto crosswalks on a red signal. There was no significant change in the percentage of turning vehicles that yield at the crosswalk to pedestrians on a green light.

Consideration

NTOR can be considered based on crash location, street geometry and land use.

Crash Type Addressed

At a signalized intersection, driver turning right side and hit pedestrian in a crosswalk

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[41] Tenderloin No Turn On Red Evaluation - https://www.sfmta.com/sites/default/files/reports-and-documents/2022/04/tenderloinntor_factsheet_0.pdf

TRAFFIC CALMING MEASURES

FHWA reports that lower motor vehicle speeds result in both fewer and less severe crashes (i.e. crashes that are less likely to result in severe injury or fatalities). Therefore, reducing prevailing speeds through various design mechanisms—collectively referred to as traffic calming measures—will reduce the frequency of crashes and the risk of fatal and severe injury.

A traffic calming measure can cause a reduction in average vehicle speed and in the range of speeds observed (i.e., eliminating or reducing very high vehicle speeds).

Effects

Traffic calming treatments along Easy Street from Central Expressway to SR 85 on-ramp in Mountain View resulted in a reduction of the 85th percentile speed from 39 mph to 22.6 mph. The traffic calming measures included installation of a speed humps, narrow median island, choker and electronic speed feedback sign.

FHWA does not yet classify traffic calming as a *Proven Safety Countermeasure,* however, it is included in the Crash Modification Factor (CMF) Clearinghouse. According to the CMF Clearinghouse, traffic calming can reduce crashes by 25-33%.[42]

Considerations

In Mountain View, Traffic calming devices/elements can be added into developer projects and or CIP's without going through the Neighborhood Traffic Management Plan (NTMP), except for speed humps.

Crash Type Addressed

- Unsafe speed

TRAFFIC CALMING: HORIZONTAL DEFLECTIONS

Horizontal deflections or shifts along a street segment are associated with reductions in travel speeds, which are in turn associated with fewer and less severe traffic crashes. Examples of horizontal deflectors include chicanes, traffic circles, medians, channelizers, splitters, and roundabouts.

<u>Chicanes</u>

Chicanes are a series of alternating curves or lane shifts to steer drivers back and forth out of a straight travel path. This curve path is intended to reduce vehicle speeds.

Effects

According to Crash Modification Factor (CMF) Clearinghouse, chicanes can slow speeds 3 to 9 mph.[43]

Considerations

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42 Crash Modification Factors Clearinghouse. 2008. <http://www.cmfclearinghouse.org/index.cfm>

43 Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed July 2014 . https://highways.dot.gov/sites/fhwa.dot.gov/files/2022-06/eng_ctm_spd_14.pdf

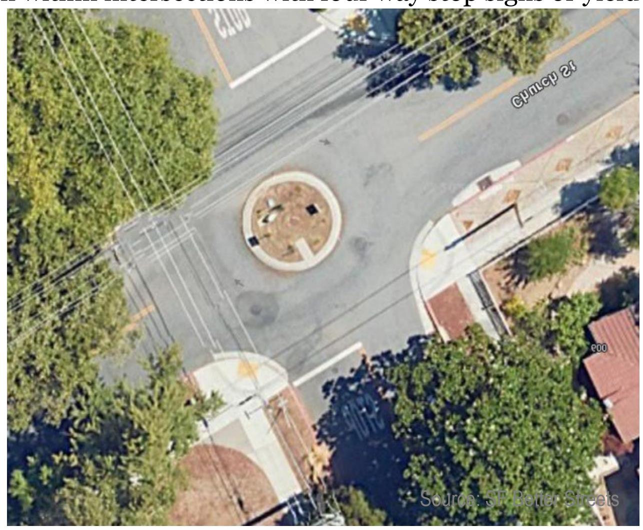
The design of chicanes should account for road type, land use, and crash history. Chicanes on local streets may require drivers to yield to oncoming traffic, while chicanes on arterials resemble a lane shift.

Crash Type Addressed

- Pedestrian-involved crashes
- Unsafe speed

Traffic Circles

Traffic circles are raised center islands constructed in within intersections with four way stop signs or yield signs. At traffic circles, it is permissible to turn left in front of the island, a maneuver that is prohibited at a conventional roundabouts.



Source: Google Maps

Effects

According to *Traffic Calming: State of the Practice* (ITE, 1999) and several recent research and data analysis documents, traffic circles are associated with a reduction in travel speeds of 3 to 4 mph.[44] Lower travel speeds are associated with fewer and less severe crashes.

Considerations

Design of traffic circles should account for intersection size and geometry. Larger intersections may be better suited to roundabouts.

Crash Type Addressed

- Unsafe speed
- Drivers turning left or right and hitting pedestrian or bicyclist

Roundabouts

Roundabout are intersection designs that incorporate channelized approaches, a center island, and circular design. A roundabout provides a horizontal deflection with an island at the entry point and requires all motorists to yield to vehicles in the roundabout and follow a circuitous path no matter which departure leg they use.

Effects

According to CMF Clearinghouse, roundabouts can lower speeds by 15 to 20 mph[45] and reduce severe crashes by nearly 80 percent.[46]

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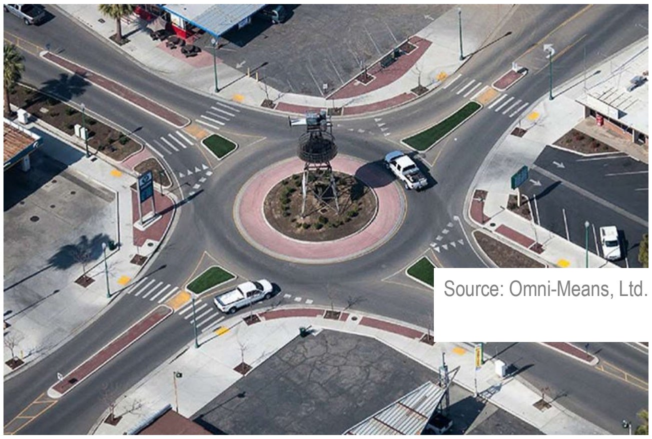
44 Module 4: Effects of Traffic Calming Measures on Motor Vehicle Speed and Volume. https://highways.dot.gov/safety/speed-management/traffic-calming-eprimer/module-4-effects-traffic-calming-measures-motor#note17

45 FHWA, "A Desktop Reference of Potential Effectiveness in Reducing Speed," July 2014. Available at: http://safety.fhwa.dot.gov/speedmgt/ref_mats/eng_count/2014/reducing_speed.cfm

46 FHWA, "Proven Safety Countermeasures - Roundabouts," FHWA-SA-12-005 (Washington, DC: 2012). Available at: http://safety.fhwa.dot.gov/provencountermeasures/fhwa_sa_12_005.cfm.

Considerations

The geometry of roundabouts requires a substantial spatial footprint that may not be available at all intersections. If space is available, roundabouts provide considerable safety benefits at a lower capital and operating cost than other treatments such as signalization. Due to the yielding requirements, roundabouts work best at intersections with similar vehicle flows from all approaches. Pedestrian and bicycle accommodations should also be carefully considered.



Source: Omni-Means, Ltd.

Crash Type Addressed

Unsafe speed

Intersection crashes

TRAFFIC CALMING: VERTICAL DEFLECTIONS

Vertical deflections or elevation changes along a street segment are associated with lower travel speeds as drivers need to decelerate when traveling through theses segment. Lower speeds are associated with fewer and less severe traffic crashes Examples of vertical deflectors include speed humps, dips, raised crosswalks and speed tables.

Speed Humps

Speed humps are raised pavement structures within a roadway segment.

Speed Humps in Mountain View, Mountain View

Effects

According to the Crash Modification Factor (CMF) Clearinghouse, speed humps can be effective at reducing speeds by nearly 10 mph[47].

Considerations

Speed humps are generally suitable for only residential streets or other low-speed roads.

Crash Type Addressed

Unsafe speed

Speed Tables

47 FHWA, "A Desktop Reference of Potential Effectiveness in Reducing Speed," July 2014. Available at: http://safety.fhwa.dot.gov/speedmgt/ref_mats/eng_count/2014/reducing_speed.cfm

Example of Speed Table, NACTO

Speed tables are similar to speed humps but have an extended flat section typically between 3 and 6 inches above street level that can accommodate an entire car.

Effects

According to the Crash Modification Factor (CMF) Clearinghouse, speed tables have been found to reduce speed by an average of 9 mph.

Considerations

Speed tables typically allow for speeds of 25 to 30 mph, which are typical for local and collector streets. Speed tables are generally placed on roadways where there is minimal heavy vehicle traffic. Information on the design of speed humps and speed tables are available in ITE's *Guidelines for the Design and Application of Speed Humps and Speed Tables* (see www.ite.org).

Crash Type Addressed

Unsafe speed

<u>**Raised Crosswalk**s</u>

A raised crosswalk is a variation of a flat-topped speed table where the crosswalk is level with the sidewalk and curb. A raised crosswalk is marked and signed as a pedestrian crossing and enhances pedestrian safety by causing motorist to slow down at the crossing. Raised crosswalks also increase the visibility of crossing pedestrians to motorists and improve the visibility of oncoming vehicles to pedestrians.

Effects

According to the Traffic Calming: State of the Practice and several recent research and data analysis documents, speed tables (which are similar to raised crosswalks), were associated with a 3% reduction in total traffic.

Consideration

Crossing context and crash history are key considerations for raised crosswalks. Some raised crosswalks are installed at midblock crossing locations to increase the visibility of the crosswalk.

Crash Type Addressed

- Unsafe speed
- Pedestrian crossing at intersection

Appendix C: Prioritization Criteria

The following section outlines prioritization criteria used to rank infrastructure projects in Mountain View. Three criteria used for this analysis include crash severity, equity, and proximity to destinations.

Severity of Crashes

The crash severity criterion is consistent with City's Vision Zero policy and Caltrans LRSP goals and metrics. This criterion weighs crash severity based on standardized crash cost estimates from Caltrans' Local Roadway Safety Manual. The crash cost represents the human and productivity cost to the society.

The total weighted crash cost was based on the number of crashes at each severity level in that location. Based on Caltrans guidance (Figure 72) fatal or severe injury crashes were weighted at twenty times that of crashes with a complaint of pain. For example, a corridor where five fatal crashes and ten visible injury crashes occurred would have a total weighted crash value of 120. The total weighted crash value for each location was then compared to the total weighted crash value for other projects, and each intersection was assigned between 1 and 5 points based on the quintile of total weighted crash values. For corridors, the total weighted crash value was normalized by the length of the corridor and each corridor was assigned between 1 and 5 points based on the quintile on a per-mile basis (Figure 73). A score of 5 represents locations or corridors with the most severe crash history. This analysis was undertaken for crash locations as well as risk levels for each location as identified in the systemic safety analysis.

Figure 72 Crash Severity by Cost of Crash Type and Associated Weighting

Crash Type	Crash Cost	Weight
Fatal and Severe Injury	$1,590,000	20
Other Visible Injury	$142,300	2
Complaint of Pain	$80,900	1

Source: Caltrans' Local Roadway Safety Manual

Figure 73 Converting Crash Weight to Score

Total Crash Weight per Corridor	Quintile-based Score
< 51	1
52 – 75	2
76 – 115	3
116 – 135	4
136 – 290	5

Equity

The Equity criterion includes several elements that are consistent with General Plan policies on equitable distribution of amenities (Figure 74).

Two demographic factors included in this analysis were low-income populations and limited English-speaking households. For this analysis, each location was scored based on the characteristics of the population within a quarter-mile of the location relative to citywide rates for each factor. For example, on a citywide basis 23.7% of people have incomes at or below 150% of the poverty level, while 9.6% of households are limited English-speaking households. A third metric also addressed vulnerable road users' level of stress and history of walking and bicycling crashes.

Figure 74 Elements of Equity

Factor	Data Source	Weight	
The low-income population within ¼-mile (percent of the total population)	US Census American Community Survey 2020 5-year estimates	Above citywide rate (23.7%)	1
		Below the citywide rate (23.7% and below)	0
Limited English-speaking households within ¼-mile (percent of the total population)	US Census American Community Survey 2020 5-year estimates	Above citywide rate (9.6%)	1
		Below the citywide rate (9.6% and below)	0
Vulnerable road users	Crash history and level of stress	High-stress location for biking or walking AND Higher than average number of bicycle and pedestrian crashes or fatalities	2
		High-stress location for biking or walking OR Higher than average number of bicycle and pedestrian injury crashes	1
		Neither of the above	0

Proximity to Key Destinations

The third criterion was proximity to key destinations (Figure 75). This criterion considered accessibility to destinations that are pedestrian and bicyclist attractors and locations that should be accessible for all modes of transportation. Key destinations included schools, parks and open spaces, commercial centers, senior centers, senior living communities, healthcare facilities and libraries. Feedback from community members indicated that schools were very important, so these destinations were weighted more heavily.

Figure 75 Proximity to Key Destinations Criteria

Element	Weight	
Proximity to school/on suggested route to school	Within 0.25 miles of a school or on school route	2
	Within 0.5 mile	1
	More than 0.5 mile and not on school route	0
Proximity to other key destination (commercial center, park/open space, trail, light rail stop, senior center or living community)	Within 0.25 miles	1
	Within 0.5 mile	0.5
	More than 0.5 mile	0

Appendix D: Draft Priority Project Materials

This appendix provides project information that may be used to support grant applications for a limited number of specific priority project.

RENGSTORFF AVENUE GREEN COMPLETE STREETS

Project Description

The Rengstorff Avenue Green Complete Streets will consider ways to improve conditions for people walking, bicycling, using public transit and driving along and across Rengstorff Avenue between El Camino Real and Leghorn Street. The project will incorporate technical analysis and community engagement with a view to developing agreed concepts including plan line drawings for the Rengstorff Avenue corridor from El Camino Real in the south to Leghorn Street in the north.

The Plan will build on previously planned improvements on the corridor, including:

- Rengstorff Avenue Grade Separation at Central Expressway including Class IV bikeways, wider sidewalks, and a bicycle and pedestrian overcrossing between Leland Avenue and Crisanto Avenue.
- Intersection improvements at Latham Street and at Junction Ave

Corridor Context

This corridor is served by multiple bus routes (VTA Route 21, Mountain View Community Shuttle Red and Grey lines). The corridor connects residential areas, recreational facilities (Rengstorff Park, Rengstorff Pool, Heritage Park, Wyandotte Park, Mountain View Community Center, Mountain View Senior Center), nearby schools (including Castro Elementary, Monta Loma Elementary, Mistral Elementary, Stevenson Elementary, Crittenden Middle, Los Altos High, and Waldorf School), and businesses (including Monta Loma Plaza shops and various after-school services).

Rengstorff Avenue is a high-stress environment for walking (PQOS 5, which is the lowest quality of service, based on AccessMV 2021) and riding a bicycle (Level of Traffic Stress 3) and has been the site of multiple crashes involving those modes (48 pedestrian and bicycle crashes from 2014 to 2019).

Emphasis Areas

- **High Injury Network (HIN):** Rengstorff Avenue has been identified as part of the City's HIN based on the concentration of fatal and severe injury crashes along the corridor. The segment of Rengstorff Avenue from Central Expressway to Leghorn Street has also been identified by the Metropolitan Transportation Commission (MTC) as part of the Regional HIN.[48]

[48] https://bayviz.mysidewalk.com/

- **School and Senior Routes**: Rengstorff Avenue is a key school access route for Los Altos High School and Waldorf School. Additionally, the roadway is within the area allocated to each school for Castro Elementary, Monta Loma Elementary, Mistral Elementary, Stevenson Elementary, and Crittenden Middle schools. The intersections of Rengstorff with Rock Street and Junction Avenue are part of the suggested routes to school for Crittenden Middle School and Monta Loma Elementary.

  This corridor also serves the Mountain View Senior Center, which is located adjacent to Rengstorff Park. It also serves key senior routes between the Senior Center and the neighborhood with the highest proportion of senior housing bounded by Rengstorff Avenue, Middlefield Road, Farley Street and Central Expressway.
- **Pedestrians:** Pedestrians are over-represented in fatal and severe injury crashes throughout Mountain View. Key pedestrian crossing locations in this plan area include the intersection of larger roads with higher posted speed limits such as Rengstorff Avenue with smaller side streets with lower posted speed limits such as Latham Street, Junction Avenue, Rock Street, and Wyandotte Street.
- **Bicyclists:** Bicyclists are over-represented in fatal and severe-injury crashes throughout Mountain View. Rengstorff Avenue is an important north-south bicycle route within the City, particularly including segments south of Middlefield Road that are part of the suggested route to school for Los Altos High School.
- **Driver Behavior:** Based on Vision Zero analysis, key driver behaviors to address include speed, compliance with traffic control devices including crosswalks, LED enhanced crosswalks and red lights, as well as distracted driving.
- **Speed Management**: Rengstorff Avenue is an arterial roadway within Mountain View with a wide cross section (60 to 70 feet from curb to curb) and a posted speed limit of 35 miles per hour. City policy requires prioritization of protected bikeways on roadways with posted speeds of 30 mph or greater where feasible.
- **Equity Communities**: Rengstorff Avenue corridor is located along two locally recognized low-income communities including a neighborhood north of Central Expressway with a high proportion of senior housing (described above), and a neighborhood south of Caltrain with a high proportion of Spanish speaking households. Based on Vision Zero analysis, Spanish-speaking residents are over-represented in crashes involving all modes of transportation in the city.

Crash Types

Along this corridor, the following crash types are common:

- Vehicle-bicycle crashes including crashes where drivers are making left turns
- Vehicle-pedestrian crashes where drivers are making left turns,
- Vehicle-pedestrian crashes including crashes where pedestrians are crossing outside of the crosswalk between intersections.

Improvements for consideration

The Plan could consider treatments that include the treatments listed below. However, all these elements would require in depth engineering review, including a traffic analysis, to determine their site-specific adequacy and feasibility.

- Crossing improvements including high-visibility crosswalks and median crossing islands;
- New crossings with high-visibility crosswalks, median crossing islands, and RRFBs or Pedestrian Hybrid Beacons;
- Intersection improvements such as better lighting and visibility and protected left-turn phases;
- Lane repurposing for Class IV Protected Bike Lanes;

- Protected Intersections and other bicycle treatments at intersections;
- Driveway access management;
- Lane narrowing and/or median treatments to reduce prevailing speeds; and

SOUTH SHORELINE BOULEVARD COMPLETE STREETS PROJECT

Project Description

The South Shoreline Boulevard Complete Streets project was developed through the City of Mountain View's 2015 California/Escuela/Shoreline Complete Streets Feasibility Study, which analyzed existing conditions, incorporated extensive community input, assessed various design features, and developed preferred streetscape concepts for three corridors. This project will include design and construction of complete streets improvements for South Shoreline Boulevard between El Camino Real and Montecito Avenue. Key design features include:

- Ramp reconfiguration to square up on- and off- ramps on the northeast and northwest side of the Shoreline Boulevard overpass over Central Expressway;
- Intersection improvements including high visibility crosswalks, corner bulb outs at smaller streets and protected intersections at Shoreline/California and Shoreline/Wright;
- 6 to 4 lane reduction, lane narrowing and Class IV parking protected bikeways from El Camino Real to Wright Avenue – would require a traffic analysis to determine feasibility;
- Lane narrowing (min 11' wide) and Class II bike lane from Wright Avenue to Montecito Avenue; and
- Landscaped buffers and green street treatments.

Corridor Context

This corridor is served by multiple bus routes (VTA Route 21, 40 and 51, Mvgo Routes B and D). The corridor connects residential areas, recreational facilities (Eagle Park, Eagle Pool, McKelvey Park), nearby schools (including Landels Elementary, Theuerkauf Elementary, Mistral Elementary, Stevenson Elementary, Graham Middle, Crittenden Middle, St Joseph, Saint Francis, and Mountain View Academy), and businesses (including Bailey Park Plaza Shopping Center).

South Shoreline Boulevard is a high-stress environment for walking (PQOS 5, which is the lowest quality of service based on AccessMV 2021) and riding a bicycle (Level of Traffic Stress 3) and has been the site of multiple crashes involving those modes (40 pedestrian and bicycle crashes from 2014 to 2019).

Emphasis Areas

- **High Injury Network (HIN):** S Shoreline Boulevard has been identified as part of the City's HIN based on the concentration of fatal and severe injury crashes along the corridor. The corridor has also been identified by the Metropolitan Transportation Commission (MTC) as part of the Regional HIN.[49]
- **School and Senior Routes**: Shoreline Boulevard is a key school access route for Graham Middle School, Crittenden Middle School and Mountain View Academy. Additionally, the roadway is within the school catchment for Landels Elementary, Theuerkauf Elementary, Mistral Elementary,

[49] https://bayviz.mysidewalk.com/

Stevenson Elementary, St Joseph and Saint Francis schools. The intersections of Shoreline Boulevard with Latham Street, Villa Street, Wright Avenue and Montecito Avenue are part of the suggested routes to school for Crittenden Middle School and Graham Middle School. This corridor also serves senior access to Downtown Mountain View.

- **Pedestrians:** Pedestrians are over-represented in fatal and severe injury crashes throughout Mountain View. Key pedestrian crossing locations in this plan area include the intersection of larger roads with higher posted speed limits such as Shoreline Boulevard with smaller side streets with lower posted speed limits such as Latham-Church Street, Mercy Street, Dana Street, and Wright Avenue.
- **Bicyclists:** Bicyclists are over-represented in fatal and severe-injury crashes throughout Mountain View. South Shoreline Boulevard is an important north-south bicycle route within the City including segments north of Latham Street that are frequently used by school students (though not officially a suggested route to school).
- **Driver Behavior:** Based on Vision Zero analysis, key driver behaviors to address include speed, compliance with traffic control devices including crosswalks, LED enhanced crosswalks and red lights, as well as distracted driving.
- **Speed Management**: South Shoreline Boulevard is an arterial roadway within Mountain View with a wide cross section (100 to 114 feet from curb to curb from El Camino to Villa, 100 to 130 feet from Villa to Wright, and 70 to 85 feet from Wright to Montecito) and a high posted speed limit of 35 miles per hour. City policy requires prioritization of protected bikeways on roadways with posted speeds of 30 mph or greater. In this corridor, City staff have received community comments that allege speeding on the downhill side of the overpass north of Central expressway.

Crash Types

Along this corridor, the following crash types are common:

- Crashes involving drivers making right turns on red
- Vehicle-bicycle crashes including crashes where drivers are making left turns
- Vehicle-pedestrian crashes.

Improvements for consideration

The Plan could consider treatments that include the treatments listed below. However, all these elements would require in depth engineering review, including a traffic analysis, to determine their site-specific adequacy and feasibility.

- Ramp reconfiguration to square up on- and off- ramps on the northeast and northwest side of the Shoreline Boulevard overpass over Central Expressway;
- Intersection improvements including high visibility crosswalks, corner bulb outs at smaller streets and protected intersections at Shoreline/California and Shoreline/Wright;
- 6 to 4 lane reduction, lane narrowing and Class IV parking protected bikeways from El Camino Real to Wright Avenue;
- Lane narrowing and Class II bike lane from Wright Avenue to Montecito Avenue; and
- Landscaped buffers and green street treatments.

SAN ANTONIO COMPLETE STREETS

Project Description

The San Antonio Complete Streets project may be a joint project between the State of California, Caltrain, and the City of Mountain View. The project will focus on crash reduction, vulnerable users, and vehicle speeds.

San Antonio Rd currently does not have city projects planned. However, the San Antonio Precise Plan provides key guiding principles, including the following:

- Create open space and pedestrian-oriented frontages.
- Improve connectivity to, from and within the San Antonio Plan Area.
- Leverage Transit resources and improve transit access.
- Prioritize pedestrian improvements.
- Prioritize bicycle connections.

Corridor Context

This corridor is served by multiple bus routes (VTA Route 21, Mvgo Routes C and D, and the Standford Marguerite Shuttle Shopping Express Route, along with Caltrain Routes L1 and L3 near the intersection of Pacchetti Way). The corridor connects residential areas, recreational facilities (including Village Green Dog Park and Fayette Greenway Park), nearby schools (including the School for Independent Learners, Bullis Charter School North Campus, and Egan Junior High School), and businesses (including shopping centers, grocery stores, pharmacies, restaurants, banks, and other services).

The corridor is a highway-like environment that is stressful for people walking (PQOS 5, which is the lowest quality of service based on AccessMV 2021) and riding bicycles (Level of Stress 3) and has been the site of multiple crashes involving those modes (12 pedestrian and bicycle crashes from 2014 to 2019).

Emphasis Areas

- **High Injury Network (HIN):** San Antonio Rd has been identified as part of the City's HIN based on the concentration of fatal and severe injury crashes along the corridor.
- **Pedestrians:** Pedestrians are over-represented in fatal and severe injury crashes throughout Mountain View. Key pedestrian crossing locations in this plan area include the intersection of larger roads such as El Camino Real, California Street, and Central Expressway, and smaller side streets such as Fayette Drive, Miller Avenue, and Lena Way.
- **Bicyclists:** Bicyclists are over-represented in fatal and severe-injury crashes throughout Mountain View. San Antonio Road is an important north-south bicycle route within the city.
- **Driver Behavior:** Based on the Vision Zero analysis, key driver behaviors to address include speed, compliance with traffic control devices including crosswalks, LED-enhanced crosswalks and red lights, as well as distracted driving.
- **Speed Management:** San Antonio Road is an arterial roadway within Mountain View with a wide cross section (80 to 100 feet from curb to curb from Central Expy to California St, and 100 feet from California St to El Camino Real) and a high posted speed limit of 35 miles per hour. City policy requires prioritization of protected bikeways on roadways with posted speeds of 30 mph or greater.

Crash Types

Along this corridor, the following crash types are common:

- Pedestrian and bicycle crashes at signalized intersections

Improvements for consideration

The Plan could consider treatments that include the treatments listed below. However, all these elements would require in depth engineering review, including a traffic analysis, to determine their site-specific adequacy and feasibility.

- Sidewalks or shared-use path on the bridge over Central Expwy;
- Improvements at intersections, including pedestrian signal modifications, high-visibility; crosswalks, median crossing islands, and curb radius reduction, and improved lighting
- New pedestrian crossings with high visibility crosswalks, median crossing islands, rectangular rapid flashing beacon (RRFB) or pedestrian hybrid beacon (PHB);
- Lane reduction for Class IV protected bike lanes;
- Protected intersection and other bike treatments at intersections
- Enhanced delineation; and
- Driveway access management

MIDDLEFIELD ROAD / INDEPENDENCE AVENUE INTERSECTION IMPROVEMENTS

Project Description

Improvements for the intersection on Middlefield Road and Independence Avenue focus on vulnerable users, and improved visibility. The intersection currently does not have a city project planned.

Intersection Context

This intersection at W Middlefield Rd and Independence Ave is less than a 10-minute walk from the intersection of W Middlefield Rd and Rengstorff Ave, where there are bus stops for VTA Route 40 and Mountain View Community Shuttle Routes Red and Gray. The intersection is on a network of suggested routes to Monta Loma Elementary School, Crittenden Middle School and the Waldorf School of the Peninsula. The intersection is also close to Thaddeus Park and several commercial destinations, including a grocery store, several restaurants, and a gas station.

The intersection is a stressful crossing for people walking (PQOS 4, the second-lowest quality of service, on W Middlefield Way, and PQOS 2, the second-highest quality of service, on Independence Ave, based on Access MV 2021) and people riding bicycles (Level of Stress 3 on W Middlefield Rd and Low Stress on Independence Ave) and has been the site of multiple crashes involving those modes (2 pedestrian and bicycle crashes from 2014 to 2019).

Emphasis Areas

- **High Injury Network (HIN):** W Middlefield Rd, which intersects with Independence Ave, has been identified as part of the City's HIN based on the concentration of fatal and severe injury crashes along the corridor.

- **School Routes:** The intersection at W Middlefield Rd and Independence Ave is on a network of suggested routes to several elementary and middle schools, including Art School of SF Bay, Monta Loma Elementary School, Hobbledehoy Montessori School, and Waldorf School of the Peninsula.
- **Pedestrians:** Pedestrians are over-represented in fatal and severe injury crashes throughout Mountain View. The intersection at W Middlefield Road and Independence Ave is a key crossing location.
- **Bicyclists:** Bicyclists are over-represented in fatal and severe-injury crashes throughout Mountain View. W Middlefield Rd and Independence Ave are important east-west and north-south bicycle routes of varying stress within the city.
- **Driver Behavior:** Based on the Vision Zero analysis, key driver behaviors to address include speed, compliance with traffic control devices including crosswalks, LED-enhanced crosswalks and red lights, as well as distracted driving.
- **Speed Management:** Middlefield Road is an arterial roadway while Independence Ave is a local roadway. The intersection of these streets has an average to wide cross-section of 40 to 80 feet. W Middlefield Road has a high posted speed of 35 miles per hour while Independence Ave has a medium posted speed of 35 miles per hour. City policy requires prioritization of protected bikeways on roadways with posted speeds of 30 mph or greater.

Crash Types

At this intersection, the following crash types are common:

- A serious-injury crash involving a pedestrian and a driver due to the driver proceeding straight and violating the pedestrian's right of way.
- A complaint-of-pain-injury crash involving a bicyclist proceeding straight who was hit by a driver making a left turn.

Improvements for consideration

The improvements would require in depth engineering review, including a traffic analysis, to determine their site-specific adequacy and feasibility.

- Median crossing islands;
- Rectangular rapid flashing beacon (RRFB) or pedestrian hybrid beacon; and
- Improved intersection lighting

ORTEGA AVENUE / LATHAM STREET INTERSECTION IMPROVEMENTS

Project Description

Recommended improvements for the intersection at Ortega Ave and Latham St focus on vulnerable users. The intersection currently does not have a city project planned. However, the El Camino Real Precise Plan designated the area surrounding the intersection as residential land use only or medium intensity. The Precise Plan provides key guiding principles for the area surrounding the intersection, including the following:

- Preserve, connect, and service adjacent neighborhoods.
- Prioritize pedestrian-oriented urban design and building form.
- Improve bicycle access and facilities.

Furthermore, the San Antonio Precise Plan called for the development of 9.2 acres between Showers Drive and Ortega Avenue, with 279 condominiums in a combination of two-story townhomes and three-story buildings containing one-story condominium units. Moreover, the Latham/Church Street Bicycle Boulevard Feasibility Study, which includes the intersection and its surrounding area, included the following intersection concepts as part of Council recommendations for the corridor:

- Splitter islands to decrease motor vehicle speeds, and increase pedestrian visibility and reduce uninterrupted crossing distance;
- Raised intersections to reduce motor vehicle speeds;
- Cross culvert removal to eliminate risks of people biking or driving into the cross culvert;
- Curb extensions to decrease motor vehicle speeds, increase pedestrian visibility, and reduce pedestrian crossing distance;
- High-visibility crosswalks to improve yielding behavior to pedestrians; and
- Advanced stop bars to improve yielding behavior to pedestrians and reduce encroachment on the crosswalk.

Intersection Context

The intersection at Ortega Ave and Latham St is about a 5-minute walk from the intersection of Ortega Ave and California St, where there are bus stops for VTA Routes 21 and 40 and Mountain View Community Shuttle Routes Gray and Red. The intersection is also about a 5-minute walk from the intersection of Latham St and Showers Dr, where there are also bus stops for VTA Routes 21 and 40 and Mountain View Community Shuttle Routes Gray and Red, as well as the Standford Marguerite Shuttle Shopping Express Route.

The intersection of Ortega Ave and Latham St is on a network of suggested routes to school, with connections to Portnov Computer School and Mountain View-Los Altos Montessori Children's center. The intersection is within a 5-minute walk to Klein Park and is in an area with an above-average share of low-income residents. The intersection is near several commercial destinations, including a grocery store, a pharmacy, and plenty of restaurants and other businesses.

The intersection is a stressful crossing for pedestrians (PQOS 5, the lowest quality of service, on Ortega Ave, and PQOS 2, the second-highest quality of service, on Latham St, based on Access MV 2021) and people riding bicycles (Level of Stress 3 on Ortega Ave and Low Stress on Latham St) and has been the site of multiple crashes involving those modes (3 pedestrian and bicycle crashes from 2014 to 2019)

Emphasis Areas

- **School Routes:** Ortega Ave and Latham St are both suggested routes to elementary and high schools, with direct connections to Portnov Computer School and Mountain View-Los Altos Montessori Children's Center.
- **Pedestrians:** Pedestrians are over-represented in fatal and severe injury crashes throughout Mountain View. The intersection at Ortega Ave and Latham St is a key crossing location.
- **Bicyclists:** Bicyclists are over-represented in fatal and severe-injury crashes throughout Mountain View. Ortega Ave and Latham St are important north-south and east-west bicycle routes of lower stress within the city.
- **Driver Behavior:** Based on the Vision Zero analysis, key driver behaviors to address include speed, compliance with traffic control devices including crosswalks, LED-enhanced crosswalks and red lights, as well as distracted driving.
- **Equity Communities:** Ortega Ave and Latham St is at the intersection of a locally-recognized low-income community north of El Camino Real. The intersection is also in an area north of El Camino

Real and east and west of Ortega Ave, where there is a high proportion of people who have low or no English proficiency. Based on Vision Zero analysis, Spanish-speaking residents are over-represented in crashes involving all modes of transportation in the City.

Crash Types

At this intersection, the following crash types are common:

- Crashes involving pedestrians where drivers are making left turns.

Improvements for consideration

The improvements would require in depth engineering review, including a traffic analysis, to determine their site-specific adequacy and feasibility.

- Curb Extensions;
- High-Visibility Crosswalk; and
- Traffic Calming with Traffic Circle

Appendix E: Key Non-Infrastructure Recommendations

SAFE ROUTES TO SCHOOL (RU-1)

Safe Routes to School (SRTS) is a program that typically includes engaging traffic safety assemblies, hands on pedestrian/bicycle safety training for school students, educational materials on suggested routes to school, and encouragement events such as school based walk and roll days.

Best practice SRTS programs also engage the broader school community in encouraging more sustainable school access, evaluating student travel patterns and parent attitudes, identifying safety pain points and potential improvements, and empowering families and students to engage in safe school access such as bike trains and walking school buses.

Effects

SRTS programing does not appear to have been evaluated by FHWA as a potential safety countermeasure. However, many elements of SRTS programs are associated with positive safety outcomes. For example, research note that research supports the effectiveness of educational campaigns on safety as well as the notion of safety in numbers.[50]

Considerations

Implementation of SRTS programming needs to be coordinated with school districts and members of the school community such as educators, parents and students.

[50] National Highway Traffic Safety Administration. Countermeasures that Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices. 2020. < https://www.nhtsa.gov/book/countermeasures/countermeasures-work>

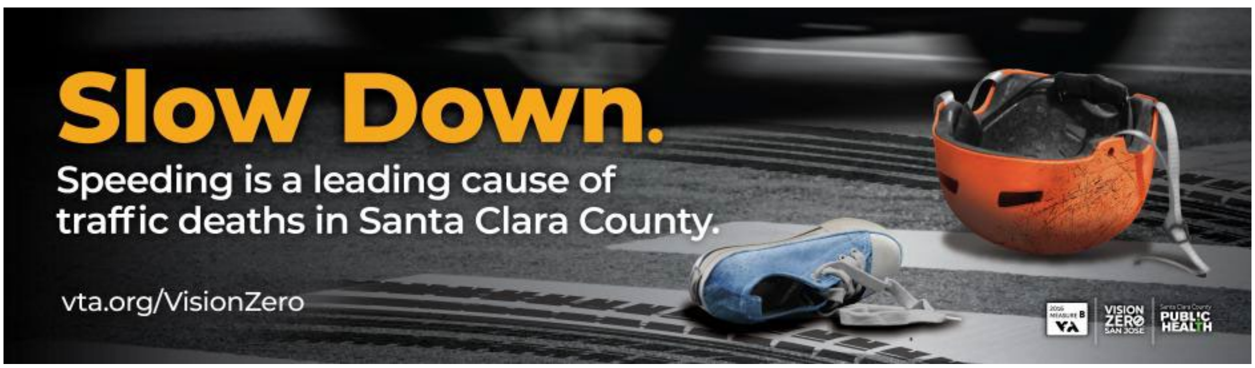
VISION ZERO MARKETING, OUTREACH AND ENGAGEMENT (RU-2)

Vision Zero marketing, outreach and engagement address unsafe driver or road user behaviors through coordinated multilingual communications strategies. Typically marketing campaigns for Vision Zero involve five steps:

- research and understanding of local safety concerns and key market segments;
- development of campaign strategies and key messages;
- creative development and beta testing of campaign materials;
- distribution of materials to target audiences via paid, owned and earned media; and
- evaluation of outputs and outcomes.

These efforts aim to move recipients along a spectrum of awareness and action starting with developing awareness of safety issues; and then moving to developing an understanding of the problem behind these issues (such as the relationship between speed and safety outcomes); being ready to take action; committing to personal behavior change (like staying under the speed limit); and engaging in collective responsibility for safety outcomes.

Effective campaigns engage with community-based organizations and community partners to amplify messages, and ensure that they address the concerns of those overrepresented in crashes.



Effects

While Vision Zero marketing and engagement are broadly recognized as a central element of Vision Zero implementation, FHWA has not evaluated these approaches as safety countermeasures.

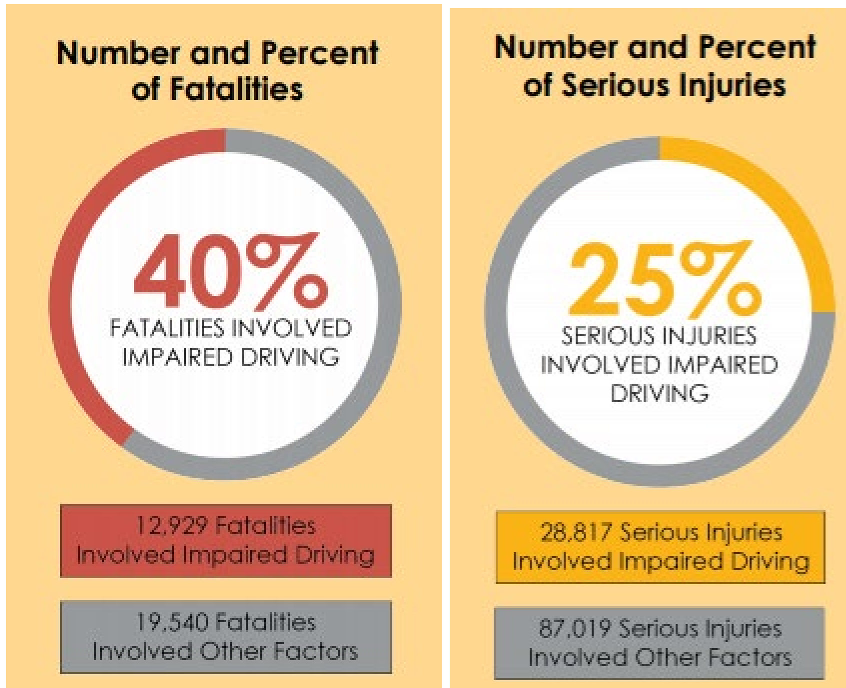
Considerations

Key issues to be addressed in a Vision Zero marketing and outreach campaign must be data driven. For example, campaigns could address key maneuvers identified in Mountain View such as speed (and stopping distance), driving under the influence, encroachment into pedestrian right of way, and taking care to look both ways at intersections.

IMPAIRED DRIVING POLICIES (SR-1)

Crashes involving impaired driving represent 40% of all traffic fatalities in California. Impaired driving is classified as a high priority challenge area for the state in the California 2020-2024 Strategic Highway Safety Plan Report. Coordination with local, regional, and state level partners for policy and education action are critical to reducing impaired driving crashes.

A place of last drink (POLD) survey may be included in an impaired driving prevention strategy. The survey documents where a DUI/DWI subject consumed their last drink and provides data for the local community to establish appropriate interventions.



California Statewide Impaired Driving Statistics. Source: 2020-2024 California Strategic Highway Safety Plan

Effects

Impaired driving policies are included as a recommended strategy in California Safe Roads: 2020-2024 Strategic Highway Safety Plan.[51] The strategy was implemented in Ventura, California. The city conducted 36 bar risk assessments of alcohol retail establishments, resulting in a reduction in survey mentions for 2 of the establishments.[52]

Considerations

Implementation of impaired driving policies should consider resources for policy implementation, and coordination with local, regional, and state level partners.

Crash Type Addressed

- Alcohol or drug intoxication

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[51] California Department of Transportation. California Safe Roads - 2020-2024 Strategic Highway Safety Plan. 2020. <https://dot.ca.gov/-/media/dot-media/programs/safety-programs/documents/shsp/2020-2024-shsp-report.pdf>

[52] National Highway Traffic Safety Administration. A Summary Report of Six Demonstration Projects to Reduce Alcohol-Impaired Driving Among 21- to 34-Year-Old Drivers. 2008. <http://www.nmprevention.org/Project_Docs/Report%20of%20Projects%20to%20Reduce%20Alc%20Imp%20Driving%20Among%2021-34%20yo%20NHTSA%202008.pdf>