CITY OF ALBANY

LOCAL ROADWAY SAFETY PLAN

DRAFT REPORT

JANUARY 2023

TJKM

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EXECUTIVE SUMMARY

The City of Albany's Local Road Safety Plan (LRSP) is a comprehensive plan that creates a framework to systematically identify and analyze traffic safety related issues and recommend projects and countermeasures. It aims to reduce fatal and severe injury collisions through a prioritized list of improvements that can enhance safety on local roadways.

The LRSP takes a proactive approach to addressing safety needs. It is viewed as a guidance document that can be a source of information and ideas. It will also be a living document, one that is routinely reviewed and updated by City staff and their safety partners to reflect evolving collision trends and community needs and priorities. With the LRSP as a guide, the City will be able to apply for grant funds, such as the federal Highway Safety Improvement Program (HSIP) or One Bay Area Grant (OBAG). This document summarizes an analysis of collisions that occurred in Albany, identifies high-injury locations, and recommends countermeasures at each of these high-risk locations. It is organized into eight sections as follows:

Chapter 1 – INTRODUCTION
The Introduction describes what an LRSP is and details the study area.

Chapter 2 – SAFETY PARTNERS
Involvement of safety partners is critical in the success of the LRSP. For the City of Albany, this included City Staff, Albany Police Department, Albany Fire Department, Albany Unified School District, AC Transit, Alameda County Transportation Commission, Caltrans, and Albany residents. This chapter summarizes the involvement of the stakeholders in the LRSP process.

Chapter 3 – EXISTING PLANNING EFFORTS
This chapter summarizes City and regional planning documents and projects that are relevant to the LRSP. It ensures that the recommendations of the LRSP are in line with existing goals, objectives, policies, or projects.

Chapter 4 – COLLISION DATA AND ANALYSIS
This chapter summarizes the data analysis approach and presents preliminary as well as detailed collision analysis and findings in the study area. This analysis of killed and severe injury (KSI) collisions is performed by facility type (intersection and roadway segment). Collision data was obtained and analyzed for a five-year period from 2016-2020 from the California Highway Patrol's Statewide Integrated Traffic Records System (SWITRS) and the University of California at Berkeley SafeTREC's Transportation Injury Mapping Service (TIMS). This time period was chosen because 2021 data were preliminary at the time of the analysis. It should be noted that in many situations for prior collisions, the safety measures are implemented post collision that may result in

eliminating or reducing future collisions. For post 2020 collisions, future reviews and updates of the LRSP will capture those collisions.

Chapter 5 – EMPHASIS AREAS

Emphasis areas are a focus of the LRSP that are identified through the various collision types and factors resulting in fatal and severe injury collisions within the City of Albany. The seven emphasis areas for Albany are:

1. Improve Safety at Unsignalized Intersections (Collisions within 250 feet of an intersection)
2. Address Broadside Collisions & Automobile Right of Way Violations
3. Address Rear End Collisions
4. Address Improper Turning Collisions
5. Address Bicycle Safety
6. Address Pedestrian Safety
7. Improve San Pablo Ave (Intersection & Roadway Segment)

Chapter 6 – COUNTERMEASURE IDENTIFICATION

Engineering countermeasures were selected for each of the high-risk locations and for the emphasis areas. These were based off of approved countermeasures from the Caltrans Local Roadway Safety Manual (LRSM) used in HSIP grant calls for projects. The intention is to give the City potential countermeasures for each location that can be implemented either in future HSIP calls for projects, or using other funding sources, such as the City's Capital Improvement Program. Non-engineering countermeasures were also selected using the 5 E's strategies, and are included with the emphasis areas.

Chapter 7 – SAFETY PROJECTS

A set of nine safety projects were created for high-risk intersections and roadway segments, using HSIP approved countermeasures. These safety projects are:

- Project #1: Systemic Improvements at Signalized Intersections (Improve signal timings, Install raised pavement markers and striping)
- Project #2: Systemic Improvements at Signalized Intersections (Pedestrian and Bicycle) (Improve signal hardware, Install advance stop bar before crosswalk, Modify signal phasing to implement a Leading Pedestrian Interval)
- Project #3: Systemic Improvements at Un-signalized Intersections(Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs, Install flashing

beacons at stop-controlled intersections, Install splitter-island on the minor road approaches, Install raised medians on approaches)

- Project #4: Systemic Improvements at Un-signalized Intersections (Pedestrian Safety) (Install/upgrade pedestrian crossing at uncontrolled location, Install rectangular rapid flashing beacons)
- Project #5: Citywide Signal Upgrade
- Project #6: Citywide Street Light Inventory
- Project #7: Citywide Leading Pedestrian Inventory (LPI) feasibility
- Project #8:Systemic Improvements at Roadway Segments (Install median barrier, Install/upgrade signs with new fluorescent sheeting, install delineators, reflectors and/ object markers, Install edge-line and centerlines, Install centerline rumble strips/stripes, Install edge-line rumble strip/stripes)
- Project #9: System Improvements at Roadway Segments (Pedestrian and Bicycle Safety) (Install separated bike lanes, Install raised pedestrian crossing, Install rectangular flashing beacons)

Chapter 8 – IMPLEMENTATION AND EVALUATION

The LRSP is a guidance document that is recommended to be updated every two to five years in coordination with the safety partners. The LRSP document provides engineering, education, enforcement, and emergency medical service-related countermeasures that can be implemented throughout the City to reduce fatal and severe injury collisions. After implementing countermeasures, the performance measures for each emphasis area should be evaluated annually. The most important measure of success of the LRSP should be reducing fatal and severe injury collisions throughout the City. If the number of fatal and severe injury collisions does not decrease over time, then the emphasis areas and countermeasures should be re-evaluated.

1. INTRODUCTION

What is an LRSP?

The Local Roadway Safety Plan (LRSP) is a localized data-driven traffic safety plan that provides opportunities to address unique roadway safety needs and reduce the number of killed and severe injury (KSI) collisions. The LRSP creates a framework to systematically identify and analyze traffic safety-related issues, and recommend safety projects and countermeasures. It facilitates the development of local agency partnerships and collaboration, resulting in the development of a prioritized list of improvements that can qualify for Highway Safety Improvement Program (HSIP) funding. The LRSP is a proactive approach to addressing safety needs and is viewed as a living document that can be constantly reviewed and revised to reflect evolving trends, and community needs and priorities.

Process

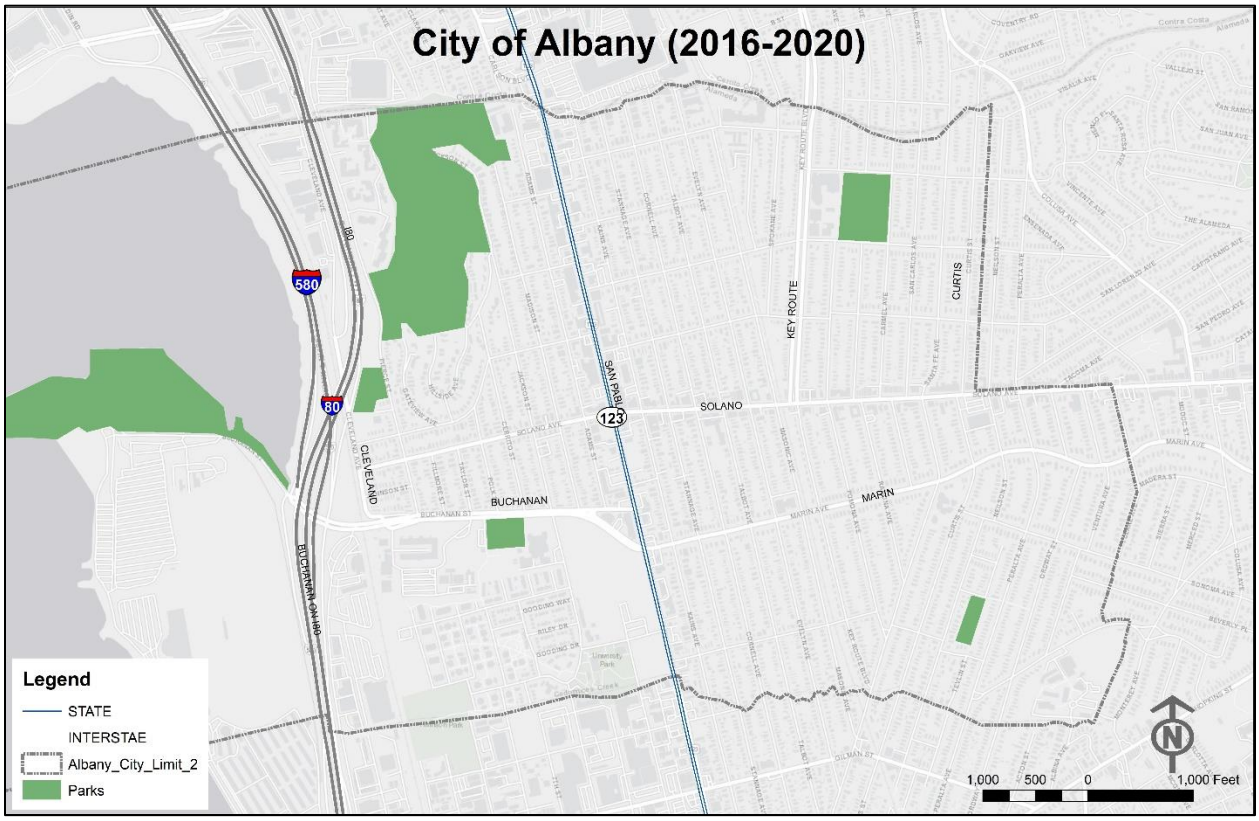
The systemic approach in preparing the LRSP involves the following steps:

- Develop plan goals and objectives
- Analyze collision data
- Meet with stakeholders/safety partners
- Determine focus areas and identify crash reduction strategies
- Prioritize countermeasures/projects
- Prepare the LRSP

Study Area

The City of Albany, located in Alameda County, California, covers a total area of 5.4 square miles and is located on the east shore of San Francisco Bay in northwestern Alameda County. The City's estimated population is 20,271 (US Census 2020). San Pablo Avenue, Solano Avenue, Buchanan St and Marin St are main thoroughfares that connect the City with nearby cities and Interstate 580. The nearest cities include Berkeley to the east and south, Kensington to the northeast, El Cerrito to the north and Richmond to Northwest. The study area is mapped in **Figure 1** below.

Figure 1: Study Area



According to 5-year estimates from the American Community Survey (ACS) 2020 from the U.S. Census, 53.8% of Albany commuters get to work by driving alone, lower than both the Alameda County and State rate of driving commuters. The second most common method of commuting to work is public transportation at 19.4%. The different modes of transportation used by Albany residents to commute to work are shown in **Table 1** below.

Table 1: Albany Commute to Work Census Data

Commute to Work	Albany	Alameda County	California
Drive Alone	53.8%	66.4%	71.8%
Carpool	12.3%	13.8%	14.5%
Public Transportation	19.4%	10.6%	5.1%
Walked	3.5%	3.2%	2.9%
Bicycle	4.1%	1.2%	0.8%
Work from Home	5.0%	3.5%	3.8%
Other	1.5%	0.9%	0.8%

American Community Survey (ACS) 2020 http://www.bayareacensus.ca.gov/california.htm

2. SAFETY PARTNERS

Safety partners are vital to the development and implementation of an LRSP. For the City of Albany, these include City Staff, Albany Police Department, Albany Fire Department, Albany Unified School District, AC Transit, Alameda County Transportation Commission, Caltrans, and Albany residents. These stakeholders attended one virtual stakeholder meetings, which were held on May 25, 2022 to review project goals and findings, and to solicit feedback from the group.

In addition, four presentations were given to the Transportation Commission to review projects goals and findings, review website feedback, review countermeasures and safety projects, and provide feedback and comments. These virtual meetings were held on March 24, 2022, June 23, 2022, July 27, 2022, and October 27, 2022.

Figure 2: Zoom Meeting from Stakeholder Meeting #1

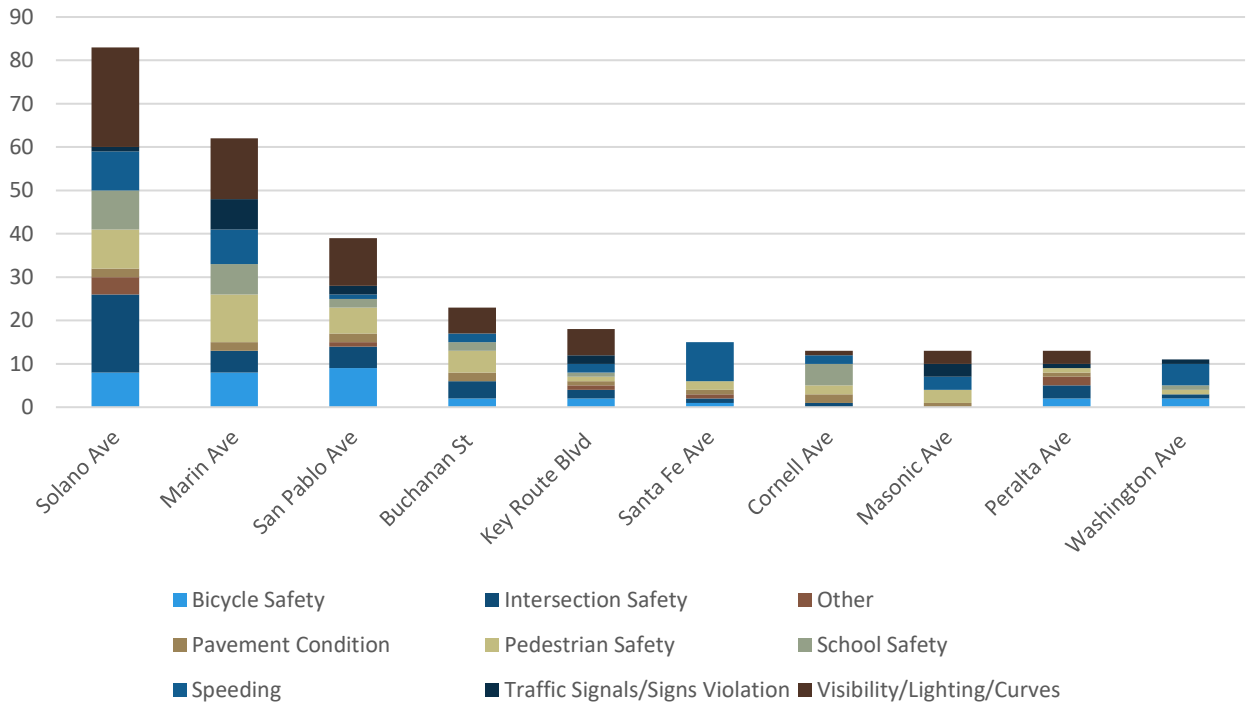
This stakeholder outreach was supplemented by a project website with an interactive platform. The interactive map was used to solicit from City of Albany residents and stakeholder outside the confines of traditional meetings.

Figure 3: Albany LRSP Project Website

In total, 579 comments were received through the project website for Albany. The most comments were received about Solano Avenue, Marin Avenue, and San Pablo Avenue, and the most common concerns were visibility, lighting, curves, speeding, and bicycle & pedestrian safety. The results of the interactive map are shown below in **Figure 4**, and summarized in **Figure 5**. In **Figure 4**, each dot and line represents a comment provided by a community member.

Figure 4: Interactive Map Comment Responses

Figure 5: Public Comments on Traffic Safety by Location



Note: Corridors with less than 2 comments are not listed in this summary. Category was chosen based on the primary issue listed in the comment. Each comment was assigned to the major road if at an intersection.

3. EXISTING PLANNING EFFORTS

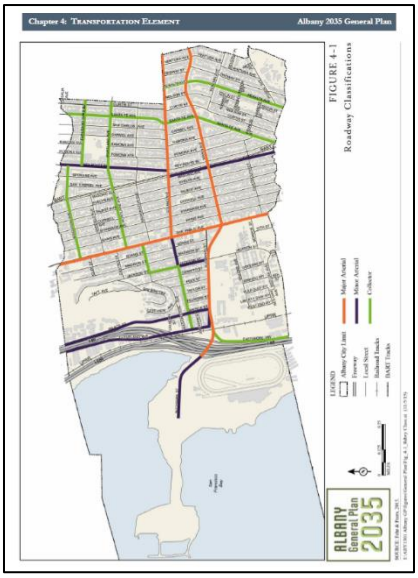
This chapter summarizes the planning documents, projects underway, and studies reviewed for the City of Albany Local Roadway Safety Plan (LRSP). The purpose of this memorandum is to ensure the LRSP vision, goals, and E's strategies (Education, Enforcement, Engineering, Equity, and Emergency Medical Services (EMS)) are aligned with prior planning efforts, planned transportation projects, and non-infrastructure programs for the City. The documents reviewed are listed below:

1. Albany General Plan | Transportation Element (2035)
2. Albany Active Transportation Plan (2019)
3. Solana Avenue Complete Streets and Corridor Revitalization Plan (2019)
4. City of Albany Engineering & Traffic Survey (2021)
5. Albany Traffic Management Plan
6. Alameda Countywide Transportation Plan (2020)

The following sections include brief descriptions of these documents and how they inform the development of the LRSP. A detailed list of relevant policies and projects is listed in **Appendix A.**

ALBANY GENERAL PLAN | TRANSPORTATION ELEMENT (2035)

The General Plan mobility element identifies safe, reliable and accessible transportation needs within Albany and seeks to maintain and improve the city's transportation network through policies and standards. The General Plan also reflects goals to create better and safer communities through a multi-modal circulation system, complete streets, transportation options, integrating land use and transportation, mobility and neighborhood quality, and regional leadership. The element is organized into five parts, detailing the existing conditions of the system and projecting future conditions and needs. These goals and policies inform City's Local Roadway Safety Plan to improve roadway safety for all so that it encourages users to choose walking, bicycling, and transit as a mode of transportation in Albany to reduce traffic trips and improve environmental quality.



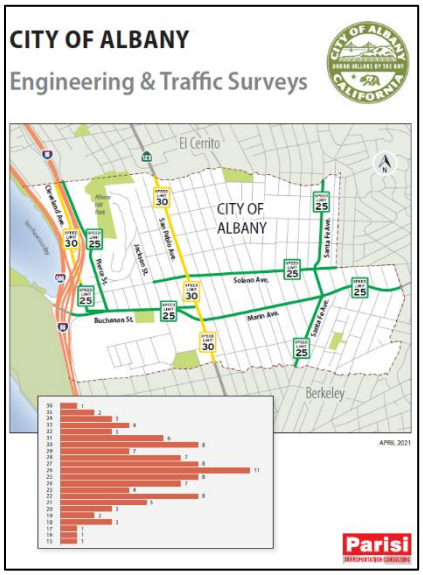
ALBANY ACTIVE TRANSPORTATION PLAN (2019)

The Albany Active Transportation Plan is a combination of the previous Bicycle Master Plan and Pedestrian Master Plan and assesses unmet needs for non-motorized transportation in the city. The plan sets forth key goals and policy objectives that apply to walking and bicycling facilities directly and seeks to institutionalize the accomodation for these modes throughout City policies and practices. It also recommends developing city wide bicycle routes, safe routes to school, traffic calming strategies, expanding the network of off- street path, and identify priorty safety improvements. It does this by proposing a system of bikeways and pedestrian facilities that connect neighborhoods to key activity centers throughout the City; developing essential support facilities, such as bike parking; suggesting education, encouragement and other programs; and identifying recommendations for improving safety for walkers and cyclists. The Plan prioritizes routes to schools, BART, Solano Avenue, San Pablo Avenue, shopping, parks, the waterfront, and neighboring Cities.

SOLANO AVENUE COMPLETE STREETS AND CORRIDOR REVILATIZATION PLAN (2019)

The Solano Avenue Complete Streets and Corridor Revitalization Plan provides a vision for the future of Solano Avenue from Masonic Avenue to Tulare Avenue, and presents a proposed corridor design, design palette and supportive strategies. The Plan proposes streetscape and mobility improvements to improve safety, enhance access, deliver a cohesive streetscape and support economic development. This Plan envisions modifying the existing corridor to better serve pedestrians, bicyclists, motorists, and transit riders. This Plan incorporates innovative urban design and infrastructure upgrades to improve pedestrian safety and access, provide stronger connections to transit, enhance the public realm, implement spot improvements for bicyclists, manage curbside space, and improve predictability for motorists. The goal is a vibrant and accessible main street for Albany that is safe, comfortable, and enjoyable for all users whether they arrive by foot, by bike, in a wheelchair, on public transit, or in a car.

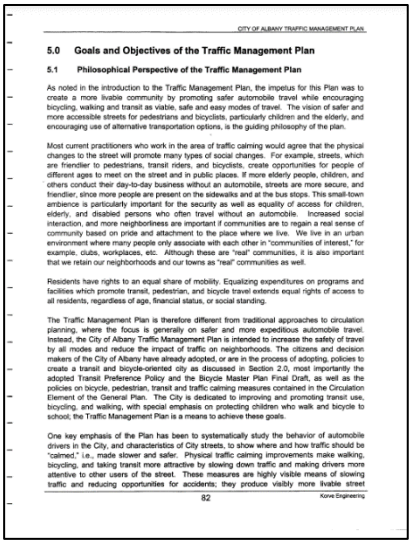
CITY OF ALBANY ENGINEERING & TRAFFIC SURVEYS (2021)



Engineering and Traffic Surveys were conducted for the City of Albany along 8 bi-directional roadway segments within the City limits. The survey was conducted in compliance with regulations set in the California Vehicle Code (CVC) and was based on the guidelines for setting proper speed limits established by the California Department of Transportation (Caltrans) as documented in the California Manual for Setting Speed Limits (2014). The report also includes the measurements of the free-flowing speeds along with the survey segments, and also includes collision analysis and existing roadside conditions or future improvements. The report establishes guidelines for setting a speed limit that provides a rational and defensible determination using the E&TS. The report also identifies locations for speed zones and effects on traffic signals and stop signs on vehicle travel speeds.

ALBANY TRAFFIC MANAGEMENT PLAN

The purpose of the Albany Traffic Management Plan is to create a more livable community by promoting safer automobile travel while encouraging bicycling, walking, and transit as viable, safe, and easy modes of travel. The vision of safer and more accessible streets for pedestrians and bicyclists, particularly children and older adults, and encouraging use of alternative transportation options, is the guiding philosophy of the plan. It provides a toolbox by which City staff and residents can implement traffic calming strategies within Albany, as well as facilitate transit access and mitigate truck traffic.



CITY OF ALBANY TRAFFIC MANAGEMENT PLAN

5.0 Goals and Objectives of the Traffic Management Plan

5.1 Philosophical Perspective of the Traffic Management Plan

As noted in the introduction to the Traffic Management Plan, the impetus for this Plan was to create a more livable community by promoting safer automobile travel while encouraging bicycling, walking and transit as viable, safe and easy modes of travel. The vision of safer and more accessible streets for pedestrians and bicyclists, particularly children and the elderly, and encouraging use of alternative transportation options, is the guiding philosophy of the plan.

Most current practitioners who work in the area of traffic calming would agree that the physical changes to the street will promote many types of social changes. For example, streets, which are friendlier to pedestrians, transit riders, and bicyclists, create opportunities for people of different ages to meet on the street and in public places. If more elderly people, children, and others conduct their day-to-day business without an automobile, streets are more secure, and friendlier, since more people are present on the sidewalks and at the bus stops. This small-town ambience is particularly important for the security as well as equality of access for children, elderly, and disabled persons who often travel without an automobile. Increased social interaction, and more neighborliness are important if communities are to regain a real sense of community based on pride and attachment to the place where we live. We live in an urban environment where many people only associate with each other in "communities of interest," for example, clubs, workplaces, etc. Although these are "real" communities, it is also important that we retain our neighborhoods and our towns as "real" communities as well.

Residents have rights to an equal share of mobility. Equalizing expenditures on programs and facilities which promote transit, pedestrian, and bicycle travel extends equal rights of access to all residents, regardless of age, financial status, or social standing.

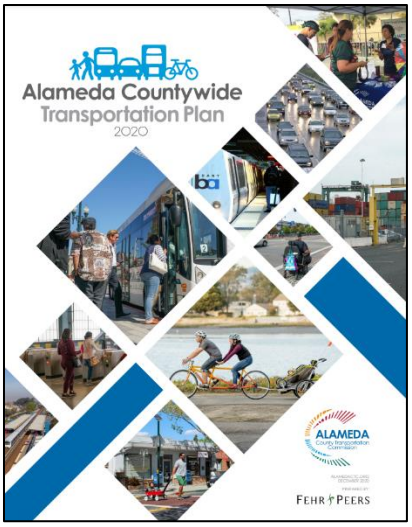
The Traffic Management Plan is therefore different from traditional approaches to circulation planning, where the focus is generally on safer and more expeditious automobile travel. Instead, the City of Albany Traffic Management Plan is intended to increase the safety of travel by all modes and reduce the impact of traffic on neighborhoods. The citizens and decision makers of the City of Albany have already adopted, or are in the process of adopting, policies to create a transit and bicycle-oriented city as discussed in Section 2.0, most importantly the adopted Transit Preference Policy and the Bicycle Master Plan Final Draft, as well as the policies on bicycle, pedestrian, transit and traffic calming measures contained in the Circulation Element of the General Plan. The City is dedicated to improving and promoting transit use, bicycling, and walking, with special emphasis on protecting children who walk and bicycle to school; the Traffic Management Plan is a means to achieve these goals.

One key emphasis of the Plan has been to systematically study the behavior of automobile drivers in the City, and characteristics of City streets, to show where and how traffic should be "calmed," i.e., made slower and safer. Physical traffic calming improvements make walking, bicycling, and taking transit more attractive by slowing down traffic and making drivers more attentive to other users of the street. These measures are highly visible means of slowing traffic and reducing opportunities for accidents; they produce visibly more livable street

82 Kone Engineering

ALAMEDA COUNTYWIDE TRANSPORTATION PLAN (2020)

This countywide plan prepared by the Alameda County Transportation Commission, sets a vision for the future of the transportation system in Alameda County.



It was developed in order to assess the current state of the transportation, project future needs, and prioritize improvements. The goals included in the plan are expanding multimodal connectivity, reducing greenhouse gas emissions, maximize modern infrastructure benefits and intergrating sustainable transit-oriented development for regional and interregional travel. The plan includes an assessment of the needs and priorities for each transportation mode in the county. It also emphasizes on making transportation improvements in key locations, such as low- income communities, communities of color, and areas prioritized for growth and development (specifically in Priority Development Areas (PDAs)). The plan includes various strategies identifying opportunities beyond building infrastructure and delivering transportation services to advance the vison and goals and address needs.

4. COLLISION DATA AND ANALYSIS

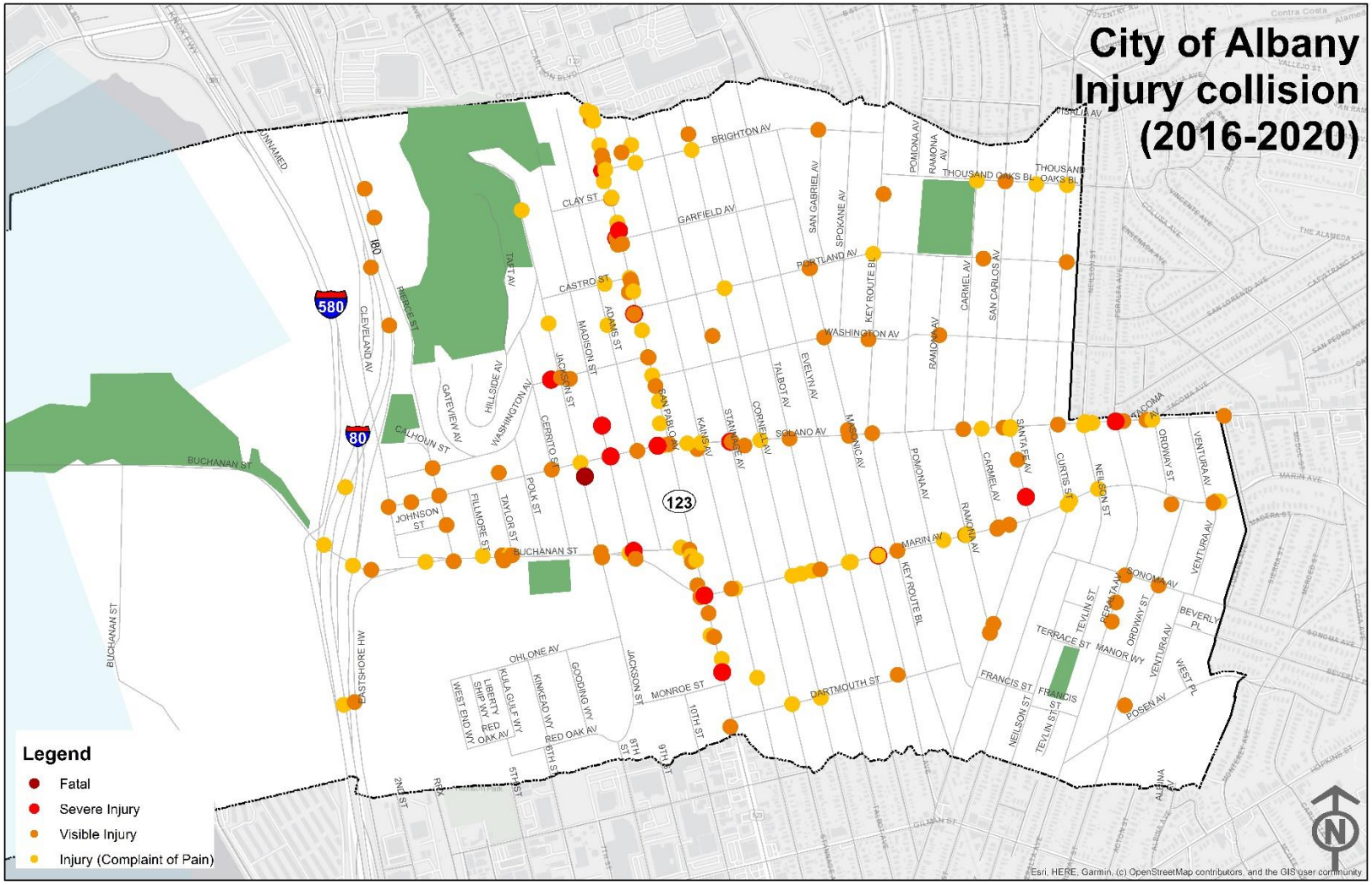
This chapter summarizes the results of the analysis of collisions that have occurred in the City of Albany between January 2016 and December 2020, as part of the Local Roadway Safety Plan (LRSP). This memorandum includes the following sections:

- Data Collection
- Collision Data Analysis
- Killed and Severe Injury Collision Analysis
- Geographic Collision Analysis
- High Injury Network
- Bicycle & Pedestrian High Injury Network
- Summary

The LRSP focuses on systemically identifying and analyzing traffic safety issues and recommends appropriate safety improvements. The memorandum starts with a comprehensive analysis of collisions of all severity in the City of Albany, including Property Damage Only (PDO) collisions, and compares these with KSI collisions. Factors such as collision severity, type of collision, primary collision factor, lighting, weather and time of the day were analyzed. Following this, a more detailed analysis was conducted for killed and severe injury (KSI) collisions that have occurred on the City's roadways, including analyzing intersection and roadway segment collisions separately.

Figure 6 illustrates all the injury collisions that have occurred in the City of Albany from 1/1/2016 to 12/31/2020.

Figure 6. Injury Collisions in the City of Albany (2016-2020)



Data Collection

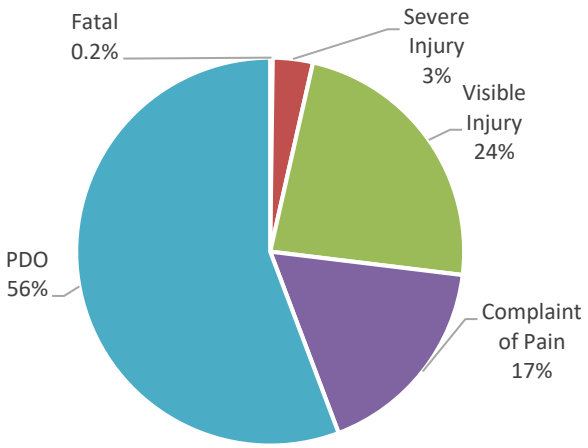
Collision data helps to understand different factors that might be leading to collisions and influencing collision patterns in a given area. For the purpose of this analysis, five-years of jurisdiction-wide collision data (2016 to 2020) was retrieved from Transportation Injury Mapping System (TIMS) and Statewide Integrated Traffic Records System (SWITRS). Collisions that occurred on state routes were excluded for this analysis, with the exception of San Pablo Ave (SR 123). The collision data was analyzed and plotted in ArcMap to identify high-injury intersections and roadways segments.

COLLISION DATA ANALYSIS RESULTS

Collision Classification

There were a total of 478 all collisions reported on Albany roads from 2016 to 2020. Out of these, 267 collisions (56%) were PDO, 83 collisions (17%) led to complaint of pain injury, 112 collisions (24%) led to a visible injury and 16 collisions led to KSI (killed and severe injury) collisions, of which 15 collisions (3%) led to a severe injury and 1 collision (0.2%) led to a fatality. **Figure** illustrates the classification of all collisions based on severity.

Figure 7 Collisions by Severity (2016-2020)



The analysis first includes a comparative evaluation between all collisions and KSI collisions, based on various factors including (but not limited to): collision trend, primary collision factor, collision type, facility type, motor vehicle involved with, weather, lighting, and time of the day. Following this, a comprehensive analysis is conducted for only KSI collisions. KSI collisions cause the most damage to those affected and to infrastructure. The LRSP process thus focuses on these collision locations to proactively identify and counter safety issues leading to these KSI collisions.

The collision data was separated by facility type, i.e. based on collisions occurring on intersections and roadway segments. In accordance with HSIP guidelines, a collision was designated to have occurred at an intersection if it occurred within 250 feet, as intersections can often influence collisions that occur within this distance. For the purposes of the collision trend analysis, intersection collisions occurred at 250' or less from the intersection. Later in this report, the high injury network for intersections is identified with all collisions within 250' of an intersection, while roadway segments are identified using all collisions except those that occurred directly at (0') from intersection. This is done to streamline the HSIP application process following the LRSP.

The reported collisions categorized by facility type and collision severity are presented in **Table 2**.

Table 2. Collisions by Severity and Facility Type

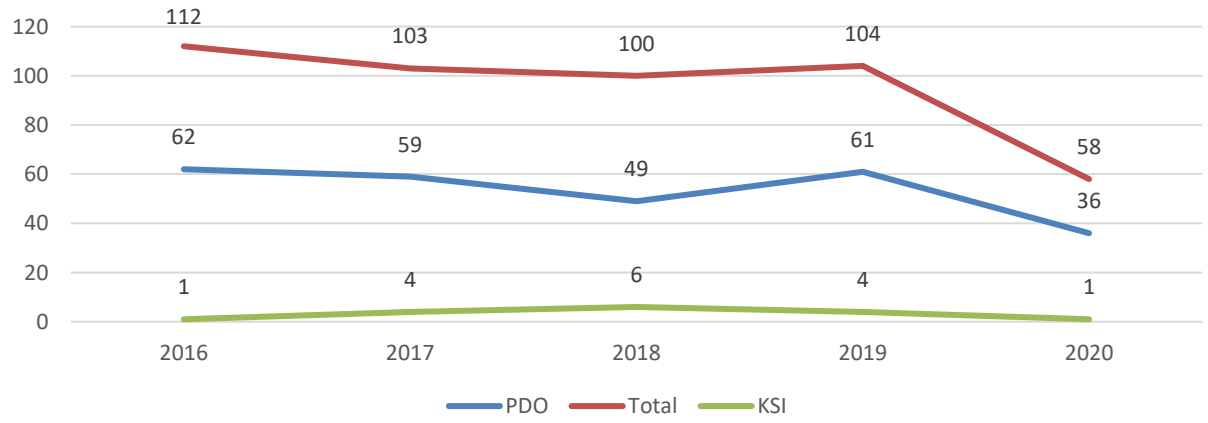
Collision Severity	Roadway Segment	Intersection	Total
Killed	0	1	1
Severe Injury	2	13	15
Visible Injury	4	108	112
Complaint of Pain	1	82	83
PDO	10	257	267
Total	17	462	478

Preliminary Analysis

YEARLY TREND

The number of reported collisions of all severity has overall decreased from 2016 to 2020. The year with the highest number of collisions was 2016 (112 collisions), while the year with the lowest number of collisions were 2020 (58 collisions). A total of 16 KSI collisions occurred in Albany during the study period, overall increasing from 2016 to 2018, then decreasing in 2019 and 2020. The least number of KSI collisions occurred in 2020 (1 collision), while the most occurred in 2018 (6 collisions). It should be noted that stay-at-home orders due to the COVID-19 pandemic led to decreased traffic volumes, and is the likely contributing factor to a decrease in collisions in 2020. **Figure 8** illustrates the five-year collision trend for all collisions, PDO collisions, and KSI collisions.

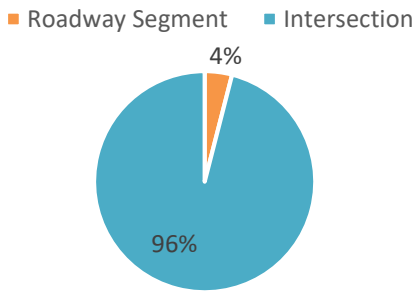
Figure 8. Five Year Collision Trend



Roadway Segment vs. Intersection

When evaluating the locations of collisions, the majority of collisions occurred at intersections. In the City of Albany, 96% of all collisions (461 collisions) occurred at intersections whereas 4% (17 collisions) occurred on roadway segments. This classification by facility type can be observed in **Figure 9.**

Figure 9. Intersection vs Roadway Collisions – All Collisions

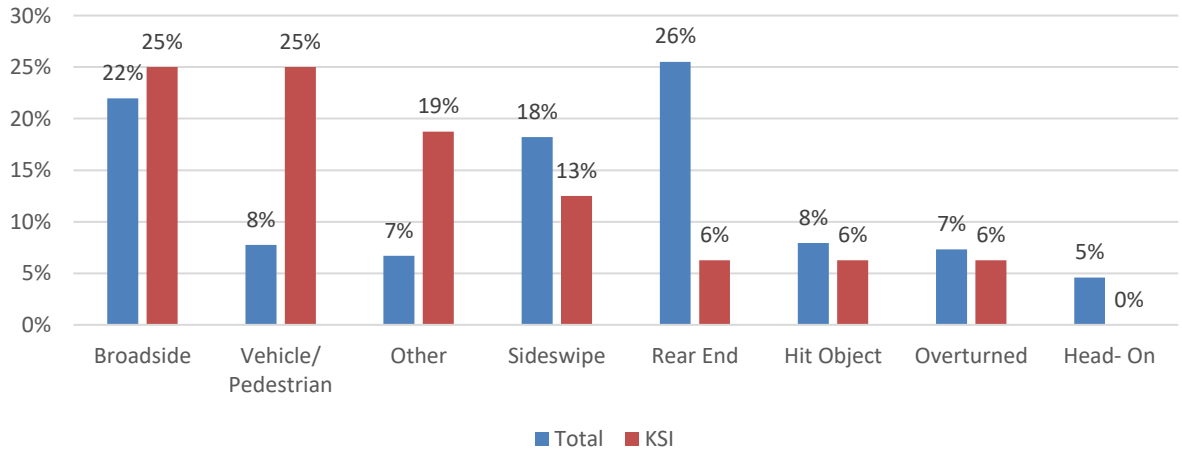


COLLISION TYPE

The most commonly occurring collision types among all collisions were rear end collisions (26%) and broadside collisions (22%). The collision types for KSI collisions follow a slightly different pattern, where the most commonly occurring collision type was broadside and vehicle/pedestrian collisions each (25%), followed by sideswipe collisions (13%). **Figure 10** illustrates the collision type for all collisions as well as KSI collisions. Examples of each collision type:

- Broadside: right angle crashes; front of vehicle collides with the side of another vehicle or bicyclist
- Vehicle/Pedestrian: Vehicle collides with a pedestrian
- Other: Specific collision type was not coded into the police report
- Sideswipe: Two vehicles (or with a bicyclist) collide side-by-side
- Rear End: Front of vehicle collides with the rear of another vehicle
- Hit Object: Vehicle typically leaves road and collides with a fixed object, such as a tree or power pole
- Overturned: Vehicle overturns in the collision
- Head-On: Front of vehicle collides with the front of another vehicle or bicyclist

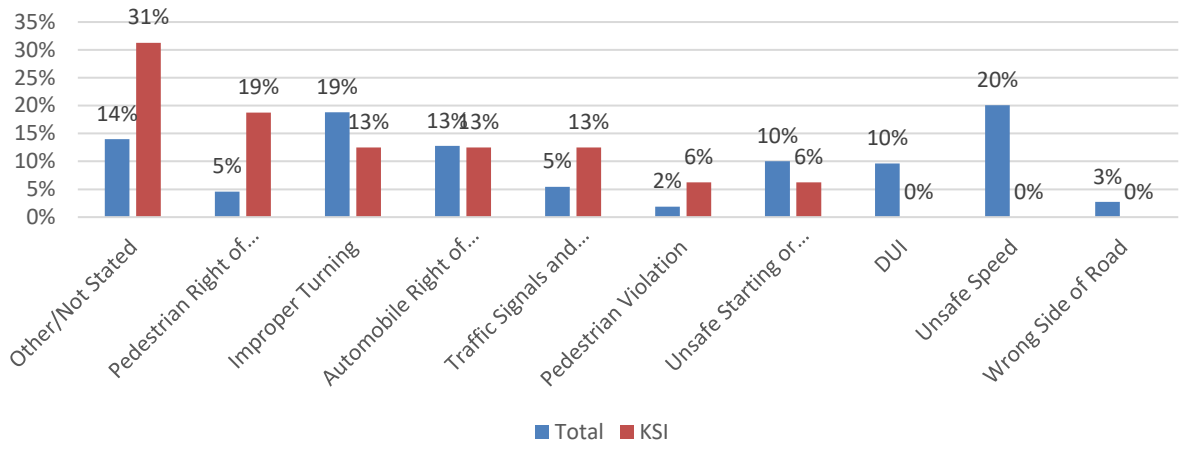
Figure 10. Collision Type – All Collisions vs. KSI Collisions



PRIMARY COLLISION FACTOR

For collisions of all severity, the most common violation category was observed to be unsafe speed (20%), followed by improper turning violations (19%). The most common primary violation categories for KSI collisions (besides Other/Not Stated) was pedestrian right of way violations (19%), followed by improper turning, automobile right of way, and traffic signals and signs, each constituting 13% of KSI collisions. **Figure 11** illustrates this distribution.

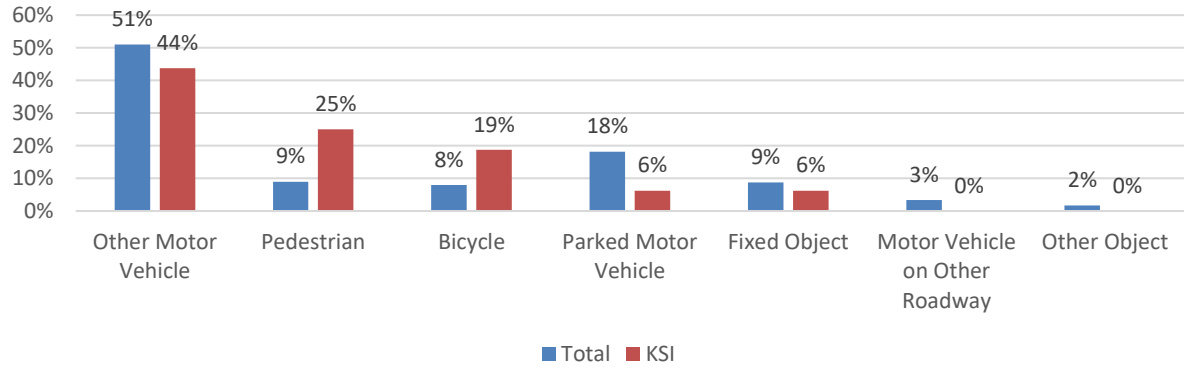
Figure 11. Violation Categories: All Collisions vs. KSI Collisions



MOTOR VEHICLE INVOLVED WITH

For collisions of all severity, 51% of the collisions occurred with other motor vehicles, followed by parked motor vehicle collisions (18%). For KSI collisions, 44% of the collisions occurred with other motor vehicles. This was followed by pedestrian collisions (25%), and bicycle collisions (19%). **Figure 12** illustrates the motor vehicle involved with category for all collisions as well as KSI collisions.

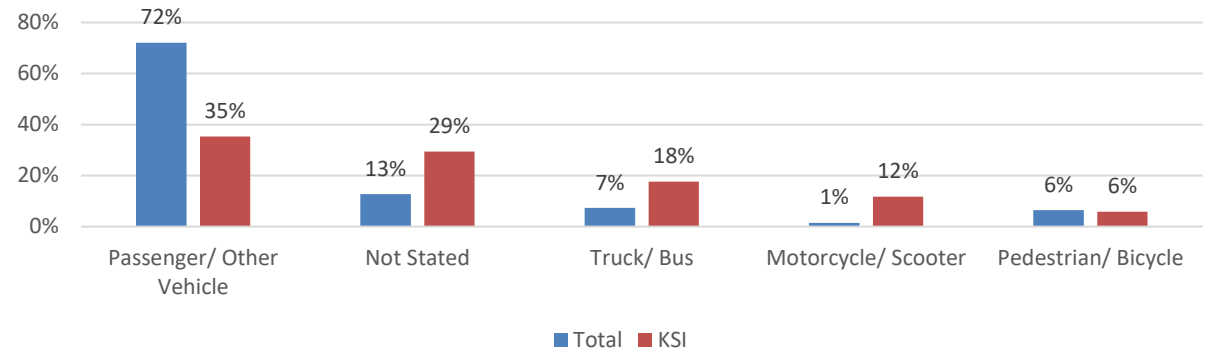
Figure 12. Motor Vehicle Involved with: All Collisions vs. KSI Collisions



MODES

In addition to motor vehicle involved with, modes include a more detailed breakdown of the vehicle type at fault in the accident, including motorcycles and trucks. For collisions of all severity, the majority were caused by passenger/other vehicles (72%), followed by (besides not stated) truck/ bus (7%). Crashes caused by passenger/other vehicles also makes up 35% of KSI collisions, followed by truck/ bus caused collisions (18%). **Figure 13** illustrates the percentage for all collisions as well as KSI collisions by mode. Note that Not Stated indicates that a particular mode was not included in the police report.

Figure 13. Modes: All Collisions vs. KSI Collisions

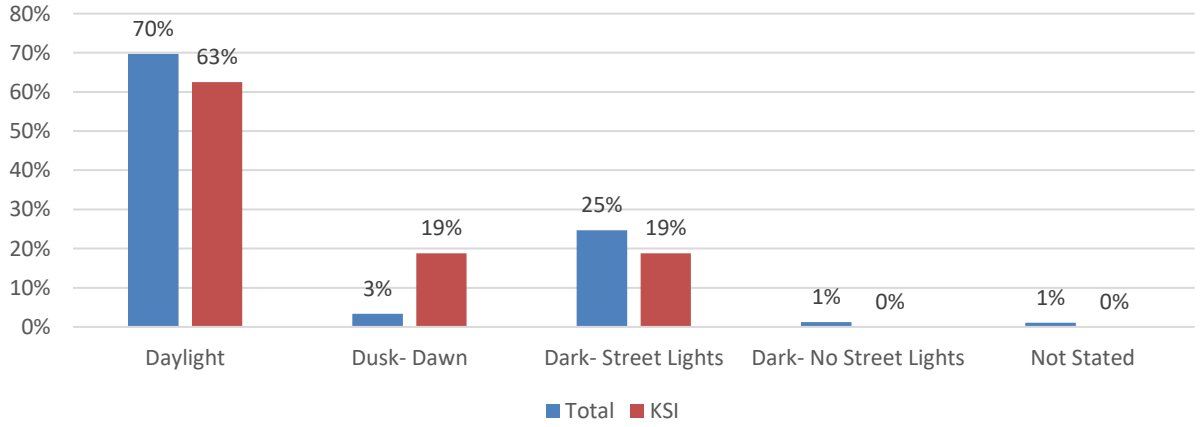


LIGHTING

For collisions of all severity, 70% of collisions occurred in daylight, while 25% of collisions occurred in the dark on streets with street lights. For KSI collisions, lighting conditions shifted slightly, with 63% of collisions having occurred in daylight, 19% of collisions occurred in dusk – dawn lighting, and 19% occurred in the dark on streets with street lights. However, according to the National Highway and Traffic Safety Administration (NHTSA), approximately 25% of travel occurs at night nationwide, so the percent of collisions occurring at night in Albany is proportional.

Figure 14 illustrates the lighting condition for all collisions and KSI collisions.

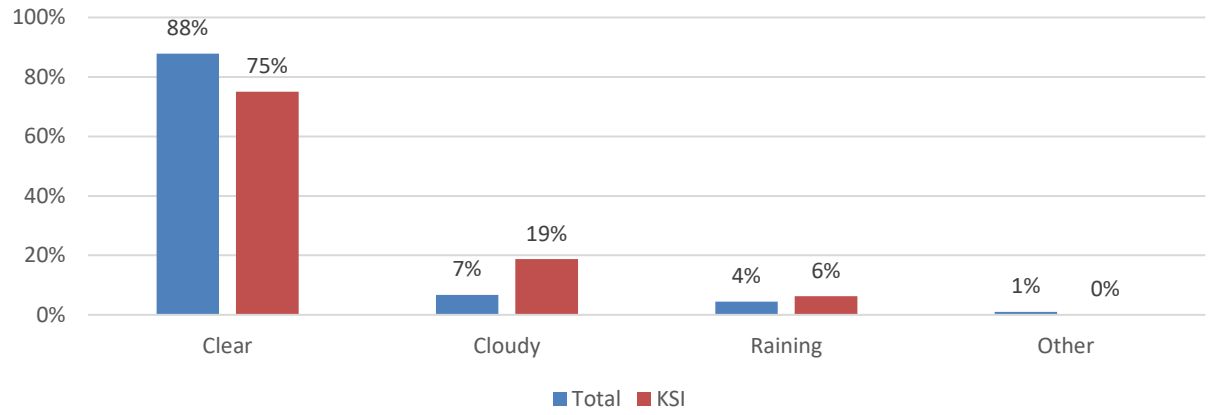
Figure 14. Lighting Conditions: All Collisions vs. KSI Collisions



WEATHER

Majority of collisions have occurred during clear weather conditions (88%). Similar trends have been observed with KSI collisions, with 75% of the collisions having occurred during clear weather conditions. **Figure 15** illustrates the percent distribution of weather conditions during occurrence of collisions of all severity as well as KSI collisions.

Figure 15. Weather Conditions: All Collisions vs. KSI Collisions



TIME OF THE DAY

For collisions of all severity, the hour with the most number of collisions was between 6:00 p.m. to 7:00 p.m. (10%), while the hour with the fewest number of collisions was 5:00 a.m. to 6:00 a.m. (0%). For KSI collisions, maximum number of collisions occurred between 5:00 p.m. to 6:00 p.m. (25%). **Figure 16** illustrates the percentage of collisions occurring during each hour of the day for all collisions as well as KSI collisions.

Figure 16. Time of Day: All Collisions vs. KSI Collisions

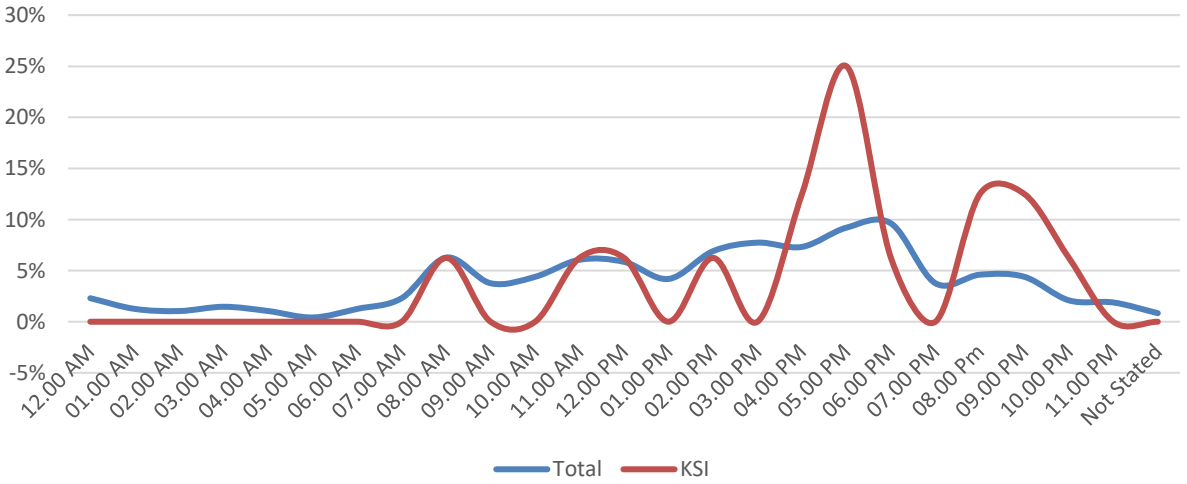


Figure 17. Motor Vehicle to Bike Collisions (2016-2020)

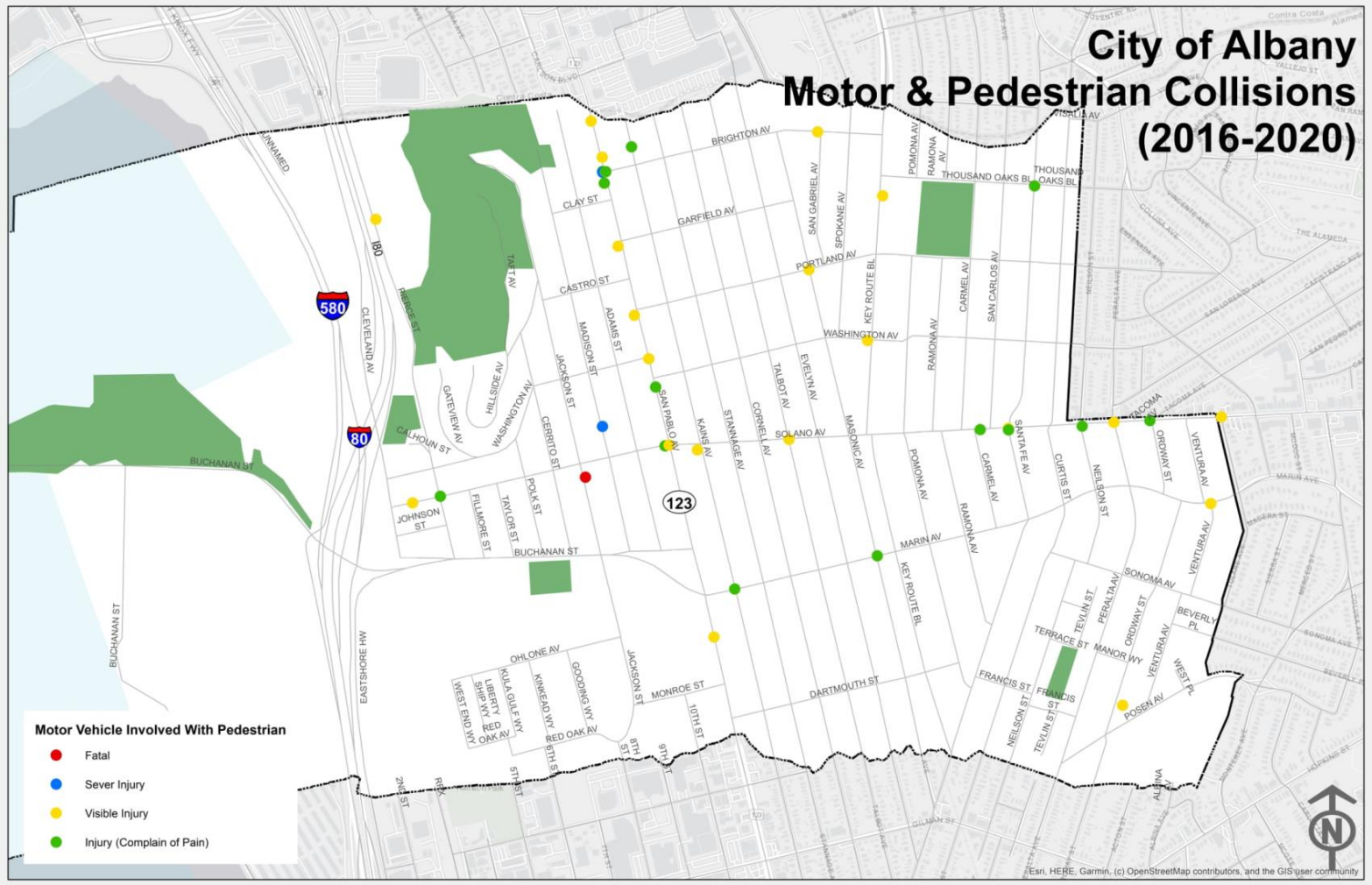


Figure 18. Motor Vehicle to Pedestrian Collisions (2016-2020)

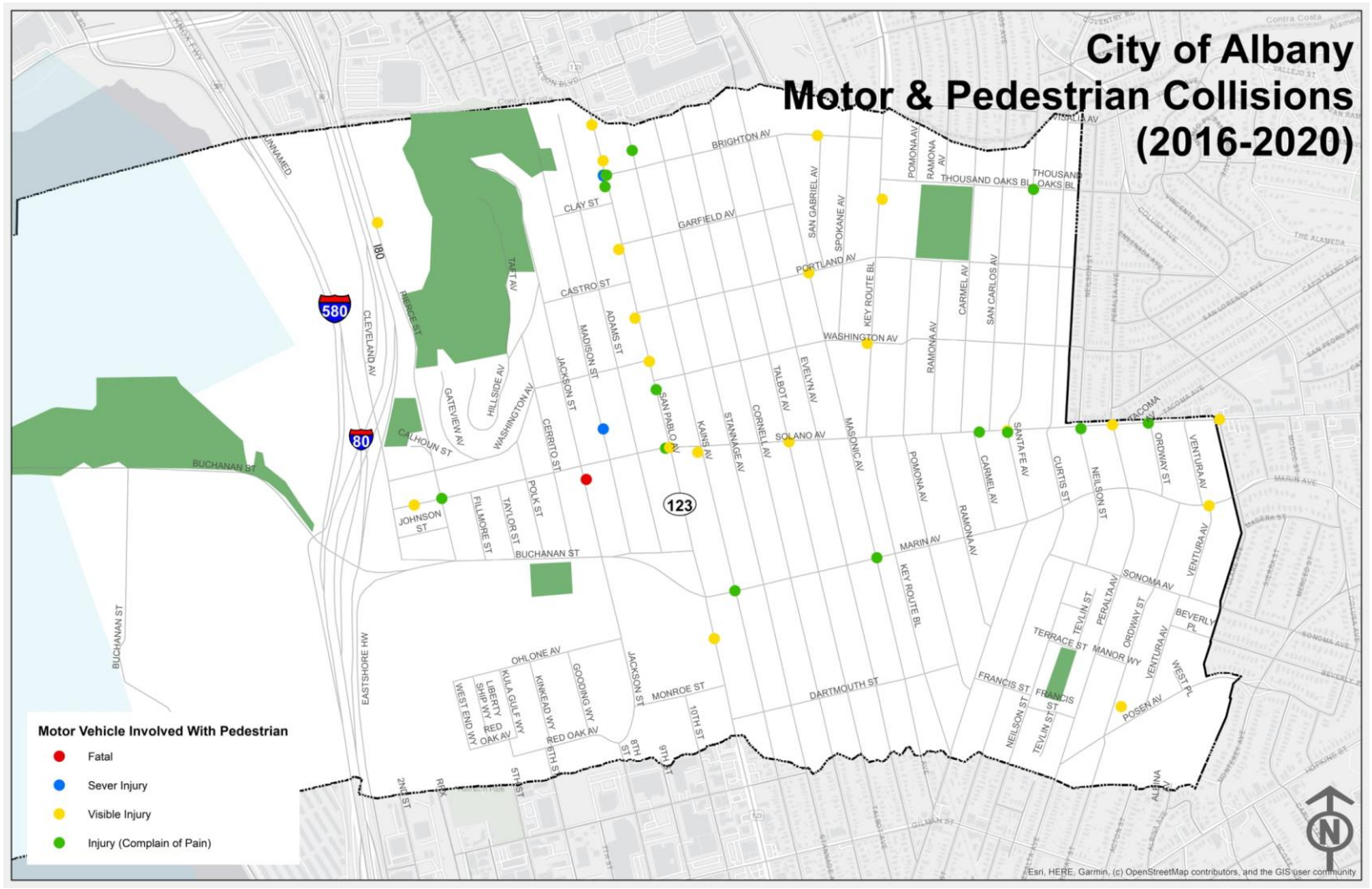
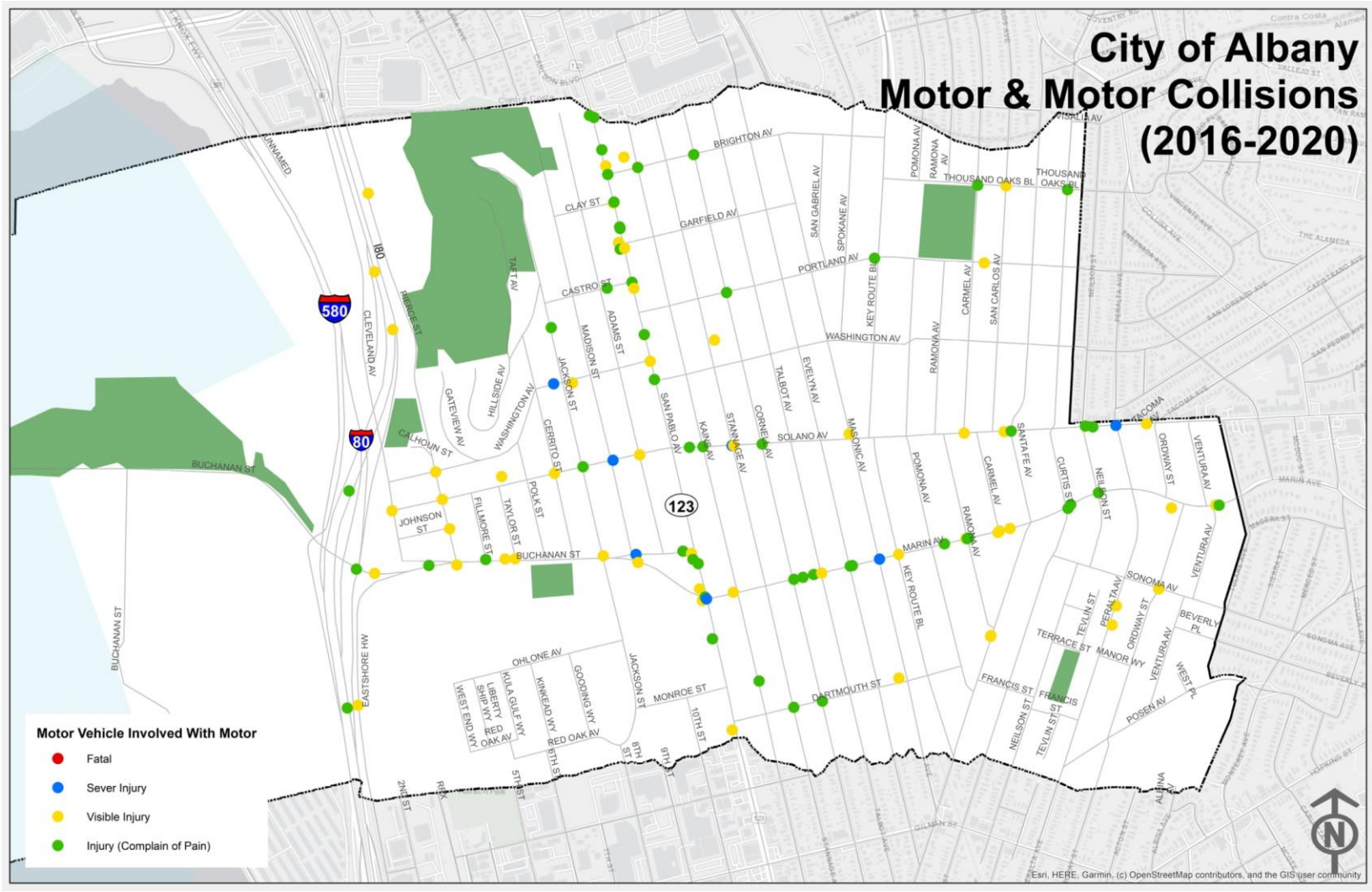


Figure 19. Motor Vehicle to Motor Vehicle Collisions (2016-202



Killed and Severe Injury Collisions

This section describes a detailed collision analysis performed for KSI collisions occurring at roadway segments and intersections in the City of Albany. Of the total 16 KSI collisions that occurred during the study period, 14 collisions (88%) occurred at intersections and 2 collisions (12%) occurred on roadway segments. Note that KSI collisions represent a small percentage of the overall number of collisions in Albany, but are still examined to determine the factors leading to them because of the focus the LRSP has on these types of collisions. This distribution is illustrated in **Figure 20.**

Figure 20. Intersection vs. Roadway Segment Collisions – KSI Collisions

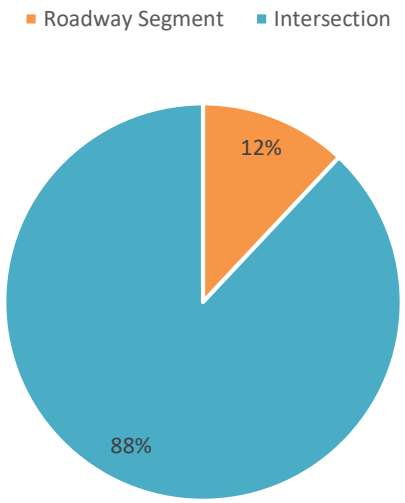
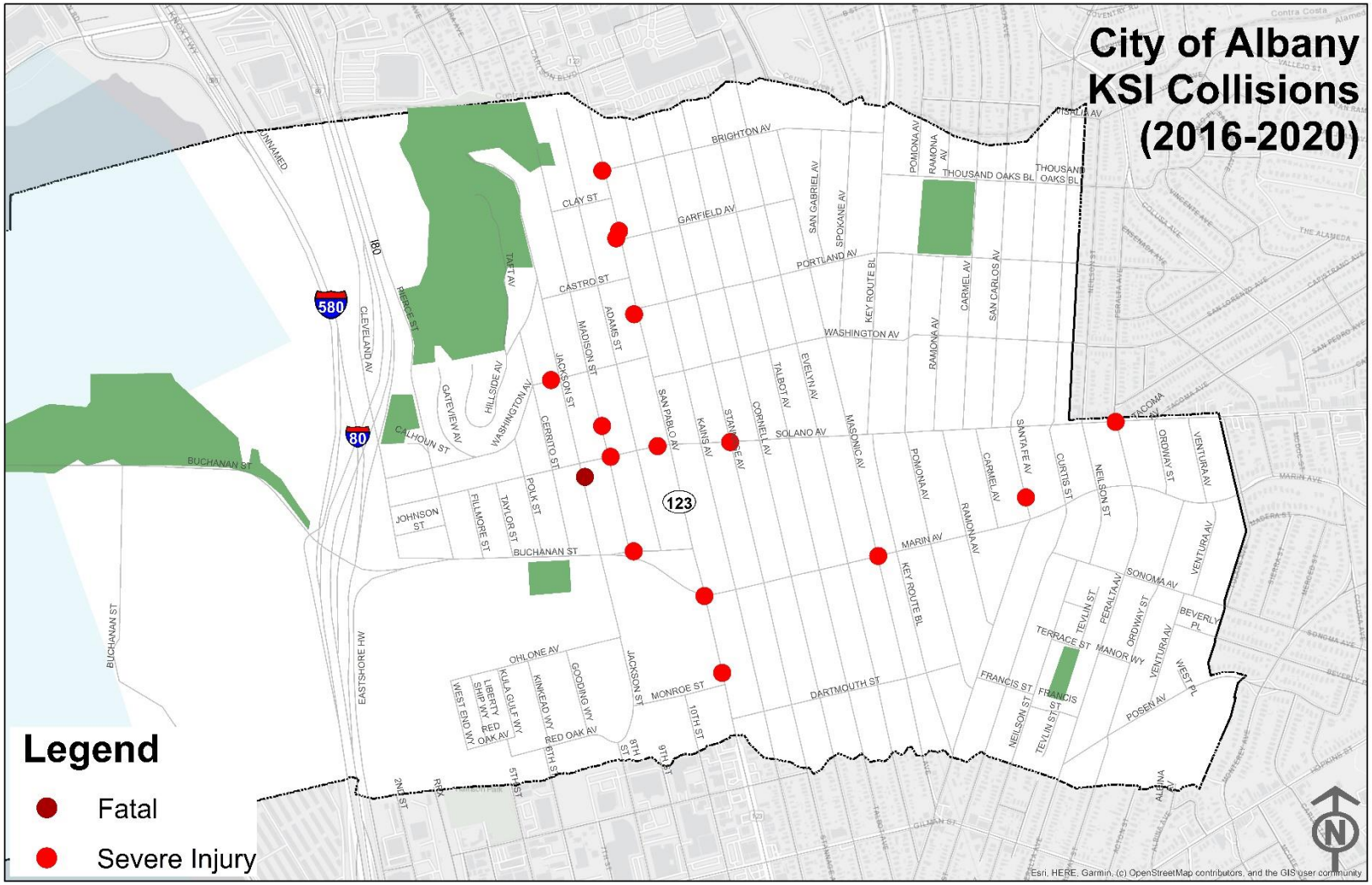


Figure 21 maps the KSI collisions that occurred in the City of Albany during the study period.

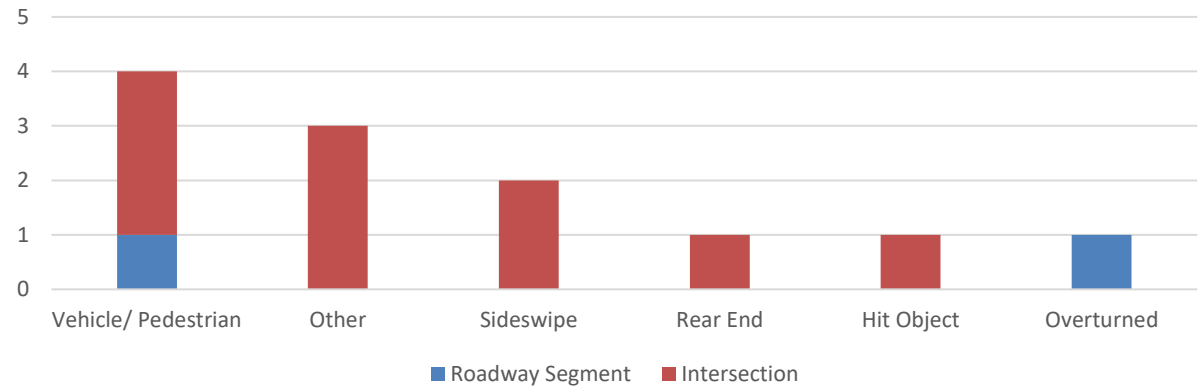
Figure 21. Killed and Severe Injury Collisions in the City of Albany (2016-2020)



COLLISION TYPE AND LOCATION TYPE

The most common KSI collision type was broadside collisions, which most commonly occurred at intersections. Besides other, broadside collisions were followed by vehicle/pedestrian collisions and sideswipe collisions as the most common intersection KSI collisions, while overturned and vehicle/ pedestrian collisions occurred on roadway segments. **Figure 22** shows KSI collisions location type as well as the collision type.

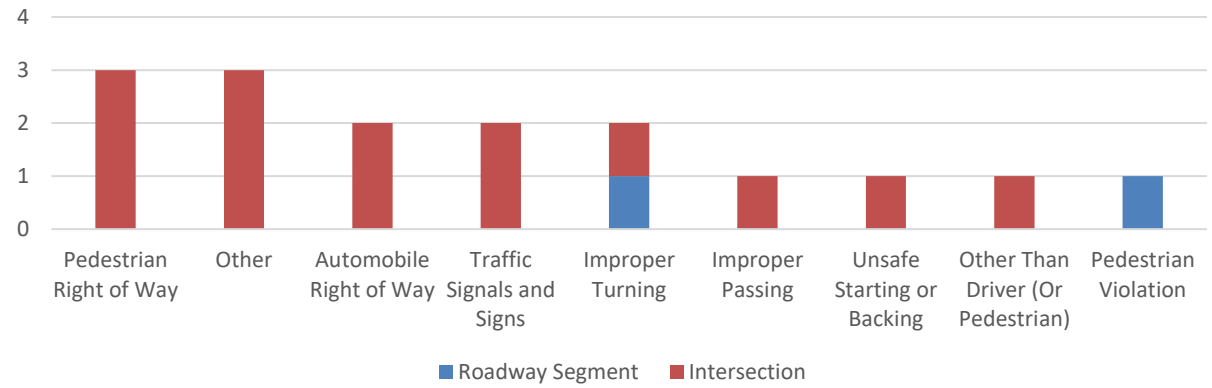
Figure 22. KSI Collisions: Collision Type vs Location Type (2016-2020)



VIOLATION CATEGORY AND LOCATION TYPE

The most common KSI violation type (besides other) were pedestrian right of way collisions at intersections, followed by automobile right of way and traffic signals and signs violations. On roadway segments, the violation categories were improper turning and pedestrian violation. **Figure 23** shows killed and severe injury collisions by the location type and violation category.

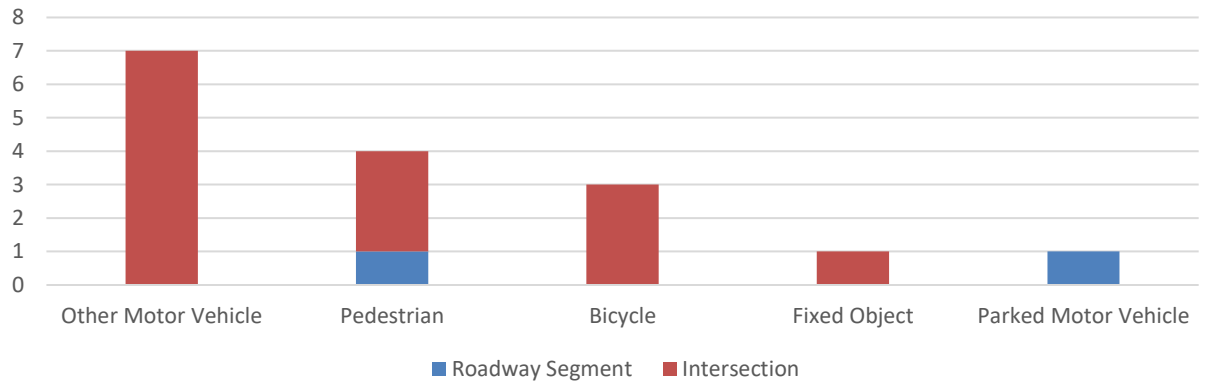
Figure 23. KSI Collisions: Violation Category vs Location Type (2016-2020)



MOTOR VEHICLE INVOLVED WITH AND LOCATION TYPE

KSI collisions involving other motor vehicle (7 collisions), followed by pedestrian and bicycle each (3 collisions) were the most common types occurring at intersection. Pedestrian collisions and collisions with parked motor vehicles occurred on roadway segments. **Figure 24** shows killed and severe injury collisions by location type and motor vehicle involved with.

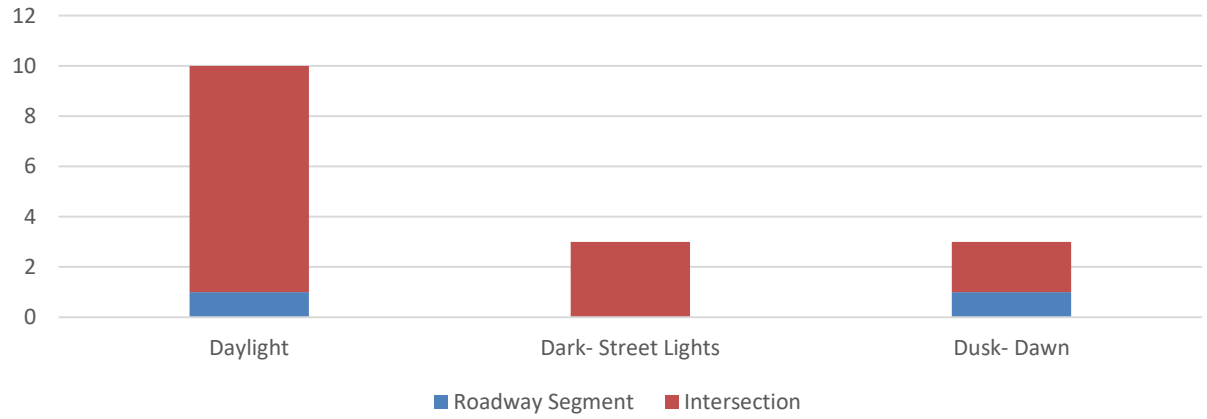
Figure 24. KSI Collisions: Motor Vehicle Involved With vs Location Type (2016-2020)



LIGHTING AND LOCATION TYPE

Most KSI collisions occurred in daylight at intersections. The second most common lighting for killed and severe injury collisions was collisions that occurred in the dark on streets with street lights at intersections, and at dawn/dusk at intersections. **Figure 25** shows killed and severe injury collisions by location type as well as lighting conditions.

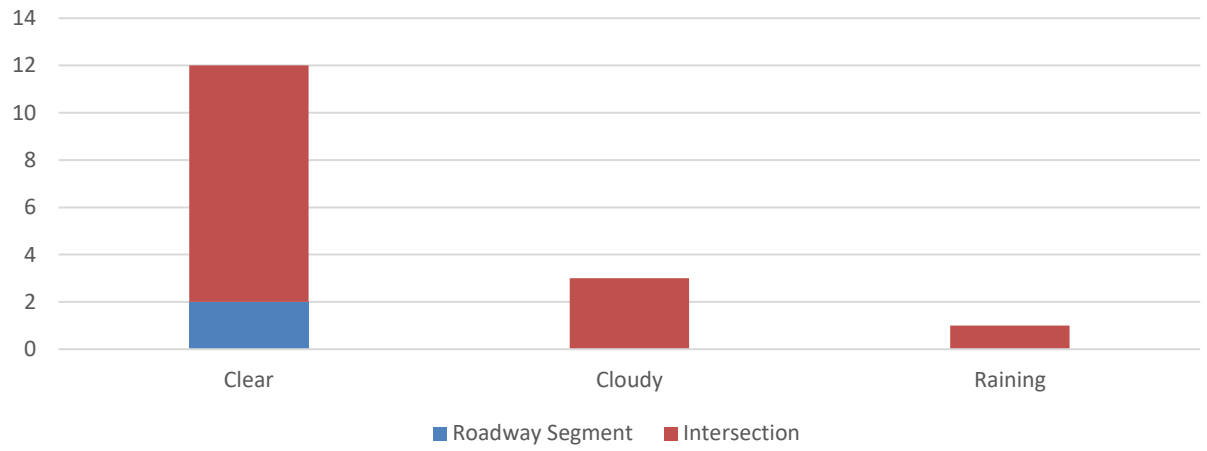
Figure 25. KSI Collisions: Lighting vs Location Type (2016-2020)



WEATHER AND LOCATION TYPE

The majority of KSI collisions occurred during clear weather at both intersections and along roadway segments. **Figure 26** shows killed and severe injury collisions by location type as well as weather conditions.

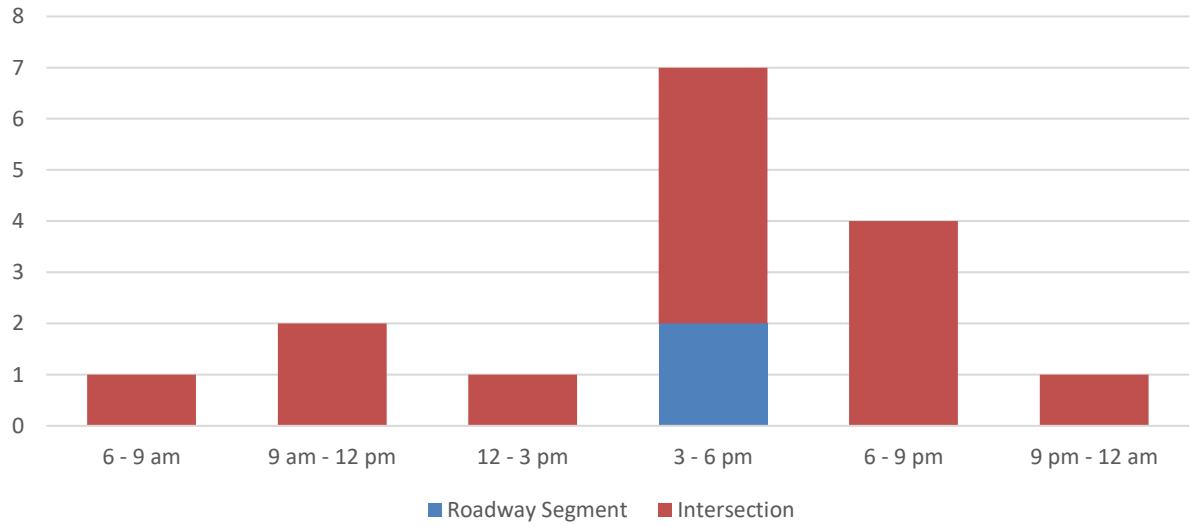
Figure 26. KSI Collisions: Weather vs Location Type (2016-2020)



TIME OF DAY AND LOCATION TYPE

The time period with the most KSI collisions at intersections was during 3:00 p.m. to 6:00 p.m., followed by 6:00 p.m. to 9:00 p.m. Both roadway segment KSI collisions occurred between 3:00 p.m. to 6:00 p.m. **Figure 27** shows killed and severe injury collisions by location type and time of day.

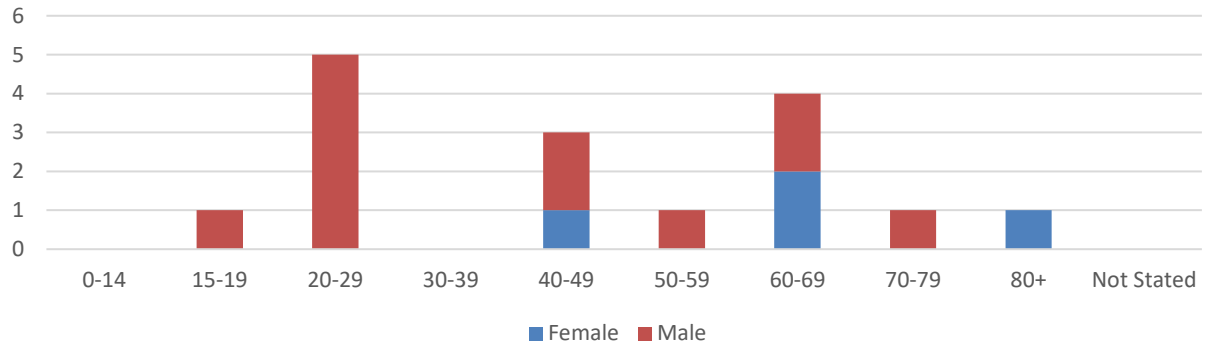
Figure 27. KSI Collisions: Time of Day vs Location Type (2016-2020)



GENDER VS. AGE

For KSI collisions, the gender of the party at fault was much more likely to be male than female (75% of KSI collisions were caused by a male). The party at fault was also slightly more likely to be older. Parties at fault over 40 years of age accounts for more than half (63%) of all KSI collisions. **Figure 28** illustrates the gender and age of the party at fault for KSI collisions.

Figure 28. KSI Collisions by Gender and Age



COLLISION TYPE VS. MOVEMENT PRECEDING COLLISION OF PARTY AT FAULT

The most common type of collision (besides other) for KSI collisions was broadside collisions. Of these collisions, the movement preceding the collision includes proceeding straight, making right turn, making left turn, and parked (one collision each). Overall, each collision type did not show a strong concentration of movements preceding the collisions, with no one collision type/movement preceding combination exceeding one. As an example, **Figure 29** shows this distribution of movement preceding each KSI broadside collision.

Figure 29. KSI Collisions by Broadside Collisions and Movement Preceding Collision of Party at Fault

Bicycle and Pedestrian Collision Analysis

Pedestrian and Bicycle analysis is studied to find out the movement and behavior of pedestrians and bicyclists in the City of Albany. This analysis will help to identify the pedestrian and bike issues such as high risk intersections and corridors and to target safety interventions to reduce the number of collisions and improve the safety of pedestrian and bicyclists. It will also help to identify patterns, risk factors and potential solutions to improve safety for both modes.

Figure 30. Bicycle Collisions: All Injury Collisions (2016-2020)

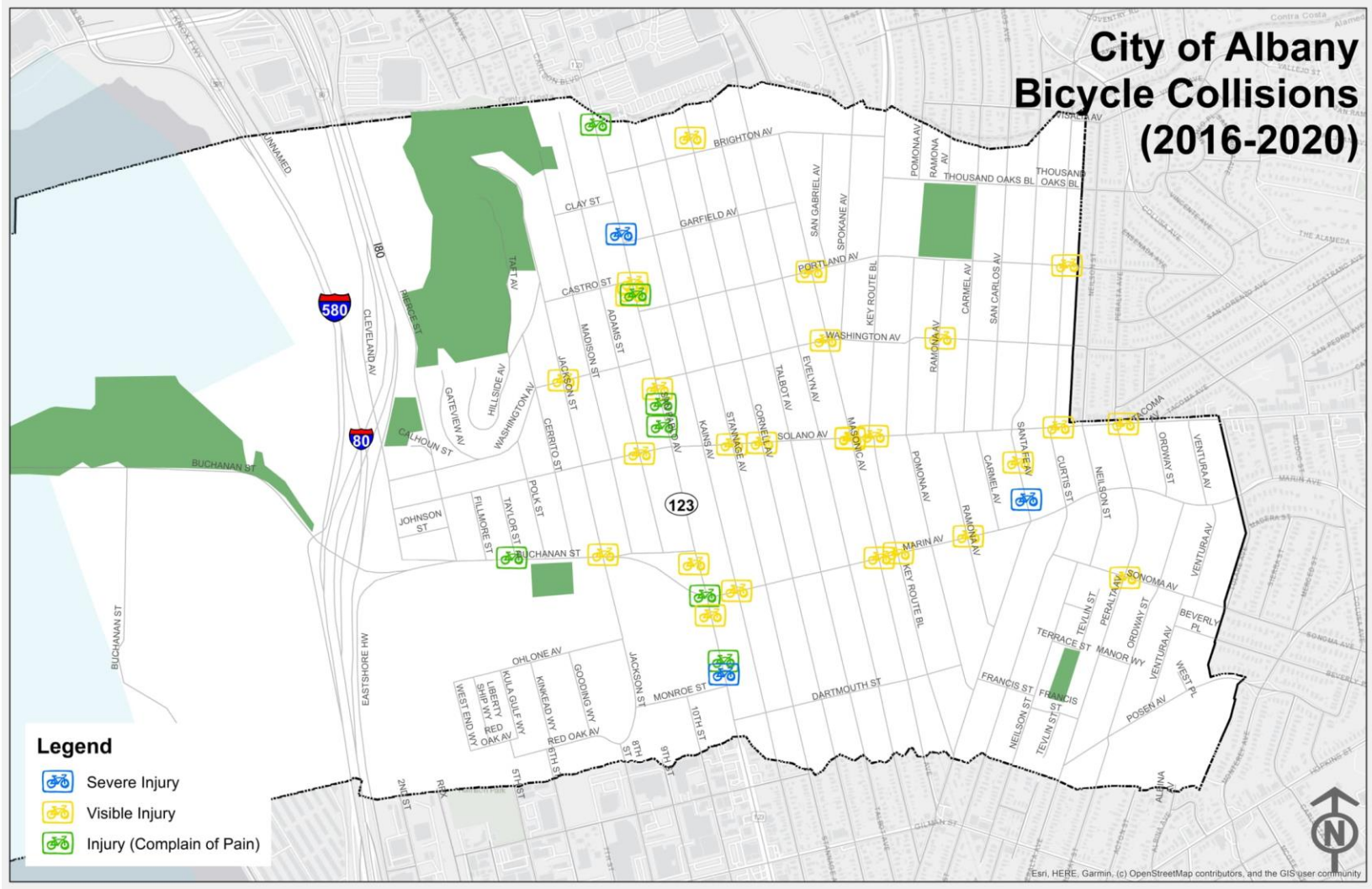


Figure 31. Pedestrian Collisions: All Injury Collisions (2016-2020)

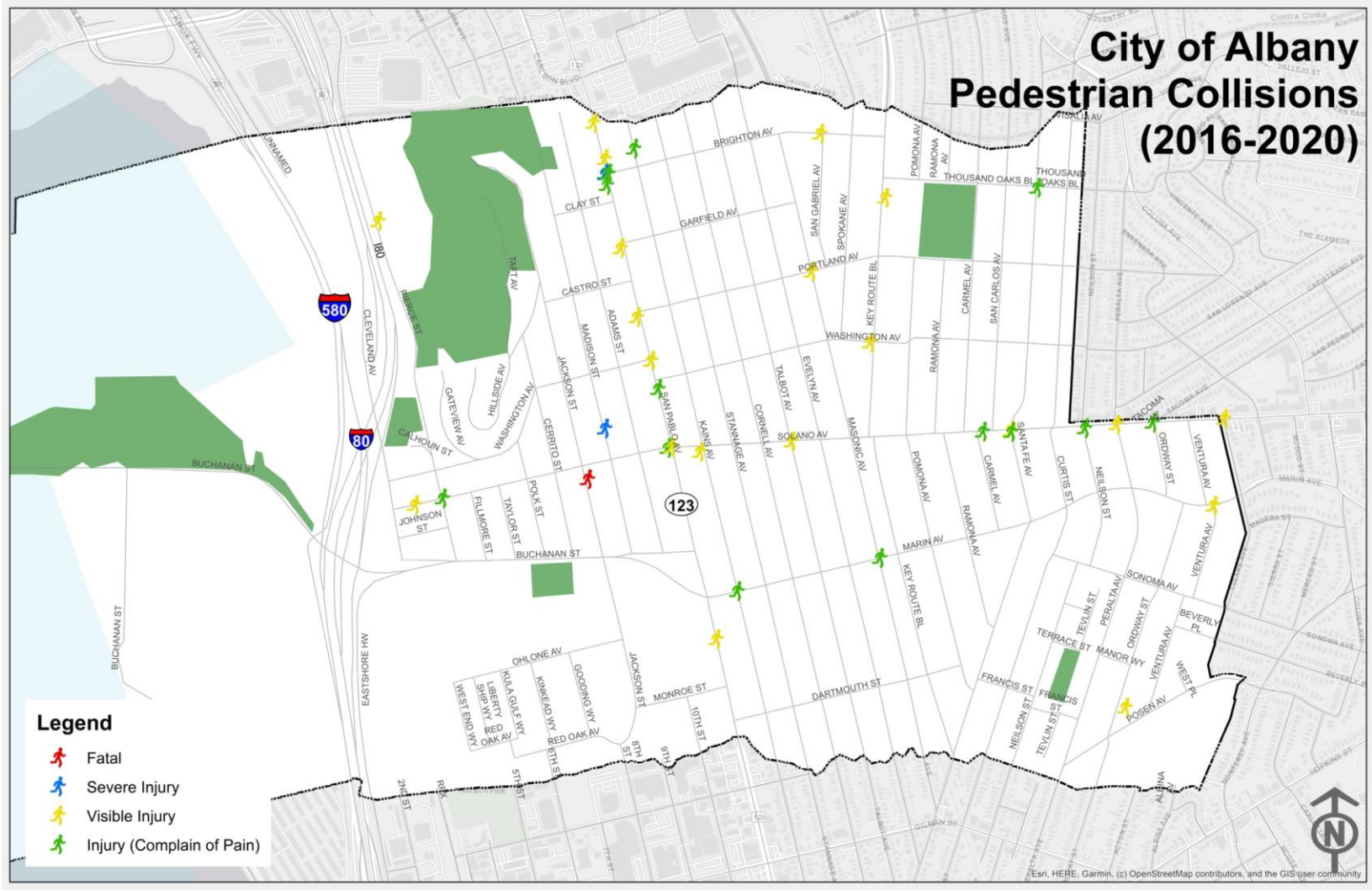


Figure 32. Bike and Pedestrian Collisions: All Injury Collisions (2016-2020)

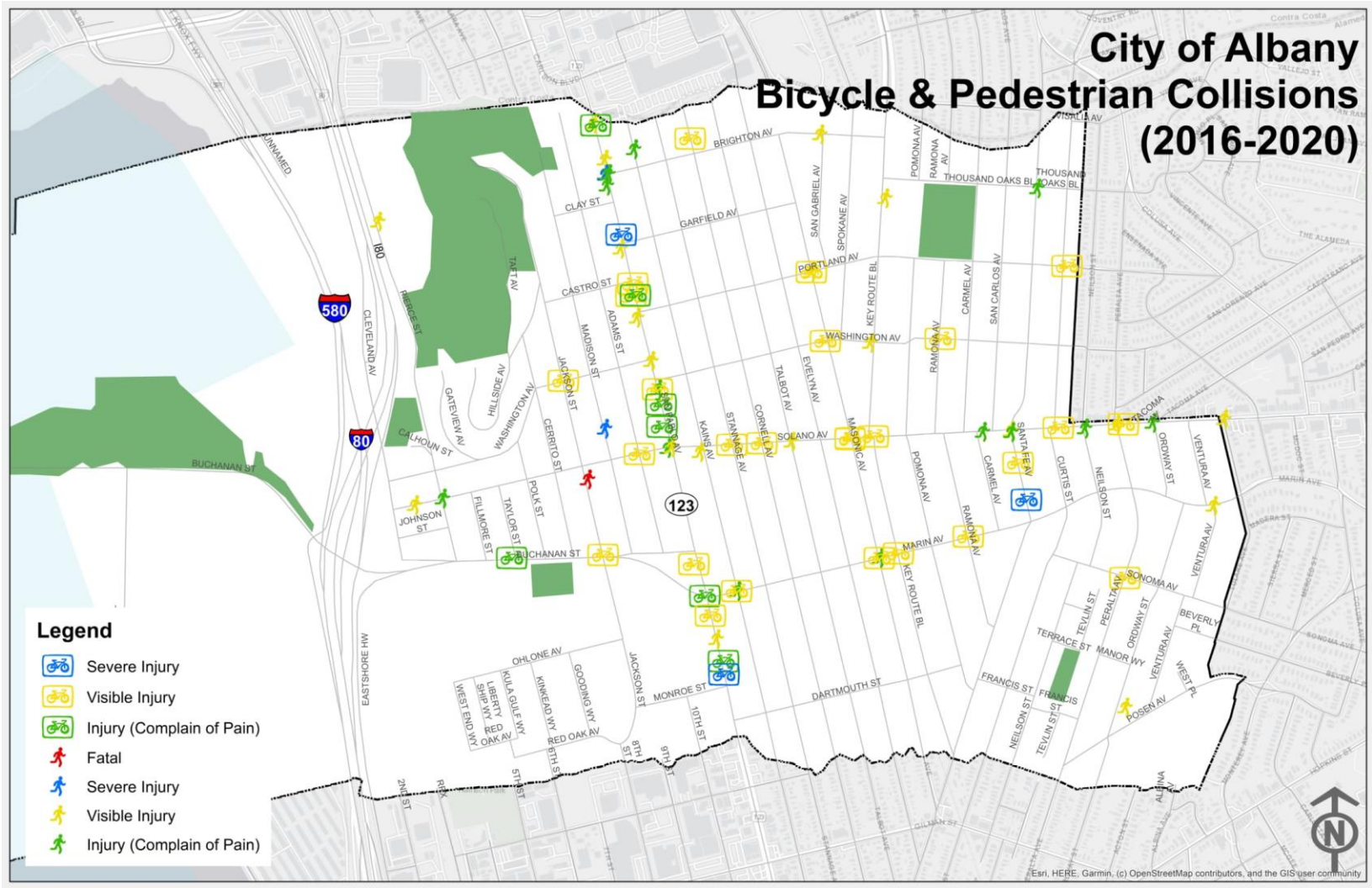


Figure 33. Bike Collisions: Fatal and Severe Injury Collisions (2016-2020)

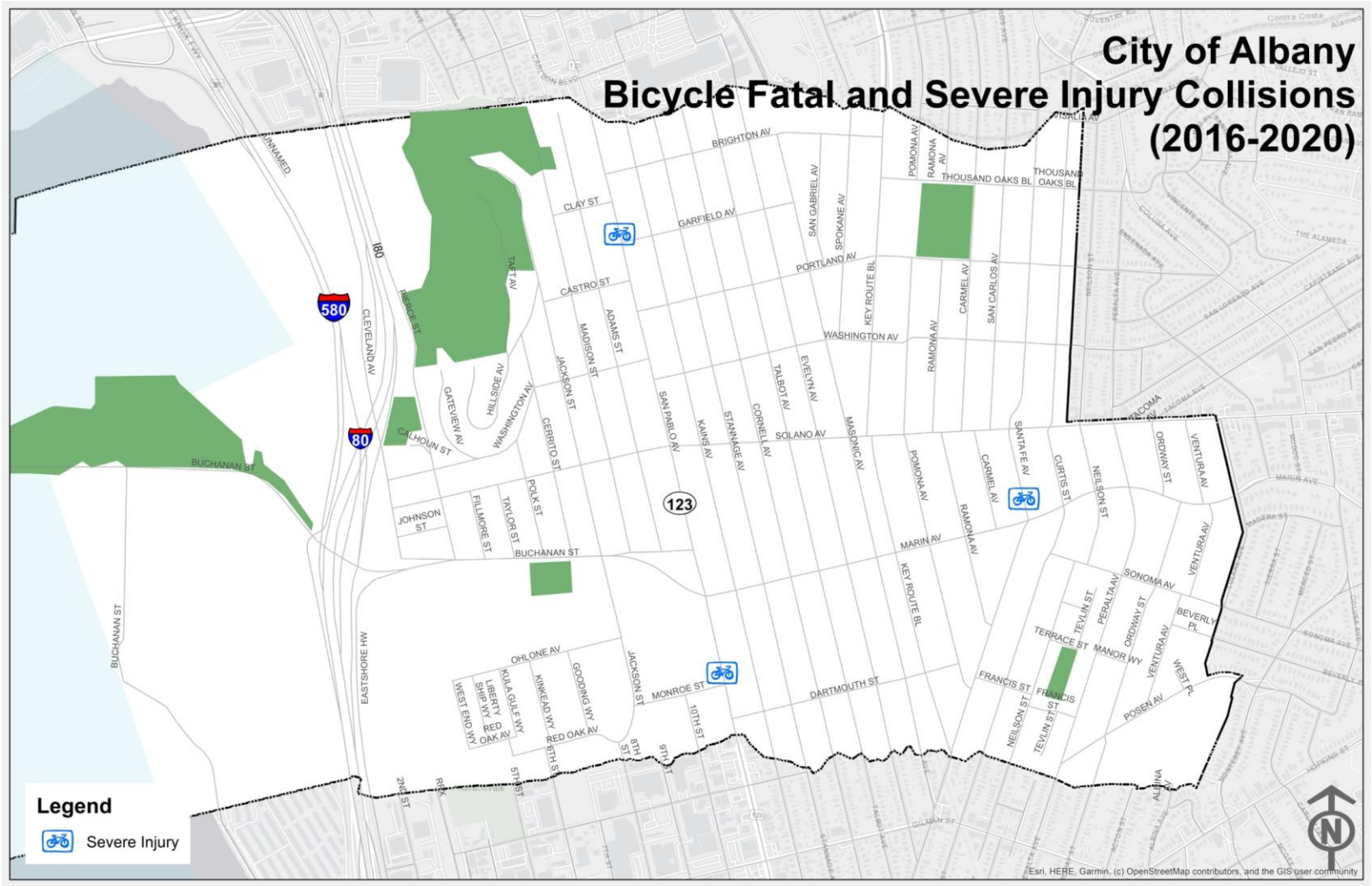


Figure 34. Pedestrian Collisions: Fatal and Severe Injury Collisions (2016-2020)

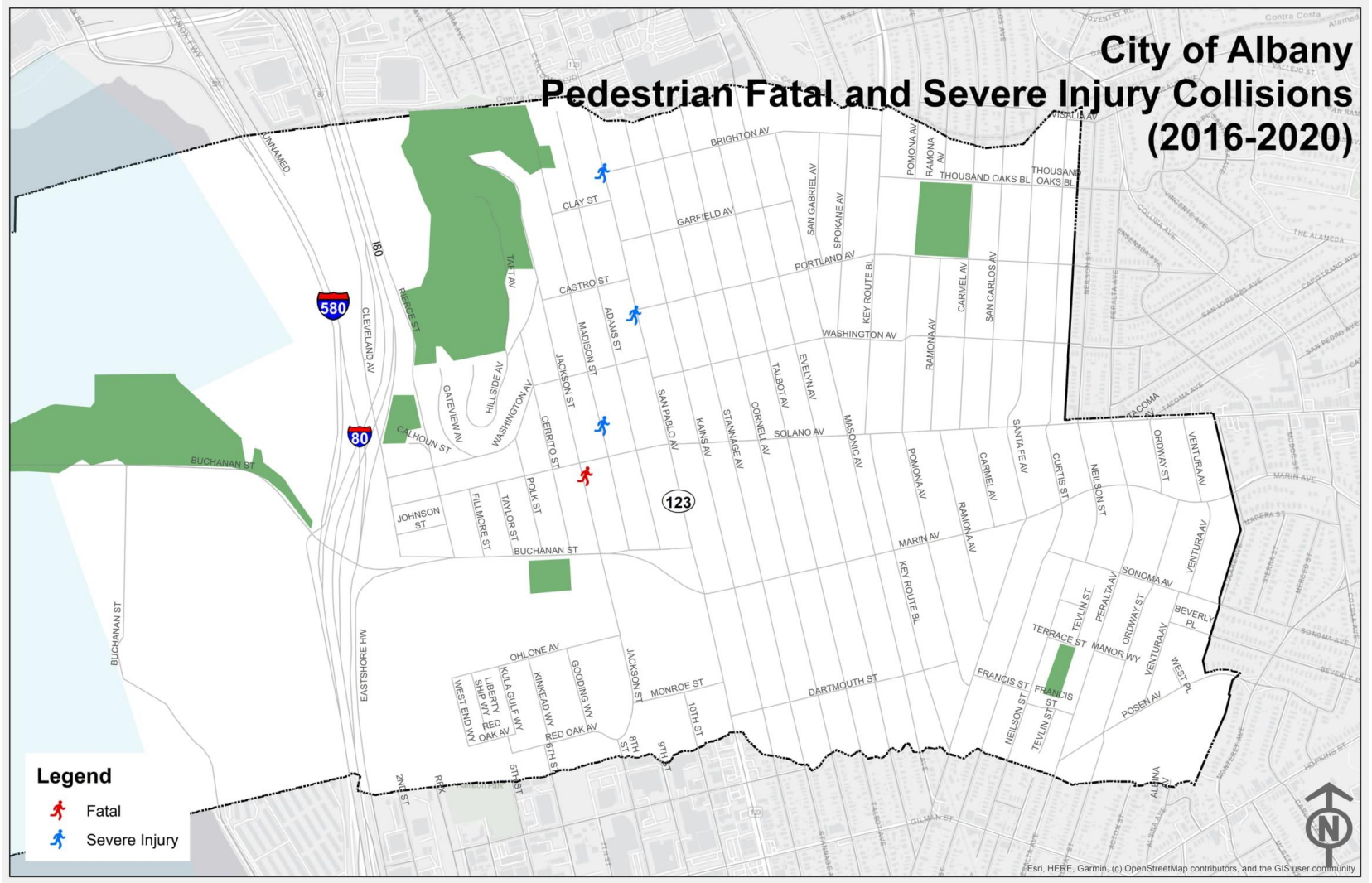
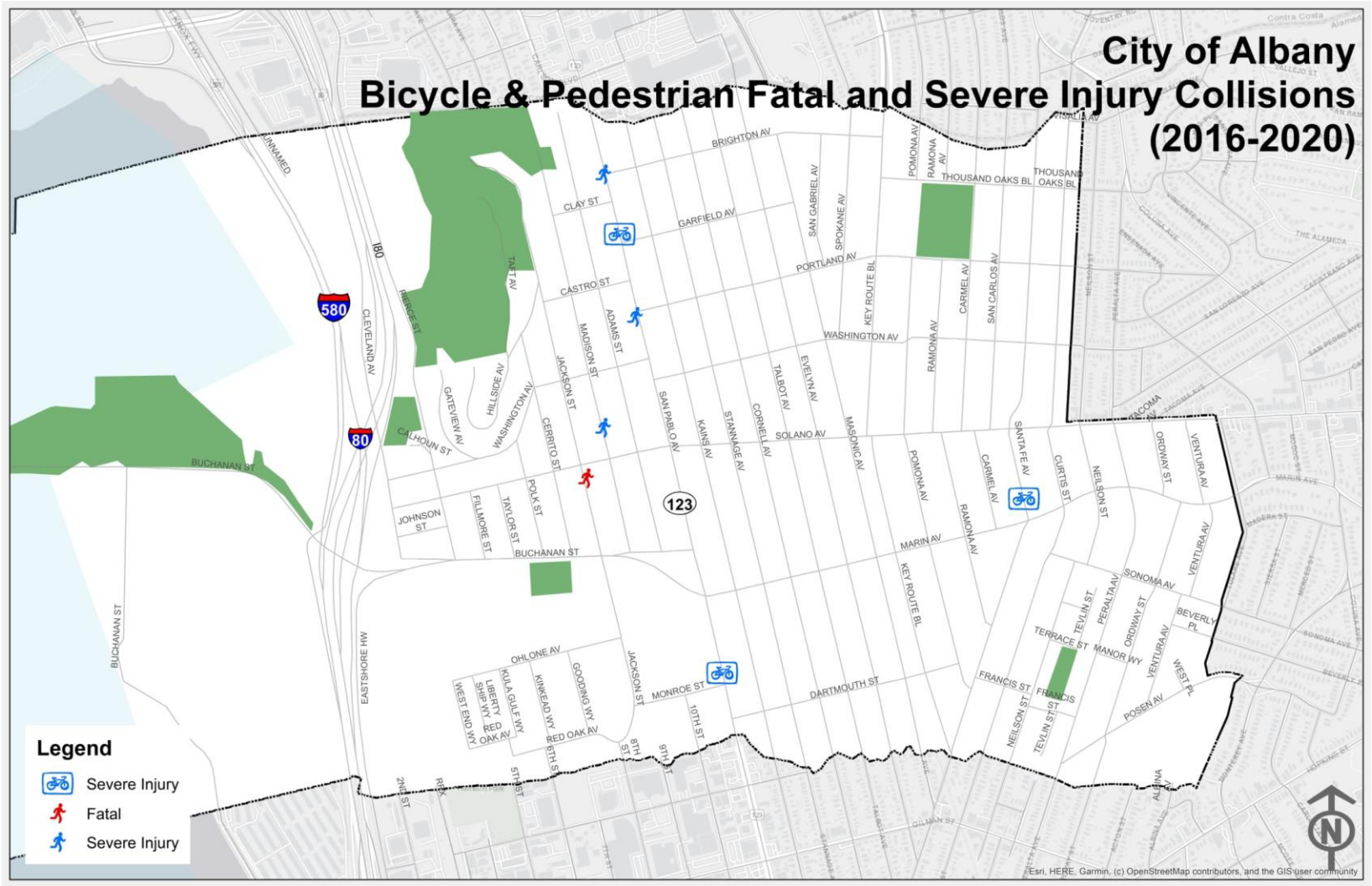


Figure 35. Bike and Pedestrian Collisions: Fatal and Severe Injury Collisions (2016-2020)



Geographic Collision Analysis

This section describes a detailed geographic collision analysis performed for injury collisions occurring on roadway segments and at intersections in the City of Albany. The above collision analysis was used to identify five main collision factors that highlight the top trends among collisions in Albany. These five collision factors were identified to be broadside collisions, improper turning collisions, pedestrian collisions, bicycle collisions, and rear end collisions.

BROADSIDE COLLISIONS

For KSI collisions in Albany, 25% of collisions were broadside collisions. This is slightly higher than its share of collisions of all severity (22%). **Figure 36** shows the distribution of broadside collisions throughout the City of Albany between 2016 and 2020.

IMPROPER TURNING COLLISIONS

For KSI collisions in the City of Albany, 13% of collisions occurred due to improper turning violation, the most of any category. It also contributed to 19% of all collisions. **Figure 37** shows the distribution of improper turning collisions throughout the City of Albany between 2016 and 2020.

PEDESTRIAN COLLISIONS

25% of KSI collisions in Albany involved a pedestrian, compared to just 8% of collisions of all severity. **Figure 38** shows the distribution of pedestrian collisions throughout the City of Albany between 2016 and 2020.

BICYCLE COLLISIONS

19% of KSI collisions in Albany involved a bicycle, compared to 8% of collisions of all severity. **Figure 39** shows the distribution of bicycle collisions throughout the City of Albany between 2016 and 2020.

REAR END COLLISIONS

26% of collisions of all severity were rear end collisions, the most of all collision types. It also makes up 6% of KSI collisions. **Figure 40** shows the distribution of rear end collisions throughout the City of Albany between 2016 and 2020.

Figure 36. City of Albany Broadside Collisions (2016-2020)

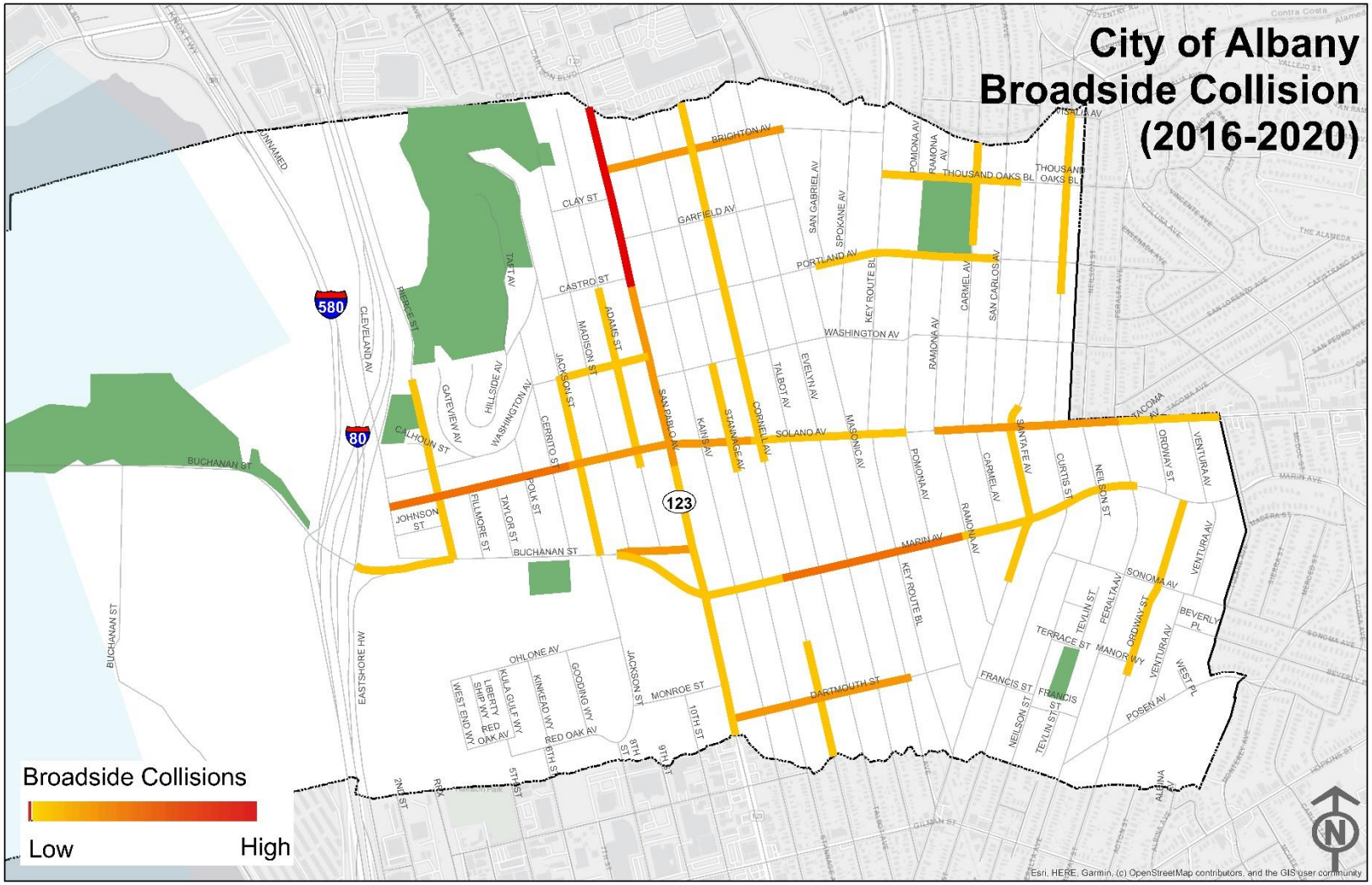


Figure 37. City of Albany Improper Turning Collisions (2016-2020)

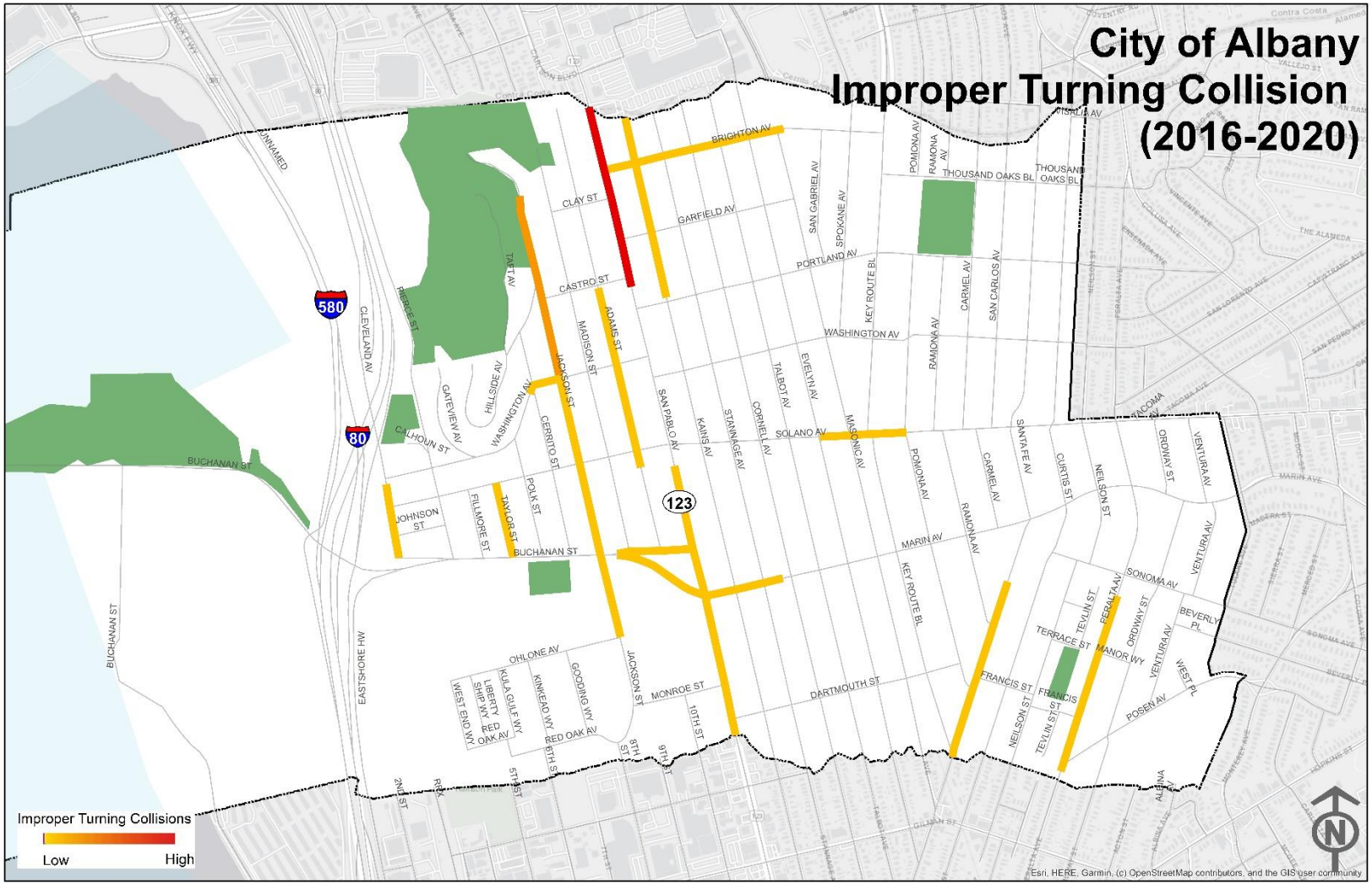


Figure 38. City of Albany Pedestrian Collisions (2016-2020)

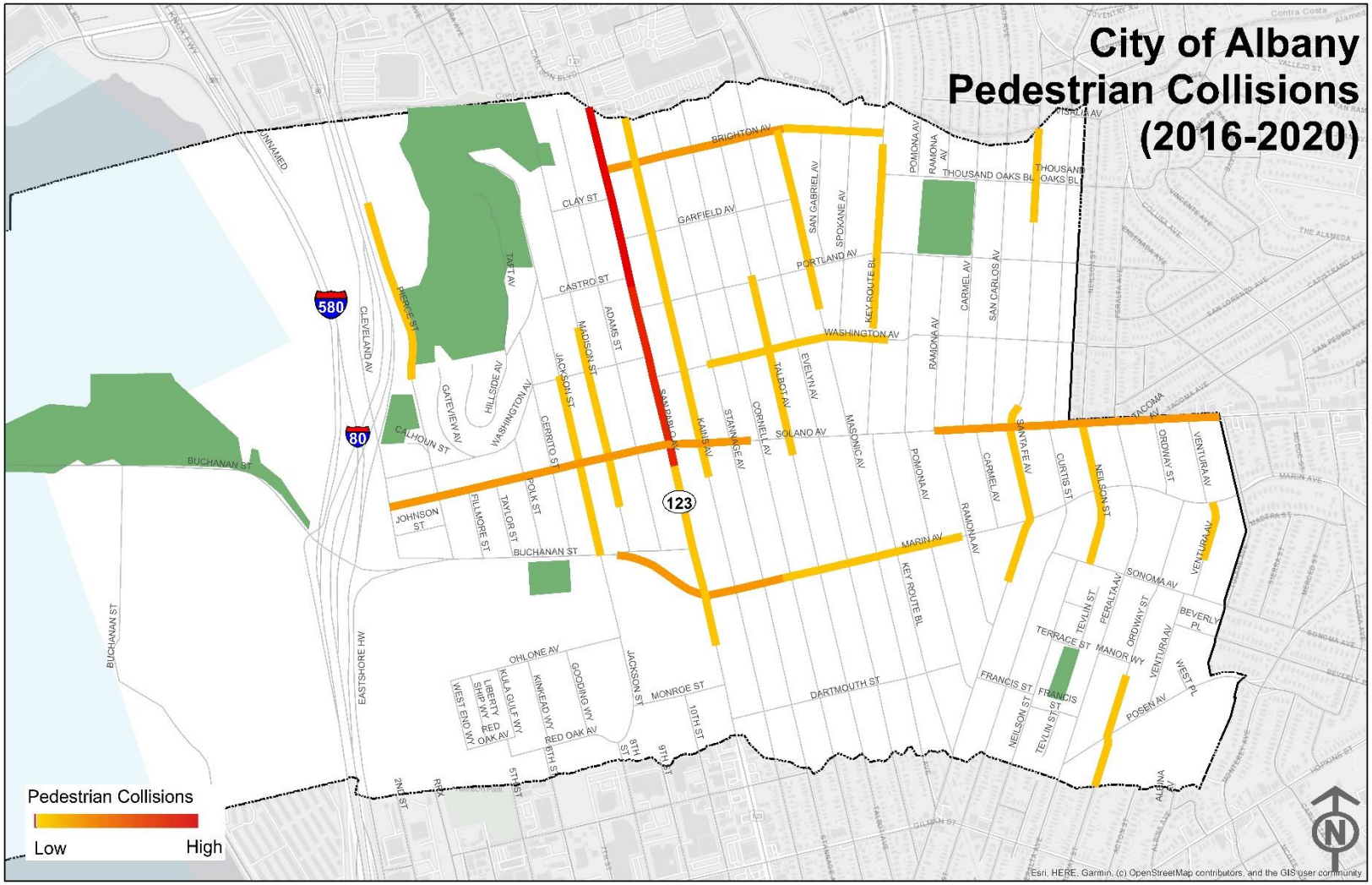


Figure 39. City of Albany Bicycle Collisions (2016-2020)

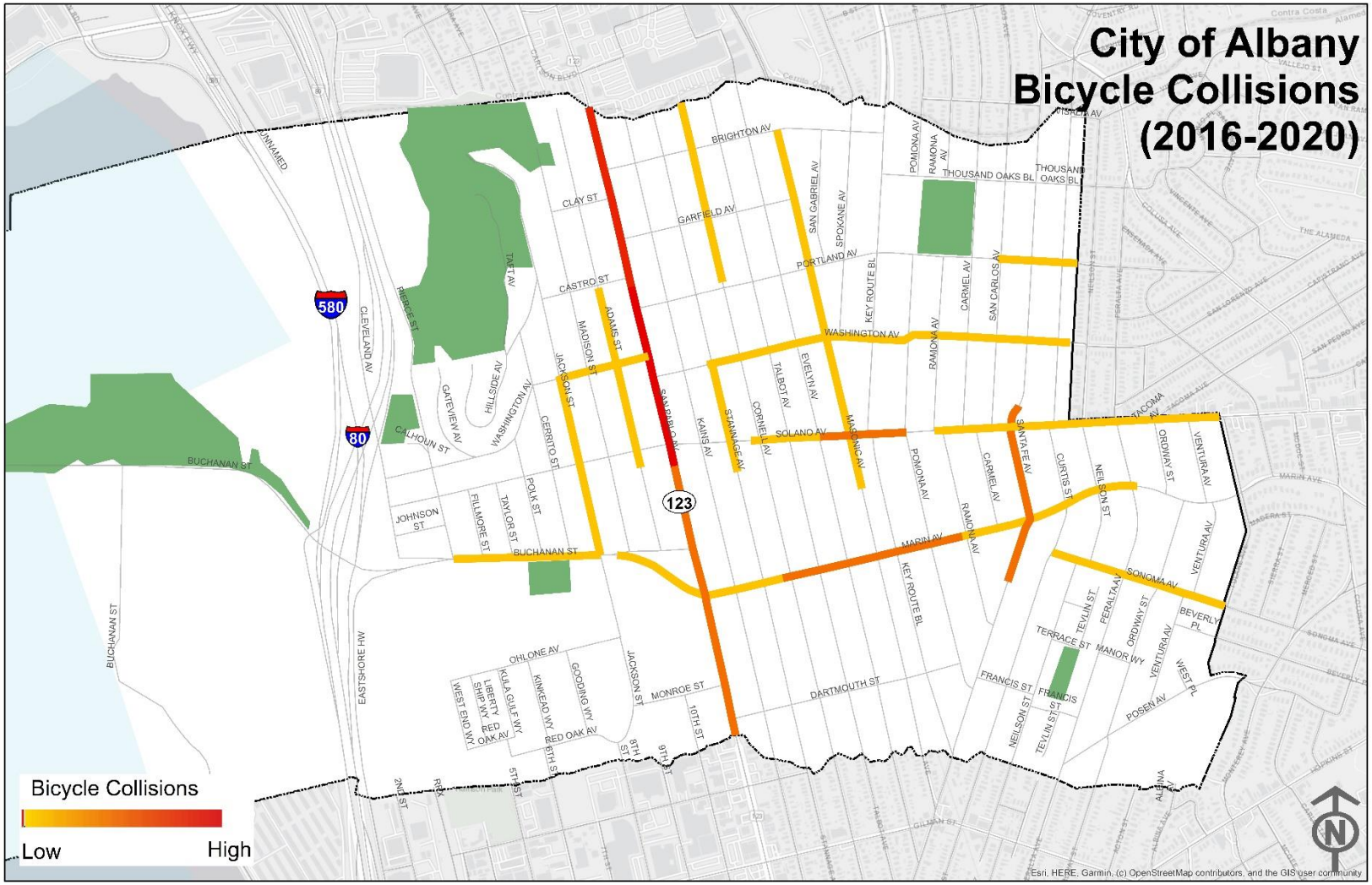
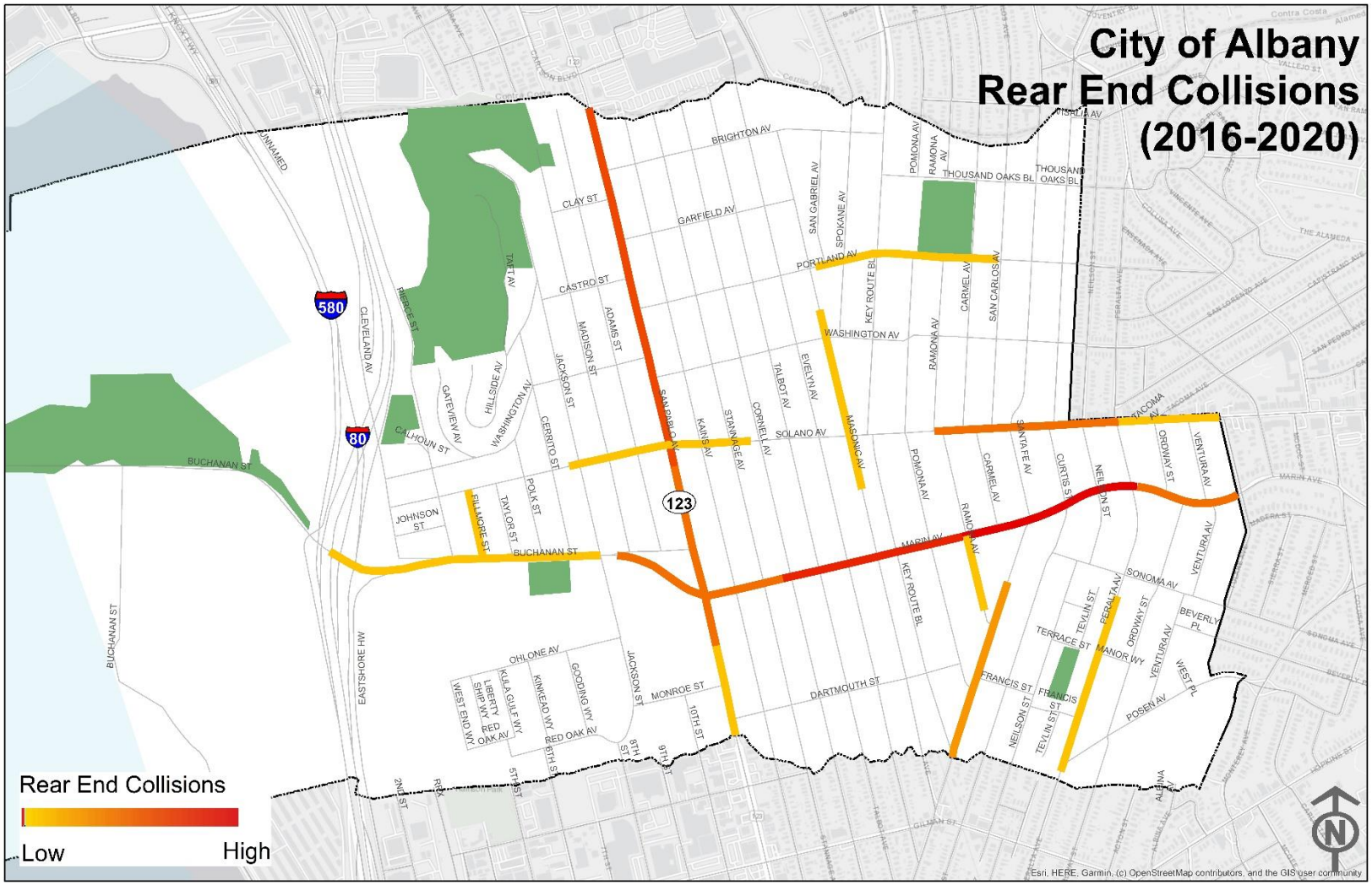


Figure 40. City of Albany Rear End Collisions (2016-2020)



Collision Severity Weight

A collision severity weight was used to identify the high severity collision network, using the Equivalent Property Damage Only (EPDO) method. The EPDO method accounts for both the severity and frequency of collisions by converting each collision to an equivalent number of property damage only (PDO) collisions. The EPDO method assigns a crash cost and score to each collision according to the severity of the crash weighted by the comprehensive crash cost. These EPDO scores are calculated using a simplified version of the comprehensive crash costs per HSIP Cycle 10 application. The weights used in the analysis are shown below in **Table 3.**

Table 3. EPDO Score used in HSIP Cycle 10

Collision Severity	EPDO Score
Killed and Severe Injury Combined	165*
Visible Injury	11
Possible Injury	6
PDO	1

*This is the score used in HSIP Cycle 10 for collisions on roadways segments, to simplify the analysis this study uses the same score for all KSI collisions regardless of location.

EPDO is used because it provides a methodology for the project team to understand the locations in Albany that are experiencing the most severe crashes. Because of the high score given to fatal and severe injury crashes, locations that have these types of crashes are more likely to receive a higher EPDO score than other locations that may have more collisions, but fewer fatal or severe injury collisions. Locations that have the highest EPDO scores are selected for inclusion in the high collision network, shown in the next section. Identifying the locations with the most severe crashes allows the team to focus recommended solutions and countermeasures at these locations.

Identified intersections are scored based on injury collisions occurring at or within 250 feet of the intersection, while roadway segment locations are identified based on injury collisions that occur along the segment, except directly at an intersection (0 feet from intersection per SWITRS and TIMS data). Note that this is slightly different from the methodology used in the collision trend analysis, where roadway segments were defined as collisions occurring more than 250 feet from an intersection. The reason for this change is to be in line with which collisions are utilized for each type of HSIP application, where roadway segment applications can include collisions not occurring at 0' from intersection. Therefore, high injury corridors are identified using these collisions, rather than only collisions that occurred over 250 feet from an intersection. Intersection applications can use collisions up to 250 feet away from the intersection; therefore, high-injury intersections are identified using these collisions.

The EPDO scores for all collisions can then be aggregated in a variety of ways to identify collision patterns, such as location hot-spots. The weighted injury collisions (PDO not included) were geolocated onto the City of Albany's road network. **Figure 32** shows the location and geographic concentration of collisions by their EPDO score. This is followed by **Figure 34** where the same EPDO

score is overlaid on a map of disadvantaged communities, based on the Calenviroscreen 4.0 poverty percentile.

Figure 33 and **Figure 34** show the concentration of EPDO score ranging from high to low. For context, the highest total EPDO score (including intersection and roadway segment collisions), is 705, while the lowest shown on the map is 6. The severity scale shown on the map is corresponded to the highest and lowest EPDO scores in Albany. To also give some context on how Albany compares to other cities, according to the California Office of Traffic Safety, Albany ranks at 16 out of 103 similar sized cities statewide in number of victims killed or injured.

Figure 41. City of Albany Severity Index

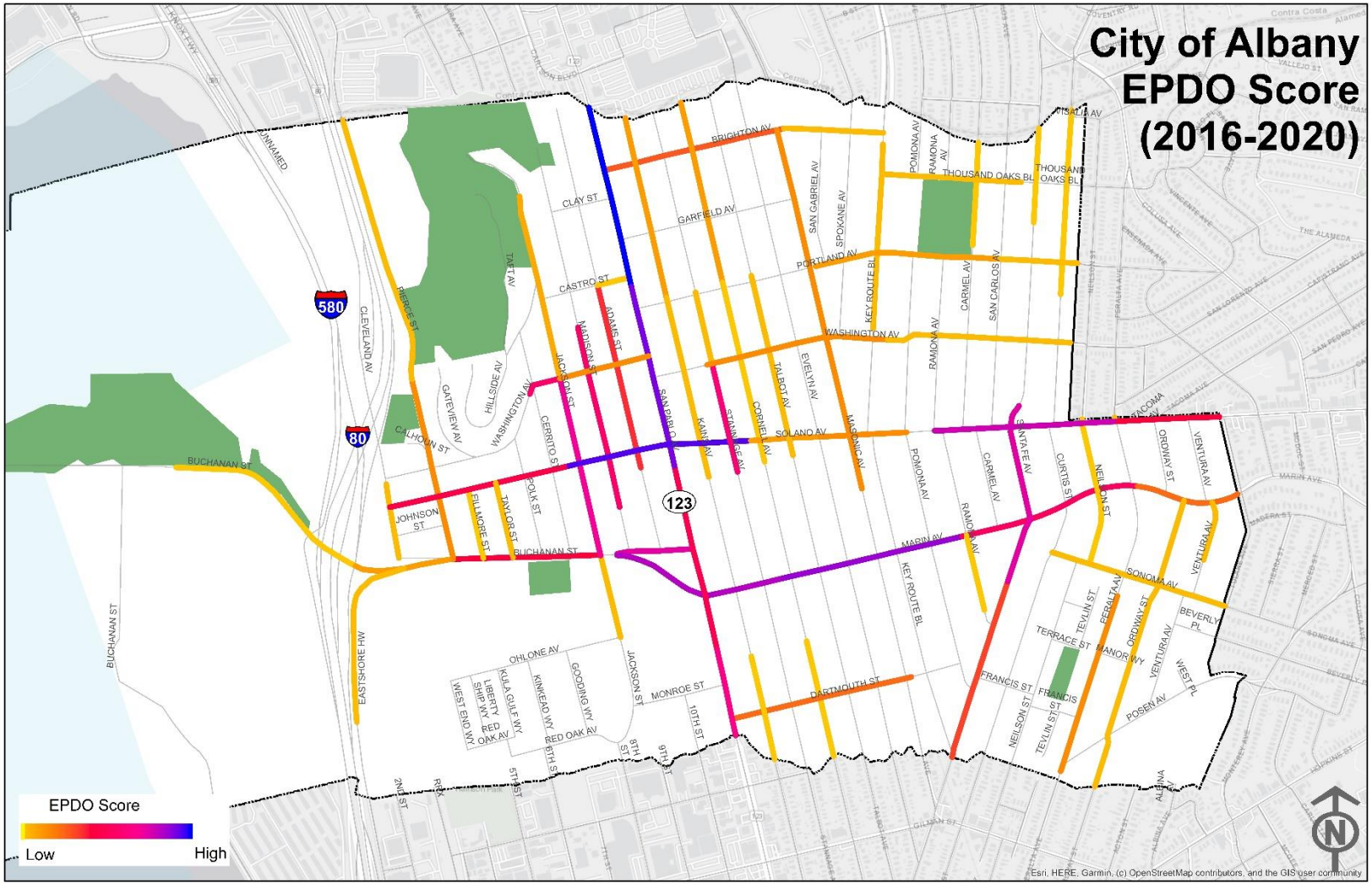
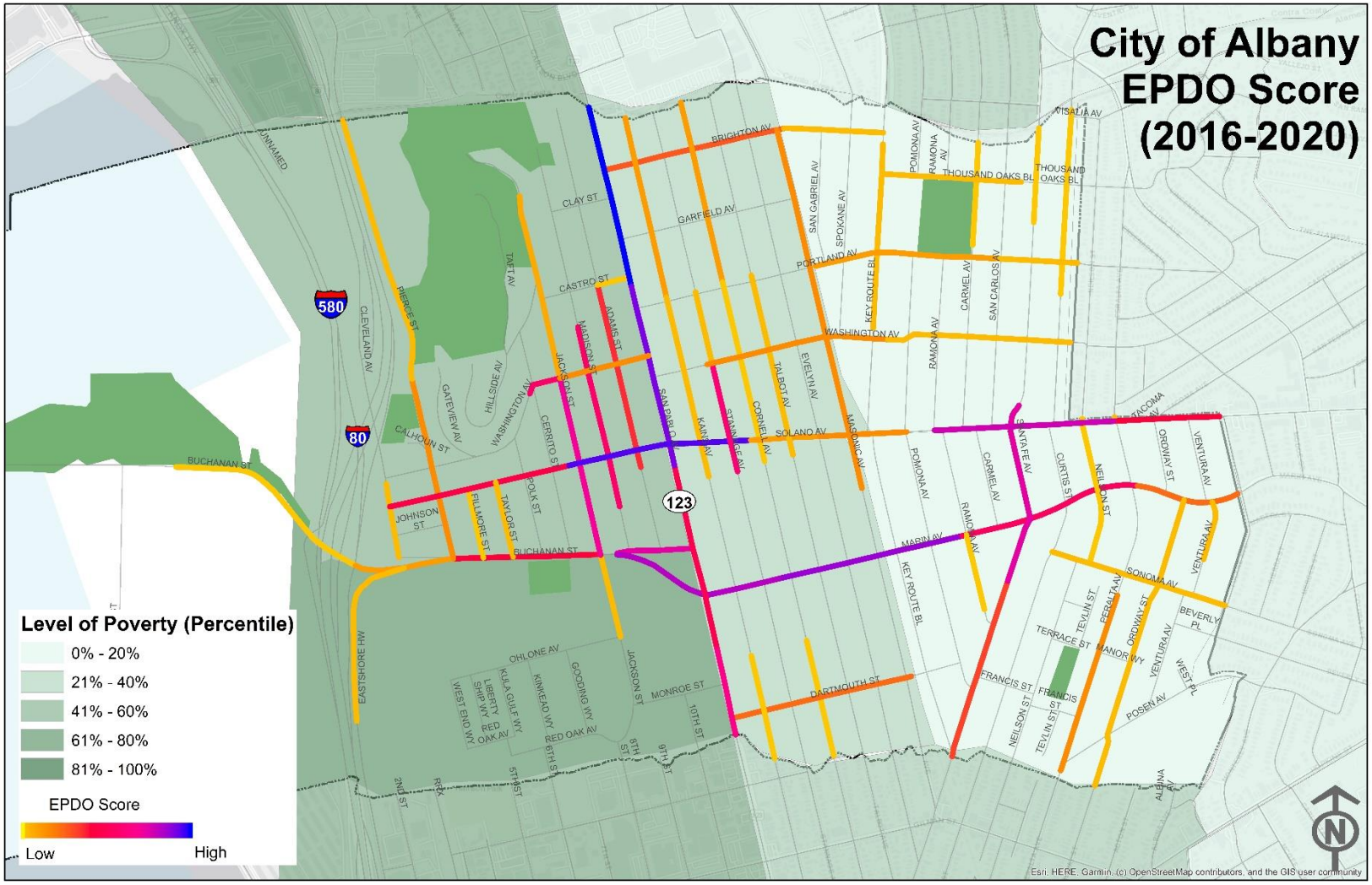


Figure 42. City of Albany Severity Index (with Disadvantaged Communities)



High Injury Network

Following the detailed collision analysis, the next step was to identify the high-injury roadway segments and intersections in City of Albany. The methodology for scoring the high injury locations is the same method as used in the severity weight section. **Figure 43** shows the top seven high-collision roadway segments, and top 10 high-collision intersections. **Figure 44** shows the high injury network overlaid on the Calenviroscreen 4.0 poverty percentile showing disadvantaged communities.

For the purposes of the high collision network analysis, intersections include collisions that occurred within 250 feet of it and roadways include all collisions that occurred along the roadway except for collisions that occurred directly at an intersection. Such collisions are assigned a 0 value in distance from intersection value column in the Statewide Integrated Traffic Records System (SWITRS).

Figure 43. City of Albany High Injury Network

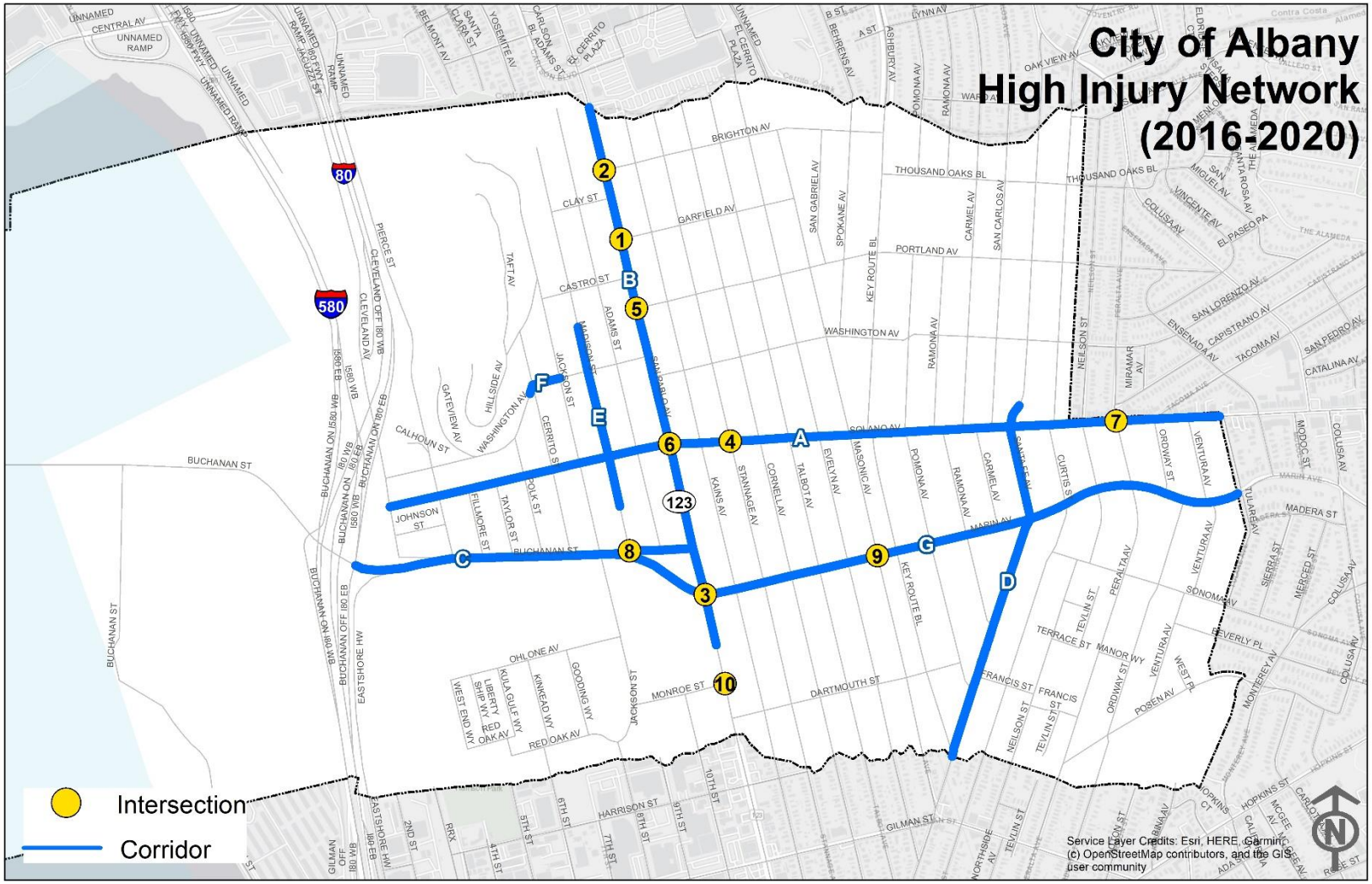
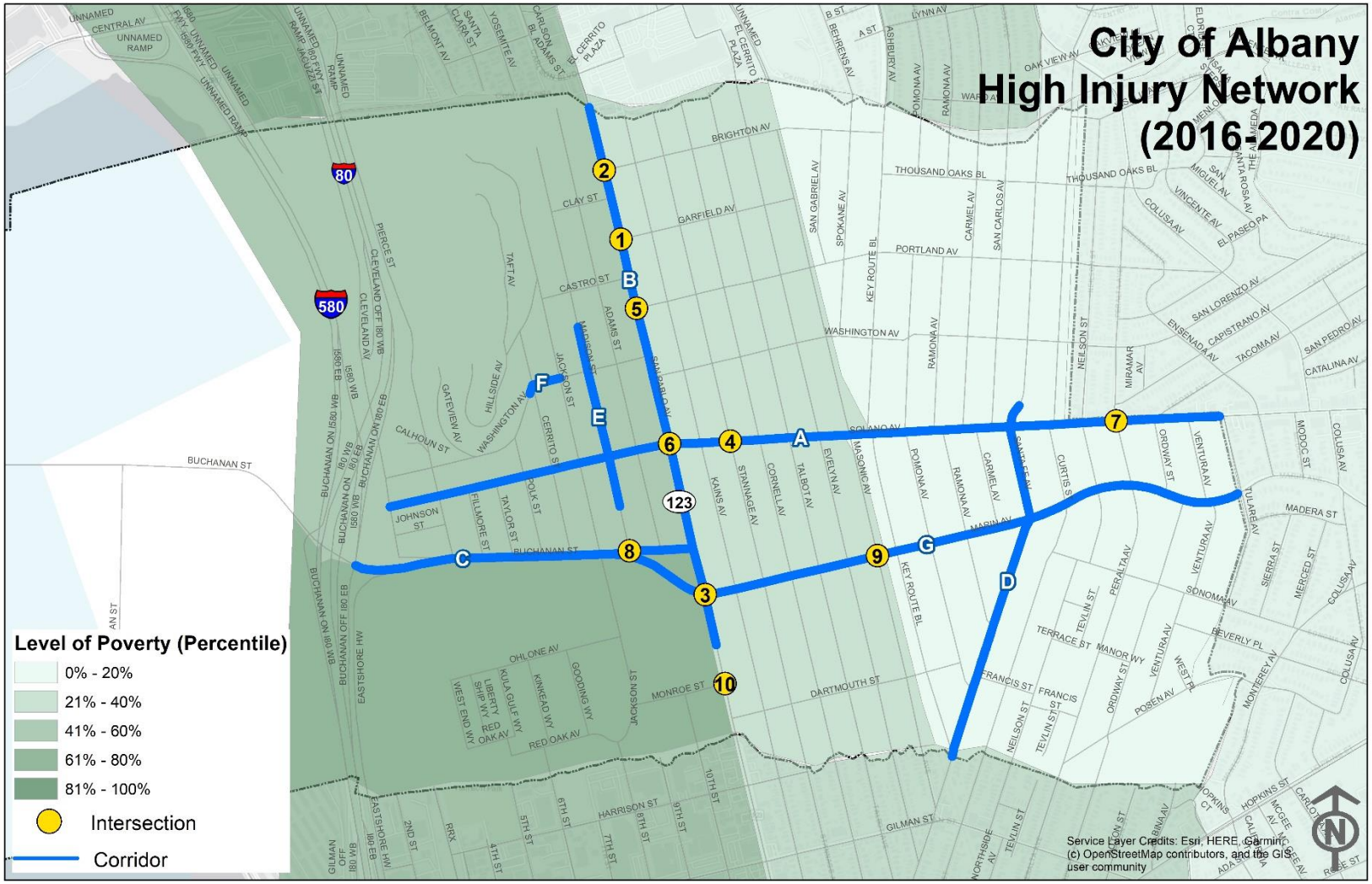


Figure 44. City of Albany High Injury Network (with Disadvantaged Communities)



INTERSECTION RANKING

A total of 10 intersections were identified as high injury intersections. There were a total of 53 injury collisions that occurred at these intersections, including 11 KSI collisions. The intersection of San Pablo Ave/SR-123 at Garfield Ave had the most number of KSI collisions with two. Based on the observed collision data, these are the locations in Albany that experienced the most KSI collisions. All 12 KSI collisions that occurred at intersections are represented in this top 10 list. These locations will be further prioritized for improvements in subsequent tasks in the LRSP.

Table 4 lists the EPDO score of the top 10 identified high-collision intersections along with the total number of collisions and the number of KSI collisions that occurred at these locations.

Table 4. High Injury Intersections

ID	Intersection	Total Injury Collisions	KSI Collisions	EPDO Score
1	San Pablo Ave/SR-123 at Garfield Ave	9	2	392
2	San Pablo Ave/SR-123 at Brighton Ave	13	1	262
3	San Pablo Ave/SR-123 at Marin St	7	1	216
4	Solano Ave at Stannage Ave	4	1	198
5	San Pablo Ave/SR-123 at Portland Ave	4	1	188
6	San Pablo Ave/SR-123 at Solano Ave	4	1	188
7	Solano Ave at Peralta Ave	3	1	187
8	Buchanan St at Madison St	3	1	182
9	Marin St at Masonic Ave	3	1	182
10	San Pablo Ave/SR-123 at Monroe St	3	1	177

CORRIDOR RANKING

A total of 7 corridors were identified as high injury corridors. There were a total 59 injury collisions along these corridors, including seven KSI collisions. The corridor with the highest number of KSI collisions was Solano Ave between Cleveland Ave and the City Limit (East) with two. These corridors experienced the most severe crashes among all corridors in Albany, and will be subsequently prioritized in future tasks for improvements.

Table lists the EPDO score of the top 7 identified high-collision corridors along with the number of KSI collisions and total collisions.

Table 5. High Injury Corridors

ID	Intersection	Total Injury Collisions	KSI Collisions	Length (mi)	EPDO Score
A	Solano Ave: Cleveland Ave to City Limit (East)	14	2	1.4	442
B	San Pablo Ave/SR-123: City Limit (North) to 450' S of Marin Ave	18	1	0.9	312
C	Buchanan St: I-80 EB Ramps to San Pablo Ave	8	1	0.6	222
D	Santa Fe Ave: 200' N of Solano Ave to City Limit (South)	5	1	0.6	204
E	Madison St: 400' N of Washington St to 450' S of Solano Ave	1	1	0.3	165
F	Washington St: 100' W of Cerrito Ave to San Pablo Ave	1	1	0.2	165
G	Marin St: Buchanan St to City Limit (East)	12	0	1.0	107

BICYCLE AND PEDESTRIAN HIGH INJURY NETWORK

Utilizing the same scoring methodology as the High Injury Network and EPDO score previously, a high injury network was also developed for only bicycle and pedestrian collisions. **Figure 45** details the location and concentration of EPDO score when considering only bicycle and pedestrian collisions, followed by **Figure 46** which overlays this score onto a map of disadvantaged communities. This is followed by the bicycle/pedestrian high injury network in **Figure 47**. (**Figure 48** shows the high injury network overlaid on the map of disadvantaged communities). All maps include AC Transit stops and routes within Albany to show where greater concentrations of bicycle and pedestrian collisions may be occurring around bus stops. It should be noted that while the higher concentration of bicycle/pedestrian collisions near bus stops may not necessarily mean those pedestrians were walking to a transit connection, it does give a starting point for where pedestrians may be more present. The bicycle/pedestrian high injury network represents the top six intersections and top four roadway segments experiencing more severe bicycle or pedestrian crashes in Albany.

Figure 45. City of Albany Bicycle & Pedestrian EPDO Score

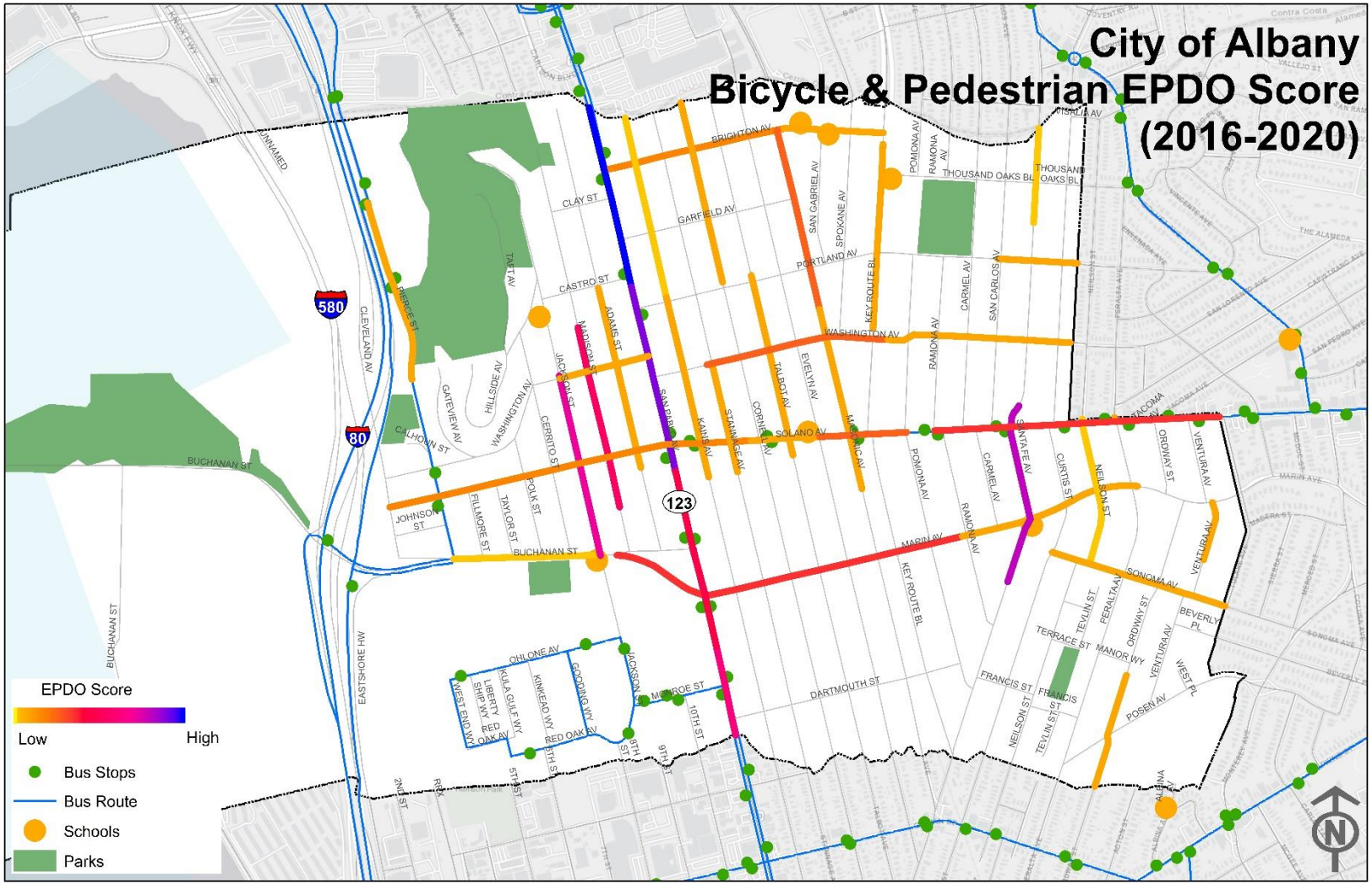


Figure 46. City of Albany Bicycle & Pedestrian EPDO Score (with Disadvantaged Communities)

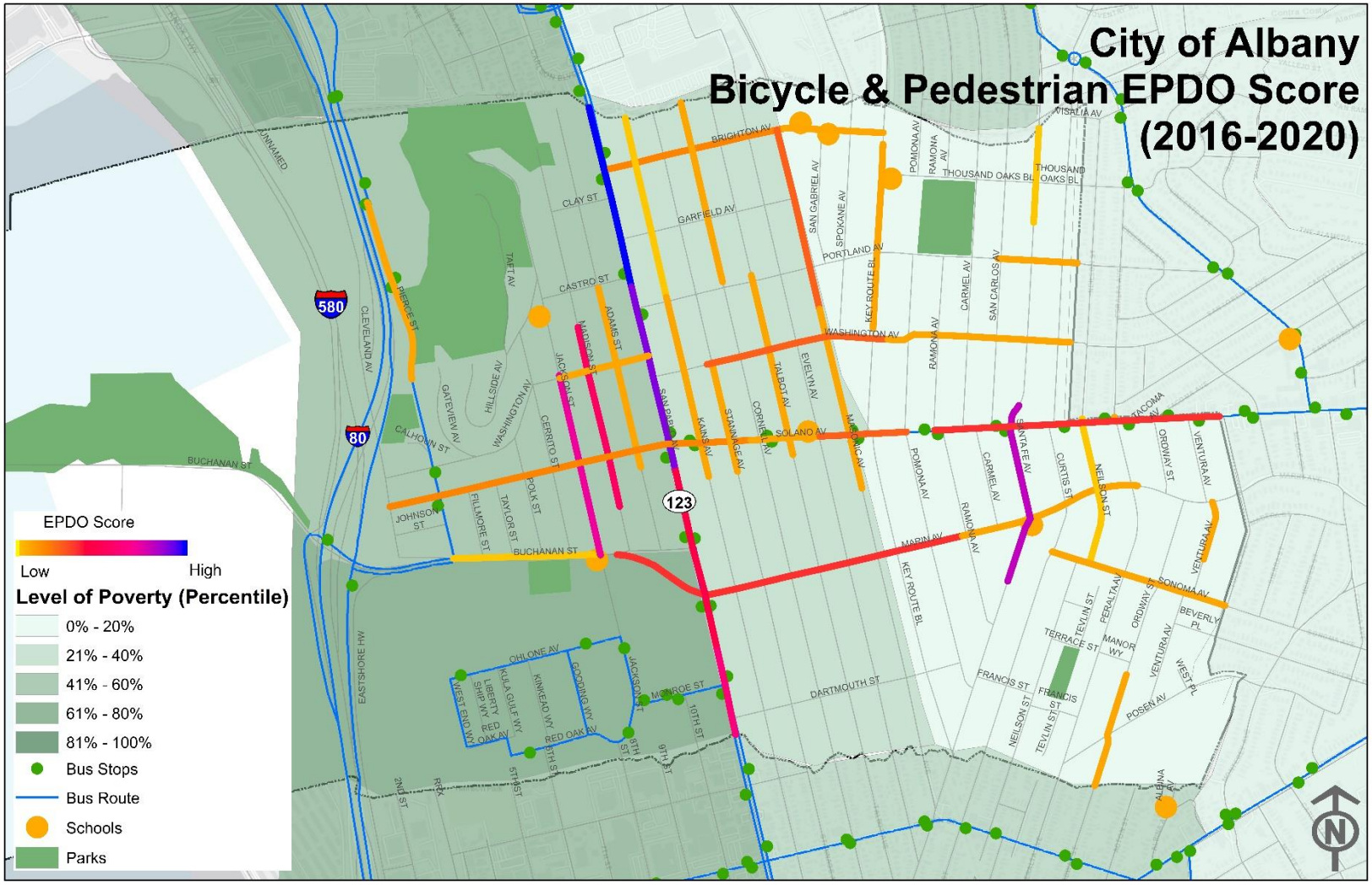


Figure 47. City of Albany Bicycle & Pedestrian High Injury Network

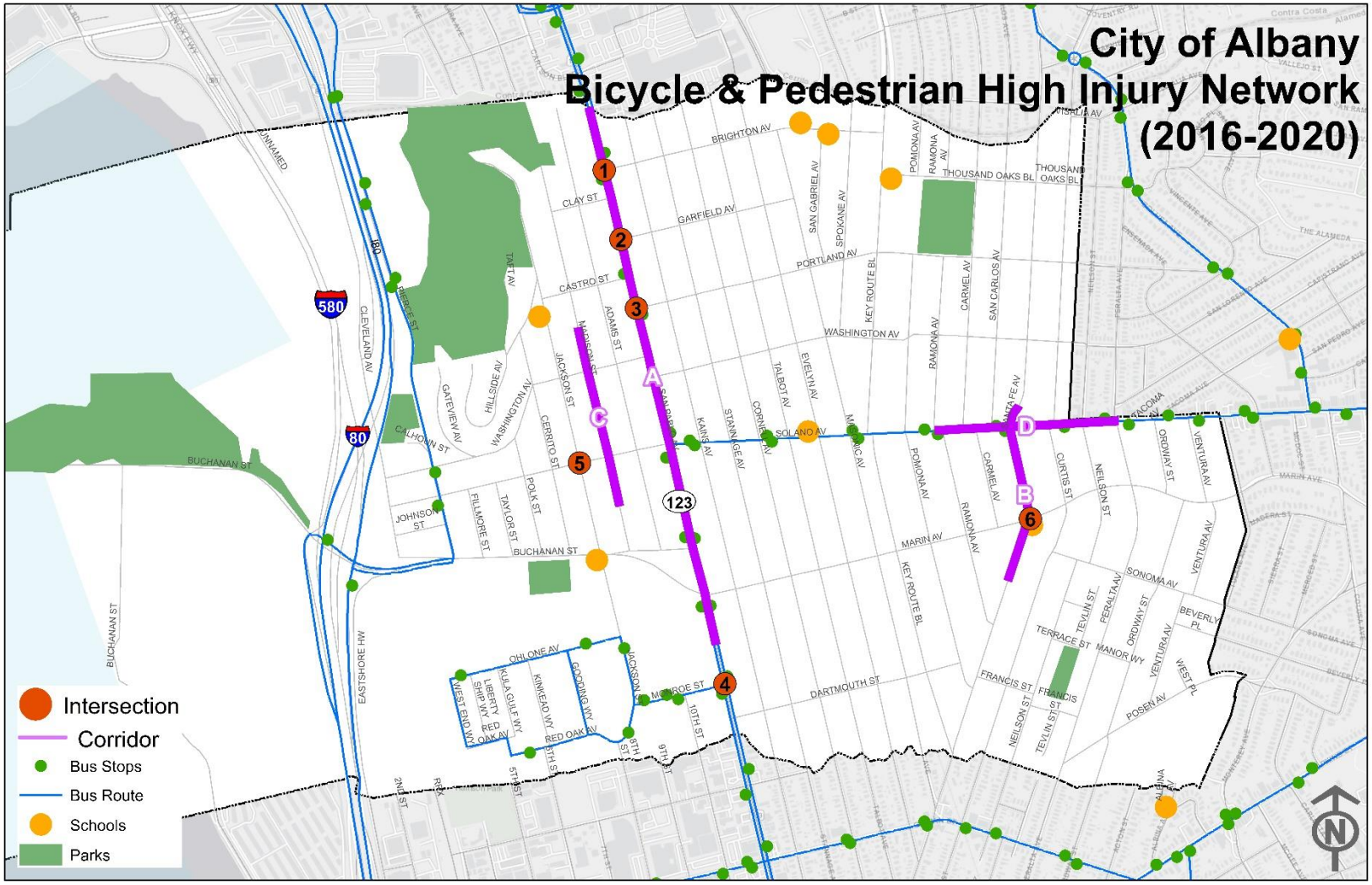
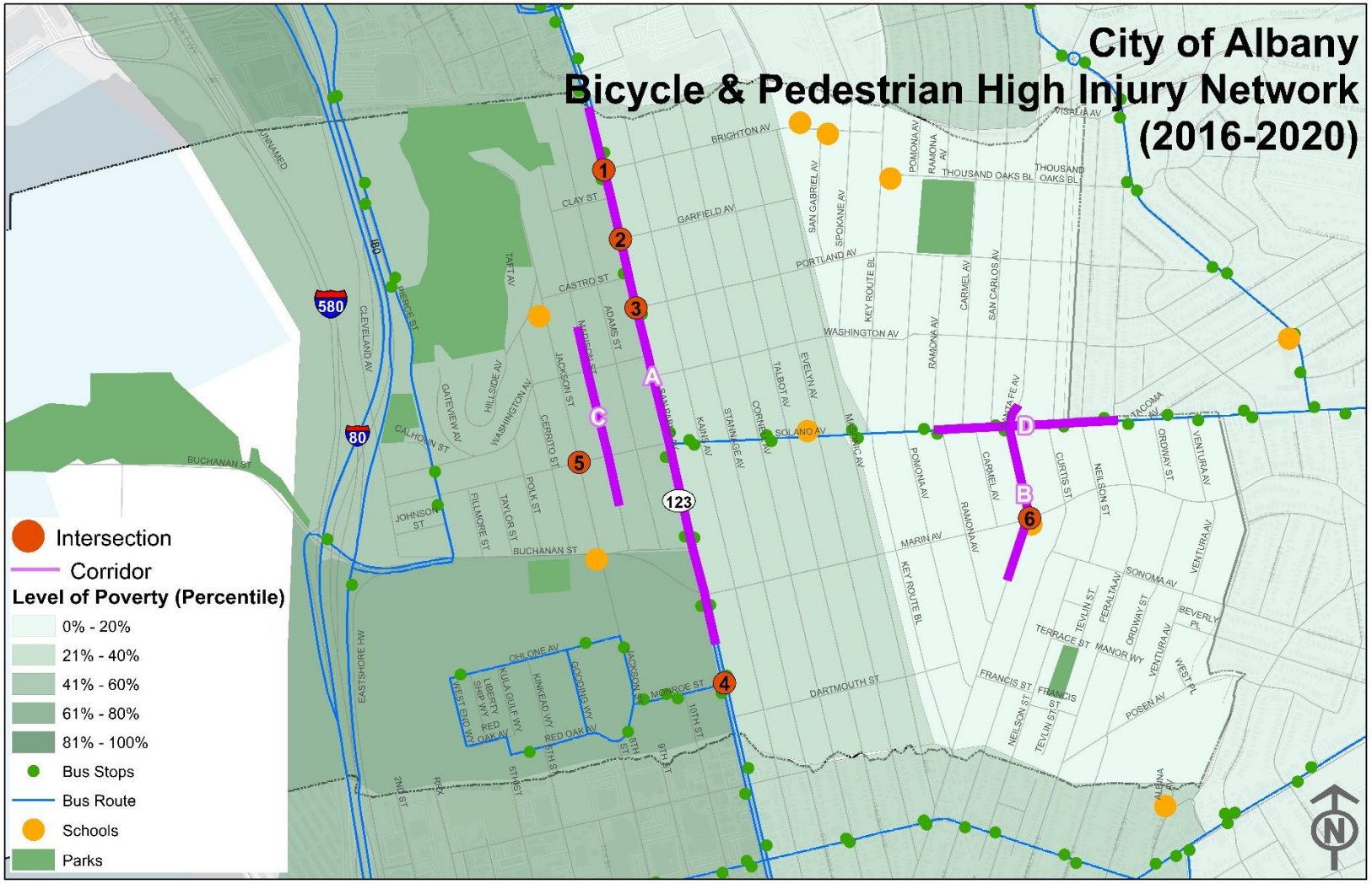


Figure 48. City of Albany Bicycle & Pedestrian High Injury Network (with Disadvantaged Communities)



INTERSECTION & ROADWAY SEGMENT RANKING

A total of six bicycle & pedestrian high injury intersections were identified. 15 injury collisions occurred at these intersections, including six KSI collisions. San Pablo Ave/SR-123 at Brighton Ave had the highest EPDO score. In addition, a total of four corridors were identified as bicycle & pedestrian high injury corridors. There were a total 15 injury collisions along these corridors, including three KSI collisions. The corridor with the highest EPDO score was San Pablo Ave/SR-123 between the City Limit (North) and 450' S of Marin Ave.

Table lists the EPDO score of the top 4 identified high-collision corridors and top 6 identified high-collision intersections along with the number of KSI collisions and total collisions.

Table 6. Bicycle & Pedestrian High Injury Intersections

ID	Intersection	Total Injury Collisions	KSI Collisions	EPDO Score
1	San Pablo Ave/SR-123 at Brighton Ave	7	1	216
2	San Pablo Ave/SR-123 at Garfield Ave	2	1	176
3	San Pablo Ave/SR-123 at Portland Ave	2	1	176
4	San Pablo Ave/SR-123 at Monroe Ave	2	1	171
5	Solano Ave at Jackson St	1	1	165
6	Marin St at Santa Fe Ave	1	1	165

Table 7. Bicycle & Pedestrian High Injury Corridors

ID	Intersection	Total Injury Collisions	KSI Collisions	Length (mi)	EPDO Score
A	San Pablo Ave/SR-123: City Limit (North) to 450' S of Marin Ave	9	1	0.9	238
B	Santa Fe Ave: 200' N of Solano Ave to 550' S of Marin Ave	3	1	0.3	182
C	Madison St: 400' N of Washington St to 450' S of Solano Ave	1	1	0.3	165
D	Solano Ave: Ramona Ave to Peralta Ave	2	0	0.3	17

Summary

During the study period of 2016-2020, a total of 478 collisions occurred on Albany roads, of which 16 resulted in either a fatality or severe injury. The number of collisions occurring each year has been overall decreasing, with the most occurring in 2016 (the most KSI collisions occurred in 2018). A majority of collisions occurred at intersections not along roadway segments. Based on the collision data, five prominent trends emerged: hit object collisions, unsafe speed collisions, nighttime collisions, pedestrian collisions and passenger/ other vehicle collisions. Each of these were selected because they were prominent factors in causing collisions on the City's roadways, with a particular emphasis on KSI collisions. A more detailed geographic analysis was conducted for each of the five identified trends.

Broadside Collisions: For KSI collisions in Albany, 25% of collisions were broadside collisions. This is slightly higher than its share of collisions of all severity (22%). Broadside collisions can potentially be mitigated by increasing the visibility of an intersection through updated pavement markings, new or updated signage, lighting, advance flashing beacons, and improving sight distance.

Improper Turning Collisions: For KSI collisions in the city of Albany, 13% of collisions occurred due to improper turning violation, the most of any category. It also contributed to 19% of all collisions. Countermeasures such as improving sight distance at intersections, installing dedicated left turn lanes, median splitter islands on minor road approaches, and raised medians can help to mitigate improper turning caused collisions.

Pedestrian Collisions: 25% of KSI collisions in Albany involved a pedestrian, compared to just 8% of collisions of all severity. Countermeasures such as traffic calming, high visibility crosswalks, Rectangular Rapid Flashing Beacons (RRFBs), sidewalk bulb outs, advanced flashing warning signs, can all help to address pedestrian collisions.

Bicycle Collisions: 19% of KSI collisions in Albany involved a bicycle, compared to 8% of collisions of all severity. These collisions can potentially be mitigated with enhanced bicycle infrastructure, such as protected bike lanes, bicycle boxes at signalized intersections, green paint for enhanced visibility, additional lighting, or adding bike lanes/widening shoulders.

Rear End Collisions: 26% of collisions of all severity were rear end collisions, the most of all collision types. It also makes up 6% of KSI collisions. Rear end collisions can potentially be mitigated through upgrading signal hardware or adding retroreflective borders, improving signal timing, upgrading/adding intersection warning signs, or adding flashing beacons in advance of intersections. Methods to reduce speeding, such as traffic calming, can also help to address rear end collisions.

The next steps will be to identify Emphasis Areas based on the collision analysis presented in this report. The most prominent collision types, violations, and human behaviors will be selected for inclusion as an Emphasis Area, as these represent the most prominent traffic safety issues in Albany. Each Emphasis Area will be accompanied with strategies corresponding to the E's of safety (Engineering, Enforcement, Education, Equity and EMS) to comprehensively make the City of Albany safer for all modes of transportation.

5. EMPHASIS AREAS

Emphasis areas are focus areas for the Local Roadway Safety Plan that are identified through the comprehensive collision analysis of the identified high injury locations within Albany. Emphasis areas help in identifying appropriate safety strategies and countermeasures with the greatest potential to reduce collisions occurring at these high injury locations. They can include (but not be limited to): specific collision types, human behaviors, facility types, and specific locations or corridors.

This section summarizes the top seven (7) emphasis areas identified for Albany. These emphasis areas were derived from the consolidated high injury collision database (**Appendix A**) where top injury factors were identified by combing the data manually. The high injury collision database contains only collisions occurring at the high injury intersections or along the high injury corridors. Along with findings from the data analysis, stakeholder input was to refine the emphasis areas specific to Albany.

The following are the identified emphasis areas –

1. Improve Safety at Signalized Intersections (Collisions within 250 feet of an intersection)
2. Address Broadside Collisions & Automobile Right of Way Violations
3. Improve Rear End Collisions
4. Address Improper Turning Collisions
5. Address Bicycle Safety
6. Address Pedestrian Safety
7. Improve San Pablo Ave (Intersection & Roadway Segment)

THE FIVE E'S OF TRAFFIC SAFETY

The LRSP utilizes a comprehensive approach to safety incorporating "4 E's of traffic safety": **E**ngineering, **E**nforcement, **E**ducation, **E**quity, and **E**mergency Medical Services (EMS). This approach recognizes that not all locations can be addressed solely by infrastructure improvements. Incorporating the 5 E's of traffic safety is often required to ensure successful implementation of significant safety improvements and reduce the severity and frequency of collisions throughout a jurisdiction.

Some of the common violation types that may require a comprehensive approach are speeding, failure-to-yield to pedestrians, red light running, aggressive driving, failure to wear safety belts, distracted driving, and driving while impaired. When locations are identified as having these types of violations, coordination with the appropriate law enforcement agencies is needed to arrange visible targeted enforcement to reduce the potential for future driving violations and related crashes and injuries.

To improve safety, education efforts can be used to supplement enforcement and improve the efficiency of each strategy. Education can also be employed in the short-term to address high crash locations until the recommended infrastructure project can be implemented. Similarly, Emergency Medical Services entails strategies around supporting organizations that provide rapid response and care when responding to collisions causing injury, by stabilizing victims and transporting them to facilities. Equity refers to examining the impact collisions have on disadvantaged communities and allocating resources to address them.

EXISTING TRAFFIC SAFETY EFFORTS IN ALBANY

The City of Albany and partner agencies have already implemented safety strategies corresponding to the 5 E's of traffic safety. The strategies detailed in this memorandum can supplement these existing programs and concentrate them on high injury collision locations and crash types. These initiatives are summarized in the following table:

Table 8: Existing Programs Summary

Document/ Program	Description	E's Addressed
Albany Traffic Calming Policy & Traffic Management Plan	The City of Albany Traffic Calming Policy establishes the process for requesting roadway elements that encourage slower vehicular traffic speeds on a particular street block or street segment.	Enforcement and Engineering
Albany Active Transportation Plan	The Albany Active Transportation Plan (ATP) assesses unmet needs for non-motorized transportation in the city and sets key goals and policy objectives. It recommends citywide bicycle routes, safe routes to school strategies, traffic calming, expanding the network of off-street paths, and safety improvements.	Engineering and Education
Solano Complete Streets	The City of Albany developed a Complete Streets and Corridor Revitalization Plan for Solano Avenue from Masonic Avenue to Tulare Avenue to create an active main street environment. The outcome will be a plan with Complete Streets designs for roadway, sidewalk and intersection changes that support all modes and users of all ages and abilities, builds foot traffic for local businesses, encourages interaction in public spaces, and adds vibrancy to the community.	Engineering
Complete Streets (Buchanan & San Pablo)	The City of Albany, in partnership with the Local Government Commission, explored ways to make it easier and safer to walk, bike, ride the bus, and drive along San Pablo Avenue and Buchanan Street.	Engineering
Safe Routes to School	The Alameda County Safe Routes to Schools (SR2S) Program organizes and supports fun, educational activities that encourage families to walk, bike, carpool, and take transit to school. The City of Albany also supplements this program with funding for in-school bicycle education programs.	Education
Albany Police Department	The Albany Police Department is responsible for the preservation of public peace, enforcement of laws, protection of life and property, and providing police related services to the community. The APD also conducts bicycle/pedestrian outreach and safety campaigns.	Enforcement, EMS, Education
Albany Fire Department	The Albany Fire Department is a full-service department providing the community with many diverse services including fire protection, emergency and disaster response, paramedic	Enforcement, EMS

	services, community education, earthquake preparedness and special events.	

FACTORS CONSIDERED IN THE DETERMINATION OF EMPHASIS AREAS

This section presents collision data analysis of collision type, collision factors, facility type, roadway geometries, and party level data, analyzed for the various emphasized areas. Emphasis areas were determined by factors that led to the highest amount of injury collisions, with a specific emphasis on fatal and severe (KSI) injury collisions. Albany experienced a total of 88 collisions at high injury network locations during the 2016-2020 study period, including 16 KSI collisions. The data presented below in each emphasis area is based on these collisions. Emphasis areas were further refined by stakeholder and community input.

Each emphasis area is accompanied by comprehensive programs, policies and countermeasures to reduce collisions on City roads in that specific emphasis area. It will provide the basis by which the countermeasure toolbox is developed for each identified high-injury location.

EMPHASIS AREA 1 – IMPROVE SAFETY AT NON-SIGNALIZED INTERSECTIONS

Non-Signalized Intersection collisions comprised 75% of collisions of all severity, as well as 69% of KSI collisions. 6 of 11 KSI collisions on the High Injury Network occurred at non-signalized intersections. The following collision data is based on only non-intersection collisions on the High Injury Network in Albany, followed by E's strategies selected to address intersection collisions.

34% (17 collisions)	32% (16 collisions)	36% (18 collisions)
Rear End Collisions	**Due to Unsafe Speed**	**Involved Bicycle or Pedestrian**

Table 9. Emphasis Area 1 Strategies

Objective:			
Reduce the number of fatal and severe injury collisions at non-signalized intersections.			
	Strategy	**Performance Measure**	**Agencies/ Organizations**
Education	Conduct public information and education campaign for intersection safety laws regarding, stop signs, and turning left or right.	Number of education campaigns or residents reached.	City/Police Department
Enforcement	Targeted enforcement at high-injury intersections to monitor right-of-way violations, speed limit laws and other violations that occur at non-signalized intersections.	Decrease in number of citations and/or warnings issued over time due to increased driver compliance.	Police Department
Engineering	• NS01, Install intersection lighting • NS02, Convert to all-way STOP control (from 2-way or Yield control) • NS03, Install signals • NS04/NS05, Convert intersection to roundabout • NS05mr, Convert intersection to mini-roundabout • NS06, Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs • NS07, Upgrade intersection pavement markings • NS08, Install Flashing Beacons at Stop-Controlled Intersections • NS09, Install flashing beacons as advance warning • NS11, Improve sight distance to intersection (Clear Sight Triangles) • NS13, Install splitter-islands on the minor road approaches • NS14, Install raised median on approaches • NS15, Create directional median openings to allow (and restrict) left turns and U-turns • NS21PB, Install/upgrade pedestrian crossing at uncontrolled locations (with enhanced safety features) • NS22PB, Install Rectangular Rapid Flashing Beacon	Number of intersections improved.	City
EMS	S05, Install emergency vehicle pre-emption systems Improve radio frequency or GPS signal for emergency responses to collision sites. Ensure emergency routes are clear and well defined	EMS vehicle response time.	City/Fire Department & EMS Response Teams

EMPHASIS AREA 2 – ADDRESS BROADSIDE COLLISIONS & AUTOMOBILE RIGHT OF WAY VIOLATIONS

14 (16%) of the high injury network collisions were broadside collisions, including 4 fatal or severe injury (KSI) collisions. 13% (11 collisions) of high injury network collisions were caused by an automobile right of way violation (which also caused 36% of broadside collisions). These two are combined due to the correlation between automobile right of way violations and broadside collisions. The following collision data is based on only broadside injury collisions on the high injury network of Albany, followed by E's strategies to address them.

29% (4 collisions)	**93% (13 collisions)**	**43% (6 collisions)**
KSI Collisions	**Occurred at Intersections**	**Occurred on San Pablo Ave**

Table 10. Emphasis Area 2 Strategies

Objective:			
Reduce the number of fatal and severe injury broadside collisions and automobile right of way violations.			
	Strategy	**Performance Measure**	**Agencies/ Organizations**
Education	Conduct public information and education campaigns for intersection safety laws regarding traffic lights, stop signs and turning left or right and right of way.	Number of education campaigns or residents reached.	City/Police Department
Enforcement	Targeted enforcement at high-injury locations where violations that lead to broadside collisions are more common, such as automobile right of way and traffic signal/stop sign violations.	Decrease in number of citations and/or warnings issued over time due to increased driver compliance.	Police Department
Engineering	• S01/NS01/R01, Add intersection or segment lighting • S02, Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number • S03, Improve signal timing • S08, Convert signal to mast arm (from pedestal-mounted) • S09, Install raised pavement markers and striping • S16/NS04/NS05, Convert intersection to roundabout • NS02, Convert to all-way STOP control (from 2-way or Yield control) • NS03, Install signals • NS06, Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs • NS07, Upgrade intersection pavement markings (NS.I.) • NS08, Install flashing beacons at stop controlled intersections • NS09/S10, Install flashing beacons as advance warning • NS11, Improve sight distance to intersection (Clear Sight Triangles) • NS13, add splitter-islands on the minor road approaches • S12/NS14, install raised median on approaches	Number of locations improved to mitigate broadside collisions.	City
EMS	S05, Install emergency vehicle pre-emption systems Improve resource of deployment for emergency responses to collision sites. Ensure emergency routes are clear and well defined	EMS vehicle response time.	City/Fire Department & EMS Response Teams

EMPHASIS AREA 3 – ADDRESS REAR END COLLISIONS & UNSAFE SPEED VIOLATIONS

25 (28%) of collisions on the high injury network were rear end collisions, including one (7%) KSI collision. 25% of high injury collisions were caused by unsafe speed, and also caused the majority of rear end collisions. Rear end collisions constituted the most prominent collision type among the high injury network collisions. The following collision data is based on only rear end collisions on the high injury network of Albany, followed by E's strategies selected to address rear end collisions.

84% (21 collisions) Involved Other Motor Vehicle

36% (9 collisions) Occurred on Marin Ave

76% (19 collisions) Occurred due to Unsafe Speed Violation

Table 11. Emphasis Area 3 Strategies

Objective:			
Reduce the number of fatal and severe injury rear end collisions.			
	Strategy	**Performance Measure**	**Agencies/ Organizations**
Education	Conduct public information and education campaign for safety laws regarding unsafe speed, following too closely and its dangers.	Number of education campaigns or residents reached.	City/Police Department
Enforcement	Targeted enforcement at high-injury locations where unsafe speed violations are more common.	Decrease in number of citations and/or warnings issued over time due to increased driver compliance.	Police Department
Engineering	• S01/NS01/R01, Add intersection or segment lighting • S02, Improve signal hardware • S03, Improve signal timing • S04, Provide Advanced Dilemma-Zone Detection for high speed approaches • S06/NS18, Install left turn lane • S09, Install raised pavement markers and striping (Through Intersection) • S11/NS12/R21, Improve pavement friction (High Friction Surface Treatment) • S16/NS04/NS05, Convert intersection to roundabout • NS06, Install/upgrade larger or additional intersection signs • NS07, Upgrade intersection pavement markings (NS.I.) • R14, Road Diet • R22, Install/Upgrade signs with new fluorescent sheeting • R26, Install dynamic/variable speed warning signs • R28, Install edge-lines and centerlines • Decrease width of travel lanes & traffic calming strategies where appropriate • Simplify turn configurations and decrease curb radius of intersections.	Number of locations improved.	City
EMS	S05, Install emergency vehicle pre-emption systems Improve resource of deployment for emergency responses to collision sites. Ensure emergency routes are clear and well defined	EMS vehicle response time.	City/Fire Department & EMS Response Teams

EMPHASIS AREA 4 – ADDRESS IMPROPER TURNING VIOLATIONS

9 (10%) of high injury network collisions occurred due to improper turning violations, including two (13%) KSI collisions. It also made up 19% of all collisions citywide. The following collision data is based on only improper turning violations on the high injury network of Albany, followed by E's strategies selected to address improper turning violations.

44% (4 collisions) Involved another motor vehicle

33% (3 collisions) Occurred Not at Intersection

78% (7 collisions) Occurred on San Pablo Ave

Table 12. Emphasis Area 4 Strategies

Objective:			
Reduce the number of fatal and severe injury collisions that occur due to improper turning violations.			
	Strategy	**Performance Measure**	**Agencies/ Organizations**
Education	Conduct public information and education campaign for intersection safety laws and the rules of the road.	Number of education campaigns or residents reached.	City/Police Department
Enforcement	Targeted enforcement at high-injury locations where improper turning violations are more common.	Decrease in number of citations and/or warnings issued over time due to increased driver compliance.	Police Department
Engineering	• S01/NS01/R01, Add Lighting • S02, Improve signal hardware • S03, Improve signal timing (coordination, phases, red, yellow, or operation) • S09, Install raised pavement markers and striping (Through Intersection) • S12/NS14, Install raised median on approach • S14, Create directional median openings to allow (and restrict) turns • S16/NS04/NS05, Convert intersection to roundabout • NS06, Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs • NS07, Upgrade intersection pavement markings (NS.I.) • NS13, Install splitter islands on minor road approaches • R22, Install/Upgrade signs with new fluorescent sheeting • R27, Install delineators, reflectors and/or object markers • R26, Install dynamic/variable speed warning signs • R28, Install edge-lines and centerlines	Number of locations improved.	City
EMS	S05, Install emergency vehicle pre-emption systems Improve resource of deployment for emergency responses to collision sites. Ensure emergency routes are clear and well defined	EMS vehicle response time.	City/ Fire Department & EMS Response Teams

EMPHASIS AREA 5 – ADDRESS BICYCLE SAFETY

16 (18%) of collisions on the high injury network involved bicyclists, however, of these 16 collisions, 3 were severe injury collisions. Majority of the bicycle collisions (including most severe injury) occurred along the San Pablo Road running through of the City. The following collision data is based on only bicycle collisions on the high injury network of Albany, followed by 4 E's strategies to address them.

20% (3 collisions)
KSI Collisions

31% (5 collisions)
Occurred due to Automobile Right-of-Way Violation

50% (8 collisions)
Occurred at on San Pablo Ave

Table 13. Emphasis Area 5 Strategies

Objective:			
Reduce the number of fatal and severe injury collisions involving bicyclists.			
	Strategy	**Performance Measure**	**Agencies/ Organizations**
Education	Conduct bicycle safety campaigns and outreach to raise their awareness of bicycle safety needs through media outlets, social media, and public events. Partner with Safe Routes to School to conduct bicycle and pedestrian safety programs in Albany's schools.	Number of education campaigns or residents reached.	City/School District/ Police Department
Enforcement	Targeted enforcement at high-injury locations especially near schools, trails, and other areas where bicyclists are more present. Continue to place a high priority on enforcement of motorist and bicyclist violations that most frequently cause injuries and fatalities among bicyclists.	Decrease in number of citations and/or warnings issued over time due to increased driver compliance.	Police Department
Engineering	• S01/NS01/R01, Add intersection or segment lighting • S17PB, Install pedestrian countdown signal heads • S20PB, Install advance stop bar before crosswalk (Bicycle Box) • S21PB, Modify signal phasing to implement a Leading Pedestrian Interval • NS19PB, Install raised medians (refuge islands) • NS21PB/R35PB, Install/upgrade pedestrian crossing (with enhanced safety features) • NS22PB/R37PB, Install Rectangular Rapid Flashing Beacon (RRFB) • NS23PB, Install pedestrian signal (including Pedestrian Hybrid Beacon (HAWK)) • R14, Road diet (reduce travel lanes from 4 to 3 and add a two-way left turn lane and bike lanes) • R32PB, Install bike lanes • R33PB, Install separated bike lanes • R34PB, Install sidewalk/pathway (to avoid walking along roadway) • Mid-block curb extension • Intersection bulb-outs	Number of locations improved.	City
EMS	S05, Install emergency vehicle pre-emption systems Improve resource of deployment for emergency responses to collision sites. Ensure emergency routes are clear and well defined, particularly to areas and times of high bicycle activity.	EMS vehicle response time.	City/ Fire Department & EMS Response Teams

EMPHASIS AREA 6 – ADDRESS PEDESTRIAN SAFETY

20 (23%) of collisions on the high injury network involved pedestrians, out of which 3 were KSI collisions. The majority of the pedestrian collisions (including 2 out of 3 KSI collisions) occurred along the San Pablo Ave. The following collision data is based on only pedestrian collisions on the high injury network of Albany, followed by E's strategies to address them.

35% (7 collisions) Occurred at Night

20% (5 collisions) Occurred due to Pedestrian Violation

45% (9 collisions) Occurred due to Pedestrian Right-of-Way Violation

Table 14. Emphasis Area 6 Strategies

Objective:			
Reduce the number of fatal and severe injury collisions involving pedestrians.			
	Strategy	**Performance Measure**	**Agencies/ Organizations**
Education	Conduct pedestrian safety campaigns and outreach to raise their awareness of pedestrian safety needs through media outlets, social media, and public events. Partner with Safe Routes to School to conduct bicycle and pedestrian safety programs in Albany's schools.	Number of education campaigns or residents reached.	City/School District/ Police Department
Enforcement	Targeted enforcement at high-injury locations especially near schools, trails, and other areas where pedestrians are more present. Continue to place a high priority on enforcement of motorist and pedestrian violations that most frequently cause injuries and fatalities among pedestrians.	Decrease in number of citations and/or warnings issued over time due to increased driver compliance.	Police Department
Engineering	• S01/NS01/R01, Add intersection or segment lighting • S13PB/R10PB, Install pedestrian median fencing • S17PB, Install pedestrian countdown signal heads • S18PB, Install pedestrian crossing (S.I.) • S19PB, Pedestrian Scramble • S20PB, Install advance stop bar before crosswalk (Bicycle Box) • S21PB, Modify signal phasing to implement a Leading Pedestrian Interval • NS11, Improve sight distance to intersection • NS19PB, Install raised medians (refuge islands) • NS21PB/R35PB, Install/upgrade pedestrian crossing (with enhanced safety features) • NS22PB, Install Rectangular Rapid Flashing Beacon (RRFB) • NS23PB, Install pedestrian signal (including Pedestrian Hybrid Beacon (HAWK)) • R34PB, Install sidewalk/pathway (to avoid walking along roadway) • R36PB, Install raised pedestrian crossing • R37PB, Install Rectangular Rapid Flashing Beacons (RRFB) • High-visibility ladder crosswalks • Mid-block curb extension & intersection bulb-outs • In-road yield sign for pedestrian crossing at crosswalk	Number of locations improved.	City
EMS	S05, Install emergency vehicle pre-emption systems Improve resource of deployment for emergency responses to collision sites. Ensure emergency routes are clear and well defined, particularly to areas and times of high pedestrian activity.	EMS vehicle response time.	City/Fire Department & EMS Response Teams

EMPHASIS AREA 7 – IMPROVE SAN PABLO AVENUE (INTERSECTIONS AND ROADWAY SEGMENTS)

A total of 38 (43%) of high injury network collisions occurred along San Pablo Avenue, including 6 KSI collisions (40%). San Pablo Ave was selected as an emphasis area due to the high percentage of collisions, combined with the fact that San Pablo Ave is an important arterial. The following collision data is based on only San Pablo Ave collisions on the high injury network of Albany, followed by E's strategies selected to address DUI collisions.

50% (19 collisions) Involved Pedestrian or Bicycle	29% Occurred at Night or Dawn/Dusk	21% (8 collisions) Rear-End Collisions

Table 15. Emphasis Area 7 Strategies

Objective:			
Reduce the number of fatal and severe injury collisions on San Pablo Avenue.			
	Strategy	**Performance Measure**	**Agencies/ Organizations**
Education	Conduct public information and education campaigns on risks of improper driving behaviors occurring on San Pablo Ave, such as unsafe speed and improper turning.	Number of education campaigns	City/Police Department
Enforcement	Targeted enforcement at high-injury intersections and roadway locations on San Pablo Ave to monitor violations of driving under influence.	Decrease in number of citations and/or warnings issued over time due to increased driver compliance.	Police Department
Engineering	• S02, Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number • S03, Improve signal timing • S09, Install raised pavement markers • S11/NS12/R21, Improve pavement friction • NS06, Install/upgrade larger or additional stop/warning/regulatory signs • NS07, Upgrade intersection pavement markings • NS11, Improve sight distance to intersection (Clear Sight Triangles) • NS13, Install splitter-islands on the minor road approaches • NS19PB, Install raised medians (refuge islands) • NS22PB/R37PB, Install Rectangular Rapid Flashing Beacon (RRFB) • NS23PB, Install pedestrian signal (Including HAWK signal) • R22, Install/Upgrade signs with new fluorescent sheeting • R27, Install delineators, reflectors, and/or object markers • R33PB, Install separated bike lanes • Speed warning signs	Number of locations improved.	City
EMS	S05, Install emergency vehicle pre-emption systems Improve resource of deployment for emergency responses to collision sites. Ensure emergency routes are clear and well defined	EMS vehicle response time.	Fire Department & EMS Response Teams

6. COUNTERMEASURE SELECTION

Identification of Countermeasures

Upon the identification of high-risk locations and Emphasis Areas, the next step was to identify appropriate safety countermeasures. The Caltrans Local Roadway Safety Manual (LRSM) provides 82 countermeasures, of which 21 are eligible in the current HSIP call for signalized intersections, 23 for un-signalized intersections, and 38 for roadway segments. The LRSM provides guidance on where to apply the countermeasures including the crash types each countermeasure would address, and a Crash Reduction Factor (CRF) for each countermeasure. The Federal Highway Administration (FHWA) CMF Clearinghouse and published research papers were reviewed by the project team to gain additional insight on CRFs and effectiveness of specific countermeasures.

The project team conducted a thorough review of the high-injury locations (intersections and roadway segments) using aerial photography, Google Maps Street View software, and in-person site visits. Crash characteristics of all collisions occurring on the High Injury Network were considered. After combining the physical and collision characteristics, the project team developed a table of preliminary countermeasures that address each of the seven identified Emphasis Areas. The table was refined by selecting up to four countermeasures for each high-risk location that were most commonly recommended among all Emphasis Areas. By doing this, the project team was able to identify countermeasures with the greatest opportunity for systemic implementation.

Countermeasure Toolbox

Engineering countermeasures were selected for each of the high-risk locations and for the emphasis areas. These were based off of approved countermeasures from the Caltrans Local Roadway Safety Manual (LRSM) used in HSIP grant calls for projects. The intention is to give the City potential countermeasures for each location that can be implemented either in future HSIP calls for projects, or using other funding sources, such as the City's Capital Improvement Program. Non-engineering countermeasures were also selected using the 5 E's strategies, and are included with the emphasis areas. The countermeasure toolbox in **Appendix D** details the draft countermeasures for each high-risk location and emphasis area, separated by intersections and roadway segments. While not all of these countermeasures will be included in the resulting safety projects, they are included to give the City a toolbox for implementing future safety improvements through other means, such as the City's Capital Improvement Program.

Table 16 provides a description of each countermeasure along with the crash reduction factor (CRF), federal funding eligibility, and opportunity for systemic implementation. An excerpt of the LRSM, detailing each available HSIP countermeasure referenced in the recommendations tables, is included as **Appendix D**.

Table 16. Countermeasures selected for the City of Albany

Code	Countermeasure Name	Countermeasure Description	CRF	Federal Funding	Systemic Approach Opportunity
S02	Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number	Includes New LED lighting, signal back plates, retro-reflective tape outlining the back plates, or visors to increase signal visibility, larger signal heads, relocation of the signal heads, or additional signal heads.	15%	90%	Very High
S03	Improve signal timing (coordination, phases, red, yellow, or operation)	Includes adding phases, lengthening clearance intervals, eliminating or restricting higher-risk movements, and coordinating signals at multiple locations.	15%	50%	Very High
S09	Install raised pavement markers and striping (Through Intersection)	Adding clear pavement markings can guide motorists through complex intersections. When drivers approach and traverse through complex intersections, drivers may be required to perform unusual or unexpected maneuvers	10%	90%	Very High
S20PB	Install advance stop bar before crosswalk (Bicycle Box)	Signalized Intersections with a marked crossing, where significant bicycle and/or pedestrians volumes are known to occur.	15%	90%	Very High
S21PB	Modify signal phasing to implement a Leading Pedestrian Interval (LPI)	Addition of LPI gives pedestrians the opportunity to enter an intersection 3-7 seconds before vehicles are given a green indication; only minor signal timing alteration is required.	60%	90%	Very High
NS06	Add intersection lighting (NS.I.)	Provision of lighting at intersection.	40%	90%	Medium
NS08	Install Signals	Installation of traffic signals	25%	90%	Low
NS13	Install Flashing Beacons at Stop-Controlled Intersections	Flashing beacons can reinforce driver awareness of the Non-Signalized intersection control and can help mitigate patterns of right-angle crashes related to stop sign violations. Post-mounted advanced flashing beacons or overhead flashing beacons can be used at stop-controlled intersections to supplement and call driver attention to stop signs.	15%	90%	High
NS14	Install flashing beacons as advance warning (NS.I.)	Installation of advance flashing beacons to call drivers attention to intersection control signs	30%	90%	High
NS21PB	Improve pavement friction (High Friction Surface Treatments)	Non-signalized Intersections noted as having crashes on wet pavements or under dry conditions when the pavement friction available is significantly less than needed for the actual roadway approach speeds. This treatment is intended to target locations where skidding and failure to stop is determined to be a problem in wet or dry conditions and the target vehicle is unable to stop due to insufficient skid resistance.	55%	90%	Medium

NS22PB	Install splitter-islands on the minor road approaches	The installation of a splitter island allows for the addition of a stop sign in the median to make the intersection more conspicuous.	40%	90%	Medium
R03	Improve signal timing (coordination, phases, red, yellow, or operation)	Improving the skid resistance at locations with high frequencies of wet road crashes and/or failure to stop crashes	55%	90%	High
R22	Install/Upgrade signs with new fluorescent sheeting (regulatory or warning)	Additional or new signage can address crashes caused by lack of driver awareness or compliance of roadway signing.	15%	90%	Very High
R27	Install delineators, reflectors and/or object markers	Installation of delineators, reflectors and/or object markers are intended to warn drivers of an approaching curve or fixed object that cannot easily be removed.	15%	90%	Very High
R28	Install edge-lines and centerlines	Any road with a history of run-off-road right, head-on, opposite-direction-sideswipe, or run-off-road-left crashes is a candidate for this treatment -install where the existing lane delineation is not sufficient to assist the motorist in understanding the existing limits of the roadway. Depending on the width of the roadway, various combinations of edge line and/or center line pavement markings may be the most appropriate.	25%	90%	Very High
R30	Install centerline rumble strips/stripes	Center Line rumble strips/stripes can be used on virtually any roadway – especially those with a history of head-on crashes.	20%	90%	High
R31	Install edge line rumble strips/stripes	Shoulder and edge line milled rumble strips/stripes should be used on roads with a history of roadway departure crashes.	15%	90%	High
R33PB	Install Separated Bike Lanes	Separated bikeways are most appropriate on streets with high volumes of bike traffic and/or high bike-vehicle collisions, presumably in an urban or suburban area. Separation types range from simple, painted buffers and flexible delineators, to more substantial separation measures including raised curbs, grade separation, bollards, planters, and parking lanes.	45%	90%	High
R34PB	Install sidewalk/pathway (to avoid walking along roadway)	Areas noted as not having adequate or no sidewalks and a history of walking along roadway pedestrian crashes. In rural areas asphalt curbs and/or separated walkways may be appropriate.	80%	90%	Medium
R36PB	Install Raised Pedestrian Crossing	Roadway segments with no controlled crossing for a significant distance in high-use midblock crossing areas and/or multilane roads locations. Flashing beacons, curb extensions, medians and pedestrian crossing islands and/or other safety features should be added to complement the standard crossing elements.	35%	90%	Medium

R37PB	Install Rectangular Rapid Flashing Beacon (RRFB)	Rectangular Rapid Flashing Beacon (RRFB) includes pedestrian-activated flashing lights and additional signage that enhance the visibility of marked crosswalks and alert motorists to pedestrian crossings. It uses an irregular flash pattern that is similar to emergency flashers on police vehicles. RRFBs are installed at unsignalized intersections and mid-block pedestrian crossings	35%	90%	Medium

* Code: S - Signalized intersection improvements
NS - Non-signalized intersection improvements
R - Roadway segment improvements

7. VIABLE SAFETY PROJECTS

This chapter summarizes the process of selecting safety projects as part of the analysis for Albany's Local Roadway Safety Plan (LRSP). The next step after the identification of high-injury locations, emphasis areas and applicable countermeasures was to identify location specific safety improvements for all high-risk roadway segments and intersections.

Specific countermeasures and improvements were selected from the 2020 Local Roadway Safety Manual (LRSM) from Caltrans, where:

- S refers to improvements at signalized locations,
- NS refers to improvements at non-signalized locations, and
- R refers to improvements at roadway segments.

The corresponding number refers to the countermeasure number in the LRSM (2020). The countermeasures were grouped into safety projects for high-risk intersections and roadway segments. A total of nine safety projects were developed. All countermeasures were identified based on the technical teams' assessment of viability that consisted of extensive analysis, observations, City staff input, and stakeholder/community input. The most applicable and appropriate countermeasures as identified have been grouped together to form projects that can help make high-risk locations safer.

Table 17 lists the safety projects for high-risk intersections and roadway segments, along with total base planning level cost (2022 dollar amounts) estimates and the resultant preliminary Benefit-Cost (B/C) Ratio. The "Total Benefit" estimates were calculated for the proposed improvements being evaluated in the proactive safety analysis. This "Total Benefit" is divided by the "Total Cost per Location" estimates for the proposed improvements, giving the resultant B/C Ratio. The B/C Ratio Calculation follows the methodology as mentioned in the LRSM (2022).
Attachment F lists the detailed methodology to calculate B/C Ratio, as well as the complete cost, benefit and B/C Ratio calculation spreadsheet.
These safety projects were chosen based on the previously completed collisions analysis, which was used to identify main collision attributes that were found to be leading factors of fatal and severe collisions in Albany. These collision factors are shown below, as well as viable safety projects that can help address these factors.

Broadside Collisions: For F+SI collisions in Albany, 25% of collisions were broadside collisions. This is slightly higher than its share of collisions of all severity (22%). Broadside collisions can potentially be mitigated by increasing the visibility of an intersection through updated pavement markings, new or updated signage, lighting, advance flashing beacons, and improving sight distance.

Improper Turning Collisions: For F+SI collisions in the city of Albany, 13% of collisions occurred due to improper turning violation, the most of any category. It also contributed to 19% of all collisions.

Countermeasures such as improving sight distance at intersections, installing dedicated left turn lanes, median splitter islands on minor road approaches, and raised medians can help to mitigate improper turning caused collisions.

Pedestrian Violations: 25% of F+SI collisions in Albany involved a pedestrian, compared to just 8% of collisions of all severity. Countermeasures such as traffic calming, high visibility crosswalks, Rectangular Rapid Flashing Beacons (RRFBs), sidewalk bulb outs, advanced flashing warning signs, can all help to address pedestrian collisions.

Bicycle Violations: 19% of F+SI collisions in Albany involved a bicycle, compared to 8% of collisions of all severity. These collisions can potentially be mitigated with enhanced bicycle infrastructure, such as protected bike lanes, bicycle boxes at signalized intersections, green paint for enhanced visibility, additional lighting, or adding bike lanes/widening shoulders.

Rear End Collisions: 26% of collisions of all severity were rear end collisions, the most of all collision types. It also makes up 6% of F+SI collisions. Rear end collisions can potentially be mitigated through upgrading signal hardware or adding retroreflective borders, improving signal timing, upgrading/adding intersection warning signs, or adding flashing beacons in advance of intersections. Methods to reduce speeding, such as traffic calming, can also help to address rear end collisions.

The next step in the process will be to prepare grant ready materials for HSIP Cycle 11 applications. TJKM has scoped to provide the City with materials for up to two applications. However, it should be noted that while the LRSP projects were based on high-risk locations, HSIP applications can be expanded to include many locations across the city. TJKM can work with the City to identify additional locations that may be beneficial to add to the HSIP application and calculate the BCR.

Below is the list of identified projects for the City of Albany, with a preliminary cost estimate for each location and the resulting benefit-cost ratio of the project (the title of each countermeasure is located in a separate table below):

The next step in the process will be to prepare grant ready materials for HSIP Cycle 11 applications. TJKM has scoped to provide the City with materials from up to two applications. However, is should be noted that while the LRSP projects were based on high-risk locations, HSIP applications can be expanded to include many locations across the city. TJKM can work with the City to identify additional locations that may be beneficial to add to the HSIP Application and calculate the Benefit Cost Ratio.

List of Safety Projects

Project 1: Systemic Improvements at Signalized Intersections
Project 2: Systemic Improvements at Signalized Intersections (Pedestrian and Bicycle)
Project 3: Systemic Improvements at Un-signalized Intersections
Project 4: Systemic Improvements at Un-Signalized Intersections (Pedestrian Safety)
Project 5: Citywide Signal Upgrade
Project 6: Citywide Street Light Inventory
Project 7: Citywide Leading Pedestrian Inventory (LPI) feasibility
Project 8: Systemic Improvements at Roadway Segments
Project 9: Systemic improvements at Roadway Segments (Pedestrian and Bicycle Safety)

Table 17. List of Viable Safety Projects

Location	CM1	CM2	CM3	Cost per Location	Total Cost	B/C Ratio
Project 1 – Signalized Intersections: Install Raised Pavement Markers and Stripping Through Intersection, Improve signal timing						
San Pablo Ave/SR-123 at Brighton Ave	S03	S09		**$2,117,300**	**$4,403,310**	**76.69**
San Pablo Ave/SR-123 at Marin St	S03	S09		**$1,894,100**		
San Pablo Ave/SR-123 at Solano Ave	S03	S09		**$1,894,100**		
Marin St at Masonic Ave	S03			**$1,813,200**		
San Pablo Ave/SR-123 at Monroe St	S03	S09		**$1,813,200**		
Marin at Santa Fe Ave	S03			**$0**		
Project 2: Signalized Intersections (Pedestrian and Bicycle safety): Install advance stop bar before crosswalk, Modify signal phasing to implement a Leading Pedestrian Interval, Improve signal hardware						
San Pablo Ave/SR-123 at Brighton Ave		S20PB	S21PB	**$1,751,800**	**$11,213,700**	**18.69**
San Pablo Ave/SR-123 at Marin St	S02			**$0**		
San Pablo Ave/SR-123 at Solano Ave	S02	S20PB	S21PB	**$0**		
Marin St at Masonic Ave	S02	S20PB	S21PB	**$0**		
San Pablo Ave/SR-123 at Monroe St	S02	S20PB	S21PB	**$3,180,000**		
Marin at Santa Fe Ave	S02	S20PB	S21PB	**$1,590,000**		

Project 3: Unsignalized Intersection: Install larger or additional stop sign or other intersection warning/regulatory signs, Install Flashing Beacons at Stop-controlled intersections, Install splitter-island on the minor road approaches, and install raised medians on approaches.							
San Pablo Ave/SR-123 at Garfield Ave	NS06			NS14	**$1,955,500**	**$9,566,020**	**29.00**
Solano Ave at Stannage Ave	NS06	NS08			**$1,732,300**		
San Pablo Ave/SR-123 at Portland Ave	NS06		NS13	NS14	**$1,732,300**		
Solano Ave at Peralta Ave		NS08	NS13	NS14	**$142,300**		
Buchanan St at Madison St	NS06				**$1,590,000**		
Solano Ave at Jackson St	NS06				**$0**		
Project 4: Improvements at Unsignalized Intersection (Pedestrian and Bicycle safety): Install Rectangular Rapid Flashing Beacon (RRFB), Install/upgrade pedestrian crossing at uncontrolled locations (with enhanced safety features)							
San Pablo Ave/SR-123 at Garfield Ave	NS21PB	NS22PB			**$223,200**	**$3,163,440**	**4.19**
Solano Ave at Stannage Ave					**$0**		
San Pablo Ave/SR-123 at Portland Ave		NS22PB			**$0**		
Solano Ave at Peralta Ave		NS22PB			**$223,200**		
Solano Ave at Jackson St		NS22PB			**$1,590,000**		
Buchanan at Madison St		NS22PB			**$0**		
Key Route Boulevard at Solano Avenue		NS22PB			**$0**		

Project 5: Citywide Signal Upgrade									
Project 6: Citywide Street Light Inventory									
Project 7: Citywide Leading Pedestrian Inventory (LPI) feasibility									
Project 8: Roadway Segments: Install/upgrade signs with new fluorescent sheeting, Install delineators, reflectors and/or object markers, Install edge-lines and Centerlines, Install centerline rumble strips/stripes, Install edge line rumble strips/stripes									
Solano Ave: Cleveland Ave to City Limit (East)			R27			R31	**$6,801,200**		
San Pablo Ave/SR-123: City Limit (North) to 450′ S of Marin Ave	R03	R22					**$6,636,500**		
Buchanan St: I-80 EB Ramps to San Pablo Ave		R22					**$2,340,500**		
Santa Fe Ave: 200′ N of Solano Ave to City Limit (South)		R22	R27				**$2,097,800**		
Madison St: 400′ N of Washington St to 450′ S of Solano Ave				R28			**$1,590,000**		
Washington St: 100′ W of Cerrito Ave to San Pablo Ave				R28	R30		**$1,590,000**	**$16,100,000**	**8.06**
Project 9: Pedestrian and Bicyclist Safety Roadway Improvements: Install separate Bike lanes, Install Rectangular Rapid Flashing Beacon (RRFB), Install raised pedestrian crossing									
San Pablo Ave/SR-123: City Limit (North) to 450′ S of Marin Ave	R33PB	R36PB	R37PB				**$4,072,800**	**$27,287,760**	**7.04**
Santa Fe Ave: 200′ N of Solano Ave to Solano Ave to 550' S of Marin Ave			R37PB				**$1,813,200**		
Madison St: 400′ N of Washington St to 450′ S of Solano Ave			R37PB				**$1,590,000**		

Solano Ave: Ramona Ave to Peralta Ave			R37PB	**$2,401,900**		
Buchanan St: I-80 EB Ramps to San Pablo Ave			R37PB	**$80,900**		
Marin St: Buchanan St to City Limit (East)			R37PB	**$223,200**		

Notes: CM – countermeasure. B/C ratio is the dollar amount of benefits divided by the cost of the countermeasure.

Countermeasure Name
S02- Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number
S03 - Improve signal timing (coordination, phases, red, yellow, or operation)
S09 - Install raised pavement markers and striping (Through Intersection)
S20PB - Install advance stop bar before crosswalk (Bicycle Box)
S21PB - Modify signal phasing to implement a Leading Pedestrian Interval (LPI)
NS06 - Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs
NS08 – Install Flashing Beacons at Stop-Controlled Intersections
NS13- Install splitter-islands on the minor road approaches
NS14- Install raised median on approaches (NS.I.)
NS21PB- Install/upgrade pedestrian crossing at uncontrolled locations (with enhanced safety features)
NS22PB- Install Rectangular Rapid Flashing Beacon (RRFB)
R03- Add Segment Lighting
R22 - Install/Upgrade signs with new fluorescent sheeting (regulatory or warning)
R27 - Install delineators, reflectors and/or object markers
R28- Install edge-lines and centerlines
R30- Install centerline rumble strips/stripes
R31- Install edge-line rumble strips/stripes
R33PB – Install separate bike lanes
R36PB- Install raised pedestrian crossing
R37PB - Install Rectangular Rapid Flashing Beacon (RRFB)

8. IMPLEMENTATION AND EVALUATION

This chapter describes the steps the City may take to evaluate the success of this plan and steps needed to update the plan in the future. The LRSP is a guidance document and requires periodic updates to assess its efficacy and re-evaluate potential solutions. It is recommended to update the plan every two to five years in coordination with the identified safety partners. This document was developed based on community needs, stakeholder input, and collision analysis conducted to identify priority emphasis areas throughout the City. The implementation of strategies under each emphasis area would aim to reduce KSI collisions in the coming years.

Implementation

The LRSP is a guidance document that is recommended to be updated every two to five years in coordination with the safety partners. The LRSP document provides engineering, education, enforcement, and emergency medical service-related countermeasures that can be implemented throughout the City to reduce KSI collisions. It is recommended that the City of Albany implement the selected projects in high-collision locations in coordination with other projects proposed for the City's infrastructure development in their future Capital Improvement Plans. After implementing countermeasures, the performance measures for each emphasis area should be evaluated annually. The most important measure of success of the LRSP should be reducing KSI collisions throughout the City. If the number of KSI collisions does not decrease over time, then the emphasis areas and countermeasures should be re-evaluated.

Funding is a critical component of implementing any safety project. While the HSIP program is a common source of funding for safety projects, there are numerous other funding sources that could be pursued for such projects. (See **Table 18** below).

Table 18: List of Potential Funding Sources

Funding Source	Funding Agency	Amount Available	Next Estimated Call for Projects	Applicable E's	Notes
Active Transportation Program	Caltrans, California Transportation Commission, MTC	~$450 million per cycle (every two years)	2022	Engineering, Education	Can use used for most active transportation related safety projects as well as education programs? Funding available through Caltrans or MTC
Highway Safety Improvement Program	Caltrans		May 2022	Engineering	Most common grant source for safety projects
One Bay Area Grant (OBAG) Cycle 3	MTC (Combines various federal funds)	$750 million for 2023-2026	County & Local Program: 2022	Engineering	Distributes federal funding to cities and counties in MTC region.
Office of Traffic Safety Grants	California Office of Traffic Safety	Varies by grant	Closes January 31st annually	Education, Enforcement, Emergency Response	10 grants available to address various components of traffic safety
Affordable Housing and Sustainable Communities Program	Strategic Growth Council and Dept. of Housing and Community Development	~$405 million	2022	Engineering, Education	Must be connected to affordable housing projects; typically focuses on bike/pedestrian infrastructure/programs
Urban Greening	California Natural Resources Agency	$28.5 million	2022	Engineering	Focused on bike/pedestrian infrastructure and greening public spaces
Local Streets and Road Maintenance and Rehabilitation	CTC (distributed to local agencies)	$1.5 billion statewide	N/A; distributed by formula	Engineering	Typically pays for road maintenance type projects
RAISE Grant	USDOT	~$1 billion	2022	Engineering	Typically used for larger infrastructure projects
Sustainable Transportation Equity Project	California Air Resources Board	~$19.5 million	TBD; most recent call in 2020	Engineering, Education	Targets projects that will increase transportation equity in disadvantaged communities
Transformative Climate Communities	Strategic Growth Council	~$90 million	TBD; most recent call in 2020	Engineering	Funds community-led projects that achieve major reductions in greenhouse gas emissions in disadvantaged communities.

Monitoring and Evaluation

For the success of the LRSP, it is crucial to monitor and evaluate the five E-strategies continuously. Monitoring and evaluation help provide accountability, ensures the effectiveness of the countermeasures for each emphasis area, and help making decisions on the need for new strategies. The process would help the City make informed decisions regarding the implementation plan's progress and accordingly, update the goals and objectives of the plan.

After implementing countermeasures, the strategies should be evaluated annually as per their performance measures. The evaluation should be recorded in a before-after study to validate the effectiveness of each countermeasure as per the following observations:

- Number of KSI collisions
- Number of police citations
- Number of public comments and concerns

Evaluation should be conducted during similar time periods and durations each year. The most important measure of success of the LRSP should be reduction in KSI collisions throughout the City. If the number of KSI collisions doesn't decrease initially, then the countermeasures should be evaluated as per the other observations, as mentioned above. The effectiveness of the countermeasures should be compared to the goals for each emphasis area.

LRSP Update

The LRSP is a guidance document and is recommended to be updated every two to five years after adoption. After monitoring performance measures focused on the status and progress of the E's strategies in each emphasis area, the next LRSP update can be tailored to resolve any continuing safety problems. An annual stakeholder meeting with the safety partners is also recommended to discuss the progress for each emphasis area and oversee the implementation plan. The document should then be updated as per the latest collision data, emerging trends, and the E's strategies' progress and implementation.

APPENDIX A: SUMMARY OF PLANNING DOCUMENTS

Table 1: Matrix of Planning Goals, Policies, and Projects

Document	Highlights
Albany General Plan | Transportation Element (2035)	The focus is on future improvements that will expand the capacity for "active" transportation (e.g., bicycling and walking) and public transit while recognizing that steps also must be taken to manage motor vehicle flow. A variety of transportation issues are then discussed, including traffic calming, transportation safety, parking, and technology. The final section presents goals, policies, and actions for transportation. **Goals and Policies** Create and maintain a street network that accommodates all modes of travel, meets the mobility needs of all travels and enhances Albany's sense of place. **Policies:** • **Policy T-1.1: Balancing the Needs of All Users**: Create and maintain "complete streets" that provide safe, comfortable, and convenient travel for all users, including pedestrians, bicyclists, transit users, motorists, movers of commercial goods, emergency responders, persons with disabilities, seniors, children, youth, and families. • **Policy T-1.2: Context-Sensitive Design:** Require City departments and other agencies responsible for the design and operation of the street system to be sensitive to the needs of nearby residents, businesses, and institutions. The design of the street network should respect the local physical context, improve the safety of all travelers, and contribute to the city's identity. • **Policy T-1.3: Complete Streets**: Operating Procedures Incorporate Complete Streets practices as a routine part of City operations. The planning, design, funding, and implementation of any construction, reconstruction, maintenance, alteration, or repair of the transportation network should consider ways to make streets safer and easier to navigate for all users. Exceptions to this policy may be considered, consistent with the Complete Streets Resolution adopted by the City Council in January 2013. • **Policy T-1.4: Complete Streets Design**: Follow locally adopted policies and standards in the design of City streets, including the Active Transportation Plan and the Climate Action Plan, as well as the General Plan. All roadway planning, design, and maintenance projects should be consistent with local bicycle,

Document	Highlights
	pedestrian, and transit plans. National, state, or other recognized standards may also be used if the outcome is improved safety, health, vitality, sense of place, and a more balanced transportation system. • **Policy T-1.5: Connecting the City**: Ensure that the design of streets and other transportation features helps to connect the city, enhance neighborhood livability, and facilitate safer and more convenient travel between Albany and surrounding communities. • **Policy T-1.6: Accessibility**: Improve access throughout the City for persons with disabilities, seniors, and others with mobility limitations. Repairs or improvements to City streets, sidewalks, pathways and trails should include curb cuts, accessible signal buttons, and other improvements which remove barriers to mobility. **Goal T-2: Sustainable Transportation** Reduce the consumption of non-renewable resources and the emission of greenhouse gases and other air pollutants related to transportation **Policies** • **Policy T-2.1:Transit-Oriented Development**: Encourage land use patterns and public space designs that support walking, bicycling, and public transit use, thereby reducing greenhouse gas emissions and fossil fuel consumption. Future land use and development choices should maximize opportunities to travel without a car by focusing new growth along walkable, transit-served corridors such as Solano and San Pablo Avenues, and in areas within ½ mile of the El Cerrito Plaza BART station. • **Policy T-2.2: Connectivity**: Improve the ability to travel within Albany and between Albany and other cities using multiple modes of travel (e.g., bicycle and bus, walking and BART, etc.). Barriers to non-auto travel in the City should be reduced and the ability to easily transfer between modes should be improved. **Goal T-3: Transportation Choice** Provide the opportunity to safely and conveniently travel through Albany using a variety of travel modes, including walking, bicycling, and public transportation as well as driving. **Policies**

Document	Highlights
	• **Policy T-3.1: Bikeway System:** Support development of a bikeway system that meets the needs of commuters and recreation users, reduces vehicle trips, and links residential neighborhoods with BART and regional destinations. Bicycling in Albany should be a viable alternative to driving for most short distance trips. • **Policy T-3.2: Designated Bike Network and Improvements**: Designate a network of bike paths, lanes, and routes as the primary system for bicyclists traveling through Albany. Improvements to this system, such as bike lanes and signage, should be made in accordance with an official plan for the Albany bicycle system. • **Policy T-3.3: Intergovernmental Coordination:** Coordinate development of Albany's bike network with plans for adjacent cities in order to improve the functionality of the system and create seamless connections across jurisdictional lines. • **Policy T-3.4: Bike Route Maintenance:** Regularly maintain bicycle routes and paths through sweeping, pavement repairs, and vegetation trimming. Encourage public reporting of facilities needing repair or clean-up. • **Policy T-3.5: Bicycle Parking:** Install additional bike racks and bike parking facilities in commercial and civic areas and in other locations where such facilities would help support bicycle use. The need for bicycle parking facilities should be periodically evaluated and at minimum should include locations along Solano and San Pablo Avenues and at high activity bus stops. • **Policy T-3.6: Sidewalks and Paths**: Improve Albany's network of sidewalks and paths to make the city safer and easier to travel on foot. Sidewalks should be present on all Albany streets, although their design and location may vary based on topography and other factors. Priority walking corridors should be identified and targeted for improvements such as wider sidewalks, enhanced crosswalks, curb ramp upgrades, sidewalk parking enforcement, and routine maintenance. • **Policy T-3.7: Bicycle and Pedestrian:** Access to Open Space Maintain and enhance trails through open space areas, including the Bay Trail along the shoreline, recreational trails on Albany Hill, trails along Cerrito and Codornices Creeks, and the Ohlone Greenway Trail in the BART Right-of-Way. Where appropriate,

Document	Highlights
	developers should be required to dedicate public access easements for trails through designated open space areas. • **Policy T-3.8: Bicycle and Pedestrian**: Connectivity Improve the connectivity of Albany's pedestrian and bicycle networks by removing obstacles to pedestrian travel and linking major pathways such as the Ohlone Greenway and the Bay Trail to each other and to community facilities. • **Policy T-3.9: Bicycle Programs:** Continue to undertake programs and activities to encourage bicycle use and bicycle safety in the city, including bicycle "rodeos," "Bike to Work Day" events, and programs which stress the health benefits of bicycling. • **Policy T-3.10: Public Transit Service:** Improve public transportation service and transit amenities in Albany so that transit becomes a more reliable alternative to driving. The City will work with AC Transit to provide safe, accessible, convenient bus stops that can be easily accessed on foot or by bicycle. The City will also encourage investment in exclusive transit lanes, limiting parking and curb cuts on major transit routes, synchronization of traffic signals, signal preemption devices, curb extensions for bus stops, enforcement of parking rules in bus stops, posting of route information at bus stops, and other measures which increase the attractiveness and comfort of public transportation. • **Policy T-3.11: Transit and Streetscapes:** Incorporate provisions for public transit when undertaking streetscape improvements, including bike lanes, curb extensions, landscaping, benches, and crosswalks. • **Policy T-3.12: Monitoring Transit Needs:** Work with AC Transit to monitor and periodically adjust transit service and bus stop locations. A particular emphasis should be placed on feeder service between Albany and the BART stations at North Berkeley and El Cerrito Plaza **Goal T-4: Traffic Safety** Improve the safety of all modes of travel, taking particular care to reduce the rate of injury accidents for bicycles and pedestrians. **Policies**

Document	Highlights
	• **Policy T-4.1: Accident Data:** Collect, analyze, and periodically report out on data on traffic accidents. When prioritizing capital improvement projects, place the highest priority on those that would reduce the potential for such accidents, particularly those involving pedestrians or bicycles. • **Policy T-4.2: Enforcement:** Strictly enforce traffic safety and speed laws for all modes of travel, taking special care to protect the rights of pedestrians and bicyclists on local streets. • **Policy T-4.3: Preventive Maintenance:** Continue to undertake preventive maintenance activities on sidewalks, streets, paths, and bike routes and ensure that such facilities are kept in a condition that minimizes accident risks. This should include trimming of trees and other vegetation along local streets to address visibility constraints. • **Policy T-4.4: Crosswalks**: Designate, stripe, and maintain a system of pedestrian crosswalks, and take appropriate street lighting, signage, and enforcement measures to ensure the safety of persons using these crosswalks • **Policy T-4.5: Education on Safety Laws:** Provide educational opportunities for Albany staff and residents to better understand the legal rights and responsibilities of motorists, bicyclists and pedestrians. • **Policy T-4.6: School Safety:** Work with the Albany Unified School District to identify key improvements and initiatives that would facilitate safer walking and bicycling to school. • **Policy T-4.7: Pedestrian-Vehicle Interface:** Design the pedestrian circulation system to minimize the number of times that walkers, runners, and other modes of active transportation need to stop for cross traffic. • **Policy T-4.8: Personal Safety:** Enhance personal safety for pedestrians by providing adequate lighting along sidewalks and other walkways, keeping vegetation properly trimmed, and taking other measures to reduce the potential for street crime. • **Policy T-4.9: Street Lighting**: Periodically assess street lighting needs and maintenance of street light facilities to ensure a high level of visibility for all travelers. Funds for new and replacement street lights should be set aside as part of the Capital Improvement Program.

Document	Highlights
	Goal T-5: Managing Transportation Impacts Minimize the adverse effects of vehicle traffic on Albany's neighborhoods. **Policies** • **Policy T-5.1: Residential Arterials**: Recognize the dual function of arterial streets such as Buchanan Street and Marin Avenue to carry relatively high traffic volumes while also providing access to individual homes. Use landscaping, speed controls, and other streetscape improvements to create a more attractive environment, facilitate pedestrian crossings, and mitigate the impacts of vehicle traffic in such locations. • **Policy T-5.3: Regional Traffic on Local Streets**: Support measures to reduce and better manage traffic resulting from vehicles using Albany surface streets to avoid freeway congestion. Encourage traffic to and from major employment centers such as the University of California and Downtown Berkeley to stay on Interstate 80 to the appropriate exit. • **Policy T-5.4: Managing Through-Traffic:** Focus motor vehicle through-traffic on arterial and collector streets rather than on local streets. Traffic calming measures may be used to encourage drivers to use arterials and collectors, and to discourage aggressive driving, disproportionately high volumes, and excessive speed on local streets. As appropriate and as a last resort, street closures to motor vehicles may be considered as a means of directing traffic to designated arterial and collector streets. • **Policy T-5.5: Streetscape Improvements:** Undertake streetscape improvement programs to beautify the city and reduce the degree to which major streets create real or perceived barriers within the community. • **Policy T-5.6: Traffic Calming:** Consider the use of road features such as speed humps, speed trailers, traffic diverters, traffic circles, medians, and other methods to limit through-traffic and reduce speeds on residential streets. Implementation of such measures should be subject to a public process and should consider the potential impacts to adjacent streets due to changed travel patterns. Thresholds such as decreases in vehicle traffic volume and increases in pedestrian and bicycle volumes

Document	Highlights
	should be used to evaluate appropriate traffic calming measures. • **Policy T-5.7: Truck Routes:** Limit the intrusion of truck traffic into residential areas by designating and signing specific streets as truck routes and enforcing weight limits on all City streets. • **Policy T-5.8: Sidewalk Cafes:** Maintain Municipal Code provisions allowing outdoor seating on public sidewalks, provided that seating does not interfere with pedestrian movement and that the approval is subject to a revocable encroachment permit and applicable zoning clearance requirements. • **Policy T-5.9: Hillside Sidewalks:** On streets that traverse the slopes of Albany Hill, allow variations from conventional sidewalk standards which reduce the need for grading but still support continuous pedestrian circulation. **Goal T-6: Motorized Vehicle Flow** Provide for the safe and efficient flow of motor vehicle traffic. **Policies** • **Policy T-6.1: Road Hierarchy:** Maintain a network of arterial, collector, and local streets that safely and efficiently moves motorized and non-motorized vehicle traffic through Albany. Engineering and design standards for each road type should reflect function, road volumes, and the characteristics of adjacent uses, and should be consistent with the Complete Streets policies in Goal T-1 and the bicycle and pedestrian policies in Goal T-3. • **Policy T-6.7: Signal Timing and Lane Configurations:** Consider modifications to signal timing and turning lanes as necessary to maintain traffic flow through Albany's signalized intersections. • **Policy T-6.8: Construction Traffic:** Require traffic management plans for major construction projects, and ensure that those plans address bicyclists and pedestrians. • **Policy T-6.9: Levels of Service:** On major corridors such as San Pablo Avenue and Solano Avenue, evaluate the performance of the transportation network using metrics that not only consider automobile speed and delay but other factors, such as vehicle

Document	Highlights
	miles traveled and the volume of transit passengers, bicyclists and pedestrians.
Albany Active Transportation Plan(2012)	**General Plan 2035** The City of Albany General Plan: Circulation Element describes the existing bicycling, walking, transit, and vehicle facilities within the City and establishes the goals and policies for future transportation needs. **Goal CIRC 4:** Support public transit, and other means to reduce reliance on the automobile as the primary means of transportation. • **Policy CIRC 4.3** – Continue to work with the City's Trip Reduction Ordinance and continue to develop programs and incentives for the use of carpools, staggered work hours, bicycling, walking, and the increased use of public transit for residents and employees in the community. • **Policy CIRC 4.5 –** Increase pedestrian travel throughout the City by connecting major pathway systems such as the BART linear park to other City, regional, and State Parks, and other community facilities**.** • **Policy CIRC 4.6 –** Increase disabled access throughout the city by installing curb cuts wherever feasible as part of new construction, repair or improvements to streets, sidewalks, pathways and trails. • **Policy CIRC 4.7-** Assure that sidewalks, pathways and trails used by pedestrians are safe and provide unhindered access for all. **Goal CIRC 6:** Improve and enhance the City's bicycling route and path system. • **Policy CIRC 6.1 –** Develop a plan for bike routes for Albany, linking existing bike paths and routes in Berkeley and El Cerrito. Implement this plan as part of the City's overall roads maintenance and traffic sign program within the annual capital projects budgets, as well as through specific transportation funding. • **Policy CIRC 6.2 –** Work to obtain funding sources to develop the Bay Trail in Albany and along the entire East Bay Shoreline corridor as an alternative parallel route to I-80.

Document	Highlights
	Climate Action Plan • Objective TL-1: Facilitate Walking and Biking • Objective TL-2: Make Public Transit More User-Friendly • Objective TL-3: Promote Pedestrian- and Transit Oriented Development • Objective TL-4: Reduce Vehicle Emission and Trips **Goals, Policies and Actions for Active Transportation:** The Plan addresses four primary issues: safety, accessibility, connectivity, and public health. The goals provide the foundation for the community's long-term vision identified in the *Climate Action Plan* for developing a citywide bicycling and walking network that is safe and accessible for all users. **Goal 1: Safety:** Improve safety for those that choose to walk and bike. • **Policy 1.1**: Monitor and record bicyclist and pedestrian-involved collisions. • **Policy 1.2**: Strictly enforce the rights and responsibilities of pedestrians and bicyclists on City streets. **Goal 2: Accessibility:** Provide the citizens of Albany with a citywide network of trails and routes that are accessible to a wide variety of users including pedestrians, bicyclists, and the physically disabled. • **Policy 2.1**: Consider pedestrians and bicyclists in design and construction of land use and infrastructure projects. • **Policy 2.2**: Emphasize maintenance and funding for key walking and bicycling routes. **Goal 3: Connectivity:** Develop bicycling and walking networks that meet the needs of all bicyclists and pedestrians, help reduce vehicle trips, link residential neighborhoods with regional destinations, and make walking and biking realistic ways to travel throughout the City and region. • **Policy 3.1:** Maximize multi-modal connections to the bicycling and walking network. • **Policy 3.2:** Provide end-of-trip facilities to make bicycling a convenient alternative to driving. • **Policy 3.4:** Promote Walking-, Bicycling- and Transit-Oriented Development. **Goal 4: Public Health:** Increase frequency and types of walking and bicycling trips in Albany to promote public health an improve environment.

Document	Highlights
	• **Policy 4.1:** Promote walking and bicycling for work and non-work related trips by developing continuous and safe routes for recreation and experiential cycling and walking. These routes should minimize the number of times walkers, runner, cyclists or other users need to stop for cross traffic. • **Policy 4.2:** Integrate land-use and transportation planning in order to ensure patterns that facilitate safe and convenient mobility of people and goods are reasonable cost, and to increase travel alternatives to single- occupant automobiles**.** **Goal 5: Other:** Maximize funding available to multi-modal projects, plan and programs that support this plan. • **Policy 5.1:** Develop an effective implementation strategy for this Plan. **List of Projects:** Tier 0/ Partially funded and Planned: • Buchanan Street Path and Buchanan Merge Realignment • Bay Trail • Pierce Street Segment I Path/ Segment II Path • Codornices Creek Path Tier 1: • Jackson Street Safe Routes to School • Adams Street Bicycling Routes • Masonic Avenue Bicycling Route and Pedestrian improvements • Talbot Bicycling Route • Solano Avenue Streetscape, Greening and Walking Safety Project • Kains Avenue Bicycling Boulevard • Ohlone Greenway Crossing Enhancements • San Pablo Streetscape and walking Safety Project • East shore Frontage Road Path Tier 2: • Marin Avenue Walking and Bicycling Enhancements • Dartmouth Bicycling Boulevard • Cerrito Creek Path • Santa Fe Bicycling Route • Washington Avenue Bicycling Boulevard/ Route Tier 3:

Document	Highlights
	• Key Route Boulevard Median Walking Path and Separated Bikeway • Polk Street/ UC Village Connection • Peralta Bicycling Route • Portland Avenue Safe Route to school • Francis Street Bicycling Route Long- Term: • University Village/ East shore Crossing • Posen Avenue Bicycling Facility • Sonoma Avenue Bicycling Facility • Waterfront Trail
Solano Avenue Complete Streets and Corridor Revitalization Plan (2019)	This Plan incorporates innovative urban design and infrastructure upgrades to improve pedestrian safety and access, provide stronger connections to transit, enhance the public realm, implement spot improvements for bicyclists, manage curbside space, and improve predictability for motorists. **Plan Process** The development of the plan consist of community analysis and needs assessments. The process included concept design, design palette and implementation strategy. **Need of the Plan** • Slower traffic and a narrower roadway • Wider sidewalks free of tripping hazards • Clearly marked crosswalks with curb ramps that align with people's path of travel • More curb bulb-outs • Pedestrian-scale street lighting • More public gathering space (including outdoor dining) and parklets that incorporate public art • More trees and landscaping that are appropriate for a main street • Additional parking spaces • Additional bicycle parking/racks • Safer bicycling conditions **General Plan 2035** The Transportation Element contains Goal T-1 "Complete Streets" which seeks to "create and maintain a street network that accommodates all modes of travel, meetings the mobility needs of all travelers, and

Document	Highlights
	enhances Albany's sense of place." The following policies are identified in the General Plan that pertain to this Plan: • **Policy: T-1.1: Balancing the Needs of All Users** Create and maintain "complete streets" that provide safe, comfortable, and convenient travel for all users, including pedestrians, bicyclists, transit users, motorists, movers of commercial goods, emergency responders, persons with disabilities, seniors, children, youth, and families. • **Policy T-1.2: Context-Sensitive Design:** Require City departments and other agencies responsible for the design and operation of the street system to be sensitive to the needs of nearby residents, businesses, and institutions. The design of the street network should respect the local physical context, improve the safety of all travelers, and contribute to the city's identity. • **Policy T-1.3: Complete Streets Operating Procedures:** Operating Procedures Incorporate Complete Streets practices as a routine part of City operations. The planning, design, funding, and implementation of any construction, reconstruction, maintenance, alteration, or repair of the transportation network should consider ways to make streets safer and easier to navigate for all users. Exceptions to this policy may be considered, consistent with the Complete Streets Resolution adopted by the City Council in January 2013. • **Policy T-1.4: Complete Streets Design:** Follow locally adopted policies and standards in the design of City streets, including the Active Transportation Plan and the Climate Action Plan, as well as the General Plan. All roadway planning, design, and maintenance projects should be consistent with local bicycle, pedestrian, and transit plans. National, state, or other recognized standards may also be used if the outcome is improved safety, health, vitality, sense of place, and a more balanced transportation system. • **Policy T-1.5: Connecting the City:** Ensure that the design of streets and other transportation features helps to connect the city, enhance neighborhood livability, and facilitate safer and more convenient travel between Albany and surrounding communities. • **Policy T-1.6: Accessibility:**

Document	Highlights
	Improve access throughout the City for persons with disabilities, seniors, and others with mobility limitations. Repairs or improvements to City streets, sidewalks, pathways and trails should include curb cuts, accessible signal buttons, and other improvements which remove barriers to mobility. • **Policy T-1.7: Development Review:** Require that future development projects address bicycling and walking access in their project plans, and include provisions to accommodate access by all modes of travel. • **Policy T-3. G: Transit Corridors** • **Policy T-3. I: Bus Stop Improvements** Work with AC transit to ensure that bus waiting areas are located in appropriate locations and are designed to maximize rider comfort and safety. Waiting areas should be improved, especially in high activity locations such as San Pablo Avenue and Solano Avenue. Additional investment should be made in bus shelters in these locations, providing transit riders with shade, weather protection, seating, lighting, bike parking, and route information. • **Policy T-4. F: Pedestrian Crossings** Consider funding and implementation of demonstration projects for new pedestrian crossing treatments on San Pablo Avenue, Solano Avenue, and Marin Avenue/Buchanan Street • **Policy T-6. 9: Level of Service** On major corridors such as San Pablo Avenue and Solano Avenue, evaluate the performance of the transportation network using metrics that not only consider automobile speed and delay but other factors, such as vehicle miles traveled and the volume of transit passengers, bicyclists and pedestrians. • **Policy T-7. E: Solano Avenue Parking Management** Develop a parking management plan for the Solano Avenue commercial district which includes provisions for patron parking, employee parking, and parking for persons living on or near Solano Avenue • **PROS-6.G: Key Route Median** Pursue trail improvements, landscaping, and other amenities on the Key Route Boulevard median between Solano Avenue and El Cerrito. **Proposed Corridor Elements** The design and function of Solano Avenue, the corridor design addresses the following elements: • Safety and Americans with Disabilities Act (ADA) accessibility • Streetscape amenities • Curbside uses • Storm water management

Document	Highlights
	Street Design Palette • Sense of Place Design Elements Design elements such as branding, public art, and retail and commercial signage can provide a unifying theme to Solano Avenue. • Sidewalks and Public Spaces Design Elements Design elements located in the sidewalk and public spaces can provide a sense of arrival and identity to the central portion of Solano Avenue. This includes plazas, bus stops, bike racks, streets and plantings, rain gardens, site furnishings, lighting, trash cans and compost bins, and paving materials. • Roadway Design Elements Design elements located within the roadway, such as parking area pavers, pedestrian refuge islands, valley gutters, and truck aprons, provide safety, access, and identity to Solano Avenue.
City of Albany Engineering and Traffic Surveys (E&TS) (2021)	This report presents the results of the Engineering and Traffic Surveys (E&TS) conducted for the City of Albany along 8 bi-directional roadway segments within the City limits. The 8 segments lie within the following roadway limits: • Buchanan Street & Marin Avenue – Between City Limits and San Pablo Avenue • Cleveland Avenue – Between Washington Ave and City Limits • Pierce Street – Between Buchanan Street and City Limits • San Pablo Avenue – Between North City Limits and City Limits • Marin Avenue – Between San Pablo Avenue and City Limits • Santa Fe Avenue – Between Marin Avenue to the South City Limits • Santa Fe Avenue – Between Marin Avenue to the North City Limits • Solano Avenue – Between Jackson Street and East City Limits The E&TS consists of engineering measurements of the prevailing free flow speeds along survey segments, a review of the collision history reports, and a review of existing roadside conditions including the identification of any conditions not readily apparent to the motorist.
Albany Traffic Management Plan	**Goals** • Goal 1: Provide equal rights of access for non-automobile modes

Document	Highlights
	• Goal 2: Reduce automobile trips in the City of Albany by encouraging use of non-automobile modes • Goal 3: Create conditions throughout the city for safer and more convenient walking and bicycling, especially for children going to and from school • Goal 4: Improve AC Transit service and transit amenities in the City • Goal 5: Take measures to calm traffic on Marin Ave so it no longer "divides" the community • Goal 6: Make traffic management a citywide priority through education and public outreach • Goal 7: Take a proactive leadership role in working with other agencies and jurisdictions to effect sound decisions regarding transportation funding, transit service, highway improvements, and other transportation issues
Alameda Countywide Transportation Plan (2020)	The strategies complement the 10- year priority projects and programs by capturing key additional implementation areas to achieve the vision and goals, including policies, legislation, funding, and guidance for how projects and programs should be implemented. • Industry best practices and innovations relevant to Alameda County • Input From public outreach, elected officials and agency partners **Goals supporting transportation vision:** • Accessible, affordable and equitable: Improve and expand connected multimodal choices that are available for people of all abilities to all income levels and equitable. • Safe, Healthy and Sustainable: Create safe multimodal facilities to walk, bike and access public transportation to promote healthy outcomes and support strategies that reduce reliance on single-occupant vehicles and minimize impacts of pollutants and greenhouse gas emissions. • High Quality and Modern infrastructure Deliver a transportation system that is of a high, well-maintained, and resilient and maximizes the benefits of new technologies for the public. • Economic Vitality

Document	Highlights
	Support the growth of Alameda County's economy and vibrant local communities through a transportation system that is safe , reliable, efficient, cost-efficient, high- capacity and integrated with sustainable transit- oriented development facilitating multimodal local, regional and interregional travel. The plan identifies long- term strategies to support near-term actions. **Recommendation and strategies:** • Advance Equity • Safe System Approach • Complete Corridor Approach • Partnerships to Address Regional and Megaregional Issues • Transit Accessibility and Travel Demand Management • New Mobility and an Automated, Low- Emission and Shared Future **Strategies:** • Advance Equity Equity is a cross-cutting across all strategies. Implementation of the 2020 CTP will consider the historical impacts of transportation investments and seek to proactively address needs of disadvantaged communities. Strategies and actions that address the mobility an access needs of low- income communities and communities of color were identified through community engagement in the CBTP. Strategies that advance equity are indicated with this icon on the following pages. • Safe Systems Approach These strategies support improving the safety of streets and facilities for all transportation users. Safety is an overarching priority that needs to permeate throughout the countywide transportation network and be a priority in all projects planning. • Complete Corridor Approach These strategies support planning, design and implementation of multimodal travel corridors centered on major arterials. Multimodal corridor planning involves a systematic approach to developing transportation improvements, rather than addressing each project, street or mode n a silo. It requires robust partnerships and other requires balancing competing needs and considering a set of parallel facilities together to create strong multimodal travel options. • Partnerships to address regional and mega regional issues

Document	Highlights
	These strategies support partnerships and coordination on issues that require regional or megaregional action. Some transportation issues are complex and involve more decision-makers than just Alameda CTC and its local partners. Examples include climate resiliency and adaption, addressing the jobs/housing imbalance, or regional rail planning. In these cases, Alameda CTC must partner and coordinate to take effective action. • Transit Accessibility and Transportation Demand Management (TDM) These strategies support reducing drive- alone trips by incentivizing use of other modes and making transit easy and affordable to use. Improving public transit options and implementing transportation demand management (TDM) strategies can help reduce congestion and improve mobility options. • New Mobility and an Automated, Low-Emission These strategies support the transition to low- emission and automated vehicles, including low0emission technologies for goods movement and encouragement of vehicle-sharing to reduce congestion and environmental impacts. The mobility landscape is rapidly evolving, with innovation in the form of vehicle technologies, new mobility options, and integrated travel platforms. This strategy supports progress towards safe, equitable, and widely beneficial innovation in the transportation sector.

APPENDIX B: CITY OF ALBANY HIGH INJURY NETWORK

CASE_ID	ACCIDENT_Y	PROC_DATE	JURIS	COLLISION_	COLLISION1	Hour	OFFICER_ID	REPORTING_	DAY_OF_WEE	CHP_SHIFT
8694006	2018	2018-09-07	102	2018-07-20	1450	14	EC0624	7	5	5
8203037	2016	2017-01-05	102	2016-09-26	1647	16	DH0611	5	1	5
8693248	2018	2018-09-18	102	2018-01-14	1724	17	EC0624	5	7	5
8200117	2016	2017-01-04	102	2016-11-16	1421	14	DL0626	5	3	5
8843130	2018	2019-05-08	102	2018-11-29	2118	21	C00613	5	4	5
8850669	2019	2019-04-30	102	2019-02-08	15	0	MP0622	7	5	5
8529795	2017	2018-01-11	102	2017-08-16	814	8	EC0624	5	3	5
8513275	2017	2018-01-12	102	2017-03-11	1722	17	AW0629	5	6	5
8529827	2017	2018-01-11	102	2017-05-09	1654	16	TA0619	1	2	5
8079840	2016	2016-07-14	102	2016-06-23	1758	17	MP0622	4	4	5
8203033	2016	2017-01-05	102	2016-09-28	1612	16	AW0629	5	3	5
8289782	2016	2017-01-30	102	2016-12-13	1647	16	CO0613	5	2	5
8203174	2016	2017-01-09	102	2016-10-05	1751	17	MP0622	4	3	5
9291856	2020	2021-07-13	102	2020-07-05	15	0	DW190456	4	7	5
8513204	2017	2018-01-12	102	2017-04-02	1624	16	EC0624	4	7	5
8757802	2018	2018-12-19	102	2018-10-13	1433	14	DL0626	4	6	5
8976925	2019	2019-11-20	102	2019-05-07	1714	17	JL0614	5	2	5
8200109	2016	2017-01-04	102	2016-11-19	1050	10	ML0610	4	6	5
8651045	2018	2018-09-05	102	2018-03-17	2151	21	CO0613	4	6	5
9291867	2020	2021-07-12	102	2020-12-27	1044	10	TP237998	2	7	5
8688983	2018	2018-09-13	102	2018-01-06	1053	10	MP0622	1	6	5
9286178	2020	2021-07-20	102	2020-10-31	2102	21	MD236619	2	6	5
8688975	2018	2018-09-13	102	2018-01-25	1634	16	TA0619	2	4	5
8203196	2016	2017-03-03	102	2016-09-02	2047	20	AJ0625	1	5	5
8504345	2017	2018-06-14	102	2017-06-23	2250	22	EC0624	1	5	5
9286170	2020	2021-07-16	102	2020-09-12	1616	16	LL0615	5	6	5
8984084	2019	2020-01-09	102	2019-08-01	833	8	LL0615	5	4	5
8504394	2017	2018-06-25	102	2017-09-21	1856	18	AJ0625	5	4	5
8688979	2018	2018-09-17	102	2018-01-03	1545	15	BC0624	1	3	5
8078048	2016	2017-02-11	102	2016-06-17	2049	20	MP0622	1	5	5
9286166	2020	2021-07-15	102	2020-06-18	1655	16	P00623	1	4	5
8975401	2019	2019-12-14	102	2019-09-19	2104	21	JR0612	2	4	5
8199548	2016	2018-02-03	102	2016-06-11	1523	15	DL0626	1	6	5

CASE_ID	POPULATION	CNTY_CITY_	SPECIAL_CO	BEAT_TYPE	CHP_BEAT_T	CITY_DIVIS	CHP_BEAT_C	BEAT_NUMBE
8694006	3	102	0	0	0	0	0	2
8203037	3	102	0	0	0	0	0	2
8693248	3	102	0	0	0	0	0	2
8200117	3	102	0	0	0	0	0	2
8843130	3	102	0	0	0	0	0	2
8850669	3	102	0	0	0	0	0	2
8529795	3	102	0	0	0	0	0	2
8513275	3	102	0	0	0	0	0	2
8529827	3	102	0	0	0	0	0	1
8079840	3	102	0	0	0	0	0	2
8203033	3	102	0	0	0	0	0	2
8289782	3	102	0	0	0	0	0	2
8203174	3	102	0	0	0	0	0	2
9291856	3	102	0	0	0	0	0	2
8513204	3	102	0	0	0	0	0	2
8757802	3	102	0	0	0	0	0	2
8976925	3	102	0	0	0	0	0	2
8200109	3	102	0	0	0	0	0	2
8651045	3	102	0	0	0	0	0	2
9291867	3	102	0	0	0	0	0	1
8688983	3	102	0	0	0	0	0	1
9286178	3	102	0	0	0	0	0	1
8688975	3	102	0	0	0	0	0	1
8203196	3	102	0	0	0	0	0	1
8504345	3	102	0	0	0	0	0	1
9286170	3	102	0	0	0	0	0	2
8984084	3	102	0	0	0	0	0	2
8504394	3	102	0	0	0	0	0	2
8688979	3	102	0	0	0	0	0	1
8078048	3	102	0	0	0	0	0	1
9286166	3	102	0	0	0	0	0	1
8975401	3	102	0	0	0	0	0	1
8199548	3	102	0	0	0	0	0	1

CASE_ID	PRIMARY_RD	SECONDARY_	DISTANCE	DIRECTION	INTERSECTI	Intersec_1	WEATHER_1	WEATHER_2
8694006	BUCHANAN	EASTSHORE HWY	104	W	N	Y	A	-
8203037	BUCHANAN	PIERCE AV	241	W	N	Y	A	-
8693248	BUCHANAN	TAYLOR	86	W	N	Y	A	-
8200117	BUCHANAN	JACKSON	246	E	N	Y	A	-
8843130	BUCHANAN	UTILITY STANDARD 110279218	55	E	N	Y	A	-
8850669	BUCHANAN	LIGHT STANDARD 07142	20	W	N	Y	A	-
8529795	BUCHANAN ST	TAYLOR ST	27	W	N	Y	A	-
8513275	BUCHANAN ST	LIGHT POLE 2694	3	S	N	Y	A	-
8529827	MADISON ST	SOLANO AV	274	N	N	N	A	-
8079840	MARIN	MARIN AV	18	N	N	Y	A	-
8203033	MARIN	TALBOT	75	W	N	Y	A	-
8289782	MARIN	EVELYN AV	18	N	N	Y	A	-
8203174	MARIN	RAMONA	25	W	N	Y	A	-
9291856	MARIN	RAMONA AV	8	W	N	Y	A	-
8513204	MARIN	CURTIS	28	E	N	Y	A	-
8757802	MARIN	VENTURA AV	67	E	N	Y	A	-
8976925	MARIN	KAINS AV	30	W	N	Y	A	-
8200109	MARIN AV	POMONA AV	100	E	N	Y	C	-
8651045	MARIN AV	SANTA FE AV	170	W	N	Y	A	-
9291867	MASONIC AV	SOLANO	4	E	N	Y	A	-
8688983	SAN PABLO	BRIGHTON AV	418	N	-	N	A	-
9286178	SAN PABLO	GARFIELD AV	10	N	N	Y	A	-
8688975	SAN PABLO	GARFIELD AV	113	N	N	Y	B	-
8203196	SAN PABLO	SOLANO	171	N	N	Y	A	-
8504345	SAN PABLO	SOLANO	64	N	N	Y	A	-
9286170	SAN PABLO	SAN PABLO 1000	24	W	N	Y	A	-
8984084	SAN PABLO	MARIN	53	N	N	Y	A	-
8504394	SAN PABLO	MARIN	115	S	N	Y	A	-
8688979	SAN PABLO AV	BRIGHTON AV	50	N	N	Y	A	-
8078048	SAN PABLO AV	GARFIELD	22	W	N	Y	A	-
9286166	SAN PABLO AV	CASTRO ST	128	S	N	Y	A	-
8975401	SAN PABLO AV	CASTRO ST	36	S	N	Y	A	-
8199548	SAN PABLO AV	PORTLAND	134	N	N	Y	B	-

CASE_ID	STATE_HWY_	CALTRANS_C	CALTRANS_D	STATE_ROUT	ROUTE_SUFF	POSTMILE_P	POSTMILE	LOCATION_T
8694006	N		0	0			0	
8203037	N		0	0			0	
8693248	N		0	0			0	
8200117	N		0	0			0	
8843130	N		0	0			0	
8850669	N		0	0			0	
8529795	N		0	0			0	
8513275	N		0	0			0	
8529827	N		0	0			0	
8079840	N		0	0			0	
8203033	N		0	0			0	
8289782	N		0	0			0	
8203174	N		0	0			0	
9291856	N		0	0			0	
8513204	N		0	0			0	
8757802	N		0	0			0	
8976925	N		0	0			0	
8200109	N		0	0			0	
8651045	N		0	0			0	
9291867	N		0	0			0	
8688983	Y	ALA	4	123	-	-	5.16	H
9286178	Y	ALA	4	123	-	-	4.98	I
8688975	Y	ALA	4	123	-	-	4.99	H
8203196	Y	ALA	4	123	-	-	4.72	H
8504345	Y	ALA	4	123	-	-	4.69	I
9286170	Y	ALA	4	123	-	-	4.49	H
8984084	Y	ALA	4	123	-	-	4.45	H
8504394	Y	ALA	4	123	-	-	4.4	H
8688979	Y	ALA	4	123	-	-	5.1	H
8078048	Y	ALA	4	123	-	-	4.97	I
9286166	Y	ALA	4	123	-	-	4.9	H
8975401	N		0	123			0	
8199548	Y	ALA	4	123	-	-	4.9	H

CASE_ID	RAMP_INTER	SIDE_OF_HW	TOW_AWAY	COLLISIO_1	NUMBER_KIL	NUMBER_INJ	PARTY_COUN	PRIMARY_CO
8694006			Y	3	0	1	2	A
8203037			N	4	0	2	4	A
8693248			N	3	0	1	4	A
8200117			Y	4	0	1	1	A
8843130			N	4	0	2	2	A
8850669			Y	3	0	1	1	A
8529795			N	4	0	1	2	A
8513275			Y	2	0	1	2	A
8529827			N	2	0	1	2	A
8079840			N	3	0	4	3	A
8203033			N	4	0	1	2	A
8289782			N	4	0	1	2	A
8203174			N	3	0	2	2	A
9291856			N	3	0	1	2	A
8513204			N	4	0	1	3	A
8757802			Y	3	0	1	2	A
8976925			N	3	0	1	2	A
8200109			N	4	0	1	2	A
8651045			Y	3	0	3	3	A
9291867			N	3	0	1	2	A
8688983	-	N	N	4	0	1	2	A
9286178	5	S	Y	3	0	1	2	A
8688975	-	N	N	2	0	1	2	A
8203196	-	S	N	4	0	1	2	A
8504345	5	S	N	4	0	1	2	A
9286170	-	N	Y	4	0	2	3	A
8984084	-	S	N	3	0	2	2	A
8504394	-	N	N	3	0	1	2	A
8688979	-	N	N	3	0	1	2	A
8078048	5	S	N	3	0	1	1	A
9286166	-	S	N	3	0	1	2	A
8975401			N	3	0	1	2	A
8199548	-	N	N	4	0	1	2	A

CASE_ID	PCF_CODE_O	PCF_VIOL_C	PCF_VIOLAT	PCF_VIOL_S	HIT_AND_RU	TYPE_OF_CO	MVIW	PED_ACTION	ROAD_SURFA
8694006	-	5	21460	A	N	D	C	A	A
8203037	-	3	22350		N	C	C	A	A
8693248	-	3	22350		N	C	C	A	A
8200117	-	8	22107		N	E	I	A	A
8843130	-	-	0		N	D	C	A	A
8850669	-	1	23153	A	N	E	I	A	A
8529795	-	12	22450	A	N	H	G	A	A
8513275	-	6	21755	A	N	B	C	A	A
8529827	-	11	21954	A	N	G	B	D	A
8079840	-	3	22350		N	C	C	A	A
8203033	-	4	21703		N	C	C	A	A
8289782	-	3	22350		N	C	C	A	A
8203174	-	3	22350		N	C	C	A	A
9291856	-	9	21802	A	N	D	C	A	A
8513204	-	3	22350		N	C	C	A	A
8757802	-	3	22350		N	C	E	A	A
8976925	-	3	22350		N	C	C	A	A
8200109	-	3	22350		N	C	C	A	B
8651045	-	3	22350		N	C	C	A	A
9291867	-	12	21453		N	A	G	A	A
8688983	-	8	22107		N	D	C	A	A
9286178	-	1	23152		N	A	C	A	A
8688975	-	21	22106		N	H	G	A	A
8203196	-	17	22517		N	H	G	A	A
8504345	-	11	21950	B	N	G	B	B	A
9286170	-	3	22350		N	C	C	A	A
8984084	-	3	22350		N	C	C	A	A
8504394	-	9	21804	A	N	H	G	A	A
8688979	-	21	22106		N	H	E	A	A
8078048	-	3	22350		N	E	I	A	A
9286166	-	0	21760	B	N	H	G	A	A
8975401	-	9	21804	A	N	H	G	A	A
8199548	-	0	22804	A	N	D	G	A	A

CASE_ID	ROAD_COND_	ROAD_COND1	LIGHTING	CONTROL_DE	CHP_ROAD_T	PEDESTRIAN	BICYCLE_AC	MOTORCYCLE
8694006	H	-	A	D	0			Y
8203037	H	-	A	D	0			
8693248	H	-	B	A	0			
8200117	H	-	A	D	0			
8843130	H	-	C	A	0			
8850669	H	-	C	A	0			
8529795	H	-	A	A	0		Y	
8513275	H	-	A	D	0			Y
8529827	H	-	A	D	0	Y		
8079840	H	-	A	D	0			
8203033	H	-	A	D	0			
8289782	H	-	A	D	0			
8203174	H	-	A	D	0			
9291856	H	-	C	D	0			
8513204	H	-	A	A	0			
8757802	H	-	A	D	0			Y
8976925	G	-	A	D	0			
8200109	H	-	A	D	0			
8651045	H	-	C	A	0			
9291867	H	-	A	A	0		Y	
8688983	H	-	A	D	0			
9286178	H	-	C	D	0			
8688975	H	-	A	D	0		Y	
8203196	H	-	C	D	0		Y	
8504345	H	-	C	A	0	Y		
9286170	H	-	A	D	0			
8984084	H	-	A	A	0			
8504394	H	-	A	D	0		Y	
8688979	H	-	A	D	0			
8078048	H	-	C	D	0			Y
9286166	H	-	A	D	0		Y	
8975401	H	-	C	D	0		Y	
8199548	H	-	A	D	0		Y	

CASE_ID	TRUCK_ACCI	NOT_PRIVAT	ALCOHOL_IN	STWD_VEHTY	CHP_VEHTYP	COUNT_SEVE	COUNT_VISI	COUNT_COMP
8694006		Y		A	7	0	1	0
8203037		Y		A	8	0	0	2
8693248		Y		A	1	0	1	0
8200117		Y		A	1	0	0	1
8843130		Y		-	-	0	0	2
8850669		Y	Y	A	1	0	1	0
8529795		Y		L	4	0	0	1
8513275		Y		C	2	1	0	0
8529827		Y		N	60	1	0	0
8079840		Y		A	1	0	1	3
8203033		Y		A	1	0	0	1
8289782		Y		A	1	0	0	1
8203174		Y		A	1	0	1	1
9291856		Y		A	1	0	1	0
8513204		Y		A	8	0	0	1
8757802		Y		C	3	0	1	0
8976925		Y		A	1	0	1	0
8200109		Y		A	1	0	0	1
8651045		Y	Y	A	8	0	2	1
9291867		Y		A	1	0	1	0
8688983		Y		A	1	0	0	1
9286178		Y	Y	A	1	0	1	0
8688975		Y		A	1	1	0	0
8203196		Y		A	7	0	0	1
8504345		Y		N	60	0	0	1
9286170		Y		A	1	0	0	2
8984084		Y		A	1	0	2	0
8504394		Y		A	7	0	1	0
8688979		Y		-	99	0	1	0
8078048		Y		C	2	0	1	0
9286166		Y		A	1	0	1	0
8975401		Y		A	8	0	1	0
8199548		Y		A	1	0	0	1

CASE_ID	COUNT_PED_	COUNT_PED1	COUNT_BICY	COUNT_BI_1	COUNT_MC_K	COUNT_MC_I	PRIMARY_RA	SECONDARY1
8694006	0	0	0	0	0	1	-	-
8203037	0	0	0	0	0	0	-	-
8693248	0	0	0	0	0	0	-	-
8200117	0	0	0	0	0	0	-	-
8843130	0	0	0	0	0	0	-	-
8850669	0	0	0	0	0	0	-	-
8529795	0	0	0	1	0	0	-	-
8513275	0	0	0	0	0	1	-	-
8529827	0	1	0	0	0	0	-	-
8079840	0	0	0	0	0	0	-	-
8203033	0	0	0	0	0	0	-	-
8289782	0	0	0	0	0	0	-	-
8203174	0	0	0	0	0	0	-	-
9291856	0	0	0	0	0	0	-	-
8513204	0	0	0	0	0	0	-	-
8757802	0	0	0	0	0	1	-	-
8976925	0	0	0	0	0	0	-	-
8200109	0	0	0	0	0	0	-	-
8651045	0	0	0	0	0	0	-	-
9291867	0	0	0	1	0	0	-	-
8688983	0	0	0	0	0	0	-	-
9286178	0	0	0	0	0	0	-	-
8688975	0	0	0	1	0	0	-	-
8203196	0	0	0	1	0	0	-	-
8504345	0	1	0	0	0	0	-	-
9286170	0	0	0	0	0	0	-	-
8984084	0	0	0	0	0	0	-	-
8504394	0	0	0	1	0	0	-	-
8688979	0	0	0	0	0	0	-	-
8078048	0	0	0	0	0	1	-	-
9286166	0	0	0	1	0	0	-	-
8975401	0	0	0	1	0	0	-	-
8199548	0	0	0	1	0	0	-	-

CASE_ID	LATITUDE	LONGITUDE	COUNTY	CITY	POINT_X	POINT_Y
8694006	0	0	ALAMEDA	ALBANY	-122.3077469	37.88718033
8203037	0	0	ALAMEDA	ALBANY	-122.3061288	37.88739237
8693248	0	0	ALAMEDA	ALBANY	-122.3038483	37.88758087
8200117	0	0	ALAMEDA	ALBANY	-122.3000593	37.88768884
8843130	0	0	ALAMEDA	ALBANY	-122.298529	37.887846
8850669	37.8874588	-122.3038025	ALAMEDA	ALBANY	-122.3038025	37.8874588
8529795	0	0	ALAMEDA	ALBANY	-122.3036435	37.88758681
8513275	0	0	ALAMEDA	ALBANY	-122.299931	37.887748
8529827	0	0	ALAMEDA	ALBANY	-122.3009479	37.8906907
8079840	0	0	ALAMEDA	ALBANY	-122.29987	37.88756
8203033	0	0	ALAMEDA	ALBANY	-122.2946003	37.88735438
8289782	0	0	ALAMEDA	ALBANY	-122.2934495	37.8875821
8203174	0	0	ALAMEDA	ALBANY	-122.2900638	37.8882726
9291856	37.88827133	-122.2900238	ALAMEDA	ALBANY	-122.2900085	37.88828278
8513204	0	0	ALAMEDA	ALBANY	-122.2869444	37.88912622
8757802	0	0	ALAMEDA	ALBANY	-122.2826004	37.88917923
8976925	0	0	ALAMEDA	ALBANY	-122.2969953	37.88689755
8200109	0	0	ALAMEDA	ALBANY	-122.2907047	37.88813959
8651045	0	0	ALAMEDA	ALBANY	-122.2887497	37.88853455
9291867	37.89057922	-122.2935791	ALAMEDA	ALBANY	-122.2935791	37.89056015
8688983	0	0	ALAMEDA	ALBANY	-122.301445	37.8980751
9286178	0	0	ALAMEDA	ALBANY	-122.3006287	37.89512634
8688975	0	0	ALAMEDA	ALBANY	-122.3005524	37.89530182
8203196	0	0	ALAMEDA	ALBANY	-122.2992225	37.89076523
8504345	0	0	ALAMEDA	ALBANY	-122.2990616	37.89026014
9286170	37.88759995	-122.298439	ALAMEDA	ALBANY	-122.2980652	37.88755798
8984084	37.88677979	-122.29776	ALAMEDA	ALBANY	-122.2980118	37.88696289
8504394	0	0	ALAMEDA	ALBANY	-122.2976628	37.88630832
8688979	0	0	ALAMEDA	ALBANY	-122.3010635	37.89693451
8078048	0	0	ALAMEDA	ALBANY	-122.3005821	37.89496974
9286166	37.89355087	-122.3004074	ALAMEDA	ALBANY	-122.3002243	37.89385223
8975401	37.89421082	-122.2999802	ALAMEDA	ALBANY	-122.3001785	37.89414597
8199548	0	0	ALAMEDA	ALBANY	-122.3000927	37.89387377

CASE_ID	ACCIDENT_Y	PROC_DATE	JURIS	COLLISION_	COLLISION1	Hour	OFFICER_ID	REPORTING_	DAY_OF_WEE	CHP_SHIFT
8289692	2016	2017-01-30	102	2016-12-11	1821	18	JT0628	1	7	5
8689080	2018	2018-09-18	102	2018-06-11	1918	19	JR0612	2	1	5
8849318	2019	2019-08-21	102	2019-01-29	1050	10	DL0626	5	2	5
8748626	2018	2018-12-18	102	2018-10-16	1243	12	JT0628	1	2	5
8529788	2017	2018-01-11	102	2017-01-20	1916	19	CO0613	4	5	5
8199572	2016	2017-01-10	102	2016-07-26	1857	18	CO0613	3	2	5
8529823	2017	2018-01-11	102	2017-06-19	1557	15	SW0618		1	5
9291880	2020	2021-07-14	102	2020-10-06	1904	19	TP237998	4	2	5
8693256	2018	2018-09-27	102	2018-01-19	832	8	TA0619	4	5	5
8529767	2017	2018-01-11	102	2017-09-11	759	7	LL0615	5	1	5
8529775	2017	2018-03-05	102	2017-09-27	2159	21	CO0613	5	3	5
9291912	2020	2021-07-14	102	2020-11-12	1807	18	LL0615	5	4	5
8693268	2018	2018-09-18	102	2018-01-23	919	9	EC0624	5	2	5
8078436	2016	2016-07-15	102	2016-05-17	1654	16	MG0620	4	2	5
8693323	2018	2018-09-18	102	2018-05-01	1111	11	JR0612	3	2	5
8529796	2017	2018-01-11	102	2017-01-27	2303	23	MP0622	4	5	5
8693252	2018	2018-09-18	102	2018-01-13	1507	15	EC0624	4	6	5
8976933	2019	2019-11-20	102	2019-05-18	1117	11	HM92142	5	6	5
8749281	2018	2018-12-18	102	2018-08-22	1546	15	CO0613		3	5
8078467	2016	2016-07-19	102	2016-05-28	1132	11	TA0619	4	6	5
8529780	2017	2018-01-11	102	2017-02-28	1812	18	LL0615	4	2	5
8976427	2019	2019-11-22	102	2019-08-15	2331	23	JR0612	1	4	5
8976929	2019	2019-11-20	102	2019-05-23	2031	20	DW190456	4	4	5
9291871	2020	2021-07-12	102	2020-12-21	1750	17	MD236619	1	1	5
8529495	2017	2018-01-12	102	2017-12-17	1452	14	EC0624	1	7	5
8684454	2018	2018-09-10	102	2018-07-25	1717	17	DL0626	5	3	5
8083479	2016	2016-07-19	102	2016-02-03	1938	19	DH0611	5	3	5
9291892	2020	2021-07-14	102	2020-10-15	2044	20	JR0612	5	4	5
8504398	2017	2018-07-06	102	2017-10-16	1250	12	MP0622	1	1	5
9286174	2020	2021-07-16	102	2020-10-30	1625	16	DL0626	2	5	5
8504382	2017	2018-06-14	102	2017-05-09	1753	17	LL0615	1	2	5
8083491	2016	2016-07-19	102	2016-01-25	845	8	LL0615	5	1	5
8849655	2019	2019-08-21	102	2019-03-02	1123	11	DL0626	5	6	5

CASE_ID	POPULATION	CNTY_CITY_	SPECIAL_CO	BEAT_TYPE	CHP_BEAT_T	CITY_DIVIS	CHP_BEAT_C	BEAT_NUMBE
8289692	3	102	0	0	0	0	0	1
8689080	3	102	0	0	0	0	0	1
8849318	3	102	0	0	0	0	0	2
8748626	3	102	0	0	0	0	0	1
8529788	3	102	0	0	0	0	0	2
8199572	3	102	0	0	0	0	0	1
8529823	3	102	0	0	0	0	0	1
9291880	3	102	0	0	0	0	0	2
8693256	3	102	0	0	0	0	0	2
8529767	3	102	0	0	0	0	0	2
8529775	3	102	0	0	0	0	0	2
9291912	3	102	0	0	0	0	0	2
8693268	3	102	0	0	0	0	0	2
8078436	3	102	0	0	0	0	0	2
8693323	3	102	0	0	0	0	0	1
8529796	3	102	0	0	0	0	0	2
8693252	3	102	0	0	0	0	0	2
8976933	3	102	0	0	0	0	0	2
8749281	3	102	0	0	0	0	0	1
8078467	3	102	0	0	0	0	0	2
8529780	3	102	0	0	0	0	0	2
8976427	3	102	0	0	0	0	0	1
8976929	3	102	0	0	0	0	0	2
9291871	3	102	0	0	0	0	0	1
8529495	3	102	0	0	0	0	0	1
8684454	3	102	0	0	0	0	0	2
8083479	3	102	0	0	0	0	0	2
9291892	3	102	0	0	0	0	0	2
8504398	3	102	0	0	0	0	0	1
9286174	3	102	0	0	0	0	0	1
8504382	3	102	0	0	0	0	0	1
8083491	3	102	0	0	0	0	0	2
8849655	3	102	0	0	0	0	0	2

CASE_ID	PRIMARY_RD	SECONDARY_	DISTANCE	DIRECTION	INTERSECTI	Intersec_1	WEATHER_1	WEATHER_2
8289692	SAN PABLO AV	WASHINGTON	162	S	N	Y	A	-
8689080	SAN PABLO AV	WASHINGTON AV	80	S	N	Y	A	-
8849318	SAN PABLO AV	MARIN AV	365	S	N	N	A	-
8748626	SAN PABLO AV	SAN PABLO AV 400	32		N	Y	A	-
8529788	SANTA FE	SOLANO	13	S	N	Y	C	-
8199572	SANTA FE	UTILITY POLE #110279154	6	S	N	Y	A	-
8529823	SANTA FE AV	MARIN	1029	S	N	N	A	-
9291880	SANTA FE AV	POLE #110253328	119	S	N	Y	A	-
8693256	SANTA FE AV	MARIN	200	N	N	Y	B	-
8529767	SOLANO	CLEVELAND	202	E	N	Y	A	-
8529775	SOLANO	MADISON	13	E	N	Y	A	-
9291912	SOLANO	LIGHT STANDARD #1102534	63	N	N	Y	A	-
8693268	SOLANO	STANNAGE	14	E	N	Y	A	-
8078436	SOLANO	SANTA FE	55	W	N	Y	A	-
8693323	SOLANO	CURTIS	86	E	N	Y	A	-
8529796	SOLANO	NEILSON	73	E	N	Y	A	-
8693252	SOLANO	ORDWAY	50	W	N	Y	A	-
8976933	SOLANO	KAINS	118	W	N	Y	C	-
8749281	SOLANO AV	CARMEL	33	N	N	Y	A	-
8078467	SOLANO AV	SAN CARLOS	95	W	N	Y	A	-
8529780	SOLANO AV	PERALTA AV	65	E	N	Y	A	-
8976427	SOLANO AV	TAYLOR ST	40	E	N	Y	A	-
8976929	SOLANO AV	PERALTA	11	W	N	Y	A	-
9291871	WASHINGTON	ADAMS ST	590	W	N	N	A	-
8529495	BRIGHTON	SAN PABLO AV	0		Y	Y	A	-
8684454	MARIN	MASONIC	0		Y	Y	A	-
8083479	MARIN	MASONIC	0		Y	Y	A	-
9291892	MARIN AV	MASONIC AV	0		Y	Y	A	-
8504398	SAN PABLO	BRIGHTON	0		Y	Y	A	-
9286174	SAN PABLO	BRIGHTON	0		Y	Y	A	-
8504382	SAN PABLO	GARFIELD AV	0		N	Y	A	-
8083491	SAN PABLO	MARIN	0		Y	Y	A	-
8849655	SAN PABLO	MARIN	0		Y	Y	B	-

CASE_ID	STATE_HWY_	CALTRANS_C	CALTRANS_D	STATE_ROUT	ROUTE_SUFF	POSTMILE_P	POSTMILE	LOCATION_T
8289692	N		0	0			0	
8689080	Y	ALA	4	123	-	-	4.77	I
8849318	Y	ALA	4	123	-	-	4.36	H
8748626	N		0	0			0	
8529788	N		0	0			0	
8199572	N		0	0			0	
8529823	N		0	0			0	
9291880	N		0	0			0	
8693256	N		0	0			0	
8529767	N		0	0			0	
8529775	N		0	0			0	
9291912	N		0	0			0	
8693268	N		0	0			0	
8078436	N		0	0			0	
8693323	N		0	0			0	
8529796	N		0	0			0	
8693252	N		0	0			0	
8976933	N		0	0			0	
8749281	N		0	0			0	
8078467	N		0	0			0	
8529780	N		0	0			0	
8976427	N		0	0			0	
8976929	N		0	0			0	
9291871	N		0	0			0	
8529495	N		0	0			0	
8684454	N		0	0			0	
8083479	N		0	0			0	
9291892	N		0	0			0	
8504398	Y	ALA	4	123	-	-	5.09	I
9286174	Y	ALA	4	123	-	-	5.09	I
8504382	Y	ALA	4	123	-	-	4.98	H
8083491	N		0	0			0	
8849655	Y	ALA	4	123	-	-	4.43	I

CASE_ID	RAMP_INTER	SIDE_OF_HW	TOW_AWAY	COLLISIO_1	NUMBER_KIL	NUMBER_INJ	PARTY_COUN	PRIMARY_CO
8289692			N	4	0	1	2	A
8689080	5	N	N	4	0	1	2	A
8849318	-	N	N	3	0	1	2	A
8748626			Y	4	0	2	2	A
8529788			N	4	0	1	2	A
8199572			N	3	0	1	2	A
8529823			Y	3	0	1	1	A
9291880			Y	3	0	1	1	A
8693256			N	2	0	1	3	C
8529767			N	3	0	1	2	A
8529775			N	2	0	1	2	D
9291912			N	3	0	1	2	A
8693268			N	3	0	4	2	A
8078436			N	3	0	1	3	A
8693323			N	3	0	1	2	A
8529796			N	4	0	1	2	A
8693252			N	3	0	1	2	A
8976933			N	4	0	1	2	-
8749281			N	3	0	1	2	A
8078467			N	4	0	1	2	A
8529780			N	3	0	1	2	A
8976427			Y	3	0	1	3	A
8976929			N	2	0	1	2	D
9291871			N	2	0	1	2	A
8529495			N	3	0	1	2	A
8684454			Y	2	0	2	4	A
8083479			N	4	0	1	2	A
9291892			N	3	0	1	2	A
8504398	5	N	N	4	0	1	2	A
9286174	5	N	N	4	0	1	2	A
8504382	-	S	Y	2	0	1	3	A
8083491			N	4	0	1	2	A
8849655	5	N	N	2	0	3	3	A

CASE_ID	PCF_CODE_O	PCF_VIOL_C	PCF_VIOLAT	PCF_VIOL_S	HIT_AND_RU	TYPE_OF_CO	MVIW	PED_ACTION	ROAD_SURFA
8289692	-	1	23152	A	N	C	C	A	A
8689080	-	11	21955		N	G	B	D	A
8849318	-	8	22107		F	B	B	E	A
8748626	-	9	21804		N	H	C	A	A
8529788	-	10	21950	A	N	G	B	B	B
8199572	-	17	22517		N	H	G	A	A
8529823	-	1	23152		M	C	E	A	A
9291880	-	3	22350		N	A	J	A	A
8693256	-	18	0		N	H	G	A	A
8529767	-	11	21954	A	N	H	B	D	A
8529775	-	0	0		N	B	C	A	A
9291912	-	10	21950	A	N	G	B	B	A
8693268	-	9	21802	A	N	D	C	A	A
8078436	-	3	22350		N	C	C	A	A
8693323	-	3	22350		N	H	G	A	A
8529796	-	3	22350		N	C	E	A	A
8693252	-	4	21703		N	C	C	A	A
8976933	-	-	0		N	C	D	A	B
8749281	-	3	22350		N	C	C	A	A
8078467	-	-	0		N	D	B	E	A
8529780	-	6	21750	A	N	D	G	A	A
8976427	-	1	23152	A	N	B	E	A	A
8976929	-	0	0		F	H	C	A	A
9291871	-	8	22107		N	F	E	A	A
8529495	-	0	22950	A	N	G	B	B	A
8684454	-	12	21453	A	F	D	C	A	A
8083479	-	10	21950	A	N	G	B	B	A
9291892	-	9	21801	A	N	H	G	A	A
8504398	-	8	22107		N	D	C	A	A
9286174	-	10	21950		N	A	B	B	A
8504382	-	8	22107		N	C	C	A	A
8083491	-	3	22350		N	C	C	A	A
8849655	-	12	21453	A	F	D	C	A	A

CASE_ID	ROAD_COND_	ROAD_COND1	LIGHTING	CONTROL_DE	CHP_ROAD_T	PEDESTRIAN	BICYCLE_AC	MOTORCYCLE
8289692	H	-	C	D	0			
8689080	H	-	A	D	0	Y		
8849318	H	-	A	D	0	Y		
8748626	H	-	A	D	0			
8529788	H	-	C	A	0	Y		
8199572	H	-	A	D	0		Y	
8529823	H	-	A	D	0			
9291880	H	-	C	D	0			
8693256	H	-	A	D	0		Y	
8529767	H	-	A	D	0	Y		
8529775	H	-	C	D	0			Y
9291912	H	-	C	D	0	Y		
8693268	H	-	A	A	0			
8078436	H	-	A	D	0			
8693323	H	-	A	D	0		Y	
8529796	H	-	C	D	0			
8693252	H	-	A	D	0			
8976933	H	-	A	D	0			
8749281	H	-	A	D	0			
8078467	H	-	A	D	0	Y		
8529780	H	-	A	D	0		Y	
8976427	H	-	C	D	0			
8976929	H	-	B	D	0			Y
9291871	H	-	B	D	0			
8529495	H	-	A	A	0	Y		
8684454	H	-	A	A	0			
8083479	H	-	C	A	0	Y		
9291892	H	-	C	A	0		Y	
8504398	H	-	A	A	0			Y
9286174	H	-	A	A	0	Y		
8504382	H	-	A	D	0			
8083491	H	-	A	A	0			Y
8849655	H	-	A	A	0			

CASE_ID	TRUCK_ACCI	NOT_PRIVAT	ALCOHOL_IN	STWD_VEHTY	CHP_VEHTYP	COUNT_SEVE	COUNT_VISI	COUNT_COMP
8289692		Y	Y	A	1	0	0	1
8689080		Y		N	60	0	0	1
8849318		Y		A	7	0	1	0
8748626		Y		A	1	0	0	2
8529788		Y		A	1	0	0	1
8199572		Y		A	1	0	1	0
8529823		Y	Y	-		0	1	0
9291880		Y	Y	A	1	0	1	0
8693256		Y		-	-	1	0	0
8529767		Y		N	60	0	1	0
8529775		Y		-	-	1	0	0
9291912		Y		A	1	0	1	0
8693268		Y		D	22	0	4	0
8078436		Y		A	1	0	1	0
8693323		Y		L	4	0	1	0
8529796		Y		A	1	0	0	1
8693252		Y		A	1	0	1	0
8976933		Y		-	-	0	0	1
8749281		Y		A	1	0	1	0
8078467		Y		-	-	0	0	1
8529780		Y		L	4	0	1	0
8976427		Y	Y	A	1	0	1	0
8976929		Y	Y	-	-	1	0	0
9291871		Y		A	1	1	0	0
8529495		Y		A	1	0	1	0
8684454		Y		E	23	1	1	0
8083479		Y		A	1	0	0	1
9291892		Y		L	4	0	1	0
8504398		Y		A	1	0	0	1
9286174		Y		A	1	0	0	1
8504382		Y		A	1	1	0	0
8083491		Y		A	1	0	0	1
8849655		Y		A	1	1	2	0

CASE_ID	COUNT_PED_	COUNT_PED1	COUNT_BICY	COUNT_BI_1	COUNT_MC_K	COUNT_MC_I	PRIMARY_RA	SECONDARY1
8289692	0	0	0	0	0	0	-	-
8689080	0	1	0	0	0	0	-	-
8849318	0	1	0	0	0	0	-	-
8748626	0	0	0	0	0	0	-	-
8529788	0	1	0	0	0	0	-	-
8199572	0	0	0	1	0	0	-	-
8529823	0	0	0	0	0	0	-	-
9291880	0	0	0	0	0	0	-	-
8693256	0	0	0	1	0	0	-	-
8529767	0	1	0	0	0	0	-	-
8529775	0	0	0	0	0	1	-	-
9291912	0	1	0	0	0	0	-	-
8693268	0	0	0	0	0	0	-	-
8078436	0	0	0	0	0	0	-	-
8693323	0	0	0	1	0	0	-	-
8529796	0	0	0	0	0	0	-	-
8693252	0	0	0	0	0	0	-	-
8976933	0	0	0	0	0	0	-	-
8749281	0	0	0	0	0	0	-	-
8078467	0	1	0	0	0	0	-	-
8529780	0	0	0	1	0	0	-	-
8976427	0	0	0	0	0	0	-	-
8976929	0	0	0	0	0	1	-	-
9291871	0	0	0	0	0	0	-	-
8529495	0	1	0	0	0	0	-	-
8684454	0	0	0	0	0	0	-	-
8083479	0	1	0	0	0	0	-	-
9291892	0	0	0	1	0	0	-	-
8504398	0	0	0	0	0	0	-	-
9286174	0	1	0	0	0	0	-	-
8504382	0	0	0	0	0	0	-	-
8083491	0	0	0	0	0	1	-	-
8849655	0	0	0	0	0	0	-	-

CASE_ID	LATITUDE	LONGITUDE	COUNTY	CITY	POINT_X	POINT_Y
8289692	0	0	ALAMEDA	ALBANY	-122.299482	37.89189863
8689080	0	0	ALAMEDA	ALBANY	-122.2993774	37.89165115
8849318	37.88573074	-122.2973175	ALAMEDA	ALBANY	-122.2974854	37.88575363
8748626	0	0	ALAMEDA	ALBANY	-122.3015821	37.89811964
8529788	0	0	ALAMEDA	ALBANY	-122.2887789	37.8907954
8199572	0	0	ALAMEDA	ALBANY	-122.288537	37.890074
8529823	0	0	ALAMEDA	ALBANY	-122.2892676	37.88596794
9291880	37.88607025	-122.2889328	ALAMEDA	ALBANY	-122.289163	37.88618816
8693256	0	0	ALAMEDA	ALBANY	-122.288269	37.8891983
8529767	0	0	ALAMEDA	ALBANY	-122.3065908	37.88879494
8529775	0	0	ALAMEDA	ALBANY	-122.300676	37.88996785
9291912	37.89017868	-122.2980881	ALAMEDA	ALBANY	-122.2980881	37.89017868
8693268	0	0	ALAMEDA	ALBANY	-122.2970734	37.89037323
8078436	0	0	ALAMEDA	ALBANY	-122.2889804	37.89082253
8693323	0	0	ALAMEDA	ALBANY	-122.2873535	37.89092255
8529796	0	0	ALAMEDA	ALBANY	-122.2863278	37.89097593
8693252	0	0	ALAMEDA	ALBANY	-122.2847214	37.89107132
8976933	0	0	ALAMEDA	ALBANY	-122.2983955	37.89030936
8749281	37.89113998	-122.2809067	ALAMEDA	ALBANY	-122.2901764	37.89076996
8078467	0	0	ALAMEDA	ALBANY	-122.2896284	37.89079068
8529780	0	0	ALAMEDA	ALBANY	-122.2854052	37.89103249
8976427	37.88953018	-122.3040009	ALAMEDA	ALBANY	-122.3040009	37.88953018
8976929	0	0	ALAMEDA	ALBANY	-122.2856365	37.89102071
9291871	37.89315033	-122.3008728	ALAMEDA	ALBANY	-122.3024979	37.89175034
8529495	0	0	ALAMEDA	ALBANY	-122.3009999	37.89672991
8684454	37.8853302	-122.2968597	ALAMEDA	ALBANY	-122.2926407	37.88774872
8083479	0	0	ALAMEDA	ALBANY	-122.2926399	37.88774991
9291892	37.88774109	-122.2926636	ALAMEDA	ALBANY	-122.2926407	37.88774872
8504398	0	0	ALAMEDA	ALBANY	-122.3009973	37.89673145
9286174	37.8967514	-122.3009567	ALAMEDA	ALBANY	-122.3009949	37.89673233
8504382	0	0	ALAMEDA	ALBANY	-122.3006307	37.89512519
8083491	0	0	ALAMEDA	ALBANY	-122.29784	37.88676995
8849655	0	0	ALAMEDA	ALBANY	-122.2977982	37.88672638

CASE_ID	ACCIDENT_Y	PROC_DATE	JURIS	COLLISION_	COLLISION1	Hour	OFFICER_ID	REPORTING_	DAY_OF_WEE	CHP_SHIFT
8203193	2016	2017-03-02	102	2016-10-31	1830	18	LL0615	5	1	5
8689121	2018	2018-10-25	102	2018-07-11	2208	22	CO0613	1	3	5
9286182	2020	2021-07-16	102	2020-10-26	1713	17	TP237998	1	1	5
8200121	2016	2017-01-03	102	2016-11-11	1639	16	CO0613	5	5	5
8975708	2019	2019-12-03	102	2019-10-30	1516	15	PO0623	2	3	5
8689119	2018	2018-09-18	102	2018-03-01	1736	17	CO0613	1	4	5
8975728	2019	2020-01-03	102	2019-10-14	1636	16	JT0628	1	1	5
8765118	2018	2019-01-11	102	2018-09-24	1616	16	DL0626	1	1	5
8851008	2018	2019-06-24	102	2018-12-13	1434	14	TA0619	1	4	5
8504349	2017	2018-06-14	102	2017-06-20	1835	18	PO0623	2	2	5
8689125	2018	2018-10-25	102	2018-07-10	2113	21	JR0612	1	2	5
9286186	2020	2021-07-16	102	2020-12-14	808	8	TP237998	5	1	5
8201763	2016	2017-01-04	102	2016-08-21	1716	17	DH0611	5	7	5
8529772	2017	2018-01-11	102	2017-03-10	755	7	JT0628	1	5	5
8083614	2016	2016-07-19	102	2016-03-18	1701	17	DH0611	5	5	5
8197667	2016	2017-03-03	102	2016-11-23	1803	18	DH0611	2	3	5
8757806	2018	2018-12-19	102	2018-10-01	1915	19	AJ0625	4	1	5
8983912	2019	2019-12-02	102	2019-07-23	1103	11	DH0611	5	2	5
8083471	2016	2016-07-19	102	2016-02-25	1734	17	LL0615	2	4	5
8843136	2018	2019-05-03	102	2018-12-17	2129	21	AJ0625	2	1	5
8850130	2019	2019-08-21	102	2019-02-11	2140	21	SW0618	5	1	5
8979942	2019	2019-12-05	102	2019-06-13	1452	14	PO0623	1	4	5

CASE_ID	POPULATION	CNTY_CITY_	SPECIAL_CO	BEAT_TYPE	CHP_BEAT_T	CITY_DIVIS	CHP_BEAT_C	BEAT_NUMBE
8203193	3	102	0	0	0	0	0	2
8689121	3	102	0	0	0	0	0	1
9286182	3	102	0	0	0	0	0	1
8200121	3	102	0	0	0	0	0	2
8975708	3	102	0	0	0	0	0	1
8689119	3	102	0	0	0	0	0	1
8975728	3	102	0	0	0	0	0	1
8765118	3	102	0	0	0	0	0	1
8851008	3	102	0	0	0	0	0	1
8504349	3	102	0	0	0	0	0	1
8689125	3	102	0	0	0	0	0	1
9286186	3	102	0	0	0	0	0	2
8201763	3	102	0	0	0	0	0	2
8529772	3	102	0	0	0	0	0	1
8083614	3	102	0	0	0	0	0	2
8197667	3	102	0	0	0	0	0	1
8757806	3	102	0	0	0	0	0	2
8983912	3	102	0	0	0	0	0	2
8083471	3	102	0	0	0	0	0	1
8843136	3	102	0	0	0	0	0	1
8850130	3	102	0	0	0	0	0	2
8979942	3	102	0	0	0	0	0	1

CASE_ID	PRIMARY_RD	SECONDARY_	DISTANCE	DIRECTION	INTERSECTI	Intersec_1	WEATHER_1	WEATHER_2
8203193	SAN PABLO	MONROE AV	0	N	N	Y	C	-
8689121	SAN PABLO	PORTLAND	0		Y	Y	A	-
9286182	SAN PABLO	PORTLAND AV	0		Y	Y	A	-
8200121	SAN PABLO	SAN PABLO 1031	0		N	Y	A	-
8975708	SAN PABLO	SAN PABLO 431	0		Y	Y	A	-
8689119	SAN PABLO	SAN PABLO 540	0		-	Y	A	-
8975728	SAN PABLO AV	BRIGHTON AV	0		Y	Y	A	-
8765118	SAN PABLO AV	BRIGHTON AV	0		Y	Y	A	-
8851008	SAN PABLO AV	GARFIELD AV	0		Y	Y	A	-
8504349	SAN PABLO AV	GARFIELD AV	0		Y	Y	A	-
8689125	SAN PABLO AV	GARFIELD AV	0		Y	Y	A	-
9286186	SAN PABLO AV	MARIN AV	0		Y	Y	A	-
8201763	SAN PABLO AV	MARIN AV	0		Y	Y	A	-
8529772	SAN PABLO AV	SAN PABLO AV 600 BLOCK	0		N	Y	A	-
8083614	SAN PABLO AV	SAN PABLO AV 1045	0		Y	Y	A	-
8197667	SAN PABLO AV	SAN PABLO AV 563	0		-	Y	A	-
8757806	SOLANO	PERALTA AV	0		Y	Y	A	-
8983912	SOLANO	SOLANO AV 1164	0		-	Y	A	-
8083471	SOLANO	STANNAGE	0		Y	Y	A	-
8843136	SOLANO	STANNAGE	0		Y	Y	A	-
8850130	SOLANO AV	SAN PABLO AV	0		Y	Y	A	-
8979942	SOLANO AV	SOLANO AV 1057	0		N	Y	A	-

CASE_ID	STATE_HWY_	CALTRANS_C	CALTRANS_D	STATE_ROUT	ROUTE_SUFF	POSTMILE_P	POSTMILE	LOCATION_T
8203193	Y	ALA	4	123	-	-	4.3	H
8689121	Y	ALA	4	123	-	-	4.87	I
9286182	Y	ALA	4	123	-	-	4.87	I
8200121	N		0	0			0	
8975708	N		0	123			0	
8689119	Y	ALA	4	123	-	-	5.07	H
8975728	N		0	123			0	
8765118	Y	ALA	4	123	-	-	5.09	I
8851008	Y	ALA	4	123	-	-	4.97	I
8504349	Y	ALA	4	123	-	-	4.97	I
8689125	Y	ALA	4	123	-	-	4.97	I
9286186	Y	ALA	4	123	-	-	4.43	I
8201763	N		0	0			0	
8529772	N		0	0			0	
8083614	N		0	0			0	
8197667	Y	ALA	4	123	-	-	5	H
8757806	N		0	0			0	
8983912	N		0	0			0	
8083471	N		0	0			0	
8843136	N		0	0			0	
8850130	Y	ALA	4	123	-	-	4.69	I
8979942	N		0	0			0	

CASE_ID	RAMP_INTER	SIDE_OF_HW	TOW_AWAY	COLLISIO_1	NUMBER_KIL	NUMBER_INJ	PARTY_COUN	PRIMARY_CO
8203193	-	N	N	2	0	1	2	A
8689121	5	S	N	2	0	1	2	A
9286182	5	S	N	3	0	1	2	A
8200121			Y	4	0	1	4	A
8975708			N	3	0	1	2	A
8689119	-	S	N	4	0	1	2	A
8975728			N	4	0	1	2	A
8765118	5	S	N	2	0	3	4	A
8851008	5	S	N	4	0	1	3	A
8504349	5	S	N	3	0	1	2	A
8689125	5	N	N	3	0	1	2	A
9286186	5	S	N	3	0	2	2	D
8201763			N	4	0	1	2	A
8529772			N	4	0	1	2	A
8083614			N	4	0	1	2	A
8197667	-	N	N	4	0	1	2	A
8757806			N	3	0	1	2	A
8983912			N	3	0	1	1	A
8083471			N	3	0	1	2	A
8843136			Y	2	0	2	2	A
8850130	6	N	N	3	0	1	2	A
8979942			Y	2	0	2	1	D

CASE_ID	PCF_CODE_O	PCF_VIOL_C	PCF_VIOLAT	PCF_VIOL_S	HIT_AND_RU	TYPE_OF_CO	MVIW	PED_ACTION	ROAD_SURFA
8203193	-	9	21801	A	N	D	G	A	B
8689121	-	10	21950	A	F	G	B	B	A
9286182	-	10	21950	A	N	A	B	B	A
8200121	-	9	21801	A	N	D	C	A	A
8975708	-	9	21804		N	G	B	F	A
8689119	-	17	22517		N	G	B	E	A
8975728	-	10	21950	A	N	G	B	B	A
8765118	-	10	21950	A	N	G	B	B	A
8851008	-	3	22350		N	C	C	A	A
8504349	-	10	21950	A	N	G	B	B	A
8689125	-	8	22107		N	A	C	A	A
9286186	-	0	0		N	A	C	A	-
8201763	-	8	22107		N	B	E	A	A
8529772	-	3	22350		N	C	C	A	A
8083614	-	8	22107		N	H	G	A	A
8197667	-	3	22350		N	C	C	A	A
8757806	-	1	23153	A	N	G	B	B	A
8983912	-	21	22106		N	E	I	A	A
8083471	-	9	21802	A	N	H	G	A	A
8843136	-	9	21804	A	N	D	C	A	A
8850130	-	11	21950	B	N	G	B	D	A
8979942	-	0	0		N	E	I	A	A

CASE_ID	ROAD_COND_	ROAD_COND1	LIGHTING	CONTROL_DE	CHP_ROAD_T	PEDESTRIAN	BICYCLE_AC	MOTORCYCLE
8203193	H	-	B	D	0		Y	
8689121	H	-	C	D	0	Y		
9286182	H	-	A	D	0	Y		
8200121	H	-	B	A	0			
8975708	H	-	A	D	0	Y		
8689119	H	-	A	D	0	Y		
8975728	H	-	A	A	0	Y		
8765118	H	-	A	A	0	Y		
8851008	H	-	A	D	0			
8504349	H	-	A	A	0	Y		
8689125	H	-	C	D	0			Y
9286186	H	-	A	A	0			
8201763	H	-	A	D	0		Y	
8529772	H	-	A	D	0			
8083614	H	-	A	D	0		Y	
8197667	H	-	C	D	0			
8757806	H	-	C	D	0	Y		
8983912	H	-	A	D	0			
8083471	H	-	A	D	0		Y	
8843136	H	-	C	A	0			
8850130	H	-	C	A	0	Y		
8979942	D	-	A	D	0			

CASE_ID	TRUCK_ACCI	NOT_PRIVAT	ALCOHOL_IN	STWD_VEHTY	CHP_VEHTYP	COUNT_SEVE	COUNT_VISI	COUNT_COMP
8203193		Y		A	1	1	0	0
8689121		Y	Y	-		1	0	0
9286182		Y		-	99	0	1	0
8200121		Y		A	1	0	0	1
8975708		Y		A	1	0	1	0
8689119		Y		N	60	0	0	1
8975728		Y		A	1	0	0	1
8765118		Y		D	22	1	2	0
8851008		Y		D	22	0	0	1
8504349		Y		A	1	0	1	0
8689125		Y		A	1	0	1	0
9286186		Y		-	-	0	2	0
8201763		Y		L	4	0	0	1
8529772		Y		A	7	0	0	1
8083614		Y		A	7	0	0	1
8197667		Y		A	1	0	0	1
8757806		Y	Y	A	1	0	1	0
8983912		Y		A	7	0	1	0
8083471		Y		-		0	1	0
8843136		Y		A	1	1	1	0
8850130		Y	Y	N	60	0	1	0
8979942		Y	Y	-	-	1	1	0

CASE_ID	COUNT_PED_	COUNT_PED1	COUNT_BICY	COUNT_BI_1	COUNT_MC_K	COUNT_MC_I	PRIMARY_RA	SECONDARY1
8203193	0	0	0	1	0	0	-	-
8689121	0	1	0	0	0	0	-	-
9286182	0	1	0	0	0	0	-	-
8200121	0	0	0	0	0	0	-	-
8975708	0	1	0	0	0	0	-	-
8689119	0	1	0	0	0	0	-	-
8975728	0	1	0	0	0	0	-	-
8765118	0	3	0	0	0	0	-	-
8851008	0	0	0	0	0	0	-	-
8504349	0	1	0	0	0	0	-	-
8689125	0	0	0	0	0	1	-	-
9286186	0	0	0	0	0	0	-	-
8201763	0	0	0	1	0	0	-	-
8529772	0	0	0	0	0	0	-	-
8083614	0	0	0	1	0	0	-	-
8197667	0	0	0	0	0	0	-	-
8757806	0	1	0	0	0	0	-	-
8983912	0	0	0	0	0	0	-	-
8083471	0	0	0	1	0	0	-	-
8843136	0	0	0	0	0	0	-	-
8850130	0	1	0	0	0	0	-	-
8979942	0	0	0	0	0	0	-	-

CASE_ID	LATITUDE	LONGITUDE	COUNTY	CITY	POINT_X	POINT_Y
8203193	0	0	ALAMEDA	ALBANY	-122.2972236	37.88491981
8689121	37.88529968	-122.2969894	ALAMEDA	ALBANY	-122.3000565	37.89334106
9286182	0	0	ALAMEDA	ALBANY	-122.3000565	37.89334106
8200121	0	0	ALAMEDA	ALBANY	-122.2975946	37.88578586
8975708	37.89720917	-122.3006973	ALAMEDA	ALBANY	-122.3011093	37.89707184
8689119	0	0	ALAMEDA	ALBANY	-122.301033	37.89645767
8975728	37.89667892	-122.3012924	ALAMEDA	ALBANY	-122.3010941	37.89673615
8765118	0	0	ALAMEDA	ALBANY	-122.3010864	37.89671326
8851008	0	0	ALAMEDA	ALBANY	-122.3005829	37.89496994
8504349	0	0	ALAMEDA	ALBANY	-122.3005821	37.89496974
8689125	37.89714813	-122.3005219	ALAMEDA	ALBANY	-122.3004532	37.89499283
9286186	37.88648987	-122.2979126	ALAMEDA	ALBANY	-122.2979202	37.88668442
8201763	0	0	ALAMEDA	ALBANY	-122.29784	37.88676995
8529772	0	0	ALAMEDA	ALBANY	-122.30061	37.895494
8083614	0	0	ALAMEDA	ALBANY	-122.2972459	37.88523547
8197667	0	0	ALAMEDA	ALBANY	-122.300598	37.89545844
8757806	0	0	ALAMEDA	ALBANY	-122.2856293	37.89102173
8983912	37.89028168	-122.2966919	ALAMEDA	ALBANY	-122.2966919	37.89028168
8083471	0	0	ALAMEDA	ALBANY	-122.2971199	37.89036999
8843136	0	0	ALAMEDA	ALBANY	-122.2971191	37.89036942
8850130	0	0	ALAMEDA	ALBANY	-122.2989426	37.89028168
8979942	0	0	ALAMEDA	ALBANY	-122.2992781	37.89024164

APPENDIX C: PUBLIC COMMENTS WITH MAP INPUT TOOL

Respondent ID	#	LAT LONG	Location	Name	Comments Received	Mode	Pertinent Issues
6o78ope9dsy2	182	POINT (-122.287556 37.891945)	Through St	Curtis St	Speeding cars on 800 block of Curtis. Also people parking in red zone at Curtis and Solano while picking up food from corner restaurants.	Motor Vehicle	Speeding
3ps7wni2eze4	112	POINT (-122.293528 37.890499)	Intersection- Primary St	Masonic Avenue/ Solano Avenue	Far too many cars going along Solano run ride lights at the intersection with Masonic.	Motor Vehicle	Traffic Signal/Signs Violation
3ps7wni2eze4	113	POINT (-122.292625 37.887703)	Intersection-Primary St	Marin Avenue/Masonic Avenue	Far too many cars driving along Marin run red lights at the intersection with Masonic.	Motor Vehicle	Traffic Signal/Signs Violation
8c2p6grh83j3	150	POINT (-122.300879 37.89605)	Intersection-Secondary St	Clay St/San Pablo Avenue	The cars heading south on San Pablo Ave do not always see the red traffic light at that Clay St-San Pablo Ave intersection. Even when the light for the San Pablo Ave traffic is red, cars have shot through the red light without stopping. It is as if they did not actually see the red light. I have been on the Clay Street side waiting for the green light, and could have been T-bone by cars going south on San Pablo because they did not stop for their red light. This has happened many times over the past years. It is a very dangerous intersection.	Motor Vehicle	Traffic Signal/Signs Violation
2z83xxr9ui63	217	POINT (-122.288193 37.888685)	Intersection-Primary St	Marin Avenue/Santa Fe Avenue	Location: 900 block of Santa Fe Ave between Marin and Solano. (I can't make the app work to draw the line…) There are traffic signals at both ends of this block, and drivers routinely speed up or down the block, presumably in the hope of "beating" the lights before they turns red. It's dangerous and will be even more so once Marin School is back in session. Surely, the city should be able to install a speed hump or two to slow traffic here.	Motor Vehicle	Traffic Signal/Signs Violation
73zeg8rgg9b9	239	POINT (-122.292654 37.887754)	Primary St	Masonic Avenue	School crossings a concern here. Drivers run red lights	Motor Vehicle	Traffic Signal/Signs Violation
8hf6wsz3gfr8	256	POINT (-122.297825 37.886749)	Intersection-Primary	San Pablo Avenue/Marin Avenue	People run red lights here all the time. So dangerous	Motor Vehicle	Traffic Signal/Signs Violation
3hc3lsc4tyd3	261	POINT (-122.293378 37.890634)	Primary St	Solano Avenue	Motorists run red lights at the intersection of Solano and Masonic when kids are walking to school. Lots of kids use this intersection. Can we get a red light camera and/or a dedicated turn lane?	Motor Vehicle	Traffic Signal/Signs Violation
3uxw9nek62n4	3	POINT (-122.289886 37.896774)	Through St	Carmel Avenue	Speeding cars (speeding down Carmel Ave towards & away from park) making it unsafe for pedestrians & kids.	Pedestrian	Speeding
6tg8kzl8wk96	9	POINT (-122.300993 37.887596)	Primary St	Buchanan Street	Kids often cross here but the cars are traveling at high speed	Motor Vehicle	Speeding
49zhp92pgr33	19	POINT (-122.30603 37.889606)	Intersection- Secondary St	Washington Avenue/Pierce St	Needed is a 4h way stop sign where Washington intersects with Pierce Street. Cars are speeding down Pierce Street on way to freeway. They go zooming through the intersection. Because of a street incline you don't see them coming.	Motor Vehicle	Speeding
8v8bgo4s97f8	27	POINT (-122.302074 37.89159)	Through St	Jackson St	So many cars speeding on Jackson. The block between solano and Washington needs speed bumps or other traffic calming and/or the city needs to do something to get the through traffic to stay on San Pablo.	Motor Vehicle	Speeding
94rfe8oyk6m3	31	POINT (-122.292614 37.889664)	Secondary St	Key Route Blvd	Because of the traffic on Marin, when the light on Marin (cross section of Masonic) cars turn down key route boulevard and speed to get around the light. We've only lived here for a few months and see cars going over 40-50 mph down this narrow street each week	Motor Vehicle	Speeding

7t8eyz74xbx3	33	POINT (-122.292589 37.884701)	Intersection-Secodnary St	Dartmouth St/ Evelyn Avenue	We need a stop sign. Kitten was killed due to fast driver on Dartmouth.	Motor Vehicle	Speeding
9pz6p6lez6bj	38	POINT (-122.296864 37.892373)	Intersection-Primary St	Washington Avenue/Cornell Avenue	Put up stop signs and paint crosswalks so that kids can cross that intersection safely. Cars don't stop for the kids without a stop sign in place!!	Pedestrian	Speeding
7d3z9evh36v7	39	POINT (-122.308055 37.887499)	Primary St	Buchanan St	Unsafe for pedestrians. The digital sign is super weak and drivers blast through the intersection. Should be either no right turn on red heading west on Buchanan or better notification of people in the crosswalk.	Pedestrian	Speeding
2l4hy6o9ph99	40	POINT (-122.295058 37.889487)	Secndary St	Talbot Avenue	Vehicle Speeding	Motor Vehicle	Speeding
2l4hy6o9ph99	41	POINT (-122.296059 37.889908)	Secndary St	Cornell Avenue	Traffic Speeding	Motor Vehicle	Speeding
2l4hy6o9ph99	42	POINT (-122.294795 37.89779)	Primary St	Brighton Avenue	Traffic Speeding	Motor Vehicle	Speeding
2l4hy6o9ph99	43	POINT (-122.294573 37.897532)	Secondary St	San Gabriel Avenue	Traffic Speeding	Motor Vehicle	Speeding
2l4hy6o9ph99	44	POINT (-122.292714 37.895783)	Primary St	Key Route Blvd	Traffic Speeding	Motor Vehicle	Speeding
2l4hy6o9ph99	45	POINT (-122.288482 37.887956)	Primary St	Santa Fe Avenue	Traffic Speeding	Motor Vehicle	Speeding
2l4hy6o9ph99	46	POINT (-122.302677 37.893205)	Through St	Jackson St	Traffic Spedding	Motor Vehicle	Speeding
2l4hy6o9ph99	47	POINT (-122.284102 37.884386)	Through St	Posen Avenue	Traffic Speeding	Motor Vehicle	Speeding
2l4hy6o9ph99	48	POINT (-122.287201 37.888382)	Through St	Curtis St	Traffic Speeding	Motor Vehicle	Speeding
2l4jod73m998	49	POINT (-122.301606 37.889772)	Intersection- Primary St	Solano Avenue/ Jackson St	Cars Zoom through the stop sign while coming down the hill - one pedestrian killed here, several kids have been struck over the years	Motor Vehicle	Speeding
2l4jod73m998	50	POINT (-122.301754 37.890332)	Through St	Jackson St	No stop signs coming down Jackson, cars often speed on their way out towards the highway	Motor Vehicle	Speeding
4xx4syj63ci6	51	POINT (-122.294434 37.887372)	Primary St	Marin Avenue	Children cross for school, cars blast through the blinking lights. We have almost been hit there and our crossing guard has had countless close calls.	Motor Vehicle	Speeding
4xx4syj63ci6	53	POINT (-122.287025 37.88907)	Intersection-Secondary St	Curtis St/Marin Avenue	Cars blow through the flashing lights at fast speeds.	Motor Vehicle	Speeding
27l6mjy7a929	54	POINT (-122.300223 37.893149)	Intersection-Secondary St	San Pablo Avenue/ Portland Avenue	900 block of Kains has turned into a speedway. Drivers heading South are using it to avoid lights at Solano. Speed bumps like OTHER streets have would help this dangerous problem. Police could monitor speeds as well. They ocassionally put car counters on the street but that is it. Surely the number of cars should cause concern if nothing else.	Motor Vehicle	Speeding
439tbl8398j8	60	POINT (-122.295674 37.885986)	Through St	Stannage Avenue	Due to Kains being a one way, Stannage gets a lot more cars and we see people driving insanely fast down the road. Can we install speed bumps?	Motor Vehicle	Speeding
9hd224odk298	68	POINT (-122.292847 37.894922)	Secondary St	Portland Avenue	Drivers at stop don't look for cars at all the other stops.	Motor Vehicle	Speeding
9hd224odk298	69	POINT (-122.292933 37.892896)	Secondary St	Washington Avenue	Drivers at stop don't look for cars at all the other stops.	Motor Vehicle	Speeding
9hd224odk298	70	POINT (-122.29278 37.89676)	Secondary St	Thousand Oaks Boulevard	Drivers at stop don't look for cars at all the other stops.	Motor Vehicle	Speeding
3ofl83jp6m38	79	POINT (-122.294424 37.887411)	Intersection-Secondary St	Marin Avenue/ Talbot Avenue	Despite the pedestrian lights, an occasional crossing guard, occasional police presence and heaps of children, drivers on Marin tear through this intersection. I've seen a driver frustrated by drivers stopped for pedestrians, so she used the turn lane to go straight. There were 5 children - two in strollers - and two adults actively crossing in each direction at the time.	Motor Vehicle	Speeding
2lpn9dzg8z87	103	POINT (-122.298312 37.890313)	Primary St	Solana Avenue	Some sort of speed reduction mechanisms for vehicles are needed here. When I'm eating outdoors at Zaytoon I regularly see vehicles speeding on this section of Solano to try to catch a green/ yellow light at San Pablo.	Motor Vehicle	Speeding

89hcr69gz7u8	117 POINT (-122.295623 37.883284)	Through St	Kains Avenue	Drivers are driving pretty fast in this section and many children are threatened by cars. It will be nice to have speed bumps in the road.	Pedestrian	Speeding
9h9j7nsc6pa9	122 POINT (-122.296337 37.885323)	Through St	Kains Avenue	Cars drive very fast down this stretch of Kains Ave, especially when traffic is slow on San Pablo Ave	Motor Vehicle	Speeding
8c2p6grh83j3	151 POINT (-122.302563 37.895733)	Through St-Intersection	Madison Street	There is no stop sign here or any sign to warn cars to slow down. Cars going west up Clay street sometimes speed up the hill and turn left or right onto Madison St without stopping. The drivers don't stop to see if there are any cars coming, especially from the north side of Madison St. Most cars brake in time when they suddenly notice a car on Madison St approaching Clay St, but it's dangerous that there is no traffic sign to at least tell cars to be careful and slow down.	Motor Vehicle	Speeding
3uu7rsg43cn3	161 POINT (-122.283926 37.889349)	Primary St	Marin Avenue	This is a very dangerous crosswalk. Cars are moving fast down the hill and don't always see pedestrians. Cars also do not slow down to take the turn off of Marin onto Ordway towards Solano. Can we add crossing lights at this intersection and road "bumps/reflectors" at the Marin/Ordway NE corner? There use to be bumps/reflectors at the corner, but they have disappeared from wear over time. Thank you.	Motor Vehicle	Speeding
33p7n6ci9r7n	164 POINT (-122.286936 37.88726)	Through St	Neilson Street	Speeding vehicles on a narrow residential street with children	Motor Vehicle	Speeding
8ld6umd7kag3	191 POINT (-122.302984 37.888547)	Through St	Polk St	Speeding up and down the hill despite a speed bump	Motor Vehicle	Speeding
8ld6umd7kag3	192 POINT (-122.304322 37.889259)	Primary St	Solano Avenue	People speed up and down the hill well past the posted 15 mph posted limit. They speed up the hill to keep momentum and they speed down the hill because they gain speed from going down the hill.	Motor Vehicle	Speeding
7422fda93ud9	196 POINT (-122.301641 37.889964)	Through St	Jackson St	Problems with speeding cars on Jackson between solano and Washington because cars take jackson to avoid San Pablo and also cars run the stop sign at solano and jackson.	Motor Vehicle	Speeding
7422fda93ud9	197 POINT (-122.302174 37.891739)	Intersection -Through St	Jackson St/ Washington Avenue	Cars speed down washington and jackson to avoid San Pablo and ignore the stop signs.	Motor Vehicle	Speeding
2nv2f6m9gxy4	207 POINT (-122.288413 37.8897)	Primary St	Sant Fe Avenue	I live on Santa Fe, between Marin and Solano. Backing up from my driveway is very dangerous because a lot of cars are speeding between the 2 traffic lights (Marin/Santa Fe and Solano/Santa Fe). Please add a speed bump on my block, cars are going way too fast. Thank you!	Motor Vehicle	Speeding
4aj4njz7wy9u	209 POINT (-122.300034 37.887719)	Priamry St	Buchanan St	Many drivers heading west from this location either do not stop or think they have their own lane as they proceed after stopping (when they are supposed to yield to and merge with westbound traffic on Marin). I have had many close calls at this corner.	Motor Vehicle	Speeding
36rgy83jbr33	213 POINT (-122.288307 37.889275)	Primary St	Santa Fe Avenue	Drivers speed on Santa Fe between Marin and Solano. Speed bumps would help slow them down.	Motor Vehicle	Speeding

7e3mpi3ire76	214 POINT (-122.288276 37.889203)	Primary St	Santa Fe Avenue	Cars drive way too fast trying to catch the green lights both at the corner of Santa Fe and Solano and Santa Fe and Marin. Many cars run red lights there. We need speed bumps to slow these cars down. Also the “walk” light at Crossing Solano north/south is too short for elderly and disabled people to make it accross.	Motor Vehicle	Speeding
48orj7oah4z4	218 POINT (-122.288499 37.889895)	Primary St	Santa Fe Avenue	Traffic on Santa Fe Avenue between Marin and Solano goes way too fast. I want to see at least one speed bump put on this block. It has always been a problem, but traffic seems to be speeding up. When Marin School reopens it will be a terrible accident waiting to happen.	Motor Vehicle	Speeding
6fu7koh4tm8w	219 POINT (-122.288321 37.889598)	Primary St	Santa Fe Avenue	Speed of vehicles along Santa Fe between Solano Ave and Marin	Motor Vehicle	Speeding
9zp3uxh4yiu8	245 POINT (-122.288578 37.890167)	Secondary Street	Santa Fe Avenue	The volume and speed of traffic on the 900 block of Santa Fe is high. With the speed bumps in the 1000 block of Santa Fe and the curve in the 800 block, the 900 block becomes the speedway. With stop lights on both ends, it can function like a freeway on ramp - significant acceleration and just getting from here to there. The traffic is lighter currently with the temporary closure of Marin Elementary, but there is often a steady stream of kids, bikes and parents up and down the sidewalk.	Motor Vehicle	Speeding
3og7fuv632oc	260 POINT (-122.288803 37.890781)	Primary St	Santa Fe Avenue	The 900 block of Santa Fe Ave. is the only residential block in the city with FOUR collisions noted on the collision map! We desperately need some speed bumps.	Motor Vehicle	Speeding
3hc3lsc4tyd3	262 POINT (-122.292644 37.887779)	Primary St	Masonic Avenue	People go fast through here and I’ve seen collisions. It is too much for my 11 year old to navigate solo	Motor Vehicle	Speeding
79iza3j8iih4	269 POINT (-122.29862 37.897927)	Through St	Cornell Avenue	Cars move too fast on 400 block of Cornell Avenue. The speed bump that exists has minimal impact to speeding cars, especially cars coming from El Cerrito Plaza into Cornell Ave. Can the existing bump be change to slow down the traffic to 15 miles/hour?	Motor Vehicle	Speeding
9r7i46llx9m4	280 POINT (-122.292653 37.887743)	Intersection-Primary	Marin Avenue/Masonic Avenue	The southwest corner lacks a curb and this allows/enourages drivers to cut the right turn from Marin to Masonic at high speed and dangerously close to pedestrians. Adults, children, and dogs are at risk.	Motor Vehicle	Speeding
4so66beg9x2f	293 POINT (-122.286994 37.886898)	Secondary St	Neilson Street	Speeding	Motor Vehicle	Speeding
292jv8m8p6xv	302 POINT (-122.284633 37.887332)	Secondary/Through Street	Sonoma Avenue	Cars speed down street to avoid driving on Marin	Motor Vehicle	Speeding

					Santa Fe. Ave/Key Route Blvd. This location is a very dangerous intersection for pedestrians and drivers. I have seen multiple cars going through the Key Route Blvd./ Santa Fe. Ave. intersection. Stop sign Not stopping and almost hitting pedestrians. There needs to be a obstacle that will prevent drivers from turning in the middle of Santa Fe. Ave. Vehicles coming from Gilman Street are driving Way over the speed limit. Santa Fe. and Key Route is a large intersection with NO crosswalks and very dangerous to cross in ANY direction. Please do not wait till there is a serious injury/death at this intersection.		
63elp7fyi698	96	POINT (-122.290363 37.883365)	Secondary St	Key Route Blvd	Thank You.	Motor Vehicle	Traffic Signal/Signs Violation
3y6plc7dk773	115	POINT (-122.29995 37.887779)	Primary St	Bachanan St	Cars on Buchanan, coming from San Pablo Ave, often do not stop. They think it's a merge, and just roll through the stop sign, nearly getting into accidents with cars turning off Madison or cars coming down Marin.	Motor Vehicle	Traffic Signal/Signs Violation
7xc7tor3nzm4	156	POINT (-122.292661 37.896631)	Primary St	Keu Route Blvd	STOP legend has been obliterated on NB Key Route, just south of Thousand Oaks. Suggest applying a new STOP legend.	Motor Vehicle	Traffic Signal/Signs Violation
292jv8m8p6xv	303	POINT (-122.285297 37.8874)	Intersection-Secondary	PeraltaVaenue/Sonoma Avenue	Cars often do not stop at stop sign, particularly in the morning when children are walking to school.	Motor Vehicle	Traffic Signal/Signs Violation
67xjh8879iv8	20	POINT (-122.291521 37.887776)	Primary St	Marin Avenue	I had difficulty pinning the exact location: Solano and Jackson has a 4-way stop. Vehicles regularly do NOT stop. A friend said the stop signs are treated as "suggestions."	Motor Vehicle	Traffic Signal/Signs Violation
8wh6pit8lxl6	6	POINT (-122.288202 37.888656)	Intersection-Primary St	Marin Avenue	Incredibly dangerous intersection. Rampant running of red lights in all directions and périplo Turing into pedestrian crosswalks before they are done crossing. There is an elementary school and a preschool at this intersection yet even with a crossing guard people constantly run red lights. More police presence is needed to ticket people.	Motor Vehicle	Traffic Signal/Signs Violation
6c38ibf66yz7	75	POINT (-122.29256 37.88778)	Intersection-Primary St	Marin Avenue/Marin Avenue	I have seen many vehicles run red lights here, which is especially dangerous given the number of pedestrians and bikes that are present.	Ped/Bike	Traffic Signal/Signs Violation
24jzu2kiv489	57	POINT (-122.291876 37.894888)	Secondary St	Portland Avenue	This intersection is used by families all day, pretty much non-stop. I see at least 1 car a day, usually more, blow through the stop sign barely slowing down. Love seeing the crossing guards there for drop off times, but outside of school hours the stop sign is often ignored.	Motor Vehicle	Traffic Signal/Signs Violation
24jzu2kiv489	58	POINT (-122.292829 37.894905)	Secondary St	Portland Avenue	See a lot of young drivers going through this stop sign during rush hours that are following close behind the car in front of them so that they do not have to stop.	Motor Vehicle	Traffic Signal/Signs Violation
4so66beg9x2f		POINT (-122.286994 37.886898)	Through St	Neilson St	Speeding	Motor Vehicle	Speeding
292jv8m8p6xv		POINT (-122.287831 37.888838)	Primary St	Marin Avenue	Drivers rarely follow speed limit. Pedestrian crossing is dangerous unless it's at traffic lights. Cars do not stop for pedestrians.	Motor Vehicle	Speeding
292jv8m8p6xv		POINT (-122.284633 37.887332)	Through St	Sonoma Avenue	Cars speed down street to avoid driving on Marin	Motor Vehicle	Speeding

Respondent ID	#	Lat Long	Location	Name	Comments Received	Mode	Pertinent Issues
6wz8c44zh8t7	1	LINESTRING (-122.294444 37.892961, -122.294125 37.893015, -122.294048 37.892827, -122.294361 37.892789, -122.294459 37.892957)	Primary St	Masonic Avenue	I have almost been hit here and have personally witnessed four different times where people, including children, have almost been hit.	Pedestrian	Pedestrian Safety
6wz8c44zh8t7	2	LINESTRING (-122.284761 37.891187, -122.284182 37.891215, -122.284153 37.891043, -122.284627 37.891024, -122.284749 37.891196)	Primary St	Solano Avenue	There is not enough light in this area. At night it is hard for drivers to see pedestrians. Twice I have almost been hit.	Pedestrian	Lighting
6wz8c44zh8t7	3	LINESTRING (-122.297868 37.890403, -122.295387 37.890544, -122.295396 37.890417, -122.297853 37.890288, -122.297877 37.890401)	Primary St	Solano Avenue	Cars zoom past this heavy foot traffic area.	Motor Vehicle	Speeding
6wz8c44zh8t7	4	LINESTRING (-122.304692 37.896109, -122.304018 37.894457, -122.303845 37.89449, -122.304501 37.896198, -122.304692 37.896142)	Local St	Taft Street	Dozens of cars, driven by mainly young teenagers, drive very fast up this hill and park there. It is neither enjoyable or safe for pedestrians or cyclists who go up this park. Those in the cars rarely get out of their cars but only to dump their trash.	Motor Vehicle	Speeding
2rd6hpf7eve4	5	LINESTRING (-122.281425 37.891237, -122.281526 37.891152)	Intersection- Secondary St	Solano Avenue/Ensenada Avenue	All Solano Ave....heavy trucks up and down need re-routing, Safeway @ Curtis: giant trucks in/out of parking lot...terrible & City of Albany permitted this, continues to permit this...to permit such a large grocery w/o rear loading/truck parking: venal and shows no concern for all the customers walking in/out of parking lot...who must deal with very large semi-trucks...how much did Safeway pay Zoning official for their permit...unconscionable (sp?)!	Motor Vehicle	Large Trucks
3uz7cjg96nz6	6	LINESTRING (-122.28946 37.88489, -122.289579 37.884909, -122.289653 37.884849, -122.28982 37.884868)	Through St	Franscis St	Cars do not stop for pedestrians	Motor Vehicle	Speeding
4ly8uln2lor6	7	LINESTRING (-122.292737 37.8878, -122.292737 37.8878, -122.292483 37.887865, -122.292418 37.887695, -122.292722 37.887634, -122.29279 37.887821, -122.292483 37.887865)	Primary St	Masonic Avenue	-Constant near misses as cars habitually run red lights particularly east-west on Marin. -Cyclists (and sometimes runners/pedestrians) flying through the intersection on the SB/NB trail don't realize cars are making left turns SB from Masonic onto Marin and also have a green light - and those drivers don't realize cyclists can come quickly from behind them going straight.	Ped/Bike	Lighting
2pe678zpf77a	8	LINESTRING (-122.298923 37.890326, -122.293392 37.890601)	Intersection- Primary St	San Pablo Avenue	Biking on Solano always seems unsafe. All of Solano Ave is pretty narrow, but especially this part. There is no space for bikes, and cars pulling out of bay parking have a hard time seeing bikers. I bike from the Ohlone Greenway to my job on Solano and Evelyn. When I make I right from Masonic towards Evelyn, and between the street being too narrow and the added sidewalk bay, there is no space for a bike and I´m always afraid of being hit. I realize there might not be any good solutions because of space, but I thought I´d express my concern anyway. Thanks!	Bicycle	Bicycle Safety
6jwx8yxo8er4	9	LINESTRING (-122.297592 37.886609, -122.289398 37.888135, -122.285849 37.88949)	Primary St	Marin Avenue	Pedestrian safety: at intersections without traffic lights, cars (often going above the speed limit) do not reliably stop for pedestrians in crosswalks. As a driver, it's also very hard to see pedestrians at night, particularly when crosswalk ends are hidden by parked cars	Pedestrian	Pedestrian Safety
6jwx8yxo8er4	10	LINESTRING (-122.30116 37.897563, -122.299176 37.8909, -122.296902 37.88374)	Primary St	San Pablo Avenue	Biking on San Pablo never feels safe, but it's an important business corridor with lots of places that people might want to get to by bike. In addition to a lack of bike lanes, bike parking is inadequate.	Bicycle	Bicycle Safety

6jwx8yxo8er4	11	LINESTRING (-122.295987 37.892586, -122.297975 37.89851)	Intersection-Through St	Washington Ave/Talbot Avenue	Talbot Ave is marked as a bicycle boulevard south of Washington. North of that, the markings disappear. Also, many blocks have uneven pavement and potholes, which are unpleasant at best and dangerous at worst for cyclists. Not unique to Talbot.	Bicycle	Bicycle Safety
84izu9mao9y6	12	LINESTRING (-122.297731 37.895624, -122.29536 37.890577)	Through St	Evelyn Avenue	Drivers not stopping at stop signs and/or looking at their phones while driving. I live near Cornell/Garfield and I'm shocked by how many drivers run through stop signs in the whole neighborhood on all streets (Garfield/Talbot intersection seems the worst) between here and Cornell Elementary. Some barely slow down at all, maybe slowing to 15-20 mph and this happens in the mornings when kids are walking to school. And some of them are texting, reading their phones while driving.	Motor Vehicle	Intersection Safety
36caf6k84sd7	13	LINESTRING (-122.34544 37.890319, -122.303998 37.894569, -122.298784 37.892087)	Primary St	Marin Avenue	I am not able to see the map very well. My concern is about most of Marin Ave. As a pedestrian, it feels very unsafe to cross the street except at a light.	Pedestrian	Lighting
8he6vn7akh76	14	LINESTRING (-122.28959 37.888738, -122.291715 37.887971, -122.289384 37.888383)	Primary St	Marin Avenue	Cars driving west on Marin turn at too fast a speed northbound on Carmel, Ramona, Pomona and Key Route. There are no marked cross walks there. During evening commute the cars are often driving blind but still turning fast	Pedestrian	Pavement Condition
8he6vn7akh76	15	LINESTRING (-122.296942 37.890356, -122.293352 37.890523, -122.293323 37.890607, -122.293156 37.890569, -122.288471 37.890833)	Primary St	Solano Avenue	Illegal crossing of the double yellow line into parking stalls, stops traffic in both directions. Many requests to the police to issue citations have not stopped it. We have no idea what a car is going to do on Solano and its just dangerous.	Motor Vehicle	Intersection Safety
8he6vn7akh76	16	LINESTRING (-122.291849 37.892741, -122.301515 37.872454, -122.291917 37.890851)	Through St	Pomona Avenue	Speed bumps should be considered for the 900 block of Pomona. Cars speed down at 40+ as a shortcut to Marin.	Motor Vehicle	Speeding
6vi2yo2uv36r	17	LINESTRING (-122.289989 37.894828, -122.28828 37.894785)	Intersection- Through St	Portland Avenue/ Carmel Avenue	Cars speed through these two blocks of Portland Ave on their way to/from Santa Fe Ave to Carmel Ave/Memorial Park/Albany High. A stop sign on Portland Ave at San Carlos or speed bumps would do a lot to reduce speeding. Given the amount of foot traffic due to proximity to the school/park, getting cars to slow down would help increase pedestrian safety.	Motor Vehicle	Speeding
4ez8j76ilr4g	18	LINESTRING (-122.290007 37.894835, -122.288353 37.894785)	Intersection- Through St	Portland Avenue/ Carmel Avenue	People consistently speed going east on this segment of Portland, after the stop sign at Carmel. This is an area where there are many pedestrians, as we are right next to the park and the high school.	Motor Vehicle	School Safety
9ay7mv6swm87	19	LINESTRING (-122.298374 37.890176, -122.287736 37.891047)	Primary St	Solana Avenue	Cars, bikes, pedestrians all mix on Solano. Tru traffic should be directed to Marin.	Motor Vehicle/Ped/Bike	Intersection Safety
9ay7mv6swm87	20	LINESTRING (-122.292764 37.894957, -122.287047 37.894817)	Primary St	Key Route Blvd	Portland Ave sees a lot of bikers, yet cars move too quickly for comfort. By the park, the angled parking forces bikers into the same lane as cars.	Bicycle	Bicycle Safety
9ay9lu9jfx23	21	LINESTRING (-122.296591 37.883871, -122.296594 37.883895, -122.296001 37.884015, -122.29171 37.884881)	Secondary St	Dartmouth Street	The street surfacing is awful and dangerous after the repairs. As a main throughfare to the Ohlone Greenway for cyclists, this needs to be smoothed immediately. Better yet, remove its access to San Pablo with bollards to reduce further car traffic.	Motor Vehicle	Pavement Condition
9ay9lu9jfx23	22	LINESTRING (-122.29762 37.885742, -122.297815 37.886311, -122.297827 37.886345, -122.297902 37.886565)	Secondary St	Buchanan Marin Bikeway	These cycle tracks should be connected. As it is, the segment on San Pablo goes nowhere. Better yet, after connecting to the Marin cycle track, extend it all the way north on San Pablo to El Cerrito!	Bicycle	Bicycle Safety

9ay9lu9jfx23	23	LINESTRING (-122.297688 37.886821, -122.297976 37.886622)	Intersection- Primary Street	San Pablo Avenue/Marin Avenue	Need a safer way for cyclists going westbound in the Marin ave bike lane to reach the cycle track on the south side of the street.	Bicycle	Bicycle Safety
9ay9lu9jfx23	24	LINESTRING (-122.305342 37.887324, -122.305597 37.887273, -122.30629 37.887179)	Secondary St	Buchanan Avenue	This crossing is okay, but would like to see this underpass able to be utilized by cyclists and pedestrians as well.	Ped/Bike	Ped/Bike Safety
9ay9lu9jfx23	25	LINESTRING (-122.303011 37.886377, -122.303252 37.886096)	Secondary St	Buchanan Street	There is not a paved path all the way this entrance to UC Village. Also, the gate here seems unnecessary.	Pedestrian	Pavement Condition
9ay9lu9jfx23	26	LINESTRING (-122.299899 37.890141, -122.300814 37.892991, -122.302352 37.897781, -122.302454 37.8981)	Intersection- Secondary St	Solano Avenue/Adams Street	Two things: there is no North-south bike route on this side of San Pablo that doesn't require biking up the hill (or biking on San Pablo itself, which is so dangerous). Please put in a contra flow bike lane on this street (or better yet, extend the SPA cycle track!). Second, need a bike/ped path crossing Cerrito creek!	Bicycle	Bicycle Safety
2im6a2ig8poo	28	LINESTRING (-122.30373 37.892364, -122.303082 37.894336)	Secondary St	Hillside Avenue	Hillside Avenue between the intersection with Cerrito and ending at Jackson. Cars continue to speed along sometimes 40 mph or more. We have requested 15 mph signs or a speed bump. We were told the speed bumps would take a very long process. How might we get 15 mph signs like the streets adjacent to us have? The street light in front of 927 Hillside is also still out. It's been reported to the city, PG&E came out to fix the wiring A number of months ago. But no lamp has yet been installed. With the darkness and the speeding it's a very dangerous street to be on. And some of the families have young children Who can't really even use their front yards due to concern about the speeding cars. Thank you for your consideration in taking care of this. Respectfully, The Hillside Homeowners Association.	Motor Vehicle	Speeding
2y7fzu9ul9h7	29	LINESTRING (-122.295785 37.897712, -122.295776 37.897708)	Secondary Street	Ohlone Greenway	From Brighton to Solano Ave the Ohlone Greenway is profoundly impacted by pedestrian vs e-vehicle conflicts. Why do I need to share the path with speeding e-powered scooters, bikes, multi passenger vehicles? I just want to walk in peace and there are no options!	Pedestrian	Pedestrian Safety
6ss26ftu4j33	31	LINESTRING (-122.285298 37.889682, -122.284995 37.888648, -122.284823 37.888667, -122.285028 37.889624, -122.285298 37.889637)	Primary Street	Marin Avenue	Firstly, cars speed over the hill at crazy speeds that are unsafe. Apparently it is too steep for a speed bump, but something is needed. It's scary to back out of my driveway. Secondly, when nobody pushes the walk button at Peralta the light is very short yet people regularly try to cross anyway, which leaves them in the crosswalk when cars get the green light to go.	Motor Vehicle	Speeding
6ss26ftu4j33	32	LINESTRING (-122.287113 37.888926, -122.287109 37.888806, -122.286891 37.888936, -122.286949 37.889039, -122.287129 37.888932, -122.287105 37.888861)	Intersection-Through Street	Curtis Street/ Marin Avenue	Parents whip around this corner to drop their kids off - not checking to see if there are people in cross walk. Despite many families coming from the north, there is no crossing guard here. Better protection for kids coming to school using this cross walk is needed.	Motor Vehicle	School Safety
6ah3xh8j3v74	33	LINESTRING (-122.28196 37.889312, -122.285075 37.889567, -122.292043 37.887886)	Primary St	Marin Avenue	Cars do not respect bikes in the bike lane, which is in a lane of traffic with cars parked on curbside. It's a downhill problem as bikes regularly roll at 15-20 mph.	Bicycle	Bicycle Safety
2ec8t7h8fpt6	34	LINESTRING (-122.305685 37.888987, -122.301585 37.889785)	Intersection-Primary	Solano Avenue/Pierce Street	This is a 15mph zone but cars regularly go much faster than that, including as they approach the Jackson & Solano intersection. It is a hill, so speed bumps probably would not work but the signs that show the speed limit and how fast you are going in real time would be helpful.	Motor Vehicle	Speeding

992rbh6e8768	35	LINESTRING (-122.292818 37.890395, -122.292697 37.890037, -122.292708 37.88994, -122.292625 37.889618, -122.29255 37.889401, -122.2925 37.889138, -122.292417 37.888915, -122.292334 37.888717, -122.292275 37.888533, -122.292184 37.888323, -122.292134 37.888099, -122.292059 37.887915, -122.292808 37.89046)	Secondary Street	Key Route Boulevard	People use this block of Key Route to stay off the main streets and are constantly speeding. There are lots of children (from infants to high schoolers) on this block and it's infuriating how people just race through the street! I have sent an email about speed bumps but never received a reply.	Motor Vehicle	School Safety
22a9hxb2jrs9	36	LINESTRING (-122.306815 37.897028, -122.285521 37.883883, -122.289401 37.896505, -122.305017 37.883808)	Secondary Street	Pierce Street	There should be red zones painted at the ends of blocks, particularly on the right side. This would allow better visibility of and for pedestrians crossing streets. This should be done throughout the city, starting with high traffic areas near schools, parks, etc.	Pedestrian	Visibility
4vs8a63p9gr7	37	LINESTRING (-122.292209 37.88724, -122.293349 37.890357)	Secondary St	Ohlone Greenway	Block of Masonic, between Solano and Marin. Speeding cars between lights. Constant. Our block turned in required petition in November 2021. I see today there are speed strips (4/25/2022). Once assessment complete would like to know where to see analysis and/or know when data will be presented and what the methodology is. Would think 2-3 speed limit 25 mph postings and 1-2 speed bumps needed. Thank you!	Motor Vehicle	Speeding
2ko8p2ak92wf	38	LINESTRING (-122.292824 37.890404, -122.292734 37.890309, -122.292824 37.890183, -122.292724 37.890009, -122.292624 37.889804, -122.292554 37.889433, -122.292534 37.88933, -122.292434 37.88903, -122.292294 37.888698, -122.292324 37.888446, -122.292164 37.88824, -122.292174 37.888106, -122.292144 37.887893, -122.292864 37.890507)	Secondary Street	Key Route Boulevard	Drivers use the 900 block of Key Route to go around Masonic, Marin, and Solano traffic. There is excess traffic and they are often speeding on this narrow street. Key Route is also a popular corridor for Albany students walking to and from school.	Motor Vehicle	Road too Narrow
6gc27wha9ru3	39	LINESTRING (-122.292725 37.894951, -122.292586 37.897768)	Intersection-Primary	Key Route Boulevard/Portland Avenue	There should be designated bike lane here	Bicycle	Bicycle Safety
6gc27wha9ru3	40	LINESTRING (-122.282579 37.891222, -122.298872 37.890327, -122.307137 37.888724)	Primary Street	Solano Avenue	There should be designated bike lane here	Bicycle	Bicycle Safety
28wpd739bmz3	41	LINESTRING (-122.295086 37.889836, -122.295278 37.890353, -122.295053 37.889691, -122.294926 37.889315, -122.294812 37.888962, -122.29471 37.88866, -122.294651 37.888535, -122.294609 37.88817, -122.294493 37.88785, -122.294397 37.88763, -122.294313 37.887404, -122.294661 37.887278, -122.295054 37.887216, -122.295173 37.887211, -122.295341 37.88763, -122.295353 37.88795, -122.295515 37.888257, -122.295615 37.888543, -122.29571 37.888863, -122.295832 37.889339, -122.295943 37.889567, -122.295999 37.889925, -122.296074 37.890148, -122.296082 37.890306)	Secondary St	Talbot Avenue	Drop-off time is particularly unsafe in this area. We need to partner with AUSD to study and find some solutions.	Motor Vehicle	Curve Unsafe
9hd224odk298	42	LINESTRING (-122.295171 37.892687, -122.295035 37.892267, -122.294791 37.891513, -122.293569 37.887733)	Intersection-Secondary	Evelyn Avenue/Washington Avenue	Excessive speed and failure to stop at stop signs.	Motor Vehicle	Stop Sign Violation
9hd224odk298	43	LINESTRING (-122.297993 37.89032, -122.297006 37.890374, -122.293722 37.890552, -122.292833 37.8906)	Intersection-Primary	Solano Avenue/Kains Avenue	Cars: Excessive speed, failure to stop for pedestrians at crosswalks, not giving bicyclists enough clearance Bicyclists on sidewalk	Motor Vehicle	Ped/Bike Safety
9hd224odk298	44	LINESTRING (-122.295376 37.890438, -122.294454 37.887529, -122.294435 37.887468)	Intersection-Primary	Solano Avenue/Talbot Avenue	School zone. Excessive speed. Congestion during school pick up and drop off times.	Motor Vehicle	School Safety
9hd224odk298	45	LINESTRING (-122.296251 37.890416, -122.295227 37.887284)	Intersection-Primary	Solano Avenue/Cornell Avenue	School zone. Excessive speed. Congestion during school pick up and drop off times.	Motor Vehicle	School Safety

9hd224odk298	46	LINESTRING (-122.297732 37.886701, -122.290845 37.888127, -122.288338 37.888639, -122.285421 37.889542, -122.282779 37.889136, -122.281797 37.889339)	Intersection- Primary Street	San Pablo Avenue/Marin Avenue	Bicycle lane is not protected. Cross street drivers don't stop at stop signs. Excessive speed.	Bicycle	Bicycle Safety
9hd224odk298	47	LINESTRING (-122.292475 37.8906, -122.282561 37.891212)	Primary Street	Solano Avenue	Crosswalks need better visibility and lighting.	Pedestrian	Visibility
9hd224odk298	48	LINESTRING (-122.306703 37.891773, -122.306262 37.890453)	Primary St	Pierce Street	Not enough parking for playground/park.	Motor Vehicle	Pavement Condition
8l4l4ihy98r4	49	LINESTRING (-122.293464 37.890497, -122.293225 37.890253, -122.293127 37.890246, -122.293119 37.890196, -122.293089 37.889959, -122.293072 37.889846, -122.293049 37.889666, -122.292991 37.889533, -122.292966 37.889436, -122.292918 37.889293, -122.292916 37.889186, -122.29277 37.888837, -122.292752 37.888776, -122.292707 37.888559, -122.292654 37.888478, -122.292551 37.888332, -122.292576 37.888099, -122.292622 37.887885)	Secondary St	Ohlone Greenway	Pedestrian safety limited by speeding electric vehicles on Ohlone Pathway. Sidewalks also pedestrian unsafe due to uneven surfaces from tree roots.	Pedestrian	Pedestrian Safety
648odw6eje76	50	LINESTRING (-122.295493 37.890851, -122.294688 37.888394)	Through St	Talbot Avenue	There is high pedestrian and bike traffic mixed with a great deal of car congestion with school drop-off and pick-ups. My car has been hit here by someone just not paying attention and my children and I have also almost been hit several times on bike and walking. You cannot fit 2 cars safely in the street at once on Talbot and it creates an unsafe situation.	Motor Vehicle	School Safety
648odw6eje76	51	LINESTRING (-122.297725 37.886768, -122.292103 37.887872)	Primary St	Marin Avenue	I have seen several accidents at Masonic and Marin. Cars regularly don't see cyclists in the designated bike lanes. The people on bikes are very vulnerable on this stretch of Marin. We could really use protected bike lanes, not just lines on the street. I'm in near accidents almost every time I take Marin on my bike and my son was almost hit by a driver heading west on Marin who quickly took a left turn when car traffic had an opening and came within feet of hitting my 9 year old on his bike in the bike lane. It's terrifying.	Bicycle	Bicycle Safety
7ee4c2wun7v9	52	LINESTRING (-122.295609 37.897771, -122.29454 37.897783)	Primary St	Brighton Avenue	Pedestrian and bike safety during school drop off and pickup	Ped/Bike	School Safety
3gg23ztu9ds6	53	LINESTRING (-122.297135 37.890567, -122.297181 37.890573, -122.295762 37.890484)	Secondary St	Stannage Avenue	no Street crossings at Solano Ave. and Stannage Ave. as well as Solano Ave. and Cornell Ave. need a sign with a pedestrian crossing button that causes the sign to blink when pressed. I see close calls daily of cars nearly hitting pedestrians because the cars are going fast down Solano and don’t see the pedestrians moving into the street.	Pedestrian	Intersection Safety
4xr72cy8pkp4	54	LINESTRING (-122.286647 37.896698, -122.286783 37.894809, -122.28825 37.894717, -122.288115 37.896668, -122.286609 37.896561)	Secodnary St	Thousand Oaks Blvd	Cars speed down Curtis between Portland and Thousand Oaks. Installing speed bumps would make me feel much more safe.	Motor Vehicle	Speeding
4xr72cy8pkp4	55	LINESTRING (-122.287231 37.896116, -122.287455 37.895233)	Through St	Curtis Street	Cars drive way too fast down Curtis St. between Portland Ave and Thousand Oaks	Motor Vehicle	Speeding
79u2d76b9x73	56	LINESTRING (-122.287254 37.896217, -122.287294 37.895031)	Through St	Curtis Street	Request for speed bumps to prevent cars and trucks from driving excessively fast on what should be a relatively slow street.	Motor Vehicle	Speeding
9ucf9pxv6jf7	57	LINESTRING (-122.288744 37.890847, -122.281365 37.891312)	Intersection-Primary St	Solano Avenue/ Santa Fe Avenue	cars SPEED very fast in this area. Solano Ave should have a 15 mph limit or speed bumps or something	Motor Vehicle	Speeding

882lru3rbe9a	58	LINESTRING (-122.296747 37.883873, -122.290159 37.885176)	Intersection-Secondary St	San Pablo Avenue/ Dartmouth St	Dartmouth is a bicycle boulevard and there are two safety issues: 1) the intersections at the side streets are not red curbed so visibility is very poor for cyclists and drivers 2) EBMUD left this street and many of the side streets in terrible disrepair after construction and it's taking them far too long to make them safe again. They have divots, potholes and bumps throughout. Please ask them to do a decent job at the initial repaving and do the final paving and re-marking on a more timely basis. Thanks.	Motor Vehicle	Intersection Safety
882lru3rbe9a	59	LINESTRING (-122.293774 37.883109, -122.29388 37.883201, -122.298713 37.897731)	Through St	Cornell Avenue	EBMUD did work on Cornell a long time ago and patched the street shoddily. It's terribly bumpy and pitted, including where it crosses Solano, and is hazardous for cyclists. EBMUD needs to do a better job of the original repaving if they're going to wait this long to do the final repaving. Thanks.	Motor Vehicle	Pavement Condition
4kk3gnj3aa64	60	LINESTRING (-122.298942 37.890228, -122.293393 37.89047)	Intersection-Primary St	San Pablo Avenue/ Solano Avenue	The bump-outs intended to make it safer for pedestrians to cross narrow the road significantly, making it feel unsafe on a bike (forced to ride too close to the vehicle traffic).	Bicycle	Road too narrow
2vn2vlc4ces7	61	LINESTRING (-122.284428 37.890947, -122.28446 37.890987, -122.284462 37.890993, -122.284464 37.891007, -122.284463 37.891013, -122.284462 37.89102, -122.284468 37.891035, -122.284473 37.89104, -122.284469 37.891048, -122.284476 37.891052, -122.284485 37.891054, -122.284475 37.891054, -122.284481 37.891057, -122.284486 37.891062, -122.284491 37.891069, -122.284497 37.891074, -122.284505 37.891078, -122.284506 37.891084, -122.284512 37.891089, -122.284518 37.891093, -122.284526 37.891096, -122.284531 37.891099, -122.284544 37.891099, -122.284551 37.891101, -122.28456 37.891101, -122.284569 37.891102, -122.284576 37.891102, -122.284584 37.891104, -122.284593 37.891106, -122.284601 37.891105, -122.284585 37.891106, -122.284604 37.89111, -122.284623 37.891111, -122.284591 37.891104, -122.284605 37.891108, -122.284618 37.891113)	Intersection-Secondary St	Ordway St	It is not possible to safely turn left onto Solano Avenue from Ordway Street without the driver first crossing and blocking the pedestrian crosswalk and then easing into Solano with the front 1/3 of the car projecting into Solano Avenue so the driver can look westward down Solano to identify oncoming traffic. There is also very little street parking (less than 10% open spaces during most business hours by survey for The Albany Complete Streets Program), so that persons seeking to use the many shops and restaurants in the area often must circle the block a number of times due to insufficient parking. In short, this dangerous intersection should be redesigned in the interest of public safety before any large developments are allowed by the City to be built in the area. Increasing pedestrian and traffic by building further developments at this corner will most certainly turn this dangerous corner into a deadly one, with the City at risk for significant liability due to design neglect	Motor Vehicle	Curve Unsafe
2lpn9dzg8z87	62	LINESTRING (-122.295083 37.890439, -122.293549 37.890497, -122.29316 37.890512)	Primary St	Solano Avenue	We need a safe bicycling passageway from Cornell elementary to the greenway along Solano. There is no bike lane connecting the school to the greenway and the sidewalk is narrow and crowded in this area. kids need a safe way to get to school by bicycle.	Bicycle	Bicycle Safety
3o26ppx7d6i4	63	LINESTRING (-122.297953 37.886596, -122.297838 37.886608)	Secondary St	Buchanan Marin Bikeway	Cars frequently turn right on green without looking for bikes/pedestrians crossing San Pablo. I have had so many near collisions that I've started carrying a long stick with a red flag at the end to help draw attention.	Ped/Bike	Ped/Bike Safety
3o26ppx7d6i4	64	LINESTRING (-122.29766 37.886827, -122.297714 37.886824)	Primary St	Marin Avenue	Bike path going west on Marin just before crossing San Pablo becomes very narrow and feels unsafe.	Bicycle	Bicycle Safety
3o26ppx7d6i4	65	LINESTRING (-122.292791 37.887714, -122.292633 37.887768, -122.292695 37.887914)	Intersection-Primary St	Marin Avenue	Cars turning left from eastbound Marin to northbound Masonic do not always look for bikes/pedestrians crossing Masonic and I've had some close calls here	Ped/Bike	Ped/Bike Safety
3o26ppx7d6i4	66	LINESTRING (-122.298842 37.890294, -122.282669 37.891174)	Interection-Primary St	Solano Avenue/San Pablo Avenue	Bike up/down Solano in the commercial area between San Pablo and Colusa feels very unsafe, especially with the cars backing out of parking spots.	Motor Vehicle	Bicycle Safety

3ps7wni2eze4	67	LINESTRING (-122.296881 37.892305, -122.2963 37.890628)	Intersection-Through St	Washington Ave/Cornell St	Cars go along the 800 block of Cornell Avenue too fast. Cars should be discouraged from going along this block anyway because traffic along Washington does NOT have to stop at Cornell. Drivers going between Solano Avenue and El Cerrito Plaza should be going along the adjacent Stannage or Talbot instead, because those two streets have four-way stops at every intersection. Cornell has none! The best thing you could do would be to put a barrier on Cornell just north of the post office parking lot, but at least put speed bumps.	Motor Vehicle	Speeding
3ps7wni2eze4	68	LINESTRING (-122.299007 37.890344, -122.293526 37.89044)	Intersection-Primary St	San Pablo Avenue/Solano Avenue	Too many cars cross the double yellow line on Solano in order to make a U turn in order to take a parking spot on the opposite side of Solano. This is illegal and dangerous.	Motor Vehicle	Inersection Safety
7g4wlt3ref2a	69	LINESTRING (-122.294429 37.887387, -122.294452 37.887458)	Intersection- Secondary St	Marin Aveue/Talbot Avenue	Drivers don't stop at this school zone. Safe Route to school it is not.	Motor Vehicle	School Safety
4xe3yrf87xu7	70	LINESTRING (-122.294389 37.892809, -122.294369 37.892806, -122.294321 37.892815, -122.29428 37.892814, -122.294234 37.892821, -122.294209 37.892817)	Secondary St	Masonic Avenue	Cars driving fast.	Motor Vehicle	Speeding
8xc2rc22ps63	72	LINESTRING (-122.295769 37.897969, -122.295505 37.897712, -122.295851 37.897644, -122.295862 37.897931, -122.295728 37.897969)	Secondary St	Ohlone Greenway	Some bikes speed through the Ohlane trail at Brighton without checking traffic.	Bicycle	Bicycle Safety
2lf27os8izc2	73	LINESTRING (-122.28942 37.890731, -122.28942 37.890728, -122.28943 37.890841)	Primary St	Solano Avenue	Drivers do not stop for pedestrians. For the school children that cross and for the people visiting retailers like Gordos dominoes and the ice cream store.	Motor Vehicle	School Safety
2lf27os8izc2	74	LINESTRING (-122.29634 37.890374, -122.296359 37.890483)	Primary St	Solana Avenue	Busy crosswalk. Drivers on Solano do not heed for pedestrians in the crosswalk. I have witness school kids almost hit while they're in the middle of the crosswalk because drivers are too impatient to stop.	Ped/Bike	Ped/Bike Safety
2lf27os8izc2	75	LINESTRING (-122.295132 37.894468, -122.294242 37.894619, -122.294433 37.894003, -122.294758 37.894954)	Secondary St	Portland Avenue	Drivers do not completely stop and speed through the intersection. This occurs regularly during the school year when students are crossing or biking through.	Motor Vehicle	Intersection Safety
8kz8dji2ow6i	77	LINESTRING (-122.29635 37.890453, -122.296111 37.89047, -122.295221 37.887335)	Primary St	Solano Avenue	There are no speed bumps and cars come through going way too fast. Please please a light up speed sign or speed bumps! This is right in front of school pick up and drop off & that congestion is welcome because it slows people down.	Motor Vehicle	School Safety
7ol4wpg38v48	78	LINESTRING (-122.299146 37.887829, -122.299871 37.890135, -122.299058 37.890241)	Secondary St	Adams St	Too many drivers using Adams to turn on to Solano, to avoid San Pablo. Also, too many speeders throughout the day.	Motor Vehicle	Speeding
8gi7i228zp34	79	LINESTRING (-122.283582 37.891332, -122.28403 37.891774)	Intersection-Secondary St	Tacoma Avenue/Solano Avenue	1.Problems with vehicles that perform a u-turn or rapid left or right turn from Solano to Ordway - nearly hitting pedestrians. Poor visibility from Tacoma to Solano due to angle of the intersection.	Motor Vehicle	Curve Unsafe
3sr8dyk9slg6	80	LINESTRING (-122.301616 37.889985, -122.302183 37.89175)	Secondary St	Jackson St	Speeding!! This is a main thru way from Solano traffic to skip the lights, and with kids walking to and from local schools, using the cross walks on Solano and Washington, the speeding is a true danger	Motor Vehicle	Speeding
3sr8dyk9slg6	81	LINESTRING (-122.299111 37.89035, -122.298882 37.890376)	Primary St	Solano Avenue	Need more robust cross walk painting, clearer signage for pedestrian awareness (flashing lights).	Pedestrian	Lighting
7le9ehc9pn26	82	LINESTRING (-122.299961 37.892257, -122.302124 37.891795, -122.300987 37.888065)	Secondary St	Washinton Avenue	Lots of feeder traffic heading to freeway used this path to avoid traffic on San Pablo but adds speeding cars to side streets	Motor Vehicle	Speeding

6r8f8zwl6zv6	83	LINESTRING (-122.294559 37.887395, -122.294306 37.887447, -122.294518 37.887313, -122.294267 37.887356, -122.294529 37.887346, -122.294295 37.887418, -122.294546 37.887388)	Priamry St	Marin Avenue	I almost got hit by a car this morning while trying to cross with my 3 children. There is only a crossing guard there for part of the time/days we need him for crossing. There needs to be a light at this intersection. There have been at least 4 instances like this since Fall 2021	Motor Vehicle	Pedestrian Safety
6r8f8zwl6zv6	84	LINESTRING (-122.296096 37.884011, -122.295871 37.884059, -122.296084 37.883993, -122.295854 37.884029, -122.296077 37.883978, -122.296094 37.884012)	Secondary St	Dartmouth St	I have seen 2 accidents at this intersection plus countless near accidents. This should either be a 4-way stop or have signs designating that cross traffic does not stop.	Motor Vehicle	Intersection Safety
2kb38yfr8kd8	85	LINESTRING (-122.300756 37.895971, -122.30076 37.896048)	Primary St	San Pablo Avenue	The signal light at Clay St. can't be seen by south-bound drivers traveling on San Pablo during mid-day light. There have been too many collisions where a car leaving Clay St, turning left on San Pablo, is plowed into by a south bound car failing to see the signal light. Not to mention the numerous instances where south bound drivers sail though the red light and luckily the Clay St driver has hesitated before entering the intersection. This occurs daily, no exaggeration!	Motor Vehicle	Intersection Safety
8c2p6grh83j3	86	LINESTRING (-122.301801 37.893866, -122.301824 37.893843, -122.301547 37.893901, -122.301864 37.893842)	Secondary St	Castro Street	Large vehicles are often parked here along Castro St and they are parked very close to the corner of Madison St and Castro St. When you are driving north on Madison St, it is difficult to see the cars coming up Castro St and to cross that intersection safely. Despite speed limits on Castro St, many cars speed up and down that street.	Motor Vehicle	Large Trucks
9kn832spm7i3	87	LINESTRING (-122.290111 37.892935, -122.290111 37.893095, -122.290108 37.892827, -122.290288 37.892974, -122.289896 37.892957, -122.290119 37.893078, -122.290278 37.892978, -122.290124 37.892835, -122.289949 37.892961)	Intersection-Secondary St	Washington Avenue/Carmel Avenue	chronic driver inattention at 4-way-stop intersection: roll-throughs, various degrees of slowing down, and often no stopping at all	Motor Vehicle	Intersection Safety
47uxw89g2739	88	LINESTRING (-122.30162 37.889951, -122.302202 37.891718, -122.301614 37.889945)	Seondary St	Jackson St	Speeding	Motor Vehicle	Speeding
69kcx3uhz6k6	89	LINESTRING (-122.297507 37.890412, -122.292337 37.890623, -122.300521 37.890021)	Primary St	Solano Avenue	Speed limits, lack of police enforcment/presence.	Motor Vehicle	Speeding
69kcx3uhz6k6	90	LINESTRING (-122.296108 37.890141, -122.295244 37.88736)	Through St	Cornell Avenue	Speeding cars in what should be a school zone. Pickup and drop off at the elementary school happens on this side of the school. No speed bumps to slow traffic.	Motor Vehicle	School Safety
3fbb22taj7f3	91	LINESTRING (-122.286168 37.891444, -122.285659 37.89119)	Through St	Neilson St	The intersection of Peralta and Solano is very hard to safely cross especially when there are vehicles parked in front of Peralta-Solano parklet.	Pedestrian	Pedestrian Safety
4hx98c7kus79	92	LINESTRING (-122.285794 37.891117, -122.285639 37.891125, -122.285492 37.890933, -122.285717 37.890915, -122.285794 37.891118)	Primary St	Solano Avenue	This intersection is quite busy (with both cars and people) and there is poor visibility. Because there is a light at Peralta and Marin people tend to drive down Peralta and then there is no light or controls at Peralta and Solano. I had the unfortunate experience of seeing a pedestrian hit at this intersection. I believe this is one of the most dangerous intersections in Albany due to the traffic levels at this intersection.	Pedestrian	Visibility
3lfk74pos2c9	93	LINESTRING (-122.297735 37.886736, -122.287644 37.88881)	Priamry St	San Pablo Avenue	Marin drivers speed aggressively coming down from the hills. The road should be dieted, speeds reduced, more protections for biking added to improve safety for bikers and peds	Bicycle	Bicycle Safety
2yrs6avz46h6	94	LINESTRING (-122.287016 37.882977, -122.287021 37.882968, -122.286277 37.884918, -122.28621 37.884953)	Intersection-Secondary St	Posen Avenue/Peralta Avenue	Speeding cars at 11-12 and 3pm-7pm from Gilman to Marin. Speeding bikes not looking out for children in 7:30 am-9am	Motor Vehicle	Bicycle Safety

623xku4jl8j3	96	LINESTRING (-122.288258 37.888658, -122.288345 37.888709, -122.297596 37.886832)	Intersection-Primary St	Marin Avenue/Santa Fe Avenue	I live south of Marin and cross it on foot, usually multiple times daily to walk my kids to school. It is so dangerous. The cars drive so fast and carelessly. I have called the police because of people trying to run us down (even going into the bike lane to go around cars that stopped to let us cross) and see cars nearly run over the crossing guard on Marin at Talbot regularly.	Motor Vehicle	School Safety
623xku4jl8j3	97	LINESTRING (-122.296719 37.88389, -122.290833 37.885087)	Secodnary St	Dartmouth St	Dartmouth would be much safer for bikes and pedestrians if it had less street parking and improved and instead had separated bike lanes along it.	Bicycle	Bicycle Safety
8xkx88iil9c6	98	LINESTRING (-122.297304 37.886831, -122.292589 37.887796)	Priamry St	Marin Avenue	Lots of speeding, cars don't stop for pedestrians in the crosswalk. Cars don't stop for the crossing guards	Motor Vehicle	Pedestrian Safety
2uz8r4vwj8o7	99	LINESTRING (-122.29126 37.89297, -122.288593 37.892921, -122.291107 37.892977)	Secondary St	Washington Avenue	Drivers use this straight, wide section of Washington as an alternate to Solano ave. Despite the stop signs, drivers drive very fast, particularly during commute hours	Motor Vehicle	Stop Sign Violation
4ad7dcd34468	100	LINESTRING (-122.288768 37.89076, -122.288194 37.888812)	Primary St	Santa Fe Avenue	On 900 block of Santa Fe Avenue, concerns about vehicle speeds, especially during commute hours. Cars often speed down (southbound) in the mornings and up (northbound) in the evenings in an effort to try to time the traffic signals at Solano and Marin. This creates a hazard for bicyclists (Santa Fe south of Marin is a city Class 3 bike route and north of Marin is a proposed Class 3 bike route) and pedestrians in crosswalks. This effect will be more hazardous once the new Marin School is built, as there will be many young children walking and biking to/from school. Suggest speed table(s) on 900 block of Marin and/or pavement marking treatments similar to the 800 block of Santa Fe.	Motor Vehicle	Ped/Bike Safety
84lw2xjs4hd8	101	LINESTRING (-122.296695 37.883862, -122.291765 37.884883)	Secondary St	Dartmouth St	The inconsistency of stop signs here - and really, throughout our neighborhood - can be confusing. New drivers in the area assume that every corner has a stop sign. I've seen a half-dozen near accidents in the last 6 months alone. Creating a simple rule (i.e., a stop sign at every corner among interior streets) would take marginally longer, but significantly improve safety.	Motor Vehicle	Intersection Safety
743u7utt97ra	102	LINESTRING (-122.302455 37.883076, -122.302455 37.883039, -122.302443 37.882835, -122.302412 37.882726, -122.302361 37.88258, -122.302331 37.882483, -122.30231 37.882435, -122.302249 37.882342, -122.302223 37.882222, -122.302202 37.882137, -122.302161 37.88204, -122.302417 37.883095, -122.302228 37.883139, -122.301966 37.88318)	Primary St	Red Oak Avenue	Children can't safely play with cars, trucks, and more speeding through this residential area. UC village has the ability to close these gates. Please close the 6th Street gate to eliminate car traffic so my kids are safe!	Motor Vehicle	Pedestrian Safety
8op879us3fl6	103	LINESTRING (-122.308324 37.887551, -122.308103 37.887486)	Primary St	Buchanan Street	The cross walk at the highway on-ramp indicates to pedestrians that it is safe to walk/cross at the same time that cars turning right onto the highway on-ramp have a green light. The cars are going fast over the hill onto the ramp and often don't see pedestrians. This is a severe pedestrian injury or death waiting to happen!	Motor Vehicle	Curve Unsafe
28xke4git44a	104	LINESTRING (-122.290808 37.887149, -122.290048 37.885055)	Through St	Pomona Avenue	Fast traffic on Pomona Ave, and people cutting corner when turning onto Dartmouth from Pomona.	Motor Vehicle	Curve Unsafe

28jnc66t9tg4	105	LINESTRING (-122.292899 37.889183, -122.292516 37.887869)	Primary St	Masonic Avenue	Cars regularly drive above the speed limit on Masonic, particularly between Solano and Marin. There are also a lot of issues with cars going through red lights and/or turning into the crosswalk when pedestrians are present on both Solano and Marin where they cross Masonic. I've seen a lot of "near misses" along this stretch and in these intersections.	Motor Vehicle	Red light Violation
28jnc66t9tg4	106	LINESTRING (-122.296224 37.880403, -122.295407 37.880561)	Intersection-Secondary St	Gilman St	There are often significant backups at this light, particularly with cars trying to turn left from Gilman onto San Pablo. I've seen a lot of risky driving as people grow impatient.	Motor Vehicle	Curve Unsafe
8kz42drj6kdr	107	LINESTRING (-122.288261 37.892807, -122.288653 37.890571, -122.28839 37.889998, -122.28839 37.889645, -122.288514 37.889426, -122.288189 37.889291, -122.288128 37.88895, -122.287942 37.888706, -122.288066 37.888255, -122.288189 37.887865, -122.288498 37.887622, -122.28873 37.887353, -122.288853 37.887024, -122.289039 37.88672, -122.289008 37.8865, -122.289023 37.886135)	Primary St	Santa Fe Avenue	People use Santa Fe Avenue like it's a speedway. Particularly on the block between Marin & Solano Avenues, drivers try to make both lights, so actually speed up rather than slowing down. That's a residential street, just like Curtis, and Neilson, and Pomona, and all the other streets. It also has a school on it, so frequently gets more foot traffic and bike traffic than other streets.	Motor Vehicle	Speeding
7e3mpi3ire76	109	LINESTRING (-122.288066 37.888632, -122.288736 37.890718, -122.288876 37.890765, -122.288876 37.890773, -122.288873 37.890874)	Intersection-Primary St	Marin Avnue/Santa Fe Avenue	WALK-Light at Solano and Santa Fe is too short for elderly or disabled people to make it a cross. Cars go at a very fast speed along Santa Fe between Solano and Marin to catch the lughts. We beed speed bumps especially when school starts again af Marin Elementary.	Pedestrian	Pedestrian Safety
62r7f9gpi8h3	110	LINESTRING (-122.295141 37.887258, -122.290102 37.888281, -122.290176 37.888263)	Intersection-Seconary St	Marin Avenue/ Cornell Avenue	When traffic is backed up cars often travel up the middle turning lane for multiple blocks at a high rate of speed to get to Masonic. My child and I have almost been hit in a crosswalk because of cars speeding up this middle lane.	motor vehicle	Pedestrian Safety
62r7f9gpi8h3	111	LINESTRING (-122.293428 37.890724, -122.295767 37.897878)	Intersection-Primary St	Solano Avenue/Masonic Avenue	Several times when stopped at a stop sign on Masonic a car has passed me on the right sped through the intersection. Cars are running stop signs all over Albany but it is especially bad on Masonic.	motor vehicle	Intersection Safety
62r7f9gpi8h3	112	LINESTRING (-122.293829 37.89779, -122.295723 37.897807, -122.300935 37.896788)	Primary St	Brighton Avene	Speeding cars especially dangerous when AMS lets out	Motor Vehicle	Speeding
48orj7oah4z4	114	LINESTRING (-122.303448 37.890157, -122.303461 37.890396)	Through St	Polk St	There are no streets on Albany Hill that are safe for bicycle riders. I would like some safe way to navigate Albany Hill streets on bike! Could there be a dedicated bike lane going from one side of Albany Hill down to Ocean View Elementary? Also -- what about a dedicated bike lane going from Albany Hill across San Pablo to Washington (on the East side of San Pablo).	Bicycle	Bicycle Safety
73zeg8rgg9b9	115	LINESTRING (-122.30102 37.896757, -122.299531 37.891895)	Intersection-Secodnary St	Brighton Avenue	Many students try to cross intersections along San Pablo and it's unsafe for kids who live on one side of San Pablo and have to cross to the other	Motor Vehicle	School Safety
73zeg8rgg9b9	116	LINESTRING (-122.292645 37.896701, -122.292726 37.894971)	Intersection-Secondary St	Key Route Blvd/Thousand Oaks Blvd	Interactions between parking vehicles and pedestrians	Motor Vehicle	Intersection Safety
73zeg8rgg9b9	117	LINESTRING (-122.299468 37.89188, -122.297149 37.892301, -122.294349 37.892888)	Intersection-Secondary St	Washington Avenue/ San Pablo Avenue	Designated as bike boulevard but gets a lot of traffic and feels unsafe for bikes	Motor Vehicle	Bicycle Safety
67rky9fsu2aa	118	LINESTRING (-122.293482 37.887499, -122.292594 37.884793)	Secondary St	Evelyn Avenue	During high traffic times vehicles wanting to turn right at Masonic will instead turn and speed down Evelyn	Motor Vehicle	Curve Unsafe

3b6b28mgt676	119	LINESTRING (-122.288219 37.888721, -122.288193 37.888982)	Intersection-Primary St	Marin Avenue/Santa Fe Avenue	When is the traffic issue going to be addressed? Is Santa Fe Ave. in extension of US 80 or what? The way they use this street is absolutely unreal the construction at the corner they start at 7:30 7:45 where I believe it should be 8 o'clock not sure but you might want to check. At night you can hear the cars racing up and down Solano Avenue not to mention Marin as well as Santa Fe the music is so loud sometimes it shakes the mirrors or pictures on the walls of the house. This town is not only a disgrace to the state but it's a disgrace to this nation and the only comparing I can give this town is it come so close to the Chicago stockyards it's not even funny in fact the Chicago stockyards is got more class to do it then the city does	Motor Vehicle	Speeding
3nv8h9mrm6zg	120	LINESTRING (-122.288781 37.890839, -122.288182 37.88872)	Intersection-Primary St	Santa Fe Avenue/Solano Avenue	Cars move much too fast down this particular block. There is a double yellow-line separating traffic and no calming measures in place, so drivers go very quickly. This doesn't serve them well either, since both the intersections at Marin and Solano have traffic lights. So people speed through and then must stop anyway. For the safety of pedestrians and cyclists, and the children at the preschool on the corner and the Marin school kids, we should take measures to slow this traffic.	Motor Vehicle	Intersection safety
3nv8h9mrm6zg	121	LINESTRING (-122.282657 37.891163, -122.298777 37.890287)	Primary St	Solano Avenue	Vehicular traffic moves fast along Solano even though this street has a high number of pedestrians. It often feels unsafe to cross Solano at unprotected intersections, since there are no barriers to their speed.	Motor Vehicle	Intersection Safety
3dg8m2dyw7k6	122	LINESTRING (-122.297721 37.886838, -122.297935 37.88663, -122.297664 37.886647, -122.298017 37.88689)	Priamry St	Marin Avenue	I travel through this intersection, on foot, twice a day on every weekday. Routinely, cars speed through the intersection and run the red light so late the the light is green for the other direction of travel. Also, I often have to stop while crossing because of cars rushing to make right turns and almost hit me.	Motor Vehicle	Red Light Violation
8zx8lox43e6v	123	LINESTRING (-122.298084 37.890414, -122.297956 37.89041)	Priamry St	Solano Avenue	Very poor visibility turning left or crossing intersection; Reflection from built out area of Zaytoon conceals traffic going west and creates illusion that traffic going east is coming from west.	Motor Vehicle	Visibility
8zx8lox43e6v	124	LINESTRING (-122.291632 37.897593, -122.294924 37.891926, -122.287482 37.885407, -122.286549 37.893185, -122.291141 37.897742)	Through St	Pomona Avenue	It is quite difficult to see pedestrians at intersections at dusk or after dark. Could we get better lights?	Motor Vehicle	Visibility
8zx8lox43e6v	125	LINESTRING (-122.295105 37.897615, -122.299168 37.896585, -122.298523 37.891101, -122.293237 37.889925, -122.295049 37.897389)	Primary St	Brighton Avenue	Cars cutting through (both east/west and north/south) and speeding while children are walking to school	Motor Vehicle	School Safety
8hf6wsz3gfr8	126	LINESTRING (-122.292691 37.887762, -122.292637 37.887741)	Intersection-Primary St	Marin Avenue/Masonic Avenue	Red light running causing accident	Motor Vehicle	Red Light Violation
4uh3lhf8mwi7	127	LINESTRING (-122.300275 37.894135, -122.300102 37.894175)	Intersection-Secondary St	San Pablo Avenue/Castro Street	crosswalk and pedestrians are invisible to drivers at night. flashing lights needed	Motor Vehicle	Lighting
4uh3lhf8mwi7	128	LINESTRING (-122.300071 37.893382, -122.299838 37.893425)	Primary St	San Pablo Avenue	crosswalk and pedestrians are invisible at night. flashing lights needed	Motor Vehicle	Lighting
7uh6yem9jbo4	129	LINESTRING (-122.288157 37.888659, -122.288406 37.889496, -122.288774 37.890734)	Intersection-Primary St	Marin Avenue	Traffic on Santa Fe Avenue between Marin and Solano is much too fast. When school restarts at Marin there will be many additional cars with parents driving/parking to drop off their children.	Motor Vehicle	School Safety

4cgd8zur4lm6	130	LINESTRING (-122.294958 37.890594, -122.294575 37.890603)	Primary St	Solano Avenue	Westbound bicyclists (many going to Tilden School) zoom onto the sidewalk without regard to residents exiting buildings.	Bicycle	Bicycle Safety
4cgd8zur4lm6	131	LINESTRING (-122.290709 37.883285, -122.292544 37.887723, -122.293619 37.891468, -122.294604 37.894559, -122.296157 37.898879)	Secondary St	Ohlone Greenway	People on electric vehicles (bikes, scooters, boards, etc.) go too fast on the shared greenway.	Bicycle	Bicycle Safety
29zgk3xrt9x6	132	LINESTRING (-122.290745 37.890603, -122.290052 37.888411)	Intersection-Secondary St	Solano Avenue	Speeding vehicles. Recommend speed bumps.	Motor Vehicle	Speeding
8z44gmt2oie8	133	LINESTRING (-122.296373 37.89042, -122.296308 37.890424, -122.295063 37.89049)	Primary St	Solano Avenue	Crossing Solano avenue near the Cornell school is very dangerous! Drivers don't yield or slow down for pedestrians on yellow crossing lanes! Had many close calls!!!	Motor Vehicle	School Safety
4ks4ifa2edf6	135	LINESTRING (-122.29921 37.890208, -122.299784 37.890114)	Primary St	Solano Avenue	Vehicles are flooring their gas pedals to make the green lights at this location starting at Madison and Adams heading East to the Solano Ave x San Pablo Ave intersection. They are going very fast! More regular police presence to write a few tickets would be a good deterrent but long term perhaps a "shows speed" light sign with a flashing blue/red light might help too just past Adams x Solano intersection for eastbound vehicles.	Motor Vehicle	Speeding
4ia6dgc2gaw4	136	LINESTRING (-122.297044 37.886813, -122.288803 37.888447)	Primary St	Marin Avenue	All crossings along Marin Ave - lack of bulbouts and pedestrian lighting make it difficult for drivers to see pedestrians waiting to cross Marin. Road width and lack of islands/refuge areas encourage people to drive fast along Marin and turn quickly. It feels unsafe to cross at all uncontrolled intersections.	Pedestrian	Lighting
4ia6dgc2gaw4	137	LINESTRING (-122.297554 37.886966, -122.292584 37.887849)	Priamary St	San Pablo Avenue	Bike connection from ohlone greenway to Buchanan cycle track. Westbound bikes are forced to take westbound bike lane with fast moving traffic on Marin between Masonic and San Pablo. Lack of good connection to cycle track at San Pablo then encourages them to continue in northern bike lane along Buchanan rather than use Cycletrack. This is a major gap and missed opportunity in our bike infrastructure that puts cyclists at risk.	Bicycle	Bicycle Safety
3zm6cgn3kfy8	138	LINESTRING (-122.284501 37.891089, -122.284521 37.891094, -122.284497 37.890976, -122.284266 37.891235, -122.284165 37.891115, -122.284627 37.891066, -122.284397 37.891089, -122.284431 37.891108, -122.284392 37.891088)	Intersection-Secondary St	Solano Avenue/Ordway St	Irregular intersection. Many near-misses as pedestrians jaywalk, drivers attempt U-turns and make careless lefts and rights onto and from side streets.. Delivery trucks at wine shop and other businesses often block lines of sight. Construction soon to begin on recently-approved project on SE corner (building currently houses a preschool).	Motor Vehicle	Large Trucks
9r7i46llx9m4	139	LINESTRING (-122.292485 37.887739, -122.29156 37.88494)	Primary St	Marin Avenue	High speed traffic. Just in the few minutes it took me to figure out this map, two vehicles roared southbound down the 1000 block of Masonic as fast as they could. This also happens northbound, especially when trying to make the light at Marin Ave. We have been approved for a series of speed bumps but are still waiting.	Motor Vehicle	Speeding
7wr67rka9mw9	140	LINESTRING (-122.29427 37.887556, -122.294312 37.887469, -122.291661 37.888068, -122.29086 37.888035, -122.292683 37.88773, -122.293898 37.887447, -122.292531 37.887763, -122.291495 37.884854, -122.291137 37.884276, -122.292793 37.889147, -122.292904 37.889038)	Primary St	Marin Avenue	Pedestrian safety at the intersection with cars speeding and turning on or off of Marin Fast!! Drivers especially at night and down masonic using it as a raceway (often over 50mph going through masonic and Marin)	Motor Vehicle	Intersection Safety

8di8d2l7rhi6	141	LINESTRING (-122.287302 37.885827, -122.287425 37.885874, -122.286603 37.885661)	Through St	Terrace St	Speeding of cars to find parking at Terrace Park. No stop sign at the corner of Terrace and Neilson causes cars to speed and not stop when turning onto Neilson/Terrace. Near head on collision. Also corner of Terrace and Tevlin, cars rush to turn around for parking and cars have run through neighbor fences.	Motor Vehicle	Stop Sign Violation
4lu3776cji6a	142	LINESTRING (-122.292624 37.887732, -122.29174 37.884911)	Intersection-Primary St	Marin Avenue	I live on Masonic Ave and have witnessed daily high speed traffic throughout the day. Cars speed through the stop light and/or turn in front of pedestrians when crossing. I have experienced near misses when trying to cross on the section of Marin and Masonic. Our 1000 block of Masonic have already been through the process to add speed bumps and has been approved. Looking forward to that being implemented. Thank you for listening.	Motor Vehicle	Speeding
4zj2x4izh4k8	143	LINESTRING (-122.296086 37.889948, -122.296192 37.890348, -122.295692 37.888713)	Secondary St	Cornell Avenue	Too much traffic/congestion at school drop off/pick up/events. Cars stop and drop off/pick up kids in the middle of the street. The designated (and signed) drop off/pick up loading zone is not used. Cars use our driveways to make U turns during pickup. This is dangerous, and at least one car was hit so badly that it needed to be towed, while doing this. Sometimes cars actually *park* in our driveways and their occupants go into the school. There are *no* traffic guards at the Cornell/Solano and Cornell/Marin intersections. Arguably, the Cornell/Solano intersection is the busiest of all. For purposes of identification, I am a (retired) certified teacher, PTA officer, Site Council officer, childcare Board member, parent, and grandparent. I have taught at 2 lab schools and worked in multiple states. *Never* have I seen traffic conditions as dangerous as the ones in front of my home and the Cornell School main gate on Cornell. This area is an accident waiting to happen.	Motor Vehicle	School Safety
9tj3bma64hx3	144	LINESTRING (-122.29079 37.890706, -122.290022 37.888305)	Intersection-Secondary St	Solano Avenue/Ramona Avenue	Safety Issue(s): Sidewalks are trip hazard and I feel unsafe during evening hours because of inadequate and poor street lighting. Recommendation: Add at least four street lights to reduce sidewalk trip hazards and help reduce criminal behavior.	Pedestrian	Pavement Condition
7fmz2vjb6bba	145	LINESTRING (-122.295828 37.89034, -122.297683 37.890357, -122.297964 37.890306, -122.297748 37.890476, -122.298137 37.890272, -122.297662 37.890408, -122.28956 37.890629)	Secondary St	Cornell Avenue	At Stannage and Solano, Kains and Solano, and Cornell and Solano there needs to be a sign and button to press so that the sign flashes when pedestrians are crossing Solano. There is too much cross traffic on Solano for there not too be a blinking/flashing sign alerting cars of crossing pedestrians.	Pedestrian	Lighting
8a98rai9msm8	146	LINESTRING (-122.288956 37.894797, -122.299971 37.893566, -122.300945 37.896771, -122.295682 37.897822, -122.292692 37.897745, -122.292757 37.894976, -122.28928 37.894822)	Secodnary St	Portland Avenue	High speeds and ignoring stop signs on Portland and Brighton heading to San Pablo	Motor Vehicle	Stop Sign Violation
2o9knw48cbc6	147	LINESTRING (-122.292653 37.887896, -122.293527 37.890394)	Primary St	Masonic Avenue	Speeding due to no bumps or other methods employed to slow traffic.	Motor Vehicle	Speeding

78ydl2jd8xxa	148	LINESTRING (-122.292338 37.896752, -122.295836 37.897378, -122.293822 37.892298, -122.293249 37.890537)	Secondary St	Thousand Oaks Blvd	People drive too fast down Masonic. Not safe for kids walking	Motor Vehicle	Pedestrian Safety
78ydl2jd8xxa	149	LINESTRING (-122.297106 37.890355, -122.296612 37.890371, -122.296381 37.890387, -122.296149 37.890426, -122.295766 37.890514, -122.295364 37.890514, -122.295273 37.890418, -122.295041 37.890426, -122.294779 37.890546)	Intersection-Secondary St	Solano Avenue/ Stannage Avenue	Cornell School is there and people drive too fast and not paying attention	Motor Vehicle	School Safety
2gp27vfa3v73		LINESTRING (-122.287395 37.890987, -122.298966 37.890316)	Primary St	Solano Avenue	To maximize safety and reduce carbon and noise emissions, all of Solano Ave. should be closed to motor vehicle traffic aside from buses and emergency vehicles.	Motor Vehicle	Intersection Safety
3e4ubo968wz7		LINESTRING (-122.288735 37.890795, -122.288143 37.888704)	Intersection-Primary St	Solano Avenue/Santa Fe Avenue	Huge increase in traffic volume, noise, and speeds!! Because there are lights at both ends of the block, people race to make it through both intersections. So many cars going WAY above the speed limit - so dangerous!	Motor Vehicle	Speeding
4vy2ii6pid49		LINESTRING (-122.29549 37.890471, -122.29878 37.890281)	Primary St	Solano Avenue	Car traffic travels down this portion of Solano at too high a rate of speed. One of the most dangerous situations I've observed involved ACTransit buses driving above the speed limit. The length of Solano should be reduced to 15MPH and this section should have traffic calming features installed to force the reduction. One element that would really help is to install continuous sidewalks, showing drivers that this place is made for pedestrians first.	Motor Vehicle	Speeding
3ct3jmw69b9a		LINESTRING (-122.298993 37.890186, -122.287671 37.890851, -122.282643 37.891197)	Intersection-Primary St	Solano Avenue/Solano Avenue	Solano Ave should have more safe and accessible bike access. Right now it is too narrow to easily bike on and presents a safety risk. It would be great to incentivize people to bike more on this major street.	Bicycle	Road too narrow
28z9abd3eo33		LINESTRING (-122.298138 37.890348, -122.296238 37.890428, -122.295693 37.888853, -122.296185 37.890438, -122.295317 37.890473, -122.294861 37.888998, -122.295322 37.890482, -122.294292 37.890557)	Primary St	Solano Avenue	Cars & AC Transit Busses & Big Safeway Delivery Trucks are Driving Way Too Fast Around Way Too Many Pedestrians. Please Do Something Around Our Schools for Traffic Safety.	Motor Vehicle	Large Trucks
28z9abd3eo33		LINESTRING (-122.292811 37.890653, -122.289335 37.89081, -122.289173 37.890827, -122.289223 37.890914, -122.289288 37.890907, -122.289365 37.890881, -122.289425 37.890825)	Intersection- Secondary St	Key Route Blvd/Solano Avenue	Around Gordos & Dominos the Same Traffic Speed is Way Too Fast. The Street Lighting at the Gordos Crosswalk is Too Dark at Night because the Tree is Not Maintained, Solano Traffic Speed Is Way Too Fast	Motor Vehicle	Speeding
7bf7b63639l7		LINESTRING (-122.288614 37.885178, -122.288787 37.884646, -122.288086 37.886509, -122.288467 37.885513)	Through St	Cutits St	When asked for directions to get from the top of Solano to the bottom of Gilman, Google maps often directs folks down Marin, left on Curtis, and then right on Gilman. Consequently traffic on Curtis is now heavy. Accidents are regular (tipped car on 12/31/21) and side view mirrors have gotten snapped off. Speed bumps please or "20 IS PLENTY" traffic signs (a la Portland OR). Thank you!	motor Vehicle	Intersection Safety

8uf9cpa4ssj8	LINESTRING (-122.285275 37.88739, -122.285423 37.887142, -122.285432 37.887096, -122.285461 37.886955, -122.285535 37.88674, -122.285609 37.886608, -122.285622 37.886528, -122.285664 37.886466, -122.285673 37.886364, -122.285752 37.886269, -122.285784 37.886229, -122.285766 37.886134, -122.28584 37.885984, -122.285932 37.885863, -122.285979 37.885736, -122.286025 37.885626, -122.286016 37.885546)	Intersection-Through St	Sonama Avenue/peralta Avenue	Cars and bicycles do not stop at the 4-way stop at Peralta and Sonoma. Cars and bicycles do not stop for pedestrians at the Manor Way Crosswalk on Peralta	Motor Vehicle	Intersection Safety
7ozb8mju7wp8	LINESTRING (-122.296706 37.883891, -122.294289 37.884372)	Through St	Dartmouth St	there should be a stop sign on dartmouth between san pablo and talbot. Probably Stannage. There have been accidents, and there are a lot of kids, pedestrians, dogs, etc in the neighborhood that need help slowing down vehicles who are making shortcuts from Marin and San Pablo.	Motor Vehicle	Intersection Safety
7ozb8mju7wp8	LINESTRING (-122.297651 37.886706, -122.292763 37.887734)	Primary st	Marin Avenue	This stretch of road (Marin b/w San Pablo and Masonic) is essentially a freeway in both directions, and many drivers aren't paying attention or have sun in their eyes (heading east during busy morning commutes or west during busy evening commutes). Even crossing at either light or with the flashing lights on Talbot can be pretty scary as a pedestrian. I would love to see a stop sign or light at cornell or talbot on Marin.	Motor Vehicle	Speeding
6t7hsz6hgx46	LINESTRING (-122.311161 37.89739, -122.309295 37.894631, -122.308364 37.892343, -122.308061 37.891154, -122.307632 37.889946, -122.307075 37.88754, -122.306263 37.884161)	Primary St	John Knox Freeway	The railroad tracks are fenced somewhat on the west side, but hardly or not at all on the east side. West side fences are regularly breached, especially near the Buchanan Overpass. Well-worn short-cut trails show regular track crossing. Trains through Albany travel at a speed such that anyone walking the tracks doesn't have enough time to hear a train and get off the tracks. Trains can't stop in time to avoid people, and the curving track makes for short sightlines. People regularly die on the tracks in the Albany/Berkeley/Richmond area.	Motor Vehicle	Pedestrian Safety
6avx3wet8uiy	LINESTRING (-122.293438 37.890524, -122.291573 37.885101)	Secondary St	Ohlone Greenway	All of Masonic Avenue from Gilman to Solano is a raceway, particularly the segment ending at Marin Ave. The park across the street is a homicide waiting to happen. Both cars and bikes ignore the light and the traffic laws and turn recklessly into oncoming pedestrians, children, families. It isn't enough to simply wait for a new traffic light to be installed. The cars literally race through the blocks to try to beat the light - the attempt to govern speed by a light at Marin is obviously making the problem worse. There need to be several speed humps all along Masonic to drive home the message - this is a 25 mph speed zone, not a 50 mph one.	Motor Vehicle	Red light Violation

7x9rog69zap4	LINESTRING (-122.293684 37.890468, -122.298733 37.89032)	Primary st	Solano Avenue	Vehicles speed along Solano, and fail to give right-of-way to people in crosswalks. There's an elementary school and many family-friendly businesses, but I often feel unsafe crossing Solano with my daughter. It's only a matter of time before a young child is killed, unless we can improve Solano. Can we upgrade Solano's two lanes to bus lanes? And other municipal and emergency vehicles, of course. Professional drivers haven't mortally threatened my daughter with lethal weapons the way private drivers do so carelessly and frequently. This would also open up many car storage spaces on Solano Ave for businesses to use as dining or other purposes. And people who ride on buses will have a faster transit time with less vehicle traffic. It's a win for everyone.	Motor Vehicle	Speeding
2yt4hsm88xi9	LINESTRING (-122.301462 37.889737, -122.293078 37.89056, -122.282934 37.890921)	Intersection-Primary St	Solano Avenue/ Jackson St	I'm uncomfortable cycling between businesses along Solano Avenue at peak times. I'm fine accessing Solano from a side street, but avoid making multiple stops on the Avenue in one trip. This reduces the amount I patronize Solano Avenue businesses.	Bicycle	Bicycle Safety
2yt4hsm88xi9	LINESTRING (-122.301312 37.897738, -122.298439 37.889284, -122.297554 37.885823)	Primary St	San Pablo Avenue	I'm not comfortable cycling on San Pablo Avenue except in the late evening when traffic is extremely low. I will go 1/2 block along SP when crossing, as at a T-intersection. I'm less likely to visit SP businesses because I can't easily go between them on my bike.	Motor Vehicle	Intersection Safety

APPENDIX D: CONSOLIDATED HIGH INJURY COLLISION DATABASE

CASE_ID	ACCIDENT_Y	PROC_DATE	JURIS	COLLISION_	COLLISION1	Hour	OFFICER_ID	REPORTING_	DAY_OF_WEE	CHP_SHIFT	POPULATION	CNTY_CITY_	SPECIAL_CO	BEAT_TYPE	CHP_BEAT_T	CITY_DIVIS
8694006	2018	2018-09-07	102	2018-07-20	1450	14	EC0624	7	5	5	3	102	0	0	0	
8203037	2016	2017-01-05	102	2016-09-26	1647	16	DH0611	5	1	5	3	102	0	0	0	
8693248	2018	2018-09-18	102	2018-01-14	1724	17	EC0624	5	7	5	3	102	0	0	0	
8200117	2016	2017-01-04	102	2016-11-16	1421	14	DL0626	5	3	5	3	102	0	0	0	
8843130	2018	2019-05-08	102	2018-11-29	2118	21	C00613	5	4	5	3	102	0	0	0	
8850669	2019	2019-04-30	102	2019-02-08	15	0	MP0622	7	5	5	3	102	0	0	0	
8529795	2017	2018-01-11	102	2017-08-16	814	8	EC0624	5	3	5	3	102	0	0	0	
8513275	2017	2018-01-12	102	2017-03-11	1722	17	AW0629	5	6	5	3	102	0	0	0	
8529827	2017	2018-01-11	102	2017-05-09	1654	16	TA0619	1	2	5	3	102	0	0	0	
8079840	2016	2016-07-14	102	2016-06-23	1758	17	MP0622	4	4	5	3	102	0	0	0	
8203033	2016	2017-01-05	102	2016-09-28	1612	16	AW0629	5	3	5	3	102	0	0	0	
8289782	2016	2017-01-30	102	2016-12-13	1647	16	CO0613	5	2	5	3	102	0	0	0	
8203174	2016	2017-01-09	102	2016-10-05	1751	17	MP0622	4	3	5	3	102	0	0	0	
9291856	2020	2021-07-13	102	2020-07-05	15	0	DW190456	4	7	5	3	102	0	0	0	
8513204	2017	2018-01-12	102	2017-04-02	1624	16	EC0624	4	7	5	3	102	0	0	0	
8757802	2018	2018-12-19	102	2018-10-13	1433	14	DL0626	4	6	5	3	102	0	0	0	
8976925	2019	2019-11-20	102	2019-05-07	1714	17	JL0614	5	2	5	3	102	0	0	0	
8200109	2016	2017-01-04	102	2016-11-19	1050	10	ML0610	4	6	5	3	102	0	0	0	
8651045	2018	2018-09-05	102	2018-03-17	2151	21	CO0613	4	6	5	3	102	0	0	0	
9291867	2020	2021-07-12	102	2020-12-27	1044	10	TP237998	2	7	5	3	102	0	0	0	
8688983	2018	2018-09-13	102	2018-01-06	1053	10	MP0622	1	6	5	3	102	0	0	0	
9286178	2020	2021-07-20	102	2020-10-31	2102	21	MD236619	2	6	5	3	102	0	0	0	
8688975	2018	2018-09-13	102	2018-01-25	1634	16	TA0619	2	4	5	3	102	0	0	0	
8203196	2016	2017-03-03	102	2016-09-02	2047	20	AJ0625	1	5	5	3	102	0	0	0	
8504345	2017	2018-06-14	102	2017-06-23	2250	22	EC0624	1	5	5	3	102	0	0	0	
9286170	2020	2021-07-16	102	2020-09-12	1616	16	LL0615	5	6	5	3	102	0	0	0	
8984084	2019	2020-01-09	102	2019-08-01	833	8	LL0615	5	4	5	3	102	0	0	0	
8504394	2017	2018-06-25	102	2017-09-21	1856	18	AJ0625	5	4	5	3	102	0	0	0	
8688979	2018	2018-09-17	102	2018-01-03	1545	15	BC0624	1	3	5	3	102	0	0	0	
8078048	2016	2017-02-11	102	2016-06-17	2049	20	MP0622	1	5	5	3	102	0	0	0	
9286166	2020	2021-07-15	102	2020-06-18	1655	16	P00623	1	4	5	3	102	0	0	0	
8975401	2019	2019-12-14	102	2019-09-19	2104	21	JR0612	2	4	5	3	102	0	0	0	
8199548	2016	2018-02-03	102	2016-06-11	1523	15	DL0626	1	6	5	3	102	0	0	0	
8289692	2016	2017-01-30	102	2016-12-11	1821	18	JT0628	1	7	5	3	102	0	0	0	
8689080	2018	2018-09-18	102	2018-06-11	1918	19	JR0612	2	1	5	3	102	0	0	0	
8849318	2019	2019-08-21	102	2019-01-29	1050	10	DL0626	5	2	5	3	102	0	0	0	
8748626	2018	2018-12-18	102	2018-10-16	1243	12	JT0628	1	2	5	3	102	0	0	0	
8529788	2017	2018-01-11	102	2017-01-20	1916	19	CO0613	4	5	5	3	102	0	0	0	
8199572	2016	2017-01-10	102	2016-07-26	1857	18	CO0613	3	2	5	3	102	0	0	0	
8529823	2017	2018-01-11	102	2017-06-19	1557	15	SW0618		1	5	3	102	0	0	0	
9291880	2020	2021-07-14	102	2020-10-06	1904	19	TP237998	4	2	5	3	102	0	0	0	
8693256	2018	2018-09-27	102	2018-01-19	832	8	TA0619	4	5	5	3	102	0	0	0	
8529767	2017	2018-01-11	102	2017-09-11	759	7	LL0615	5	1	5	3	102	0	0	0	
8529775	2017	2018-03-05	102	2017-09-27	2159	21	CO0613	5	3	5	3	102	0	0	0	
9291912	2020	2021-07-14	102	2020-11-12	1807	18	LL0615	5	4	5	3	102	0	0	0	
8693268	2018	2018-09-18	102	2018-01-23	919	9	EC0624	5	2	5	3	102	0	0	0	

CASE_ID	CHP_BEAT_C	BEAT_NUMBE	PRIMARY_RD	SECONDARY_	DISTANCE	DIRECTION	INTERSECTI	Intersec_1	WEATHER_1	WEATHER_2	STATE_HWY_	CALTRANS_C	CALTRANS_D	STATE_ROUT
8694006	0	2	BUCHANAN	EASTSHORE HWY	104	W	N	Y	A	-	N		0	0
8203037	0	2	BUCHANAN	PIERCE AV	241	W	N	Y	A	-	N		0	0
8693248	0	2	BUCHANAN	TAYLOR	86	W	N	Y	A	-	N		0	0
8200117	0	2	BUCHANAN	JACKSON	246	E	N	Y	A	-	N		0	0
8843130	0	2	BUCHANAN	UTILITY STANDARD 110279218	55	E	N	Y	A	-	N		0	0
8850669	0	2	BUCHANAN	LIGHT STANDARD 07142	20	W	N	Y	A	-	N		0	0
8529795	0	2	BUCHANAN ST	TAYLOR ST	27	W	N	Y	A	-	N		0	0
8513275	0	2	BUCHANAN ST	LIGHT POLE 2694	3	S	N	Y	A	-	N		0	0
8529827	0	1	MADISON ST	SOLANO AV	274	N	N	N	A	-	N		0	0
8079840	0	2	MARIN	MARIN AV	18	N	N	Y	A	-	N		0	0
8203033	0	2	MARIN	TALBOT	75	W	N	Y	A	-	N		0	0
8289782	0	2	MARIN	EVELYN AV	18	N	N	Y	A	-	N		0	0
8203174	0	2	MARIN	RAMONA	25	W	N	Y	A	-	N		0	0
9291856	0	2	MARIN	RAMONA AV	8	W	N	Y	A	-	N		0	0
8513204	0	2	MARIN	CURTIS	28	E	N	Y	A	-	N		0	0
8757802	0	2	MARIN	VENTURA AV	67	E	N	Y	A	-	N		0	0
8976925	0	2	MARIN	KAINS AV	30	W	N	Y	A	-	N		0	0
8200109	0	2	MARIN AV	POMONA AV	100	E	N	Y	C	-	N		0	0
8651045	0	2	MARIN AV	SANTA FE AV	170	W	N	Y	A	-	N		0	0
9291867	0	1	MASONIC AV	SOLANO	4	E	N	Y	A	-	N		0	0
8688983	0	1	SAN PABLO	BRIGHTON AV	418	N	-	N	A	-	Y	ALA	4	123
9286178	0	1	SAN PABLO	GARFIELD AV	10	N	N	Y	A	-	Y	ALA	4	123
8688975	0	1	SAN PABLO	GARFIELD AV	113	N	N	Y	B	-	Y	ALA	4	123
8203196	0	1	SAN PABLO	SOLANO	171	N	N	Y	A	-	Y	ALA	4	123
8504345	0	1	SAN PABLO	SOLANO	64	N	N	Y	A	-	Y	ALA	4	123
9286170	0	2	SAN PABLO	SAN PABLO 1000	24	W	N	Y	A	-	Y	ALA	4	123
8984084	0	2	SAN PABLO	MARIN	53	N	N	Y	A	-	Y	ALA	4	123
8504394	0	2	SAN PABLO	MARIN	115	S	N	Y	A	-	Y	ALA	4	123
8688979	0	1	SAN PABLO AV	BRIGHTON AV	50	N	N	Y	A	-	Y	ALA	4	123
8078048	0	1	SAN PABLO AV	GARFIELD	22	W	N	Y	A	-	Y	ALA	4	123
9286166	0	1	SAN PABLO AV	CASTRO ST	128	S	N	Y	A	-	Y	ALA	4	123
8975401	0	1	SAN PABLO AV	CASTRO ST	36	S	N	Y	A	-	N		0	123
8199548	0	1	SAN PABLO AV	PORTLAND	134	N	N	Y	B	-	Y	ALA	4	123
8289692	0	1	SAN PABLO AV	WASHINGTON	162	S	N	Y	A	-	N		0	0
8689080	0	1	SAN PABLO AV	WASHINGTON AV	80	S	N	Y	A	-	Y	ALA	4	123
8849318	0	2	SAN PABLO AV	MARIN AV	365	S	N	N	A	-	Y	ALA	4	123
8748626	0	1	SAN PABLO AV	SAN PABLO AV 400	32		N	Y	A	-	N		0	0
8529788	0	2	SANTA FE	SOLANO	13	S	N	Y	C	-	N		0	0
8199572	0	1	SANTA FE	UTILITY POLE #110279154	6	S	N	Y	A	-	N		0	0
8529823	0	1	SANTA FE AV	MARIN	1029	S	N	N	A	-	N		0	0
9291880	0	2	SANTA FE AV	POLE #110253328	119	S	N	Y	A	-	N		0	0
8693256	0	2	SANTA FE AV	MARIN	200	N	N	Y	B	-	N		0	0
8529767	0	2	SOLANO	CLEVELAND	202	E	N	Y	A	-	N		0	0
8529775	0	2	SOLANO	MADISON	13	E	N	Y	A	-	N		0	0
9291912	0	2	SOLANO	LIGHT STANDARD #1102534	63	N	N	Y	A	-	N		0	0
8693268	0	2	SOLANO	STANNAGE	14	E	N	Y	A	-	N		0	0

CASE_ID	ROUTE_SUFF	POSTMILE_P	POSTMILE	LOCATION_T	RAMP_INTER	SIDE_OF_HW	TOW_AWAY	COLLISIO_1	NUMBER_KIL	NUMBER_INJ	PARTY_COUN	PRIMARY_CO	PCF_CODE_O	PCF_VIOL_C	PCF_VIOLAT
8694006			0				Y	3	0	1	2	A	-	5	21460
8203037			0				N	4	0	2	4	A	-	3	22350
8693248			0				N	3	0	1	4	A	-	3	22350
8200117			0				Y	4	0	1	1	A	-	8	22107
8843130			0				N	4	0	2	2	A	-	-	0
8850669			0				Y	3	0	1	1	A	-	1	23153
8529795			0				N	4	0	1	2	A	-	12	22450
8513275			0				Y	2	0	1	2	A	-	6	21755
8529827			0				N	2	0	1	2	A	-	11	21954
8079840			0				N	3	0	4	3	A	-	3	22350
8203033			0				N	4	0	1	2	A	-	4	21703
8289782			0				N	4	0	1	2	A	-	3	22350
8203174			0				N	3	0	2	2	A	-	3	22350
9291856			0				N	3	0	1	2	A	-	9	21802
8513204			0				N	4	0	1	3	A	-	3	22350
8757802			0				Y	3	0	1	2	A	-	3	22350
8976925			0				N	3	0	1	2	A	-	3	22350
8200109			0				N	4	0	1	2	A	-	3	22350
8651045			0				Y	3	0	3	3	A	-	3	22350
9291867			0				N	3	0	1	2	A	-	12	21453
8688983	-	-	5.16	H	-	N	N	4	0	1	2	A	-	8	22107
9286178	-	-	4.98	I	5	S	Y	3	0	1	2	A	-	1	23152
8688975	-	-	4.99	H	-	N	N	2	0	1	2	A	-	21	22106
8203196	-	-	4.72	H	-	S	N	4	0	1	2	A	-	17	22517
8504345	-	-	4.69	I	5	S	N	4	0	1	2	A	-	11	21950
9286170	-	-	4.49	H	-	N	Y	4	0	2	3	A	-	3	22350
8984084	-	-	4.45	H	-	S	N	3	0	2	2	A	-	3	22350
8504394	-	-	4.4	H	-	N	N	3	0	1	2	A	-	9	21804
8688979	-	-	5.1	H	-	N	N	3	0	1	2	A	-	21	22106
8078048	-	-	4.97	I	5	S	N	3	0	1	1	A	-	3	22350
9286166	-	-	4.9	H	-	S	N	3	0	1	2	A	-	0	21760
8975401			0				N	3	0	1	2	A	-	9	21804
8199548	-	-	4.9	H	-	N	N	4	0	1	2	A	-	0	22804
8289692			0				N	4	0	1	2	A	-	1	23152
8689080	-	-	4.77	I	5	N	N	4	0	1	2	A	-	11	21955
8849318	-	-	4.36	H	-	N	N	3	0	1	2	A	-	8	22107
8748626			0				Y	4	0	2	2	A	-	9	21804
8529788			0				N	4	0	1	2	A	-	10	21950
8199572			0				N	3	0	1	2	A	-	17	22517
8529823			0				Y	3	0	1	1	A	-	1	23152
9291880			0				Y	3	0	1	1	A	-	3	22350
8693256			0				N	2	0	1	3	C	-	18	0
8529767			0				N	3	0	1	2	A	-	11	21954
8529775			0				N	2	0	1	2	D	-	0	0
9291912			0				N	3	0	1	2	A	-	10	21950
8693268			0				N	3	0	4	2	A	-	9	21802

CASE_ID	PCF_VIOL_S	HIT_AND_RU	TYPE_OF_CO	MVIW	PED_ACTION	ROAD_SURFA	ROAD_COND_	ROAD_COND1	LIGHTING	CONTROL_DE	CHP_ROAD_T	PEDESTRIAN	BICYCLE_AC	MOTORCYCLE	TRUCK_ACCI
8694006	A	N	D	C	A	A	H	-	A	D	0			Y	
8203037		N	C	C	A	A	H	-	A	D	0				
8693248		N	C	C	A	A	H	-	B	A	0				
8200117		N	E	I	A	A	H	-	A	D	0				
8843130		N	D	C	A	A	H	-	C	A	0				
8850669	A	N	E	I	A	A	H	-	C	A	0				
8529795	A	N	H	G	A	A	H	-	A	A	0		Y		
8513275	A	N	B	C	A	A	H	-	A	D	0			Y	
8529827	A	N	G	B	D	A	H	-	A	D	0	Y			
8079840		N	C	C	A	A	H	-	A	D	0				
8203033		N	C	C	A	A	H	-	A	D	0				
8289782		N	C	C	A	A	H	-	A	D	0				
8203174		N	C	C	A	A	H	-	A	D	0				
9291856	A	N	D	C	A	A	H	-	C	D	0				
8513204		N	C	C	A	A	H	-	A	A	0				
8757802		N	C	E	A	A	H	-	A	D	0			Y	
8976925		N	C	C	A	A	G	-	A	D	0				
8200109		N	C	C	A	B	H	-	A	D	0				
8651045		N	C	C	A	A	H	-	C	A	0				
9291867		N	A	G	A	A	H	-	A	A	0		Y		
8688983		N	D	C	A	A	H	-	A	D	0				
9286178		N	A	C	A	A	H	-	C	D	0				
8688975		N	H	G	A	A	H	-	A	D	0		Y		
8203196		N	H	G	A	A	H	-	C	D	0		Y		
8504345	B	N	G	B	B	A	H	-	C	A	0	Y			
9286170		N	C	C	A	A	H	-	A	D	0				
8984084		N	C	C	A	A	H	-	A	A	0				
8504394	A	N	H	G	A	A	H	-	A	D	0		Y		
8688979		N	H	E	A	A	H	-	A	D	0				
8078048		N	E	I	A	A	H	-	C	D	0			Y	
9286166	B	N	H	G	A	A	H	-	A	D	0		Y		
8975401	A	N	H	G	A	A	H	-	C	D	0		Y		
8199548	A	N	D	G	A	A	H	-	A	D	0		Y		
8289692	A	N	C	C	A	A	H	-	C	D	0				
8689080		N	G	B	D	A	H	-	A	D	0	Y			
8849318		F	B	B	E	A	H	-	A	D	0	Y			
8748626		N	H	C	A	A	H	-	A	D	0				
8529788	A	N	G	B	B	B	H	-	C	A	0	Y			
8199572		N	H	G	A	A	H	-	A	D	0		Y		
8529823		M	C	E	A	A	H	-	A	D	0				
9291880		N	A	J	A	A	H	-	C	D	0				
8693256		N	H	G	A	A	H	-	A	D	0		Y		
8529767	A	N	H	B	D	A	H	-	A	D	0	Y			
8529775		N	B	C	A	A	H	-	C	D	0			Y	
9291912	A	N	G	B	B	A	H	-	C	D	0	Y			
8693268	A	N	D	C	A	A	H	-	A	A	0				

CASE_ID	NOT_PRIVAT	ALCOHOL_IN	STWD_VEHTY	CHP_VEHTYP	COUNT_SEVE	COUNT_VISI	COUNT_COMP	COUNT_PED_	COUNT_PED1	COUNT_BICY	COUNT_BI_1	COUNT_MC_K	COUNT_MC_I	PRIMARY_RA
8694006	Y		A	7	0	1	0	0	0	0	0	0	1	-
8203037	Y		A	8	0	0	2	0	0	0	0	0	0	-
8693248	Y		A	1	0	1	0	0	0	0	0	0	0	-
8200117	Y		A	1	0	0	1	0	0	0	0	0	0	-
8843130	Y		-	-	0	0	2	0	0	0	0	0	0	-
8850669	Y	Y	A	1	0	1	0	0	0	0	0	0	0	-
8529795	Y		L	4	0	0	1	0	0	0	1	0	0	-
8513275	Y		C	2	1	0	0	0	0	0	0	0	1	-
8529827	Y		N	60	1	0	0	0	1	0	0	0	0	-
8079840	Y		A	1	0	1	3	0	0	0	0	0	0	-
8203033	Y		A	1	0	0	1	0	0	0	0	0	0	-
8289782	Y		A	1	0	0	1	0	0	0	0	0	0	-
8203174	Y		A	1	0	1	1	0	0	0	0	0	0	-
9291856	Y		A	1	0	1	0	0	0	0	0	0	0	-
8513204	Y		A	8	0	0	1	0	0	0	0	0	0	-
8757802	Y		C	3	0	1	0	0	0	0	0	0	1	-
8976925	Y		A	1	0	1	0	0	0	0	0	0	0	-
8200109	Y		A	1	0	0	1	0	0	0	0	0	0	-
8651045	Y	Y	A	8	0	2	1	0	0	0	0	0	0	-
9291867	Y		A	1	0	1	0	0	0	0	1	0	0	-
8688983	Y		A	1	0	0	1	0	0	0	0	0	0	-
9286178	Y	Y	A	1	0	1	0	0	0	0	0	0	0	-
8688975	Y		A	1	1	0	0	0	0	0	1	0	0	-
8203196	Y		A	7	0	0	1	0	0	0	1	0	0	-
8504345	Y		N	60	0	0	1	0	1	0	0	0	0	-
9286170	Y		A	1	0	0	2	0	0	0	0	0	0	-
8984084	Y		A	1	0	2	0	0	0	0	0	0	0	-
8504394	Y		A	7	0	1	0	0	0	0	1	0	0	-
8688979	Y		-	99	0	1	0	0	0	0	0	0	0	-
8078048	Y		C	2	0	1	0	0	0	0	0	0	1	-
9286166	Y		A	1	0	1	0	0	0	0	1	0	0	-
8975401	Y		A	8	0	1	0	0	0	0	1	0	0	-
8199548	Y		A	1	0	0	1	0	0	0	1	0	0	-
8289692	Y	Y	A	1	0	0	1	0	0	0	0	0	0	-
8689080	Y		N	60	0	0	1	0	1	0	0	0	0	-
8849318	Y		A	7	0	1	0	0	1	0	0	0	0	-
8748626	Y		A	1	0	0	2	0	0	0	0	0	0	-
8529788	Y		A	1	0	0	1	0	1	0	0	0	0	-
8199572	Y		A	1	0	1	0	0	0	0	1	0	0	-
8529823	Y	Y	-		0	1	0	0	0	0	0	0	0	-
9291880	Y	Y	A	1	0	1	0	0	0	0	0	0	0	-
8693256	Y		-	-	1	0	0	0	0	0	1	0	0	-
8529767	Y		N	60	0	1	0	0	1	0	0	0	0	-
8529775	Y		-	-	1	0	0	0	0	0	0	0	1	-
9291912	Y		A	1	0	1	0	0	1	0	0	0	0	-
8693268	Y		D	22	0	4	0	0	0	0	0	0	0	-

CASE_ID	SECONDARY1	LATITUDE	LONGITUDE	COUNTY	CITY	POINT_X	POINT_Y
8694006	-	0	0	ALAMEDA	ALBANY	-122.3077469	37.88718033
8203037	-	0	0	ALAMEDA	ALBANY	-122.3061288	37.88739237
8693248	-	0	0	ALAMEDA	ALBANY	-122.3038483	37.88758087
8200117	-	0	0	ALAMEDA	ALBANY	-122.3000593	37.88768884
8843130	-	0	0	ALAMEDA	ALBANY	-122.298529	37.887846
8850669	-	37.8874588	-122.3038025	ALAMEDA	ALBANY	-122.3038025	37.8874588
8529795	-	0	0	ALAMEDA	ALBANY	-122.3036435	37.88758681
8513275	-	0	0	ALAMEDA	ALBANY	-122.299931	37.887748
8529827	-	0	0	ALAMEDA	ALBANY	-122.3009479	37.8906907
8079840	-	0	0	ALAMEDA	ALBANY	-122.29987	37.88756
8203033	-	0	0	ALAMEDA	ALBANY	-122.2946003	37.88735438
8289782	-	0	0	ALAMEDA	ALBANY	-122.2934495	37.8875821
8203174	-	0	0	ALAMEDA	ALBANY	-122.2900638	37.8882726
9291856	-	37.88827133	-122.2900238	ALAMEDA	ALBANY	-122.2900085	37.88828278
8513204	-	0	0	ALAMEDA	ALBANY	-122.2869444	37.88912622
8757802	-	0	0	ALAMEDA	ALBANY	-122.2826004	37.88917923
8976925	-	0	0	ALAMEDA	ALBANY	-122.2969953	37.88689755
8200109	-	0	0	ALAMEDA	ALBANY	-122.2907047	37.88813959
8651045	-	0	0	ALAMEDA	ALBANY	-122.2887497	37.88853455
9291867	-	37.89057922	-122.2935791	ALAMEDA	ALBANY	-122.2935791	37.89056015
8688983	-	0	0	ALAMEDA	ALBANY	-122.301445	37.8980751
9286178	-	0	0	ALAMEDA	ALBANY	-122.3006287	37.89512634
8688975	-	0	0	ALAMEDA	ALBANY	-122.3005524	37.89530182
8203196	-	0	0	ALAMEDA	ALBANY	-122.2992225	37.89076523
8504345	-	0	0	ALAMEDA	ALBANY	-122.2990616	37.89026014
9286170	-	37.88759995	-122.298439	ALAMEDA	ALBANY	-122.2980652	37.88755798
8984084	-	37.88677979	-122.29776	ALAMEDA	ALBANY	-122.2980118	37.88696289
8504394	-	0	0	ALAMEDA	ALBANY	-122.2976628	37.88630832
8688979	-	0	0	ALAMEDA	ALBANY	-122.3010635	37.89693451
8078048	-	0	0	ALAMEDA	ALBANY	-122.3005821	37.89496974
9286166	-	37.89355087	-122.3004074	ALAMEDA	ALBANY	-122.3002243	37.89385223
8975401	-	37.89421082	-122.2999802	ALAMEDA	ALBANY	-122.3001785	37.89414597
8199548	-	0	0	ALAMEDA	ALBANY	-122.3000927	37.89387377
8289692	-	0	0	ALAMEDA	ALBANY	-122.299482	37.89189863
8689080	-	0	0	ALAMEDA	ALBANY	-122.2993774	37.89165115
8849318	-	37.88573074	-122.2973175	ALAMEDA	ALBANY	-122.2974854	37.88575363
8748626	-	0	0	ALAMEDA	ALBANY	-122.3015821	37.89811964
8529788	-	0	0	ALAMEDA	ALBANY	-122.2887789	37.8907954
8199572	-	0	0	ALAMEDA	ALBANY	-122.288537	37.890074
8529823	-	0	0	ALAMEDA	ALBANY	-122.2892676	37.88596794
9291880	-	37.88607025	-122.2889328	ALAMEDA	ALBANY	-122.289163	37.88618816
8693256	-	0	0	ALAMEDA	ALBANY	-122.288269	37.8891983
8529767	-	0	0	ALAMEDA	ALBANY	-122.3065908	37.88879494
8529775	-	0	0	ALAMEDA	ALBANY	-122.300676	37.88996785
9291912	-	37.89017868	-122.2980881	ALAMEDA	ALBANY	-122.2980881	37.89017868
8693268	-	0	0	ALAMEDA	ALBANY	-122.2970734	37.89037323

CASE_ID	ACCIDENT_Y	PROC_DATE	JURIS	COLLISION_	COLLISION1	Hour	OFFICER_ID	REPORTING_	DAY_OF_WEE	CHP_SHIFT	POPULATION	CNTY_CITY_	SPECIAL_CO	BEAT_TYPE	CHP_BEAT_T	CITY_DIVIS
8078436	2016	2016-07-15	102	2016-05-17	1654	16	MG0620	4	2	5	3	102	0	0	0	
8693323	2018	2018-09-18	102	2018-05-01	1111	11	JR0612	3	2	5	3	102	0	0	0	
8529796	2017	2018-01-11	102	2017-01-27	2303	23	MP0622	4	5	5	3	102	0	0	0	
8693252	2018	2018-09-18	102	2018-01-13	1507	15	EC0624	4	6	5	3	102	0	0	0	
8976933	2019	2019-11-20	102	2019-05-18	1117	11	HM92142	5	6	5	3	102	0	0	0	
8749281	2018	2018-12-18	102	2018-08-22	1546	15	CO0613		3	5	3	102	0	0	0	
8078467	2016	2016-07-19	102	2016-05-28	1132	11	TA0619	4	6	5	3	102	0	0	0	
8529780	2017	2018-01-11	102	2017-02-28	1812	18	LL0615	4	2	5	3	102	0	0	0	
8976427	2019	2019-11-22	102	2019-08-15	2331	23	JR0612	1	4	5	3	102	0	0	0	
8976929	2019	2019-11-20	102	2019-05-23	2031	20	DW190456	4	4	5	3	102	0	0	0	
9291871	2020	2021-07-12	102	2020-12-21	1750	17	MD236619	1	1	5	3	102	0	0	0	
8529495	2017	2018-01-12	102	2017-12-17	1452	14	EC0624	1	7	5	3	102	0	0	0	
8684454	2018	2018-09-10	102	2018-07-25	1717	17	DL0626	5	3	5	3	102	0	0	0	
8083479	2016	2016-07-19	102	2016-02-03	1938	19	DH0611	5	3	5	3	102	0	0	0	
9291892	2020	2021-07-14	102	2020-10-15	2044	20	JR0612	5	4	5	3	102	0	0	0	
8504398	2017	2018-07-06	102	2017-10-16	1250	12	MP0622	1	1	5	3	102	0	0	0	
9286174	2020	2021-07-16	102	2020-10-30	1625	16	DL0626	2	5	5	3	102	0	0	0	
8504382	2017	2018-06-14	102	2017-05-09	1753	17	LL0615	1	2	5	3	102	0	0	0	
8083491	2016	2016-07-19	102	2016-01-25	845	8	LL0615	5	1	5	3	102	0	0	0	
8849655	2019	2019-08-21	102	2019-03-02	1123	11	DL0626	5	6	5	3	102	0	0	0	
8203193	2016	2017-03-02	102	2016-10-31	1830	18	LL0615	5	1	5	3	102	0	0	0	
8689121	2018	2018-10-25	102	2018-07-11	2208	22	CO0613	1	3	5	3	102	0	0	0	
9286182	2020	2021-07-16	102	2020-10-26	1713	17	TP237998	1	1	5	3	102	0	0	0	
8200121	2016	2017-01-03	102	2016-11-11	1639	16	CO0613	5	5	5	3	102	0	0	0	
8975708	2019	2019-12-03	102	2019-10-30	1516	15	PO0623	2	3	5	3	102	0	0	0	
8689119	2018	2018-09-18	102	2018-03-01	1736	17	CO0613	1	4	5	3	102	0	0	0	
8975728	2019	2020-01-03	102	2019-10-14	1636	16	JT0628	1	1	5	3	102	0	0	0	
8765118	2018	2019-01-11	102	2018-09-24	1616	16	DL0626	1	1	5	3	102	0	0	0	
8851008	2018	2019-06-24	102	2018-12-13	1434	14	TA0619	1	4	5	3	102	0	0	0	
8504349	2017	2018-06-14	102	2017-06-20	1835	18	PO0623	2	2	5	3	102	0	0	0	
8689125	2018	2018-10-25	102	2018-07-10	2113	21	JR0612	1	2	5	3	102	0	0	0	
9286186	2020	2021-07-16	102	2020-12-14	808	8	TP237998	5	1	5	3	102	0	0	0	
8201763	2016	2017-01-04	102	2016-08-21	1716	17	DH0611	5	7	5	3	102	0	0	0	
8529772	2017	2018-01-11	102	2017-03-10	755	7	JT0628	1	5	5	3	102	0	0	0	
8083614	2016	2016-07-19	102	2016-03-18	1701	17	DH0611	5	5	5	3	102	0	0	0	
8197667	2016	2017-03-03	102	2016-11-23	1803	18	DH0611	2	3	5	3	102	0	0	0	
8757806	2018	2018-12-19	102	2018-10-01	1915	19	AJ0625	4	1	5	3	102	0	0	0	
8983912	2019	2019-12-02	102	2019-07-23	1103	11	DH0611	5	2	5	3	102	0	0	0	
8083471	2016	2016-07-19	102	2016-02-25	1734	17	LL0615	2	4	5	3	102	0	0	0	
8843136	2018	2019-05-03	102	2018-12-17	2129	21	AJ0625	2	1	5	3	102	0	0	0	
8850130	2019	2019-08-21	102	2019-02-11	2140	21	SW0618	5	1	5	3	102	0	0	0	
8979942	2019	2019-12-05	102	2019-06-13	1452	14	PO0623	1	4	5	3	102	0	0	0	

CASE_ID	CHP_BEAT_C	BEAT_NUMBE	PRIMARY_RD	SECONDARY_	DISTANCE	DIRECTION	INTERSECTI	Intersec_1	WEATHER_1	WEATHER_2	STATE_HWY_	CALTRANS_C	CALTRANS_D	STATE_ROUT
8078436	0	2	SOLANO	SANTA FE	55	W	N	Y	A	-	N		0	0
8693323	0	1	SOLANO	CURTIS	86	E	N	Y	A	-	N		0	0
8529796	0	2	SOLANO	NEILSON	73	E	N	Y	A	-	N		0	0
8693252	0	2	SOLANO	ORDWAY	50	W	N	Y	A	-	N		0	0
8976933	0	2	SOLANO	KAINS	118	W	N	Y	C	-	N		0	0
8749281	0	1	SOLANO AV	CARMEL	33	N	N	Y	A	-	N		0	0
8078467	0	2	SOLANO AV	SAN CARLOS	95	W	N	Y	A	-	N		0	0
8529780	0	2	SOLANO AV	PERALTA AV	65	E	N	Y	A	-	N		0	0
8976427	0	1	SOLANO AV	TAYLOR ST	40	E	N	Y	A	-	N		0	0
8976929	0	2	SOLANO AV	PERALTA	11	W	N	Y	A	-	N		0	0
9291871	0	1	WASHINGTON	ADAMS ST	590	W	N	N	A	-	N		0	0
8529495	0	1	BRIGHTON	SAN PABLO AV	0		Y	Y	A	-	N		0	0
8684454	0	2	MARIN	MASONIC	0		Y	Y	A	-	N		0	0
8083479	0	2	MARIN	MASONIC	0		Y	Y	A	-	N		0	0
9291892	0	2	MARIN AV	MASONIC AV	0		Y	Y	A	-	N		0	0
8504398	0	1	SAN PABLO	BRIGHTON	0		Y	Y	A	-	Y	ALA	4	123
9286174	0	1	SAN PABLO	BRIGHTON	0		Y	Y	A	-	Y	ALA	4	123
8504382	0	1	SAN PABLO	GARFIELD AV	0		N	Y	A	-	Y	ALA	4	123
8083491	0	2	SAN PABLO	MARIN	0		Y	Y	A	-	N		0	0
8849655	0	2	SAN PABLO	MARIN	0		Y	Y	B	-	Y	ALA	4	123
8203193	0	2	SAN PABLO	MONROE AV	0	N	N	Y	C	-	Y	ALA	4	123
8689121	0	1	SAN PABLO	PORTLAND	0		Y	Y	A	-	Y	ALA	4	123
9286182	0	1	SAN PABLO	PORTLAND AV	0		Y	Y	A	-	Y	ALA	4	123
8200121	0	2	SAN PABLO	SAN PABLO 1031	0		N	Y	A	-	N		0	0
8975708	0	1	SAN PABLO	SAN PABLO 431	0		Y	Y	A	-	N		0	123
8689119	0	1	SAN PABLO	SAN PABLO 540	0		-	Y	A	-	Y	ALA	4	123
8975728	0	1	SAN PABLO AV	BRIGHTON AV	0		Y	Y	A	-	N		0	123
8765118	0	1	SAN PABLO AV	BRIGHTON AV	0		Y	Y	A	-	Y	ALA	4	123
8851008	0	1	SAN PABLO AV	GARFIELD AV	0		Y	Y	A	-	Y	ALA	4	123
8504349	0	1	SAN PABLO AV	GARFIELD AV	0		Y	Y	A	-	Y	ALA	4	123
8689125	0	1	SAN PABLO AV	GARFIELD AV	0		Y	Y	A	-	Y	ALA	4	123
9286186	0	2	SAN PABLO AV	MARIN AV	0		Y	Y	A	-	Y	ALA	4	123
8201763	0	2	SAN PABLO AV	MARIN AV	0		Y	Y	A	-	N		0	0
8529772	0	1	SAN PABLO AV	SAN PABLO AV 600 BLOCK	0		N	Y	A	-	N		0	0
8083614	0	2	SAN PABLO AV	SAN PABLO AV 1045	0		Y	Y	A	-	N		0	0
8197667	0	1	SAN PABLO AV	SAN PABLO AV 563	0		-	Y	A	-	Y	ALA	4	123
8757806	0	2	SOLANO	PERALTA AV	0		Y	Y	A	-	N		0	0
8983912	0	2	SOLANO	SOLANO AV 1164	0		-	Y	A	-	N		0	0
8083471	0	1	SOLANO	STANNAGE	0		Y	Y	A	-	N		0	0
8843136	0	1	SOLANO	STANNAGE	0		Y	Y	A	-	N		0	0
8850130	0	2	SOLANO AV	SAN PABLO AV	0		Y	Y	A	-	Y	ALA	4	123
8979942	0	1	SOLANO AV	SOLANO AV 1057	0		N	Y	A	-	N		0	0

CASE_ID	ROUTE_SUFF	POSTMILE_P	POSTMILE	LOCATION_T	RAMP_INTER	SIDE_OF_HW	TOW_AWAY	COLLISIO_1	NUMBER_KIL	NUMBER_INJ	PARTY_COUN	PRIMARY_CO	PCF_CODE_O	PCF_VIOL_C	PCF_VIOLAT
8078436			0				N	3	0	1	3	A	-	3	22350
8693323			0				N	3	0	1	2	A	-	3	22350
8529796			0				N	4	0	1	2	A	-	3	22350
8693252			0				N	3	0	1	2	A	-	4	21703
8976933			0				N	4	0	1	2	-	-	-	0
8749281			0				N	3	0	1	2	A	-	3	22350
8078467			0				N	4	0	1	2	A	-	-	0
8529780			0				N	3	0	1	2	A	-	6	21750
8976427			0				Y	3	0	1	3	A	-	1	23152
8976929			0				N	2	0	1	2	D	-	0	0
9291871			0				N	2	0	1	2	A	-	8	22107
8529495			0				N	3	0	1	2	A	-	0	22950
8684454			0				Y	2	0	2	4	A	-	12	21453
8083479			0				N	4	0	1	2	A	-	10	21950
9291892			0				N	3	0	1	2	A	-	9	21801
8504398	-	-	5.09	I	5	N	N	4	0	1	2	A	-	8	22107
9286174	-	-	5.09	I	5	N	N	4	0	1	2	A	-	10	21950
8504382	-	-	4.98	H	-	S	Y	2	0	1	3	A	-	8	22107
8083491			0				N	4	0	1	2	A	-	3	22350
8849655	-	-	4.43	I	5	N	N	2	0	3	3	A	-	12	21453
8203193	-	-	4.3	H	-	N	N	2	0	1	2	A	-	9	21801
8689121	-	-	4.87	I	5	S	N	2	0	1	2	A	-	10	21950
9286182	-	-	4.87	I	5	S	N	3	0	1	2	A	-	10	21950
8200121			0				Y	4	0	1	4	A	-	9	21801
8975708			0				N	3	0	1	2	A	-	9	21804
8689119	-	-	5.07	H	-	S	N	4	0	1	2	A	-	17	22517
8975728			0				N	4	0	1	2	A	-	10	21950
8765118	-	-	5.09	I	5	S	N	2	0	3	4	A	-	10	21950
8851008	-	-	4.97	I	5	S	N	4	0	1	3	A	-	3	22350
8504349	-	-	4.97	I	5	S	N	3	0	1	2	A	-	10	21950
8689125	-	-	4.97	I	5	N	N	3	0	1	2	A	-	8	22107
9286186	-	-	4.43	I	5	S	N	3	0	2	2	D	-	0	0
8201763			0				N	4	0	1	2	A	-	8	22107
8529772			0				N	4	0	1	2	A	-	3	22350
8083614			0				N	4	0	1	2	A	-	8	22107
8197667	-	-	5	H	-	N	N	4	0	1	2	A	-	3	22350
8757806			0				N	3	0	1	2	A	-	1	23153
8983912			0				N	3	0	1	1	A	-	21	22106
8083471			0				N	3	0	1	2	A	-	9	21802
8843136			0				Y	2	0	2	2	A	-	9	21804
8850130	-	-	4.69	I	6	N	N	3	0	1	2	A	-	11	21950
8979942			0				Y	2	0	2	1	D	-	0	0

CASE_ID	PCF_VIOL_S	HIT_AND_RU	TYPE_OF_CO	MVIW	PED_ACTION	ROAD_SURFA	ROAD_COND_	ROAD_COND1	LIGHTING	CONTROL_DE	CHP_ROAD_T	PEDESTRIAN	BICYCLE_AC	MOTORCYCLE	TRUCK_ACCI
8078436		N	C	C	A	A	H	-	A	D	0				
8693323		N	H	G	A	A	H	-	A	D	0		Y		
8529796		N	C	E	A	A	H	-	C	D	0				
8693252		N	C	C	A	A	H	-	A	D	0				
8976933		N	C	D	A	B	H	-	A	D	0				
8749281		N	C	C	A	A	H	-	A	D	0				
8078467		N	D	B	E	A	H	-	A	D	0	Y			
8529780	A	N	D	G	A	A	H	-	A	D	0		Y		
8976427	A	N	B	E	A	A	H	-	C	D	0				
8976929		F	H	C	A	A	H	-	B	D	0			Y	
9291871		N	F	E	A	A	H	-	B	D	0				
8529495	A	N	G	B	B	A	H	-	A	A	0	Y			
8684454	A	F	D	C	A	A	H	-	A	A	0				
8083479	A	N	G	B	B	A	H	-	C	A	0	Y			
9291892	A	N	H	G	A	A	H	-	C	A	0		Y		
8504398		N	D	C	A	A	H	-	A	A	0			Y	
9286174		N	A	B	B	A	H	-	A	A	0	Y			
8504382		N	C	C	A	A	H	-	A	D	0				
8083491		N	C	C	A	A	H	-	A	A	0			Y	
8849655	A	F	D	C	A	A	H	-	A	A	0				
8203193	A	N	D	G	A	B	H	-	B	D	0		Y		
8689121	A	F	G	B	B	A	H	-	C	D	0	Y			
9286182	A	N	A	B	B	A	H	-	A	D	0	Y			
8200121	A	N	D	C	A	A	H	-	B	A	0				
8975708		N	G	B	F	A	H	-	A	D	0	Y			
8689119		N	G	B	E	A	H	-	A	D	0	Y			
8975728	A	N	G	B	B	A	H	-	A	A	0	Y			
8765118	A	N	G	B	B	A	H	-	A	A	0	Y			
8851008		N	C	C	A	A	H	-	A	D	0				
8504349	A	N	G	B	B	A	H	-	A	A	0	Y			
8689125		N	A	C	A	A	H	-	C	D	0			Y	
9286186		N	A	C	A	-	H	-	A	A	0				
8201763		N	B	E	A	A	H	-	A	D	0		Y		
8529772		N	C	C	A	A	H	-	A	D	0				
8083614		N	H	G	A	A	H	-	A	D	0		Y		
8197667		N	C	C	A	A	H	-	C	D	0				
8757806	A	N	G	B	B	A	H	-	C	D	0	Y			
8983912		N	E	I	A	A	H	-	A	D	0				
8083471	A	N	H	G	A	A	H	-	A	D	0		Y		
8843136	A	N	D	C	A	A	H	-	C	A	0				
8850130	B	N	G	B	D	A	H	-	C	A	0	Y			
8979942		N	E	I	A	A	D	-	A	D	0				

CASE_ID	NOT_PRIVAT	ALCOHOL_IN	STWD_VEHTY	CHP_VEHTYP	COUNT_SEVE	COUNT_VISI	COUNT_COMP	COUNT_PED_	COUNT_PED1	COUNT_BICY	COUNT_BI_1	COUNT_MC_K	COUNT_MC_I	PRIMARY_RA
8078436	Y		A	1	0	1	0	0	0	0	0	0	0	-
8693323	Y		L	4	0	1	0	0	0	0	1	0	0	-
8529796	Y		A	1	0	0	1	0	0	0	0	0	0	-
8693252	Y		A	1	0	1	0	0	0	0	0	0	0	-
8976933	Y		-	-	0	0	1	0	0	0	0	0	0	-
8749281	Y		A	1	0	1	0	0	0	0	0	0	0	-
8078467	Y		-	-	0	0	1	0	1	0	0	0	0	-
8529780	Y		L	4	0	1	0	0	0	0	1	0	0	-
8976427	Y	Y	A	1	0	1	0	0	0	0	0	0	0	-
8976929	Y	Y	-	-	1	0	0	0	0	0	0	0	1	-
9291871	Y		A	1	1	0	0	0	0	0	0	0	0	-
8529495	Y		A	1	0	1	0	0	1	0	0	0	0	-
8684454	Y		E	23	1	1	0	0	0	0	0	0	0	-
8083479	Y		A	1	0	0	1	0	1	0	0	0	0	-
9291892	Y		L	4	0	1	0	0	0	0	1	0	0	-
8504398	Y		A	1	0	0	1	0	0	0	0	0	0	-
9286174	Y		A	1	0	0	1	0	1	0	0	0	0	-
8504382	Y		A	1	1	0	0	0	0	0	0	0	0	-
8083491	Y		A	1	0	0	1	0	0	0	0	0	1	-
8849655	Y		A	1	1	2	0	0	0	0	0	0	0	-
8203193	Y		A	1	1	0	0	0	0	0	1	0	0	-
8689121	Y	Y	-		1	0	0	0	1	0	0	0	0	-
9286182	Y		-	99	0	1	0	0	1	0	0	0	0	-
8200121	Y		A	1	0	0	1	0	0	0	0	0	0	-
8975708	Y		A	1	0	1	0	0	1	0	0	0	0	-
8689119	Y		N	60	0	0	1	0	1	0	0	0	0	-
8975728	Y		A	1	0	0	1	0	1	0	0	0	0	-
8765118	Y		D	22	1	2	0	0	3	0	0	0	0	-
8851008	Y		D	22	0	0	1	0	0	0	0	0	0	-
8504349	Y		A	1	0	1	0	0	1	0	0	0	0	-
8689125	Y		A	1	0	1	0	0	0	0	0	0	1	-
9286186	Y		-	-	0	2	0	0	0	0	0	0	0	-
8201763	Y		L	4	0	0	1	0	0	0	1	0	0	-
8529772	Y		A	7	0	0	1	0	0	0	0	0	0	-
8083614	Y		A	7	0	0	1	0	0	0	1	0	0	-
8197667	Y		A	1	0	0	1	0	0	0	0	0	0	-
8757806	Y	Y	A	1	0	1	0	0	1	0	0	0	0	-
8983912	Y		A	7	0	1	0	0	0	0	0	0	0	-
8083471	Y		-		0	1	0	0	0	0	1	0	0	-
8843136	Y		A	1	1	1	0	0	0	0	0	0	0	-
8850130	Y	Y	N	60	0	1	0	0	1	0	0	0	0	-
8979942	Y	Y	-	-	1	1	0	0	0	0	0	0	0	-

CASE_ID	SECONDARY1	LATITUDE	LONGITUDE	COUNTY	CITY	POINT_X	POINT_Y
8078436	-	0	0	ALAMEDA	ALBANY	-122.2889804	37.89082253
8693323	-	0	0	ALAMEDA	ALBANY	-122.2873535	37.89092255
8529796	-	0	0	ALAMEDA	ALBANY	-122.2863278	37.89097593
8693252	-	0	0	ALAMEDA	ALBANY	-122.2847214	37.89107132
8976933	-	0	0	ALAMEDA	ALBANY	-122.2983955	37.89030936
8749281	-	37.89113998	-122.2809067	ALAMEDA	ALBANY	-122.2901764	37.89076996
8078467	-	0	0	ALAMEDA	ALBANY	-122.2896284	37.89079068
8529780	-	0	0	ALAMEDA	ALBANY	-122.2854052	37.89103249
8976427	-	37.88953018	-122.3040009	ALAMEDA	ALBANY	-122.3040009	37.88953018
8976929	-	0	0	ALAMEDA	ALBANY	-122.2856365	37.89102071
9291871	-	37.89315033	-122.3008728	ALAMEDA	ALBANY	-122.3024979	37.89175034
8529495	-	0	0	ALAMEDA	ALBANY	-122.3009999	37.89672991
8684454	-	37.8853302	-122.2968597	ALAMEDA	ALBANY	-122.2926407	37.88774872
8083479	-	0	0	ALAMEDA	ALBANY	-122.2926399	37.88774991
9291892	-	37.88774109	-122.2926636	ALAMEDA	ALBANY	-122.2926407	37.88774872
8504398	-	0	0	ALAMEDA	ALBANY	-122.3009973	37.89673145
9286174	-	37.8967514	-122.3009567	ALAMEDA	ALBANY	-122.3009949	37.89673233
8504382	-	0	0	ALAMEDA	ALBANY	-122.3006307	37.89512519
8083491	-	0	0	ALAMEDA	ALBANY	-122.29784	37.88676995
8849655	-	0	0	ALAMEDA	ALBANY	-122.2977982	37.88672638
8203193	-	0	0	ALAMEDA	ALBANY	-122.2972236	37.88491981
8689121	-	37.88529968	-122.2969894	ALAMEDA	ALBANY	-122.3000565	37.89334106
9286182	-	0	0	ALAMEDA	ALBANY	-122.3000565	37.89334106
8200121	-	0	0	ALAMEDA	ALBANY	-122.2975946	37.88578586
8975708	-	37.89720917	-122.3006973	ALAMEDA	ALBANY	-122.3011093	37.89707184
8689119	-	0	0	ALAMEDA	ALBANY	-122.301033	37.89645767
8975728	-	37.89667892	-122.3012924	ALAMEDA	ALBANY	-122.3010941	37.89673615
8765118	-	0	0	ALAMEDA	ALBANY	-122.3010864	37.89671326
8851008	-	0	0	ALAMEDA	ALBANY	-122.3005829	37.89496994
8504349	-	0	0	ALAMEDA	ALBANY	-122.3005821	37.89496974
8689125	-	37.89714813	-122.3005219	ALAMEDA	ALBANY	-122.3004532	37.89499283
9286186	-	37.88648987	-122.2979126	ALAMEDA	ALBANY	-122.2979202	37.88668442
8201763	-	0	0	ALAMEDA	ALBANY	-122.29784	37.88676995
8529772	-	0	0	ALAMEDA	ALBANY	-122.30061	37.895494
8083614	-	0	0	ALAMEDA	ALBANY	-122.2972459	37.88523547
8197667	-	0	0	ALAMEDA	ALBANY	-122.300598	37.89545844
8757806	-	0	0	ALAMEDA	ALBANY	-122.2856293	37.89102173
8983912	-	37.89028168	-122.2966919	ALAMEDA	ALBANY	-122.2966919	37.89028168
8083471	-	0	0	ALAMEDA	ALBANY	-122.2971199	37.89036999
8843136	-	0	0	ALAMEDA	ALBANY	-122.2971191	37.89036942
8850130	-	0	0	ALAMEDA	ALBANY	-122.2989426	37.89028168
8979942	-	0	0	ALAMEDA	ALBANY	-122.2992781	37.89024164

APPENDIX E: COUNTERMEASURE TOOLBOX

City of Albany LRSP

CM Toolbox for Intersections

Signalized						
Sr. No.	**Code**	**Countermeasure Name**	**CM Description**	**CRF**	**Federal Funding**	**Systemic Approach Opportunity**
	HSIP/Non-HSIP Code					
1	S01	Add intersection lighting	Provision of lighting at intersection.	40%	90%	Medium
2	S02	Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number	Includes New LED lighting, signal back plates, retro-reflective tape outlining the back plates, or visors to increase signal visibility, larger signal heads, relocation of the signal heads, or additional signal heads.	15%	90%	Very High
3	S03	Improve signal timing (coordination, phases, red, yellow, or operation)	Includes adding phases, lengthening clearance intervals, eliminating or restricting higher-risk movements, and coordinating signals at multiple locations.	15%	50%	Very High
5	S05	Install emergency vehicle pre-emption systems	Corridors that have a history of crashes involving emergency response vehicles. The target of this strategy is signalized intersections where normal traffic operations impede emergency vehicles and where traffic conditions create a potential for conflicts between emergency and nonemergency vehicles. These conflicts could lead to almost any type of crash, due to the potential for erratic maneuvers of vehicles moving out of the paths of emergency vehicles	70%	90%	High
6	S06	Install left-turn lane and add turn phase (signal has no left-turn lane or phase before)	Intersections that do not currently have a left turn lane or a related left-turn phase that are experiencing a large number of crashes. Many intersection safety problems can be traced to difficulties in accommodating left-turning vehicles, in particular where there is currently no accommodation for left turning traffic. A key strategy for minimizing collisions related to left-turning vehicles (angle, rear-end, sideswipe) is to provide exclusive left-turn lanes and the appropriate signal phasing, particularly on high-volume and high-speed major-road approaches.	55%	90%	Low
7	S07	Provide protected left turn phase (left turn lane already exists)	Left turns are widely recognized as the highest-risk movements at signalized intersections. Providing Protected left-turn phases for signalized intersections with existing left turn pockets significantly improve the safety for left-turn maneuvers by removing the need for the drivers to navigate through gaps in oncoming/opposing through vehicles	30%	90%	High
8	S08	Convert signal to mast arm (from pedestal-mounted)	Providing better visibility of intersection signs and signals aids the drivers' advance perception of the upcoming intersection. Visibility and clarity of the signal should be improved without creating additional confusion or distraction for drivers.	30%	90%	Medium
9	S09	Install raised pavement markers and striping (Through Intersection)	Adding clear pavement markings can guide motorists through complex intersections. When drivers approach and traverse through complex intersections, drivers may be required to perform unusual or unexpected maneuvers	10%	90%	Very High
10	S10	Install flashing beacons as advance warning (S.I.)	Increased driver awareness of an approaching signalized intersection and an increase in the driver's time to react.	30%	90%	Medium
11	S11	Improve pavement friction (High Friction Surface Treatments)	Improving the skid resistance at locations with high frequencies of wet road crashes and/or failure to stop crashes	55%	90%	Medium
12	S12	Install raised median on approaches (S.I.)	Raised medians next to left turn lanes at intersections offer a cost effective means for reducing crashes and improving operations at higher volume intersections	25%	90%	Medium
13	S13PB	Install pedestrian median fencing on approaches	Signalized Intersections with high pedestrian-generators nearby (e.g. transit stops) may experience a high volumes of pedestrians J-walking across the travel lanes at mid-block locations instead of walking to the intersection and waiting to cross during the walk-phase.	30%	90%	Low
14	S14	Create directional median openings to allow (and restrict) left-turns and U-turns (S.I.)	Crashes related to turning maneuvers include angle, rear-end, pedestrian, and sideswipe (involving opposing left turns) type crashes. If any of these crash types are an issue at an intersection, restriction or elimination of the turning maneuver may be the best way to improve the safety of the intersection	50%	90%	Medium
15	S15	Reduced Left-Turn Conflict Intersections (S.I.)	Reduced left-turn conflict intersections are geometric designs that alter how left-turn movements occur in order to simplify decisions and minimize the potential for related crashes. Two highly effective designs that rely on U-turns to complete certain left-turn movements are known as the restricted crossing U-turn (RCUT) and the median U-turn (MUT).	50%	90%	Medium
16	S16	Convert intersection to roundabout (from signal)	Signalized intersections that have a significant crash problem and the only alternative is to change the nature of the intersection itself. Roundabouts can also be very effective at intersections with complex geometry and intersections with frequent left-turn movements.	Varies	90%	Low
17	S17PB	Install pedestrian countdown signal heads	Signals that have signalized pedestrian crossing with walk/don't walk indicators and where there have been pedestrian vs. vehicle crashes.	25%	90%	Very High

18	S18PB	Install pedestrian crossing (S.I.)	Signalized Intersections with no marked crossing and pedestrian signal heads, where pedestrians are known to be crossing intersections that involve significant turning movements. They are especially important at intersections with (1) multiphase traffic signals, such as left-turn arrows and split phases, (2) school crossings, and (3) double-right or double-left turns. At signalized intersections, pedestrian crossings are often safer when the left turns have protected phases that do not overlap the pedestrian walk phase.	25%	90%	High
19	S19PB	Pedestrian Scramble	vehicular traffic is required to stop, allowing pedestrians/bicyclists to safely cross through the intersection in any direction, including diagonally. Pedestrian Scramble may be considered at signalized intersections with very high pedestrian/bicycle volumes, e.g. in an urban business district.	40%	90%	High
20	S20PB	Install advance stop bar before crosswalk (Bicycle Box)	Signalized Intersections with a marked crossing, where significant bicycle and/or pedestrians volumes are known to occur.	15%	90%	Very High
21	S21PB	Modify signal phasing to implement a Leading Pedestrian Interval (LPI)	Addition of LPI gives pedestrians the opportunity to enter an intersection 3-7 seconds before vehicles are given a green indication; only minor signal timing alteration is required.	60%	90%	Very High

Unsignalized

Sr. No.	Code	Countermeasure Name	CM Description	CRF	Federal Funding	Systemic Approach Opportunity
1	NS01	Add intersection lighting (NS.I.)	Provision of lighting at intersection.	40%	90%	Medium
2	NS02	Convert to all-way STOP control (from 2-way or Yield control)	Unsignalized intersection locations that have a crash history and have no controls on the major roadway approaches. However, all-way stop control is suitable only at intersections with moderate,and relatively balanced volume levels on the intersection approaches. Under other conditions, the use of all-way stop control may create unnecessary delays and aggressive driver behavior.	50%	90%	High
3	NS03	Install Signals	Installation of traffic signals	25%	90%	Low
4	NS04	Convert intersection to roundabout (from all way stop)	Intersections that have a high frequency of right-angle and left-turn type crashes. Whether such intersections have existing crash patterns or not, a roundabout provides an alternative to signalization. The primary target locations for roundabouts should be moderate-volume unsignalized intersections.	Varies	90%	Low
5	NS05	Convert intersection to roundabout (from 2-way stop or Yield control)	Intersections that have a high frequency of right-angle and left-turn type crashes. Whether such intersections have existing crash patterns or not, a roundabout provides an alternative to signalization. The primary target locations for roundabouts should be moderate-volume unsignalized intersections.	Varies	90%	Low
6	NS05mr	Convert intersection to mini-roundabout	Mini-roundabouts are characterized by a small diameter (45-90 ft) and traversable islands (central island and splitter islands).	30%	90%	High
7	NS06	Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs	Additional regulatory and warning signs at or prior to intersections will help enhance the ability of approaching drivers to percieve them	15%	90%	Very High
8	NS07	Upgrade intersection pavement markings (NS.I.)	Typical improvements include "Stop Ahead" markings and the addition of centerlines and stop bars	25%	90%	Very High
9	NS08	Install Flashing Beacons at Stop-Controlled Intersections	Flashing beacons can reinforce driver awareness of the Non-Signalized intersection control and can help mitigate patterns of right-angle crashes related to stop sign violations. Post-mounted advanced flashing beacons or overhead flashing beacons can be used at stop-controlled intersections to supplement and call driver attention to stop signs.	15%	90%	High
10	NS09	Install flashing beacons as advance warning (NS.I.)	Installation of advance flashing beacoms to call drivers attention to intersection control signs	30%	90%	High
11	NS10	Install transverse rumble strips on approaches	Transverse rumble strips are installed in the travel lane for the purposes of providing an auditory and tactile sensation for each motorist approaching the intersection.	20%	90%	High
12	NS11	Improve sight distance to intersection (Clear Sight Triangles)	Unsignalized intersections with restricted sight distance and patterns of crashes related to lack of sight distance where sight distance can be improved by clearing roadside obstructions without major reconstruction of the roadway.	20%	90%	High
13	NS12	Improve pavement friction (High Friction Surface Treatments)	Non-signalized Intersections noted as having crashes on wet pavements or under dry conditions when the pavement friction available is significantly less than needed for the actual roadway approach speeds. This treatment is intended to target locations where skidding and failure to stop is determined to be a problem in wet or dry conditions and the target vehicle is unable to stop due to insufficient skid resistance.	55%	90%	Medium
14	NS13	Install splitter-islands on the minor road approaches	The installation of a splitter island allows for the addition of a stop sign in the median to make the intersection more conspicuous.	40%	90%	Medium
15	NS14	Install raised median on approaches (NS.I.)	Effective access management is key to improving safety at, and adjacent to, intersections. The number of intersection access points coupled with the speed differential between vehicles traveling along the roadway often contributes to crashes. Any access points within 250 feet upstream and downstream of an intersection are generally undesirable.	25%	90%	Medium

16	NS15	Create directional median openings to allow (and restrict) left-turns and u-turns (NS.I.)	Crashes related to turning maneuvers include angle, rear-end, pedestrian, and sideswipe (involving opposing left turns) type crashes. If any of these crash types are an issue at an intersection, restriction or elimination of the turning maneuver may be the best way to improve the safety of the intersection.	50%	90%	Medium
17	NS16	Reduced Left-Turn Conflict Intersections (NS.I.)	Reduced left-turn conflict intersections are geometric designs that alter how left-turn movements occur in order to simplify decisions and minimize the potential for related crashes.	50%	90%	Medium
18	NS17	Install right-turn lane (NS.I.)	Many collisions at unsignalized intersections are related to right-turn maneuvers. A key strategy for minimizing such collisions is to provide exclusive right-turn lanes, particularly on high-volume and high-speed major-road approaches. When considering new right-turn lanes, potential impacts to non-motorized users should be considered and mitigated as appropriate.	20%	90%	Low
19	NS18	Install left-turn lane (where no left-turn lane exists)	Many collisions at unsignalized intersections are related to left-turn maneuvers. A key strategy for minimizing such collisions is to provide exclusive left-turn lanes, particularly on high-volume and high-speed major-road approaches. When considering new left-turn lanes, potential impacts to non motorized users should be considered and mitigated as appropriate.	35%	90%	Low
20	NS19PB	Install raised medians (refuge islands)	Intersections that have a long pedestrian crossing distance, a higher number of pedestrians, or a crash history. Raised medians decrease the level of exposure for pedestrians and allow pedestrians to concentrate on (or cross) only one direction of traffic at a time.	45%	90%	Medium
21	NS20PB	Install pedestrian crossing at uncontrolled locations (signs and markings only)	Non-signalized intersections without a marked crossing, where pedestrians are known to be crossing intersections that involve significant vehicular traffic. They are especially important at school crossings and intersections with right and/or left turns pockets. See Zegeer study (Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations) for additional guidance regarding when to install a marked crosswalk.	25%	90%	High
22	NS21PB	Install/upgrade pedestrian crossing at uncontrolled locations (with enhanced safety features)	Non-signalized intersections where pedestrians are known to be crossing intersections that involve significant vehicular traffic. They are especially important at school crossings and intersections with turn pockets.flashing beacons, curb extensions, advanced "stop" or "yield" markings, and other safety features should be added to complement the standard crossing elements.	35%	90%	Medium
23	NS22PB	Install Rectangular Rapid Flashing Beacon (RRFB)	Rectangular Rapid Flashing Beacon (RRFB) includes pedestrian-activated flashing lights and additional signage that enhance the visibility of marked crosswalks and alert motorists to pedestrian crossings. It uses an irregular flash pattern that is similar to emergency flashers on police vehicles. RRFBs are installed at unsignalized intersections and mid-block pedestrian	35%	90%	Medium
24	NS23PB	Install Pedestrian Signal (including Pedestrian Hybrid Beacon (HAWK))	Intersections noted as having a history of pedestrian vs. vehicle crashes and in areas where the likelihood of the pedestrian presence is high. Corridors should also be assessed to determine if there are adequate safe opportunities for non-motorists to cross and if a pedestrian signal, or a Pedestrian Hybrid Beacon (PHB) (also called High-Intensity Activated crossWalK beacon (HAWK)) are needed to provide an active warning to motorists when a pedestrian is in the crosswalk.	55%	90%	Low

CM Toolbox for Roadway Segments

Sr. No.	Code	Countermeasure Name	CM Description	CRF	Federal Funding	Systemic Approach Opportunity
1	R01	Add Segment Lighting	Provision of lighting along roadways.	35%	90%	Medium
2	R02	Remove or relocate fixed objects outside of Clear Recovery Zone	Known locations or roadway segments prone to collisions with fixed objects such as utility poles, drainage structures, trees, and other fixed objects, such as the outside of a curve, end of lane drops, and in traffic islands. A clear recovery zone should be developed on every roadway, as space is available. In situations where public right-of-way is limited, steps should be taken to request assistance from property owners, as appropriate.	35%	90%	High
3	R03	Install Median Barrier	Areas where crash history indicates drivers are unintentionally crossing the median and the cross-overs are resulting in high severity crashes. The installation of median barriers can increase the number of PDO and non-severe injuries. The net result in safety from this countermeasure is connected more to reducing the severity of crashes not the number of crashes.	25%	90%	Medium
4	R04	Install Guardrail	Guardrail is installed to reduce the severity of lane departure crashes. However, guardrail can reduce crash severity only for those conditions where striking the guardrail is less severe than going down an embankment or striking a fixed object. Guardrail should only be installed where it is clear that crash severity will be reduced, or there is a history of run-off-the-road crashes at a given location that have resulted in severe crashes.	25%	90%	High
5	R05	Install impact attenuators	Impact attenuators are typically used to shield rigid roadside objects such as concrete barrier ends, steel guardrail ends and bridge pillars from oncoming automobiles. Attenuators should only be installed where it is impractical for the objects to be removed.	25%	90%	High

6	R06	Flatten side slopes	Roadways experiencing frequent lane departure crashes that result in roll-over type crashes as a result of the roadway slope being so severe as to not accommodate a reasonable degree of driver correction. When there is a need to reduce the severity of lane departure crashes without installing a barrier system that could result in increased numbers of crashes.	30%	90%	Medium
7	R07	Flatten side slopes and remove guardrail	Locations where high number of crashes originate as a lane departure and result in collision with guardrail or a fixed object located on the side slope shielded by guardrail. The guardrail may or may not meet current standards. Even though guardrails are generally installed to reduce the severity of departure crashes, they still can result in severe crashes in some locations.	40%	90%	Medium
8	R08	Install raised median	Areas experiencing head-on collisions that may be affected by both the number of vehicles that cross the centerline and by the speed of oncoming vehicles. Installing a raised median is a more restrictive approach in that it represents a more rigid barrier between opposing traffic.	25%	90%	Medium
9	R09	Install median (flush)	Areas experiencing head-on collisions that may be affected by both the number of vehicles that cross the centerline and by the speed of oncoming vehicles. Roadways with oversized lanes offer an opportunity to restripe the roadway to reduce the lanes to standard widths and use the extra width for the median.	15%	90%	Medium
10	R10PB	Install pedestrian median fencing	Roadway segments with high pedestrian-generators and pedestrian-destinations nearby (e.g. transit stops) may experience a high volume of pedestrians J-walking across the travel lanes at mid-block locations instead of walking to the nearest intersection or designated mid-block crossing. When this safety issue cannot be mitigated with shoulder, sidewalk and/or crossing treatments, then installing a continuous pedestrian barrier in the median may be a viable solution.	35%	90%	Low
11	R11	Install acceleration/ deceleration lanes	Areas proven to have crashes that are the result of drivers not being able to turn onto a high speed roadway to accelerate until the desired roadway speed is reached and areas that do not provide the opportunity to safety decelerate to negotiate a turning movement.	25%	90%	Low
12	R12	Widen lane (initially less than 10 ft)	Horizontal curves or tangents and low speed or high speed roadways identified as having lane departure crashes, sideswipe or head-on crashes that can be attributed to an existing pavement width less than 10 feet.	25%	90%	Medium
13	R13	Add two-way left-turn lane (without reducing travel lanes)	Roadways having a high frequency of drivers being rear-ended while attempting to make a left turn across oncoming traffic. Also can be effective for drivers crossing the centerline of an undivided multilane roadway inadvertently.	30%	90%	Medium
14	R14	Road Diet (Reduce travel lanes from 4 to 3 and add a two way left-turn and bike lanes)	Areas noted as having a higher frequency of head-on, left-turn, and rear-end crashes with traffic volumes that can be handled by only 2 free flowing lanes. Using this strategy in locations with traffic volumes that are too high could result in diversion of traffic to routes less safe than the original four-lane design.	30%	90%	Medium
15	R15	Widen shoulder	Roadways that have a frequent incidence of vehicles leaving the travel lane resulting in an unsuccessful attempt to reenter the roadway. The probability of a safe recovery is increased if an errant vehicle is provided with an increased paved area in which to initiate such a recovery.	30%	90%	Medium
16	R16	Curve Shoulder widening (Outside Only)	Roadway curves noted as having frequent lane departure crashes due to inadequate or nc shoulders, resulting in an unsuccessful attempt to reenter the roadway.	45%	90%	Medium
17	R17	Improve horizontal alignment (flatten curves)	Roadways with horizontal curves that have experienced lane departure crashes as a result of a roadway segment having compound curves or a severe radius. This strategy should generally be considered only when less expensive strategies involving clearing of specific sight obstructions or modifying traffic control devices have been tried and have failed to ameliorate the crash patterns.	50%	90%	Low
18	R18	Flatten crest vertical curve	The target for this strategy is usually unsignalized intersections with restricted sight distance due to vertical geometry and with patterns of crashes related to that lack of sight distance that cannot be ameliorated by less expensive methods. This strategy should generally be considered only when less expensive strategies involving clearing of specific sight obstructions or modifying traffic control devices have been tried and have failed to ameliorate the crash patterns.	25%	90%	Low
19	R19	Improve curve superelevation	Roadways noted as having frequent lane departure crashes and inadequate or no superelevation. Safety can be enhanced when the superelevation is improved or restored along curves where the actual superelevation is less than the optimal.	45%	90%	Medium
20	R20	Convert from two-way to one-way traffic	One-way streets can offer improved signal timing and accommodate odd-spaced signals. One-way streets can simplify crossings for pedestrians, who must look for traffic in only one direction. While studies have shown that conversion of two-way streets to one-way generally reduces pedestrian crashes and the number of conflict points, one-way streets tend to have higher speeds which creates new problems.	35%	90%	Medium
21	R21	Improve pavement friction (High Friction Surface Treatments)	Improving the skid resistance at locations with high frequencies of wet road crashes and/or failure to stop crashes	55%	90%	High
22	R22	Install/Upgrade signs with new fluorescent sheeting (regulatory or warning)	Additional or new signage can address crashes caused by lack of driver awareness or complaince of roadway signing.	15%	90%	Very High
23	R23	Install chevron signs on horizontal curves	Roadways that have an unacceptable level of crashes on relatively sharp curves during periods of light and darkness.		90%	

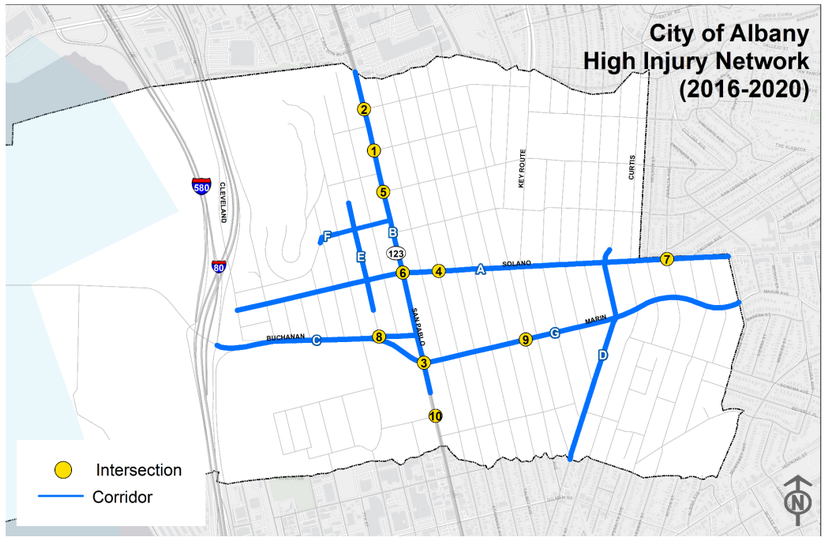
24	R24	Install curve advance warning signs	Addition of advance curve warning signs; may also include horizontal alignment and/or advisory speed warning signs	25%	90%	Very High
25	R25	Install curve advance warning signs (flashing beacon)	Roadways that have an unacceptable level of crashes on relatively sharp curves. Flashing beacons in conjunction with warning signs should only be used on horizontal curves that have an established severe crash history to help maintain their effectiveness.		90%	
26	R26	Install dynamic/variable speed warning signs	Includes the addition of dynamic speed warning signs (also known as Radar Speed Feedback Signs)	30%	90%	High
27	R27	Install delineators, reflectors and/or object markers	Installation of delineators, reflectors and/or object markers are intended to warn drivers of an approaching curve or fixed object that cannot easily be removed.	15%	90%	Very High
28	R28	Install edge-lines and centerlines	Any road with a history of run-off-road right, head-on, opposite-direction-sideswipe, or run-off-road-left crashes is a candidate for this treatment -install where the existing lane delineation is not sufficient to assist the motorist in understanding the existing limits of the roadway. Depending on the width of the roadway, various combinations of edge line and/or center line pavement markings may be the most appropriate.	25%	90%	Very High
29	R29	Install no-passing line	Roadways that have a high percentage of head-on crashes suggesting that many head-on crashes may relate to failed passing maneuvers. No-passing lines should be installed where drivers "passing sight distance" is not available due to horizontal or vertical obstructions.	45%	90%	Very High
30	R30	Install centerline rumble strips/stripes	Center Line rumble strips/stripes can be used on virtually any roadway – especially those with a history of head-on crashes.	20%	90%	High
31	R31	Install edgeline rumble strips/stripes	Shoulder and edge line milled rumble strips/stripes should be used on roads with a history of roadway departure crashes.	15%	90%	High
32	R32PB	Install bike lanes	Roadway segments noted as having crashes between bicycles and vehicles or crashes that may be preventable with a buffer/shoulder.	35%	90%	High
33	R33PB	Install Separated Bike Lanes	Separated bikeways are most appropriate on streets with high volumes of bike traffic and/or high bike-vehicle collisions, presumably in an urban or suburban area. Separation types range from simple, painted buffers and flexible delineators, to more substantial separation measures including raised curbs, grade separation, bollards, planters, and parking lanes.	45%	90%	High
34	R34PB	Install sidewalk/pathway (to avoid walking along roadway)	Areas noted as not having adequate or no sidewalks and a history of walking along roadway pedestrian crashes. In rural areas asphalt curbs and/or separated walkways may be appropriate.	80%	90%	Medium
35	R35PB	Install/upgrade pedestrian crossing (with enhanced safety features)	Roadway segments with no controlled crossing for a significant distance in high-use midblock crossing areas and/or multilane roads locations. flashing beacons, curb extensions, medians and pedestrian crossing islands and/or other safety features should be added to complement the standard crossing elements.	35%	90%	Medium
36	R36PB	Install raised pedestrian crossing	On lower-speed roadways, where pedestrians are known to be crossing roadways that involve significant vehicular traffic.	35%	90%	Medium
37	R37PB	Install Rectangular Rapid Flashing Beacon (RRFB)	additional signage that enhance the visibility of marked crosswalks and alert motorists to pedestrian crossings. It uses an irregular flash pattern that is similar to emergency flashers on police vehicles. RRFBs are installed at unsignalized intersections and mid-block pedestrian crossings	35%	90%	Medium
38	R38	Install Animal Fencing	At locations with high percent of vehicular/animal crashes (reactive) or where there is a known high percent of animals crossing due to migratory patterns (proactive).	80%	90%	Medium

High-risk Intersections

ID	Intersection	Control	Consolidated CMs (HSIP-Eligible - Refer to LRSM* 2020)						Additional CM (non-HSIP)**	EA - 1 Improve Safety at Non-Signalized Intersections			EA - 2 Address Broadside Collisions & Automobile Right of Way Violations			EA - 3 Improve Rear End Collisions			EA - 4 Address Improper Turning Violations			EA - 5 Address Bicycle Safety			EA - 6 Address Pedestrian Safety			EA - 7 Improve San Pablo Ave (intersection & Roadway Segment)		
			CM1	CM2	CM3	CM4	CM5	CM6		CM1	CM2	CM3	CM1	CM2	CM3	CM1	CM2	CM3	CM1	CM2	CM3	CM1	CM2	CM3	CM1	CM2	CM3	CM1	CM2	CM3
1	San Pablo Ave/SR-123 at Garfield Ave	Stop Controlled	NS06		NS14			NS22PB	•Drive move to north leg, •50-75' parking, •Enforcement, •Bike Lanes, •Road diet	NS07	NS11	NS22PB	NS06	NS07	NS11	NS12	NS06	NS07	NS06	NS07	NS13				NS22PB	NS06		NS07	NS11	
2	San Pablo Ave/SR-123 at Brighton Ave	Signalized	SO3	S09		S21PB	S20PB						S07	S08	S09	S11	S03	S09	S07	S08	S09				S20PB	S21PB		S07	S08	S09
3	San Pablo Ave/SR-123 at Marin St	Signalized	SO3	S09	SO2	S21PB							S03	S09		S09	S11	S03	S03	S09	S11	S20PB			S20PB	S21PB		S03	S09	S11
4	Solano Ave at Stannage Ave	Stop Controlled	NS06			NS08			•Improve visibility, •red paint to remove parking	NS07	NS05mr		NS06	NS07	NS08	NS12	NS06	NS07	NS06	NS07		NS22PB			NS22PB					
5	San Pablo Ave/SR-123 at Portland Ave	Stop Controlled	NS06	NS13	NS14			NS22PB		NS07	NS11		NS06	NS07	NS11	NS12	NS06	NS07	NS06	NS07								NS07	NS11	
6	San Pablo Ave/SR-123 at Solano Ave	Signalized	SO3	S09	SO2	S21PB	S20PB						S03	S09		S09	S11	S03	S03	S09	S11	S20PB			S20PB	S21PB		S03	S09	S11
7	Solano Ave at Peralta Ave	Stop Controlled		NS13	NS14			NS22PB		NS07	NS11	NS14	NS06	NS07	NS08	NS12	NS06	NS07	NS06	NS07		NS22PB			NS22PB	NS19PB	NS01			
8	Buchanan St at Madison St	Stop Controlled	NS06							NS07	NS11	NS14	NS06	NS07	NS08	NS12	NS06	NS07	NS06	NS07		NS22PB			NS22PB	NS19PB				
9	Marin St at Masonic Ave	Signalized	SO3		SO2	S21PB	S20PB		Red Light Enforcement Cameras				S02	S03	S08	S11	S08	S09	S07	S08	S09	S20PB			S20PB	S21PB				
10	San Pablo Ave/SR-123 at Monroe St	Signalized	SO3		SO2	S21PB	S20PB		•Ped Exclusive Phase •Black out signal improvements,				S03	S09		S09	S11	S03	S03	S09	S11	S20PB			S20PB	S21PB		S03	S09	S11
11	Solano Ave at Jackson St	Stop Controlled	NS06					NS22PB	•improve bulbouts •Install a warning sign facing northbound traffic on Jackson Street •Paint a bicycle box on northbound approach •Crosswalk Improvements, •Bike directional signages, •Class II Bike Lanes, •Curb Extention, •Bike Box	NS07	NS11	NS22PB	NS06	NS07	NS08	NS06	NS07	NS12	NS06	NS07	NS13	NS22PB			NS22PB	NS06	NS01	NS07	NS11	
12	Marin at Santa Fe Ave	Signalized	SO3		SO2	S21PB	NS06						S03	S09		S03	S09	S11	S09	S03	S11	S20PB			S20PB	S21PB		S03	S09	S11

Code	Countermeasure Name	
HSIP/Non-HSIP Code		
S01	Add intersection lighting	0
S02	Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, a	1
S03	Improve signal timing (coordination, phases, red, yellow, or operation)	14
S05	Install emergency vehicle pre-emption systems	0
S06	Install left-turn lane and add turn phase (signal has no left-turn lane or phase before)	0
S07	Provide protected left turn phase (left turn lane already exists)	4
S08	Convert signal to mast arm (from pedestal-mounted)	6
S09	Install raised pavement markers and striping (Through Intersection)	21
S10	Install flashing beacons as advance warning (S.I.)	0
S11	Improve pavement friction (High Friction Surface Treatments)	11
S12	Install raised median on approaches (S.I.)	0
S13PB	Install pedestrian median fencing on approaches	0
S14	Create directional median openings to allow (and restrict) left-turns and U-turns (S.I.)	0
S15	Reduced Left-Turn Conflict Intersections (S.I.)	0
S16	Convert intersection to roundabout (from signal)	0
S17PB	Install pedestrian countdown signal heads	0
S18PB	Install pedestrian crossing (S.I.)	0
S19PB	Pedestrian Scramble	0
S20PB	Install advance stop bar before crosswalk (Bicycle Box)	13
S21PB	Modify signal phasing to implement a Leading Pedestrian Interval (LPI)	10

Code	Countermeasure Name	
NS01	Add intersection lighting (NS.I.)	1
NS02	Convert to all-way STOP control (from 2-way or Yield control)	0
NS03	Install Signals	0
NS04	Convert intersection to roundabout (from all way stop)	0
NS05	Convert intersection to roundabout (from 2-way stop or Yield control)	0
NS05mr	Convert intersection to mini-roundabout	1
NS06	Install/upgrade larger or additional stop signs or other intersection warning/regulatorysign	16
NS07	Upgrade intersection pavement markings (NS.I.)	22
NS08	Install Flashing Beacons at Stop-Controlled Intersections	4
NS09	Install flashing beacons as advance warning (NS.I.)	0
NS10	Install transverse rumble strips on approaches	0
NS11	Improve sight distance to intersection (Clear Sight Triangles)	8
NS12	Improve pavement friction (High Friction Surface Treatments)	5
NS13	Install splitter-islands on the minor road approaches	1
NS14	Install raised median on approaches (NS.I.)	5
NS15	Create directional median openings to allow (and restrict) left-turns and u-turns (NS.I.)	0
NS16	Reduced Left-Turn Conflict Intersections (NS.I.)	0
NS17	Install right-turn lane (NS.I.)	0
NS18	Install left-turn lane (where no left-turn lane exists)	0
NS19PB	Install raised medians (refuge islands)	2
NS20PB	Install pedestrian crossing at uncontrolled locations (signs and markings only)	0
NS21PB	Install/upgrade pedestrian crossing at uncontrolled locations (with enhanced safety feature	0
NS22PB	Install Rectangular Rapid Flashing Beacon (RRFB)	11
NS23PB	Install Pedestrian Signal (including Pedestrian Hybrid Beacon (HAWK))	0

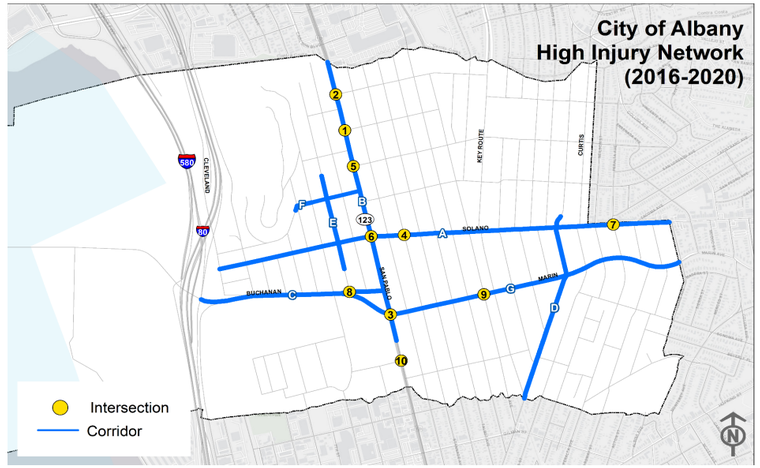


High-risk Roadway Segments

ID	Roadway Segment	Consolidated CMs (HSIP-Eligible - Refer to LRSM* 2020)(Based on Collisions)							Additional CM (non-HSIP)**	EA - 1 Improve Intersection Safety			EA - 2 Address Broadside Collisions & Automobile Right of Way Violations			EA - 3 Improve Rear End Collisions			EA - 4 Address Improper Turning Collisions			EA - 5 Address Bicycle Safety			EA - 6 Address Pedestrian Safety			EA - 7 Improve San Pablo Ave (Intersection & Roadway Segment)		
		CM1	CM2	CM3	CM4	CM5	CM6	CM7		CM1	CM2	CM3	CM1	CM2	CM3	CM1	CM2	CM3	CM1	CM2	CM3	CM1	CM2	CM3	CM1	CM2	CM3	CM1	CM2	CM3	CM1	CM2	CM3
A	Solano Ave: Cleveland Ave to City Limit (East)	RO3	R27	R31				R37PB	Restripping							R22	R27	R21	R22	R27		R33PB	R37PB		R37PB		R35PB						
B	San Pablo Ave/SR-123: City Limit (North) to 450' S of Marin Ave	R03		R14	R22	R33PB	R36PB	R37PB	Restricting few turns							R22	R27	R21	R22	R27		R33PB	R14	R37PB	R37PB		R35PB	R21	R33PB	R37PB			
C	Buchanan St: I-80 EB Ramps to San Pablo Ave				R22			R37PB	•crossing upgrade, •Taylor Hawk Crossing, •triangle RRFB at Pierce and Buchanan							R22	R27	R21	R22	R27		R33PB	R37PB		R37PB		R35PB						
D	Santa Fe Ave: 200' N of Solano Ave to City Limit (South)		R27		R22			R37PB	•speed humps, •mini round abouts, •medians, •splitter island, •Traffic Calming through corridors for additional benefits •Traffic circles							R22	R27	R21	R22	R27	R28	R32PB	R37PB		R36PB	R37PB	R35PB						
E	Madison St: 400' N of Washington St to 450' S of Solano Ave	R03		R31		R28		R37PB	•roat diet and pavement resurface							R22	R27	R21	R22	R27	R28	R32PB			R36PB	R37PB	R35PB						
F	Washington St: 100' W of Cerrito Ave to San Pablo Ave			R31	R30	R28			Restripping							R22	R27	R21	R22	R27	R28	R32PB			R36PB	R37PB	R35PB						
G	Marin St: Buchanan St to City Limit (East)	R03						R37PB								R22	R27	R21	R22	R27		R33PB	R37PB		R36PB	R37PB	R35PB						

San Pablo Ave: (Major Issues): Speeding , Improper Turning, R/W(Automobile and Pedestrian, Head-on)

Code	Countermeasure Name	
R01	Add Segment Lighting	0
R02	Remove or relocate fixed objects outside of Clear Recovery Zone	0
R03	Install Median Barrier	3
R04	Install Guardrail	0
R05	Install impact attenuators	0
R06	Flatten side slopes	0
R07	Flatten side slopes and remove guardrail	0
R08	Install raised median	0
R09	Install median (flush)	0
R10PB	Install pedestrian median fencing	0
R11	Install acceleration/ deceleration lanes	0
R12	Widen lane (initially less than 10 ft)	0
R13	Add two-way left-turn lane (without reducing travel lanes)	0
R14	Road Diet (Reduce travel lanes from 4 to 3 and add a two way left-turn and bike l	2
R15	Widen shoulder	0
R16	Curve Shoulder widening (Outside Only)	0
R17	Improve horizontal alignment (flatten curves)	0
R18	Flatten crest vertical curve	0
R19	Improve curve superelevation	0
R20	Convert from two-way to one-way traffic	0
R21	Improve pavement friction (High Friction Surface Treatments)	8
R22	Install/Upgrade signs with new fluorescent sheeting (regulatory or warning)	17
R23	Install chevron signs on horizontal curves	0
R24	Install curve advance warning signs	0
R25	Install curve advance warning signs (flashing beacon)	0
R26	Install dynamic/variable speed warning signs	0
R27	Install delineators, reflectors and/or object markers	16
R28	Install edge-lines and centerlines	5
R29	Install no-passing line	0
R30	Install centerline rumble strips/stripes	0
R31	Install edgeline rumble strips/stripes	3
R32PB	Install bike lanes	3
R33PB	Install Separated Bike Lanes	6
R34PB	Install sidewalk/pathway (to avoid walking along roadway)	0
R35PB	Install/upgrade pedestrian crossing (with enhanced safety features)	7
R36PB	Install raised pedestrian crossing	5
R37PB	Install Rectangular Rapid Flashing Beacon (RRFB)	19
R38	Install Animal Fencing	0



APPENDIX F: LRSM EXCERPT

Local Roadway Safety

A Manual for California's Local Road Owners

Version 1.6
April 2022

Created by Caltrans in conjunction with FHWA and SafeTREC
for the express benefit of California Local Agencies.

Caltrans

U. S. Department of Transportation
Federal Highway Administration

Safe Transportation
Research & Education Center
SafeTREC

Document History

Version 1.0: 4/20/2012

The California Department of Transportation - Division of Local Assistance developed the first version of the Local Roadway Safety Manual (Version 1.0) in 2012 to support the Cycle 5 HSIP call-for-projects.

Version 1.1: 4/26/2013

Based on feedback and lessons learned from Cycle 5, Caltrans updated Appendix B: "Table of Countermeasures and Crash Reduction Factors" to better clarify text in "Where to use", "Why it works", and "General Qualities" for several of the countermeasures included in the original manual.

No other changes were made to the Local Roadway Safety Manual as part of Version 1.1

Version 1.2: 03/10/2015

Based on feedback and lessons learned from Cycle 6, Caltrans made minor updates to the text of the document as needed for achieving consistency with overall Caltrans local HSIP guidance documents. The following sections were updated: 1.2, 4.2, 5.1, 6.2, and Appendix B, E, F & G.

Version 1.3: 04/29/2016

Caltrans made updates to the text of the document as needed in the following sections: 4.2, 5.1 and Appendix B.

Version 1.4: 06/08/2018

3/30/18 - Caltrans made updates to the crash costs in Appendix D, some of the website links in Appendix G, and some other texts of the document.
6/8/18 - Countermeasure S22 ("Modify signal phasing to implement a Leading Pedestrian Interval (LPI)") is added.

Version 1.5: April 2020

Caltrans added a few more countermeasures (e.g. Pedestrian Scramble, Install Separated Bike Lanes, Reduced Left-Turn Conflict Intersections, and Curve Shoulder widening), renumbered the countermeasures and updated the crash costs in Appendix D.

Version 1.6: April 2022

For Cycle 11 Call-for-projects, Countermeasure S04 (Provide Advanced Dilemma Zone Detection for high-speed approaches) was deleted and Countermeasure NS05mr (Convert intersection to mini-roundabout) added. The HSIP Funding Eligibility was changed to 90% except for S03, of which the HSIP Funding Eligibility stays at 50%. The crash costs in Appendix D were updated.

Future Updates:

In the future, Caltrans anticipates that additional changes will be needed to keep the Local Roadway Safety Manual consistent with future Calls-for-Projects' Guidelines and Application Instructions. In addition, new local HSIP programs, improvements to California data on local roadways, data analysis tools, and the latest safety research and methodologies may give rise to the need to make more significant changes to this manual.

Table of Contents

B.1 Intersection Countermeasures – Signalized

S01, Add intersection lighting (Signalized Intersection => S.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	"night" crashes	40%	20 years
Notes:	This CM only applies to "night" crashes (all types) occurring within limits of the proposed roadway lighting 'engineered' area.		

General information				
Where to use:				
Signalized intersections that have a disproportionate number of night-time crashes and do not currently provide lighting at the intersection or at its approaches. Crash data should be studied to ensure that safety at the intersection could be improved by providing lighting (this strategy would be supported by a significant number of crashes that occur at night).				
Why it works:				
Providing lighting at the intersection itself, or both at the intersection and on its approaches, improves the safety of an intersection during nighttime conditions by (1) making drivers more aware of the surroundings at an intersection, which improves drivers' perception-reaction times, (2) enhancing drivers' available sight distances, and (3) improving the visibility of non-motorists. Intersection lighting is of particular benefit to non-motorized users. Lighting not only helps them navigate the intersection, but also helps drivers see them better.				
General Qualities (Time, Cost and Effectiveness):				
A lighting project can usually be completed relatively quickly, but generally requires at least 1 year to implement because the lighting system must be designed and the provision of electrical power must be arranged. The provision of lighting involves both a fixed cost for lighting installation and an ongoing maintenance and power cost which results in a moderate to high cost. Some locations can result in high B/C ratios, but due to higher costs, these projects often result in medium to low B/C ratios.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Night, All	CRF:	20-74%

S02, Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	15%	10 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the upgraded signals. This CM does not apply to improvements like "battery backup systems", which do not provide better intersection/signal visibility or help drivers negotiate the intersection (unless applying past crashes that occurred when the signal lost power). If new signal mast arms are part of the proposed project, CM "S2" should not be used and the signal improvements would be included under CM "S7".		

General information				
Where to use:				
Signalized intersections with a high frequency of right-angle and rear-end crashes occurring because drivers are unable to see traffic signals sufficiently in advance to safely negotiate the intersection being approached. Signal intersection improvements include new LED lighting, signal back plates, retro-reflective tape outlining the back plates, or visors to increase signal visibility, larger signal heads, relocation of the signal heads, or additional signal heads.				
Why it works:				
Providing better visibility of intersection signals aids the drivers' advance perception of the upcoming intersection. Visibility and clarity of the signal should be improved without creating additional confusion for drivers.				
General Qualities (Time, Cost and Effectiveness):				
Installation costs and time should be minimal as these type strategies are classified as low cost and implementation does not typically require the approval process normally associated with more complex projects. When considered at a single location, these low cost improvements are usually funded through local funding by local maintenance crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in low to moderate cost projects that are more appropriate to seek state or federal funding.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Rear-End, Angle	CRF:	0-46%

S03, Improve signal timing (coordination, phases, red, yellow, or operation)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
50%	All	15%	10 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new signal timing. For projects coordination signals along a corridor, the crashes related to side-street movements should not be applied. This CM does not apply to projects that only 'study' the signal network and do not make physical timing changes, including corridor operational studies and improvements to Traffic Operation Centers (TOCs). In Caltrans calls for projects, this CM has a HSIP reimbursement ratio of 50%, considering that it will improve the signal operation rather than merely the safety.		

General information				
Where to use:				
Locations that have a crash history at multiple signalized intersections. Signalization improvements may include adding phases, lengthening clearance intervals, eliminating or restricting higher-risk movements, and coordinating signals at multiple locations. Understanding the corridor or roadway's crash history can provide insight into the most appropriate strategy for improving safety.				
Why it works:				
Certain timing, phasing, and control strategies can produce multiple safety benefits. Sometimes capacity improvements come along with the safety improvements and other times adverse effects on delay or capacity occur. Corridor improvements often have the highest benefit but may take longer to implement. Projects focused on capacity improvements (without a separate focus on signal timing safety needs) may not result in a reduction in future crashes.				
General Qualities (Time, Cost and Effectiveness):				
In general, these low-cost improvements to multiple signalized intersections can be implemented in a short time. Typically these low cost improvements are funded through local funding by local maintenance crews. However, some projects requiring new interconnect infrastructure can have moderate to high costs making them more appropriate to seek state or federal funding. The expected effectiveness of this CM must be assessed for each individual project.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	0 - 41%

~~S04, Provide Advanced Dilemma-Zone Detection for high speed approaches~~

~~For HSIP Cycle 11 Call-for-projects~~			
~~Funding Eligibility~~	~~Crash Types Addressed~~	~~CRF~~	~~Expected Life~~
~~90%~~	~~All~~	~~40%~~	~~10 years~~
~~Notes:~~	~~This CM only applies to crashes occurring on the approaches / influence area of the new detection and signal timing.~~		

~~General information~~				
~~**Where to use:**~~				
~~More rural/remote areas that have a high frequency of right-angle and rear-end crashes. The Advanced Dilemma Zone Detection system enhances safety at signalized intersections by modifying traffic control signal timing to reduce the number of drivers that may have difficulty deciding whether to stop or proceed during a yellow phase. This may reduce rear-end crashes associated with unsafe stopping and angle crashes due to illegally continuing into the intersection during the red phase.~~				
~~**Why it works:**~~				
~~Clearance times provide safe, orderly transitions in ROW assignment between conflicting streams of traffic. An Advanced Dilemma Zone Detection system has several benefits relative to traditional multiple detector systems, which have upstream detection for vehicles in the dilemma zone but do not take the speed or size of individual vehicles into account. These benefits include: Reducing the frequency of red-light violations; Reducing the frequency of crashes associated with the traffic signal phase change (for example, rear-end and angle crashes); Reducing delay and stop frequency on the major road and a reduction in overall intersection delay.~~				
~~**General Qualities (Time, Cost and Effectiveness):**~~				
~~Installation costs should be low and the time to implement short. Additional modifications to the traffic signal controller may also necessary. In general, This CM can be very effective and can be considered on a systematic approach. Video detection equipment is now available for this purpose, making installation and maintenance more efficient.~~				
~~**FHWA CMF Clearinghouse:**~~	~~Crash Types Addressed:~~	~~All~~	~~CRF:~~	~~39%~~

S05, Install emergency vehicle pre-emption systems

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Emergency Vehicle - only	70%	10 years
Notes:	This CM only applies to "E.V." crashes occurring on the approaches / influence area of the new pre-emption system.		

General information
Where to use:
Corridors that have a history of crashes involving emergency response vehicles. The target of this strategy is signalized intersections where normal traffic operations impede emergency vehicles and where traffic conditions create a potential for conflicts between emergency and nonemergency vehicles. These conflicts could lead to almost any type of crash, due to the potential for erratic maneuvers of vehicles moving out of the paths of emergency vehicles
Why it works:
Providing emergency vehicle preemption capability at a signal or along a corridor can be a highly effective strategy in two ways; any type of crash could occur as emergency vehicles try to navigate through intersections and as other vehicles try to maneuver out of the path of the emergency vehicles. In addition, a signal preemption system can decrease emergency vehicle response times therefore decreasing the time in receiving emergency medical attention, which is critical in the outcome of any crash. When data is not available for past crashes with emergency vehicles, an agency may consider combining the E.V. pre-emption improvements into a comprehensive project that also makes significant signal hardware and/or signal timing improvements.
General Qualities (Time, Cost and Effectiveness):
Costs for installation of a signal preemption system will vary from medium to high, based upon the number of signalized intersections at which preemption will be installed and the number of emergency vehicles to be outfitted with the technology. The number of detectors, a requirement for new signal controllers, and the intricacy of the preemption system could increase costs. This CM is considered systemic as it is usually implemented on a corridor-basis.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Emergency Vehicle - only	CRF:	70%

S06, Install left-turn lane and add turn phase (signal has no left-turn lane or phase before)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	55%	20 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new left turn lanes. This CM does NOT apply to converting a single-left into double-left turn.		

General information
Where to use:
Intersections that do not currently have a left turn lane or a related left-turn phase that are experiencing a large number of crashes. Many intersection safety problems can be traced to difficulties in accommodating left-turning vehicles, in particular where there is currently no accommodation for left turning traffic. A key strategy for minimizing collisions related to left-turning vehicles (angle, rear-end, sideswipe) is to provide exclusive left-turn lanes and the appropriate signal phasing, particularly on high-volume and high-speed major-road approaches. Agencies need to document their consideration of the MUTCD, Section 4D.19 guidelines; the section on implementing protected left-turn phases.
Why it works:
Left-turn lanes allow separation of left-turn and through-traffic streams, thus reducing the potential for rear-end collisions. Left-turn phasing also provides a safer opportunity for drivers to make a left-turn. The combination of left-turn storage and a left turn signal has the potential to reduce many collisions between left-turning vehicles and through vehicles and/or non-motorized road users.
General Qualities (Time, Cost and Effectiveness):
Implementation time may vary from months to years. At some locations, left-turn lanes can be quickly installed simply by restriping the roadway. At other locations, widening of the roadway, acquisition of additional right-of-way, and extensive environmental processes may be needed. Such projects require a substantial time for development and construction. Costs are highly variable and range from very low to high. Installing a protected left turn lane and phase where none exists results in a high Crash Reduction Factor and is often highly effective.

FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	17 - 58 %

S07, Provide protected left turn phase (left turn lane already exists)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	30%	20 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new left turn phases. This CM does NOT apply to converting a single-left into double-left turn (unless the single left is unprotected and the proposed double left will be protected).		

General information				
Where to use:				
Signalized intersections (with existing left turns pockets) that currently have a permissive left-turn or no left-turn protection that have a high frequency of angle crashes involving left turning, opposing through vehicles, and non-motorized road users. A properly timed protected left-turn phase can also help reduce rear-end and sideswipe crashes between left-turning vehicles and the through vehicles as well as vehicles behind them. Protected left-turn phases are warranted based on such factors as turning volumes, delay, visibility, opposing vehicle speed, distance to travel through the intersection, presence of non-motorized road users, and safety experience of the intersections. Agencies need to document their consideration of the MUTCD, Section 4D.19 guidelines; the section on implementing protected left-turn phases.				
Why it works:				
Left turns are widely recognized as the highest-risk movements at signalized intersections. Providing Protected left-turn phases (i.e., the provision for a specific phase for a turning movement) for signalized intersections with existing left turn pockets significantly improve the safety for left-turn maneuvers by removing the need for the drivers to navigate through gaps in oncoming/opposing through vehicles. Where left turn pockets are not protected, the pedestrian and bicyclist crossing phase often conflicts with these left turn maneuvers. Drivers focused on navigating the gaps of oncoming cars may not anticipate and/or perceive the non-motorized road users.				
General Qualities (Time, Cost and Effectiveness):				
If the existing traffic signal only requires a minor modification to allow for a protected left-turn phase, then the cost would also be low. The time to implement this countermeasure is short because there is no actual construction that has to take place. In-house signal maintainers can perform this operation once the proper signal phasing is determined so the cost is low. In addition, the countermeasure is tried and proven to be effective. Has the potential of being applied on a systemic/systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Rear-End, Sideswipe, Broadside	CRF:	16 - 99%

S08, Convert signal to mast arm (from pedestal-mounted)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	30%	20 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the converted signal heads that are relocated from median and/or outside shoulder pedestals to signal heads on master arms over the travel-lanes. Projects using CM "S7" should not also apply "S2" in the B/C calc.		

General information				
Where to use:				
Intersections currently controlled by pedestal mounted traffic signals (in medians and/or on outside shoulder) that have a high frequency of right-angle and rear-end crashes occurring because drivers are unable to see traffic signals in advance to safely negotiate the intersection. Intersections that have pedestal-mounted signals may have poor visibility and can result in vehicles not being able to stop in time for a signal change. Care should be taken to place the new signal heads (with back plates) as close to directly over the center of the travel lanes as possible.				
Why it works:				
Providing better visibility of intersection signs and signals aids the drivers' advance perception of the upcoming intersection. Visibility and clarity of the signal should be improved without creating additional confusion or distraction for drivers.				
General Qualities (Time, Cost and Effectiveness):				
Dependent on the scope of the project. Costs are generally moderate for this type of project. There is usually no right-of-way costs, minimal roadway reconstruction costs, and a shorter project development timeline. At the same time, new mast arms can be expensive. Some locations can result in high B/C ratios, but due to moderate costs, some locations may result in medium to low B/C ratios.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Rear-End, Angle	CRF:	12 - 74%

S09, Install raised pavement markers and striping (Through Intersection)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	10%	10 years
Notes:	This CM only applies to crashes occurring in the intersection and influence areas of the new pavement markers and/or markings.		

General information				
Where to use:				
Intersections where the lane designations are not clearly visible to approaching motorists and/or intersections noted as being complex and experiencing crashes that could be attributed to a driver's unsuccessful attempt to navigate the intersection. Driver confusion can exist in regard to choosing the proper turn path or where through-lanes do not line up. This is especially relevant at intersections where the overall pavement area of the intersection is large, and multiple turning lanes are involved or other unfamiliar elements are presented to the driver.				
Why it works:				
Adding clear pavement markings can guide motorists through complex intersections. When drivers approach and traverse through complex intersections, drivers may be required to perform unusual or unexpected maneuvers. Providing more effective guidance through an intersection will minimize the likelihood of a vehicle leaving its appropriate lane and encroaching upon an adjacent lane.				
General Qualities (Time, Cost and Effectiveness):				
Costs of implementing this strategy will vary based on the scope and number of applications. Applying raised pavement markers is relatively low cost but can be variable and determined largely by the material used for pavement markings (paint, thermoplastic, epoxy, RPMs etc.). When using this type delineators, an issue of concern is the cost-to-service-life of the material. (Note: When HSIP safety funding is used for these installations in high-wear-locations, the local agency is expected to maintain the improvement for a minimum of 10 years.) When considered at a single location, these low cost improvements are usually funded through local funding by local maintenance crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Wet, Night, All	CRF:	10 - 33%

S10, Install flashing beacons as advance warning (S.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	30%	10 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new flashing beacons.		

General information				
Where to use:				
At signalized intersections with crashes that are a result of drivers being unaware of the intersection or are unable to see the traffic control device in time to comply.				
Why it works:				
Increased driver awareness of an approaching signalized intersection and an increase in the driver's time to react. Driver awareness of both downstream intersections and traffic control devices is critical to intersection safety. Crashes often occur when the driver is unable to perceive an intersection, signal head or the back of a stopped queue in time to react. Advance flashing beacons can be used to supplement and call driver attention to intersection control signs. Most advance warning flashing beacons can be powered by solar, thus reducing the issues relating to power source.				
General Qualities (Time, Cost and Effectiveness):				
Before choosing this CM, the agency needs to confirm the ability to provide power to the site (solar may be an option). Flashing beacons can be constructed with minimal design, environmental and right-of-way issues and have relatively low costs. This combined with a relatively high CRF, can result in high B/Cs for locations with a history of crashes and lead to a high effectiveness.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Rear End, Angle	CRF:	36 - 62%

S11, Improve pavement friction (High Friction Surface Treatments)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	55%	10 years
Notes:	This CM only applies to crashes occurring within the limits of the improved friction overlay. This CM is not intended to apply to standard chip-seal or open-graded maintenance projects for long segments of corridors or structure repaving projects intended to fix failed pavement.		

General information				
Where to use:				
Nationally, this countermeasure is referred to as "High Friction Surface Treatments" or HFST. Signalized Intersections noted as having crashes on wet pavements or under dry conditions when the pavement friction available is significantly less than needed for the actual roadway approach speeds. This treatment is intended to target locations where skidding and failure to stop is determined to be a problem in wet or dry conditions and the target vehicle is unable to stop due to insufficient skid resistance.				
Why it works:				
Improving the skid resistance at locations with high frequencies of wet-road crashes and/or failure to stop crashes can result in reductions of 50 percent for wet-road crashes and 20 percent for total crashes. Applying HFST can double friction numbers, e.g. low 40s to high 80s. This CM represents a special focus area for both FHWA and Caltrans, which means there are extra resources available for agencies interested in more details on High Friction Surface Treatment projects.				
General Qualities (Time, Cost and Effectiveness):				
This strategy can be relatively inexpensive and implemented in a short timeframe. The installation would be done by either agency personnel or contractors and can be done by hand or machine. In general, This CM can be very effective and can be considered on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Wet, Night, ALL	CRF:	10 - 62 %

S12, Install raised median on approaches (S.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	20 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new raised median. All new raised medians funded with HSIP funding should not include the removal of the existing roadway structural section and should be doweled into the existing roadway surface. This requirement is being implemented to maximize the safety-effectiveness of the limited HSIP funding and to minimize project impacts. Landscaping, if included in the project, is considered non-participating.		

General information				
Where to use:				
Intersections noted as having turning movement crashes near the intersection as a result of insufficient access control. Application of this CM should be based on current crash data and a clearly defined need to restrict or accommodate the movement.				
Why it works:				
Raised medians next to left-turn lanes at intersections offer a cost-effective means for reducing crashes and improving operations at higher volume intersections. The raised medians prohibit left turns into and out of driveways that may be located too close to the functional area of the intersection.				
General Qualities (Time, Cost and Effectiveness):				
Raised medians at intersections may be most effective in retrofit situations where high volumes of turning vehicles have degraded operations and safety, and where more extensive CMs would be too expensive because of limited right-of-way and the constraints of the built environment. The result is This CM can be very effective and can be considered on a systematic approach. Raised medians can often be installed directly over the existing pavement. When agencies opt to install landscaping in conjunction with new raised medians, the portion of the cost for landscaping and other non-safety related items that exceeds 10% of the project total cost is not federally participated and must be funded by the applicant.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Angle	CRF:	21 -55 %

S13PB, Install pedestrian median fencing on approaches

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	35%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring on the approaches/influence area of the new pedestrian median fencing.		

General information				
Where to use:				
Signalized Intersections with high pedestrian-generators nearby (e.g. transit stops) may experience a high volumes of pedestrians J-walking across the travel lanes at mid-block locations instead of walking to the intersection and waiting to cross during the walk-phase. When this safety issue cannot be mitigated with signal timing and shoulder/sidewalk treatments, then installing a continuous pedestrian barrier in the median may be a viable solution.				
Why it works:				
Adding pedestrian median fencing has the opportunity to enhance pedestrian safety at locations noted as being problematic involving pedestrians running/darting across the roadway outside the intersection crossings. Pedestrian median fencing can significantly reduce this safety issue by creating a positive barrier, forcing pedestrians to the designated pedestrian crossing.				
General Qualities (Time, Cost and Effectiveness):				
Costs associated with this strategy will vary widely depending on the type and placement of the median fencing. Impacts to transit and other land uses may need to be considered and controversy can delay the implementation. In general, this CM can be effective as a spot-location approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	25- 40%

S14, Create directional median openings to allow (and restrict) left-turns and U-turns (S.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	50%	20 years
Notes:	This CM only applies to crashes occurring in the intersection / influence area of the new directional openings.		

General information				
Where to use:				
Crashes related to turning maneuvers include angle, rear-end, pedestrian, and sideswipe (involving opposing left turns) type crashes. If any of these crash types are an issue at an intersection, restriction or elimination of the turning maneuver may be the best way to improve the safety of the intersection.				
Why it works:				
Restricting turning movement into and out of an intersection can help reduce conflicts between through and turning traffic. The number of access points, coupled with the speed differential between vehicles traveling along the roadway, contributes to crashes. Affecting turning movements by either allowing them or restricting them, based on the application, can ensure safe movement of traffic.				
General Qualities (Time, Cost and Effectiveness):				
Turn prohibitions that are implemented by closing a median opening can be implemented quickly. The cost of this strategy will depend on the treatment. Impacts to businesses and other land uses must be considered and controversy can delay the implementation. In general, This CM can be very effective and can be considered on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	51%

S15, Reduced Left-Turn Conflict Intersections (S.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	50%	20 years
Notes:	This CM only applies to crashes occurring in the intersection / influence area of the new Reduced Left-Turn Conflict.		

General information

Where to use and Why it works:

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

Restricted Crossing U-turn (RCUT):

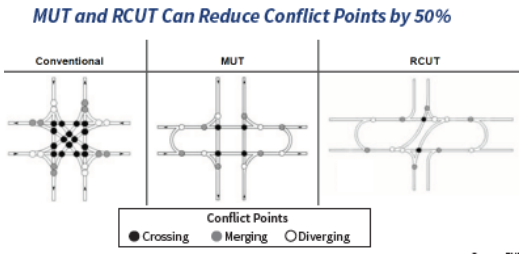
The RCUT intersection modifies the direct left-turn and through movements from cross-street approaches. Minor road traffic makes a right turn followed by a U-turn at a designated location (either signalized or unsignalized) to continue in the desired direction.

The RCUT is suitable for a variety of circumstances, including along rural, high-speed, four-lane, divided highways or signalized routes. It also can be used as an alternative to signalization or constructing an interchange. RCUTs work well when consistently used along a corridor, but also can be used effectively at individual intersections.

Median U-turn (MUT)

The MUT intersection modifies direct left turns from the major approaches. Vehicles proceed through the main intersection, make a U-turn a short distance downstream, followed by a right turn at the main intersection. The U-turns can also be used for modifying the cross-street left turns.

The MUT is an excellent choice for heavily traveled intersections with moderate left-turn volumes. When implemented at multiple intersections along a corridor, the efficient two-phase signal operation of the MUT can reduce delay, improve travel times, and create more crossing opportunities for pedestrians and bicyclists.



General Qualities (Time, Cost and Effectiveness):

Implementing this strategy may take from months to years, depending on whether additional R/W is required. Such projects require a substantial time for development and construction. Costs are highly variable and range from very low to high. The expected effectiveness of this CM must be assessed for each individual location.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Angle/Left-turn/Rear-End/All	CRF:	34.8-100%

S16, Convert intersection to roundabout (from signal)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	Varies	20 years
Notes:	This CM only applies to crashes occurring in influence area of the new roundabout. This CM is not intended for mini-roundabouts. The benefit of this CM is calculated using Caltrans procedure. The CRF is dependent on the ADT, project location (Rural/Urban) and the roundabout type (1 lane or 2 lanes). The benefit comes from both the reduction in the number and the severity of the crashes.		

General information				
Where to use:				
Signalized intersections that have a significant crash problem and the only alternative is to change the nature of the intersection itself. Roundabouts can also be very effective at intersections with complex geometry and intersections with frequent left-turn movements.				
Why it works:				
The types of conflicts that occur at roundabouts are different from those occurring at conventional intersections; namely, conflicts from crossing and left-turn movements are not present in a roundabout. The geometry of a roundabout forces drivers to reduce speeds as they proceed through the intersection. This helps keep the range of vehicle speed narrow, which helps reduce the severity of crashes when they do occur. Pedestrians only have to cross one direction of traffic at a time at roundabouts, thus reducing their potential for conflicts.				
General Qualities (Time, Cost and Effectiveness):				
Provision of a roundabout requires substantial project development. The need to acquire right-of-way is likely and will vary from site to site and depends upon the geometric design. These activities may require up to 4 years or longer to implement. Costs are variable, but construction of a roundabout to replace an existing signalized intersection are relatively high. The result is this CM may have reduced relative-effectiveness compared to other CMs.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	35 - 67%

S17PB, Install pedestrian countdown signal heads

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	25%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the intersection/crossing with the new countdown heads.		

General information				
Where to use:				
Signals that have signalized pedestrian crossing with walk/don't walk indicators and where there have been pedestrian vs. vehicle crashes.				
Why it works:				
A pedestrian countdown signal contains a timer display and counts down the number of seconds left to finish crossing the street. Countdown signals can reassure pedestrians who are in the crosswalk when the flashing "DON'T WALK" interval appears that they still have time to finish crossing. Countdown signals begin counting down either when the "WALK" or when the flashing "DON'T WALK" interval appears and stop at the beginning of the steady "DON'T WALK" interval. These signals also have been shown to encourage more pedestrians to use the pushbutton rather than jaywalk.				
General Qualities (Time, Cost and Effectiveness):				
Costs and time of installation will vary based on the number of intersections included in this strategy and if it requires new signal controllers capable of accommodating the enhancement. When considered at a single location, these low cost improvements are usually funded through local funding by local crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	25%

S18PB, Install pedestrian crossing (S.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	25%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the intersection/crossing with the new crossing. This CM is not intended to be used for high-cost aesthetic enhancements to intersection crosswalks (i.e. stamped concrete or stamped asphalt).		

General information				
Where to use:				
Signalized Intersections with no marked crossing and pedestrian signal heads, where pedestrians are known to be crossing intersections that involve significant turning movements. They are especially important at intersections with (1) multiphase traffic signals, such as left-turn arrows and split phases, (2) school crossings, and (3) double-right or double-left turns. At signalized intersections, pedestrian crossings are often safer when the left turns have protected phases that do not overlap the pedestrian walk phase.				
Why it works:				
Adding pedestrian crossings has the opportunity to enhance pedestrian safety at locations noted as being problematic. Nearly one-third of all pedestrian-related crashes occur at or within 50 feet of an intersection. Of these, 30 percent may involve a turning vehicle. Another 22 percent of pedestrian crashes involve a pedestrian either running across the intersection or darting out in front of a vehicle whose view was blocked just prior to the impact. Finally, 16 percent of these intersection-related crashes occur because of a driver violation (e.g., failure to yield right-of-way). When agencies opt to install aesthetic enhancement to intersection crosswalks like stamped concrete/asphalt, the project design and construction costs can significantly increase. For HSIP applications, these costs must be accounted for in the B/C calculation, but these costs (over standard crosswalk markings) must be tracked separately and are not federally reimbursable and will increase the agency's local-funding share for the project costs.				
General Qualities (Time, Cost and Effectiveness):				
Costs associated with this strategy will vary widely, depending if curb ramps and sidewalk modifications are required with the crossing. When considered at a single location, these low cost improvements may be funded through local funding by local crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate to high cost projects that are appropriate to seek state or federal funding.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	25%

S19PB, Pedestrian Scramble

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	40%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the intersection with the new pedestrian crossing.		

General information				
Where to use:				
Pedestrian Scramble is a form of pedestrian "WALK" phase at a signalized intersection in which all vehicular traffic is required to stop, allowing pedestrians/bicyclists to safely cross through the intersection in any direction, including diagonally. Pedestrian Scramble may be considered at signalized intersections with very high pedestrian/bicycle volumes, e.g. in an urban business district.				
Why it works:				
Pedestrian Scramble has been shown to reduce injury risk and increase bicycle ridership due to its perceived safety and comfort.				
General Qualities (Time, Cost and Effectiveness):				
Not involving any additional R/W, Pedestrian Scramble should not require a long development process and should be implemented reasonably soon. A systemic approach may be used in implementing this CM, resulting in cost efficiency with low to moderate cost.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	-10% to 51%

S20PB, Install advance stop bar before crosswalk (Bicycle Box)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	15%	10 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the intersection-crossing with the new advanced stop bars.		

General information				
Where to use:				
Signalized Intersections with a marked crossing, where significant bicycle and/or pedestrians volumes are known to occur.				
Why it works:				
Adding advance stop bar before the striped crosswalk has the opportunity to enhance both pedestrian and bicycle safety. Stopping cars well before the crosswalk provides a buffer between the vehicles and the crossing pedestrians. It also allows for a dedicated space for cyclists, making them more visible to drivers (This dedicated space is often referred to as a bike-box.)				
General Qualities (Time, Cost and Effectiveness):				
Costs and time of installation will vary based on the number of intersections included in this strategy and if it requires new signal controllers capable of accommodating the enhancement. When considered at a single location, these low cost improvements are usually funded through local funding by local crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	35%

S21PB, Modify signal phasing to implement a Leading Pedestrian Interval (LPI)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	60%	10 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the intersections with signalized pedestrian crossing with the newly implemented Leading Pedestrian Interval (LPI).		

General information				
Where to use:				
Intersections with signalized pedestrian crossing that have high turning vehicles volumes and have had pedestrian vs. vehicle crashes.				
Why it works:				
A leading pedestrian interval (LPI) gives pedestrians the opportunity to enter an intersection 3-7 seconds before vehicles are given a green indication. With this head start, pedestrians can better establish their presence in the crosswalk before vehicles have priority to turn left. LPIs provide (1) increased visibility of crossing pedestrians; (2) reduced conflicts between pedestrians and vehicles; (3) Increased likelihood of motorists yielding to pedestrians; and (4) enhanced safety for pedestrians who may be slower to start into the intersection.				
General Qualities (Time, Cost and Effectiveness):				
Costs for implementing LPIs are very low, since only minor signal timing alteration is required. This makes it an easy and inexpensive countermeasure that can be incorporated into pedestrian safety action plans or policies and can become routine agency practice. When considered at a single location, the LPI is usually local-funded. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	59%

B.2 Intersection Countermeasures – Non-signalized

NS01, Add intersection lighting (NS.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Night	40%	20 years
Notes:	This CM only applies to "night" crashes (all types) occurring within limits of the proposed roadway lighting 'engineered' area.		

General information				
Where to use:				
Non-signalized intersections that have a disproportionate number of night-time crashes and do not currently provide lighting at the intersection or at its approaches. Crash data should be studied to ensure that safety at the intersection could be improved by providing lighting (this strategy would be supported by a significant number of crashes that occur at night).				
Why it works:				
Providing lighting at the intersection itself, or both at the intersection and on its approaches, improves the safety of an intersection during nighttime conditions by (1) making drivers more aware of the surroundings at an intersection, which improves drivers' perception-reaction times, (2) enhancing drivers' available sight distances, and (3) improving the visibility of non-motorists. Intersection lighting is of particular benefit to non-motorized users as lighting not only helps them navigate the intersection, but also helps drivers see them better.				
General Qualities (Time, Cost and Effectiveness):				
A lighting project can usually be completed relatively quickly, but generally requires at least 1 year to implement because the lighting system must be designed and the provision of electrical power must be arranged. The provision of lighting involves both a fixed cost for lighting installation and an ongoing maintenance and power cost. For rural intersections, studies have shown the installation of streetlights reduced nighttime crashes at unlit intersections and can be more effective in reducing nighttime crashes than either rumble strips or overhead flashing beacons. Some locations can result in high B/C ratios, but due to higher costs, these projects often result in medium to low B/C ratios.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Night, All	CRF:	25- 50%

NS02, Convert to all-way STOP control (from 2-way or Yield control)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	50%	10 years
Notes:	This CM only applies to crashes occurring in the intersection and/or influence area of the new control. CA-MUTCD warrant must be met.		

General information				
Where to use:				
Unsignalized intersection locations that have a crash history and have no controls on the major roadway approaches. However, all-way stop control is suitable only at intersections with moderate and relatively balanced volume levels on the intersection approaches. Under other conditions, the use of all-way stop control may create unnecessary delays and aggressive driver behavior. MUTCD warrants should always be followed.				
Why it works:				
All-way stop control can reduce right-angle and turning collisions at unsignalized intersections by providing more orderly movement at an intersection, reducing through and turning speeds, and minimizing the safety effect of any sight distance restrictions that may be present. Advance public notification of the change is critical in assuring compliance and reducing crashes.				
General Qualities (Time, Cost and Effectiveness):				
The costs involved in converting to all-way stop control are relatively low. All-way stop control can normally be implemented at multiple intersections with just a change in signing on intersection approaches, and typically are very quick to implement. When considered at a single location, these low cost improvements are usually funded through local funding by local maintenance crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Left-turn, Angle	CRF:	6 - 80%

NS03, Install signals

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	30%	20 years
Notes:	This CM only applies to crashes occurring in the intersection and/or influence area of the new signals. **All new signals must meet MUTCD "safety" warrants: 4, 5 or 7.** Given the over-arching operational changes that occur when an intersection is signalized, no other intersection CMs can be applied to the intersection crashes in conjunction with this CM.		

General information				
Where to use:				
Traffic signals can be used to prevent the most severe type crashes (right-angle, left-turn). Consideration to signalize an unsignalized intersection should only be given after (1) less restrictive forms of traffic control have been utilized as the installation of a traffic signal often leads to an increased frequency of crashes (rear-end) on major roadways and introduces congestion and (2) signal warrants have been met. Refer to the CA MUTCD, Section 4C.01, Studies and Factors for Justifying Traffic Control Signals.				
Why it works:				
Traffic signals have the potential to reduce the most severe type crashes but will likely cause an increase in rear-end collisions. A reduction in overall injury severity is likely the largest benefit of traffic signal installation.				
General Qualities (Time, Cost and Effectiveness):				
Typical traffic signal costs fall in the medium to high category and are affected by application, type of signal and right-of-away considerations. Projects of this magnitude should only be considered after alternate and lesser means of correction have been evaluated. Some locations can result in high B/C ratios, but due to higher costs, these projects often result in medium to low B/C ratios.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	0 - 74%

NS04, Convert intersection to roundabout (from all way stop)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	Varies	20 years
Notes:	This CM only applies to crashes occurring in the intersection and/or influence area of the new control. The benefit of this CM is calculated using Caltrans procedure. The CRF is dependent on the ADT, project location (Rural/Urban) and the roundabout type (1 lane or 2 lanes). The benefit comes from both the reduction in the number and the severity of the crashes.		

General information				
Where to use:				
Intersections that have a high frequency of right-angle and left-turn type crashes. Whether such intersections have existing crash patterns or not, a roundabout provides an alternative to signalization. The primary target locations for roundabouts should be moderate-volume unsignalized intersections. Roundabouts may not be a viable alternative in many suburban and urban settings where right-of-way is limited.				
Why it works:				
Roundabouts provide an important alternative to signalized and all-way stop-controlled intersections. Modern roundabouts differ from traditional traffic circles in that they operate in such a manner that traffic entering the roundabout must yield the right-of-way to traffic already in it. Roundabouts can serve moderate traffic volumes with less delay than all-way stop-controlled intersections and provide fewer conflict points. Crashes at roundabouts tend to be less severe because of the speed constraints and elimination of left-turn and right-angle movements.				
General Qualities (Time, Cost and Effectiveness):				
Construction of roundabouts are usually relatively costly and major projects, requiring the environmental process, right-of-way acquisition, and implementation under an agency's long-term capital improvement program. (For this reason, roundabouts may not be appropriate for California's Federal Safety Programs that have relatively short delivery requirements.) Even with roundabouts higher costs, they still can have a relatively high effectiveness.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Left-turn, Angle	CRF:	12 - 78 %

NS05, Convert intersection to roundabout (from 2-way stop or Yield control)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	Varies	20 years
Notes:	This CM only applies to crashes occurring in the intersection and/or influence area of the new control. The benefit of this CM is calculated using Caltrans procedure. The CRF is dependent on the ADT, project location (Rural/Urban) and the roundabout type (1 lane or 2 lanes). The benefit comes from both the reduction in the number and the severity of the crashes.		

General information				
Where to use:				
Intersections that have a high frequency of right-angle and left-turn type crashes. Whether such intersections have existing crash patterns or not, a roundabout provides an alternative to signalization. The primary target locations for roundabouts should be moderate-volume unsignalized intersections. Roundabouts may not be a viable alternative in many suburban and urban settings where right-of-way is limited.				
Why it works:				
Roundabouts provide an important alternative to signalized and all-way stop-controlled intersections. Modern roundabouts differ from traditional traffic circles in that they operate in such a manner that traffic entering the roundabout must yield the right-of-way to traffic already in it. Roundabouts can serve moderate traffic volumes with less delay than all-way stop-controlled intersections and provide fewer conflict points. Crashes at roundabouts tend to be less severe because of the speed constraints and elimination of left-turn and right-angle movements.				
General Qualities (Time, Cost and Effectiveness):				
Construction of roundabouts are usually relatively costly and major projects, requiring the environmental process, right-of-way acquisition, and implementation under an agency's long-term capital improvement program. (For this reason, roundabouts may not be appropriate for California's Federal Safety Programs that have relatively short delivery requirements.) Even with roundabouts higher costs, they still can have a relatively high effectiveness.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Left-turn, Angle	CRF:	12 - 78 %

NS05mr, Convert intersection to mini-roundabout

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	30%	20 years
Notes:	This CM only applies to crashes occurring in the intersection and/or influence area of the new control.		

General information				
Where to use:				
Mini-roundabouts are characterized by a small diameter (45-90 ft) and traversable islands (central island and splitter islands). Mini-roundabouts offer most of the benefits of regular roundabouts with the added benefit of a smaller footprint. They are best suited to environments where speeds are already low and environmental constraints would preclude the use of a larger roundabout. Mini-roundabouts are most effective in lower speed environments in which all approaching roadways have posted speed of 30 mph or less and an 85th-percentile speed of less than 35 mph near the proposed yield and/or entrance line. For any location with an 85th-percentile speed above 35 mph, the mini-roundabout can be included as part of a broader system of traffic calming measures to achieve an appropriate speed environment.				
Why it works:				
Mini-roundabouts may be an optimal solution for a safety or operational issue at an existing intersection where there is insufficient right-of-way for a standard roundabout installation. The benefits of mini-roundabouts are the Compact size, operational efficiency, traffic safety improvement and traffic Calming.				
General Qualities (Time, Cost and Effectiveness):				
Construction costs for mini-roundabouts vary widely depending upon the extent of sidewalk modifications or other geometric improvements and the types of materials used. In most cases, mini-roundabouts have been installed with little or no pavement widening and with only minor changes to curbs and sidewalks. Construction costs can be minimum for an installation consisting entirely of pavement markings and signage or moderate for mini-roundabouts that include raised islands and pedestrian improvements.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	NA	CRF:	NA

NS06, Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	15%	10 years
Notes:	This CM only applies to crashes occurring in the influence area of the new signs. The influence area must be determined on a location by location basis.		

General information				
Where to use:				
The target for this strategy should be approaches to unsignalized intersections with patterns of rear-end, right-angle, or turning collisions related to lack of driver awareness of the presence of the intersection.				
Why it works:				
The visibility of intersections and, thus, the ability of approaching drivers to perceive them can be enhanced by installing larger regulatory and warning signs at or prior to intersections. A key to success in applying this strategy is to select a combination of regulatory and warning sign techniques appropriate for the conditions on a particular unsignalized intersection approach.				
General Qualities (Time, Cost and Effectiveness):				
Signing improvements do not require a long development process and can typically be implemented quickly. Costs for implementing this strategy are nominal and depend on the number of signs. When considered at a single location, these low cost improvements are usually funded through local funding by local maintenance crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	11 - 55%

NS07, Upgrade intersection pavement markings (NS.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	10 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new pavement markings. This CM is not intended to be used for general maintenance activities (i.e. the replacement of existing pavement markings in-kind) and must include upgraded safety features over the existing pavement markings and striping.		

General information				
Where to use:				
Unsignalized intersections that are not clearly visible to approaching motorists, particularly approaching motorists on the major road. The strategy is particularly appropriate for intersections with patterns of rear-end, right-angle, or turning crashes related to lack of driver awareness of the presence of the intersection. Also at minor road approaches where conditions allow the stop bar to be seen by an approaching driver at a significant distance from the intersection. Typical improvements include "Stop Ahead" markings and the addition of Centerlines and Stop Bars.				
Why it works:				
The visibility of intersections and, thus, the ability of approaching drivers to perceive them can be enhanced by installing appropriate pavement delineation in advance of and at intersections will provide approaching motorists with additional information at these locations. Providing visible stop bars on minor road approaches to unsignalized intersections can help direct the attention of drivers to the presence of the intersection. Drivers should be more aware that the intersection is coming up, and therefore make safer decisions as they approach the intersection.				
General Qualities (Time, Cost and Effectiveness):				
Pavement marking improvements do not require a long development process and can typically be implemented quickly. Costs for implementing this strategy are nominal and depend on the number of markings. When considered at a single location, these low cost improvements are usually funded through local funding by local maintenance crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding. Note: When federal safety funding is used for these installations in high-wear-locations, the local agency is expected to maintain the improvement for a minimum of 10 years.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	13 - 60%

NS08, Install Flashing Beacons at Stop-Controlled Intersections

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	15%	10 years
Notes:	This CM only applies to crashes occurring on the stop-controlled approaches / influence area of the new beacons.		

General information				
Where to use:				
Flashing beacons can reinforce driver awareness of the Non-Signalized intersection control and can help mitigate patterns of right-angle crashes related to stop sign violations. Post-mounted advanced flashing beacons or overhead flashing beacons can be used at stop-controlled intersections to supplement and call driver attention to stop signs.				
Why it works:				
Flashing beacons provide a visible signal to the presence of an intersection and can be very effective in rural areas where there may be long stretches between intersections as well as locations where night-time visibility of intersections is an issue.				
General Qualities (Time, Cost and Effectiveness):				
Flashing beacons can be constructed with minimal design, environmental and right-of-way issues and have relatively low costs. Before choosing this CM, the agency needs to confirm the ability to provide power to the site (solar may be an option). In general, This CM can be very effective and can be considered on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Angle, Rear-End	CRF:	5-34%

NS09, Install flashing beacons as advance warning (NS.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	30%	10 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new beacons placed in advance of the intersection.		

General information				
Where to use:				
Non-Signalized Intersections with patterns of crashes that could be related to lack of a driver's awareness of approaching intersection or controls at a downstream intersection.				
Why it works:				
Advance flashing beacons can be used to supplement and call driver attention to intersection control signs. Flashing beacons are intended to reinforce driver awareness of the stop or yield signs and to help mitigate patterns of crashes related to intersection regulatory sign violations. Most advance warning flashing beacons can be powered by solar, thus reducing the issues relating to power source.				
General Qualities (Time, Cost and Effectiveness):				
Use of flashing beacons requires minimal development process, allowing flashing beacons to be installed within a short time period. Before choosing this CM, the agency needs to confirm the ability to provide power to the site (solar may be an option). In general, This CM can be very effective and can be considered on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Angle, Rear-End	CRF:	36 - 62%

NS10, Install transverse rumble strips on approaches

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	20%	10 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new rumble strips.		

General information				
Where to use:				
Transverse rumble strips are installed in the travel lane for the purposes of providing an auditory and tactile sensation for each motorist approaching the intersection. They can be used at any stop or yield approach intersection, often in combination with advance signing to warn of the intersection ahead. Due to the noise generated by vehicles driving over the rumble strips, care must be taken to minimize disruption to nearby residences and businesses.				
Why it works:				
When motorists are traveling along the roadway, they are sometimes unaware they are approaching an intersection. This is especially true on rural roads, as there may be fewer clues indicating an intersection ahead. Transverse rumble strips warn motorists that something unexpected is ahead that they need to pay attention to.				
General Qualities (Time, Cost and Effectiveness):				
Use of transverse rumble strips requires minimal development process, allowing transverse rumble strips to be installed within a short time period. In general, This CM can be very effective and can be considered on a systematic approach, although care should be taken to not over-use this CM. Note: When federal safety funding is used for these installations in high-wear-locations, the local agency is expected to maintain the improvement for a minimum of 10 years.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	0 - 35%

NS11, Improve sight distance to intersection (Clear Sight Triangles)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	20%	10 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the significantly improved new sight distance. Minor/incidental improvements to sight distance would not likely result in the CRF shown below.		

General information				
Where to use:				
Unsignalized intersections with restricted sight distance and patterns of crashes related to lack of sight distance where sight distance can be improved by clearing roadside obstructions without major reconstruction of the roadway.				
Why it works:				
Adequate sight distance for drivers at stop or yield-controlled approaches to intersections has long been recognized as among the most important factors contributing to overall safety at unsignalized intersections. By removing sight distance restrictions (e.g., vegetation, parked vehicles, signs, buildings) from the sight triangles at stop or yield-controlled intersection approaches, drivers will be able see approaching vehicles on the main line, without obstruction and therefore make better decisions about entering the intersection safely.				
General Qualities (Time, Cost and Effectiveness):				
Projects involving clearing sight obstructions on the highway right-of-way can typically be accomplished quickly, assuming the objects are readily moveable. Clearing sight obstructions on private property requires more time for discussions with the property owner. Costs will generally be low, assuming that in most cases the objects to be removed are within the right-of-way. In general, this CMs can be very effective and can be implemented by agencies' maintenance staff and/or implemented on a systematic approach. Usually only high-cost removals would be good candidates for Caltrans Federal Safety Funding. Note: When federal safety funding is used to remove vegetation that has the potential to grow back, the local agency is expected to maintain the improvement for a minimum of 10 years.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	11 - 56%

NS12, Improve pavement friction (High Friction Surface Treatments)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	55%	10 years
Notes:	This CM only applies to crashes occurring within the limits of the improved friction overlay. This CM is not intended to apply to standard chip-seal or open-graded maintenance projects for long segments of corridors or structure repaving projects intended to fix failed pavement.		

General information				
Where to use:				
Nationally, this countermeasure is referred to as "High Friction Surface Treatments" or HFST. Non-signalized Intersections noted as having crashes on wet pavements or under dry conditions when the pavement friction available is significantly less than needed for the actual roadway approach speeds. This treatment is intended to target locations where skidding and failure to stop is determined to be a problem in wet or dry conditions and the target vehicle is unable to stop due to insufficient skid resistance.				
Why it works:				
Improving the skid resistance at locations with high frequencies of wet-road crashes and/or failure to stop crashes can result in reductions of 50 percent for wet-road crashes and 20 percent for total crashes. Applying HFST can double friction numbers, e.g. low 40s to high 80s. This CM represents a special focus area for both FHWA and Caltrans, which means there are extra resources available for agencies interested in more details on High Friction Surface Treatment projects.				
General Qualities (Time, Cost and Effectiveness):				
This strategy can be relatively inexpensive and implemented in a short timeframe. The installation would be done by either agency personnel or contractors and can be done by hand or machine. In general, This CM can be very effective and can be considered on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Wet, Night, ALL	CRF:	10 - 62 %

NS13, Install splitter-islands on the minor road approaches

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	40%	20 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of **the new splitter island on the minor road approaches.**		

General information				
Where to use:				
Minor road approaches to unsignalized intersections where the presence of the intersection or the stop sign is not readily visible to approaching motorists. The strategy is particularly appropriate for intersections where the speeds on the minor road are high. In creation of a splitter island allows for an additional stop sign to be placed in the median for the minor approach.				
Why it works:				
The installation of splitter islands allows for the addition of a stop sign in the median to make the intersection more conspicuous. Additionally, the splitter island on the minor-road provides for a positive separation between turning vehicles on the through road and vehicles stopped on the minor road approach.				
General Qualities (Time, Cost and Effectiveness):				
Splitter islands at non-signalized intersections can usually be installed with minimal roadway reconstruction and relatively quickly. In general, This CM can be very effective and can be considered on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Angle, Rear-End	CRF:	35 - 100 %

NS14, Install raised median on approaches (NS.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	20 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new raised median. All new raised medians funded with federal HSIP funding should not include the removal of the existing roadway structural section and should be doweled into the existing roadway surface. This requirement is being implemented to maximize the safety-effectiveness of the limited HSIP funding and to minimize project impacts. Landscaping, if included in the project, is considered non-participating.		

General information				
Where to use:				
Where related or nearby turning movements affect the safety and operation of an intersection. Effective access management is key to improving safety at, and adjacent to, intersections. The number of intersection access points coupled with the speed differential between vehicles traveling along the roadway often contributes to crashes. Any access points within 250 feet upstream and downstream of an intersection are generally undesirable.				
Why it works:				
Raised medians with left-turn lanes at intersections offer a cost-effective means for reducing crashes and improving operations at higher volume intersections. The raised medians also prohibit left turns into and out of driveways that may be located too close to the functional area of the intersection.				
General Qualities (Time, Cost and Effectiveness):				
Raised medians at intersections may be most effective in retrofit situations where high volumes of turning vehicles have degraded operations and safety, and where more extensive approaches would be too expensive because of limited right-of-way and the constraints of the built environment. Because raised medians limit property access to right turns only, the need for providing alternative access ways should be considered. In general, This CM can be very effective and can be considered on a systematic approach. When agencies opt to install landscaping in conjunction with new raised medians, the portion of the cost for landscaping and other non-safety related items that exceeds 10% of the project total cost is not federally participated and must be funded by the applicant.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	20 - 39 %

NS15, Create directional median openings to allow (and restrict) left-turns and u-turns (NS.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	50%	20 years
Notes:	This CM only applies to crashes occurring in the intersection / influence area of the new directional openings.		

General information				
Where to use:				
Crashes related to turning maneuvers include angle, rear-end, pedestrian, and sideswipe (involving opposing left turns) type crashes. If any of these crash types are an issue at an intersection, restriction or elimination of the turning maneuver may be the best way to improve the safety of the intersection. Because raised medians limit property access to right turns only, they should be used in conjunction with efforts to provide alternative access ways and promote driveway spacing objectives.				
Why it works:				
Agencies are increasingly using access management techniques on urban and suburban arterials to manage the number of conflicts experienced at an intersection. A key element of access management is to restrict certain movements, create directional median openings, or close median openings that are deemed too close to an intersection.				
General Qualities (Time, Cost and Effectiveness):				
Turn prohibitions that are implemented by closing a median opening can usually be implemented quickly. Costs are highly variable but in many cases could be considered low. In some cases this strategy may involve acquiring access or constructing replacement access; those actions will significantly increase the cost of the project. Impacts to businesses and other land uses must be considered and controversy can delay the implementation. In general, This CM can be very effective and can be considered on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	51%

NS16, Reduced Left-Turn Conflict Intersections (NS.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	50%	20 years
Notes:	This CM only applies to crashes occurring in the intersection / influence area of the new Reduced Left-Turn Conflict.		

General information

Where to use and Why it works:

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

Restricted Crossing U-turn (RCUT):

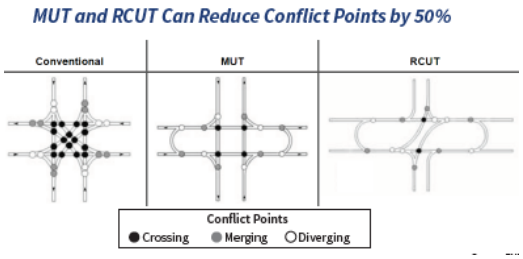
The RCUT intersection modifies the direct left-turn and through movements from cross-street approaches. Minor road traffic makes a right turn followed by a U-turn at a designated location (either signalized or unsignalized) to continue in the desired direction.

The RCUT is suitable for a variety of circumstances, including along rural, high-speed, four-lane, divided highways or signalized routes. It also can be used as an alternative to signalization or constructing an interchange. RCUTs work well when consistently used along a corridor, but also can be used effectively at individual intersections.

Median U-turn (MUT)

The MUT intersection modifies direct left turns from the major approaches. Vehicles proceed through the main intersection, make a U-turn a short distance downstream, followed by a right turn at the main intersection. The U-turns can also be used for modifying the cross-street left turns.

The MUT is an excellent choice for heavily traveled intersections with moderate left-turn volumes. When implemented at multiple intersections along a corridor, the efficient two-phase signal operation of the MUT can reduce delay, improve travel times, and create more crossing opportunities for pedestrians and bicyclists.



General Qualities (Time, Cost and Effectiveness):

Implementing this strategy may take from months to years, depending on whether additional R/W is required. Such projects require a substantial time for development and construction. Costs are highly variable and range from very low to high. The expected effectiveness of this CM must be assessed for each individual location.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Angle/Left-turn/Rear-End/All	CRF:	34.8-100%

NS17, Install right-turn lane (NS.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	20%	20 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new right-turn lanes. This CM is not eligible for use at existing all-way stop intersections.		

General information				
Where to use:				
Many collisions at unsignalized intersections are related to right-turn maneuvers. A key strategy for minimizing such collisions is to provide exclusive right-turn lanes, particularly on high-volume and high-speed major-road approaches. When considering new right-turn lanes, potential impacts to non-motorized users should be considered and mitigated as appropriate. When considering new right-turn lanes, potential impacts to non-motorized users should be considered and mitigated as appropriate.				
Why it works:				
The strategy is targeted to reduce the frequency of rear-end collisions resulting from conflicts between vehicles turning right and following vehicles and vehicles turning right and through vehicles coming from the left on the cross street. Right-turn lanes also remove slow vehicles that are decelerating to turn right from the through-traffic stream, thus reducing the potential for rear-end collisions. Right-turn lanes can increase the length of the intersection crossing and create an additional potential conflict point for non-motorized users.				
General Qualities (Time, Cost and Effectiveness):				
Implementing this strategy may take from months to years. At some locations, right-turn lanes can be quickly and simply installed by restriping the roadway. At other locations, widening of the roadway, acquisition of additional right-of-way, and extensive environmental processes may be needed. Such projects require a substantial time for development and construction. Costs are highly variable and range from very low to high. The expected effectiveness of this CM must be assessed for each individual location.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	14 - 26 %

NS18, Install left-turn lane (where no left-turn lane exists)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	35%	20 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new left-turn lanes. This CM does NOT apply to converting a single-left into double-left turn. This CM is not eligible for use at existing all-way stop intersections.		

General information				
Where to use:				
Many collisions at unsignalized intersections are related to left-turn maneuvers. A key strategy for minimizing such collisions is to provide exclusive left-turn lanes, particularly on high-volume and high-speed major-road approaches. When considering new left-turn lanes, potential impacts to non-motorized users should be considered and mitigated as appropriate.				
Why it works:				
Adding left-turn lanes remove vehicles waiting to turn left from the through-traffic stream, thus reducing the potential for rear-end collisions. Because they provide a sheltered location for drivers to wait for a gap in opposing traffic, left-turn lanes may encourage drivers to be more selective in choosing a gap to complete the left-turn maneuver. This strategy may reduce the potential for collisions between left-turn and opposing through vehicles.				
General Qualities (Time, Cost and Effectiveness):				
Implementing this strategy may take from months to years. At some locations, left-turn lanes can be quickly and simply installed by restriping the roadway. At other locations, widening of the roadway, acquisition of additional right-of-way, and extensive environmental processes may be needed. Such projects require a substantial time for development and construction. Costs are highly variable and range from very low to high. The expected effectiveness of this CM must be assessed for each individual location.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	9 -55 %

NS19PB, Install raised medians (refuge islands)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	45%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the crossing with the new islands. All new raised medians funded with federal HSIP funding should not include the removal of the existing roadway structural section and should be doweled into the existing roadway surface. This requirement is being implemented to maximize the safety-effectiveness of the limited HSIP funding and to minimize project impacts. Landscaping, if included in the project, is considered non-participating.		

General information				
Where to use:				
Intersections that have a long pedestrian crossing distance, a higher number of pedestrians, or a crash history. Raised medians decrease the level of exposure for pedestrians and allow pedestrians to concentrate on (or cross) only one direction of traffic at a time.				
Why it works:				
Raised pedestrian refuge islands, or medians at crossing locations along roadways, are another strategy to reduce exposure between pedestrians and motor vehicles. Refuge islands and medians that are raised (i.e., not just painted) provide pedestrians more secure places of refuge during the street crossing. They can stop partway across the street and wait for an adequate gap in traffic before completing their crossing.				
General Qualities (Time, Cost and Effectiveness):				
Median and pedestrian refuge areas are a low-cost countermeasure to implement. This cost can be applied to retrofit improvements or if it is a new construction project, implementing this countermeasure is even more cost-effective. In general, This CM can be very effective and can be considered on a systematic approach. When agencies opt to install landscaping in conjunction with new raised medians, the portion of the cost for landscaping and other non-safety related items that exceeds 10% of the project total cost is not federally participated and must be funded by the applicant.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian and Bicycle	CRF:	30 - 56 %

NS20PB, Install pedestrian crossing at uncontrolled locations (signs and markings only)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	25%	10 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the intersection/crossing with the new crossing. This CM is not intended to be used for high-cost aesthetic enhancements to intersection crosswalks (i.e. stamped concrete or stamped asphalt).		

General information				
Where to use:				
Non-signalized intersections without a marked crossing, where pedestrians are known to be crossing intersections that involve significant vehicular traffic. They are especially important at school crossings and intersections with right and/or left turns pockets. See Zegeer study (Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations) for additional guidance regarding when to install a marked crosswalk.				
Why it works:				
Adding pedestrian crossings has the opportunity to enhance pedestrian safety at locations noted as being problematic. Pavement markings delineate a portion of the roadway that is designated for pedestrian crossing. These markings will often be different for controlled verses uncontrolled locations. The use of "ladder", "zebra" or other enhanced markings at uncontrolled crossings can increase both pedestrian and driver awareness to the increased exposure at the crossing. Incorporating advanced "stop" or "yield" markings provides an extra safety buffer and can be effective in reducing the 'multiple-threat' danger to pedestrians. Nearly one-third of all pedestrian-related crashes occur at or within 50 feet of an intersection. Of these, 30 percent may involve a turning vehicle. There are several types of pedestrian crosswalks, including: continental, ladder, zebra, and standard. When agencies opt to install aesthetic enhancement to intersection crosswalks like stamped concrete/asphalt, the project design and construction costs can significantly increase. For HSIP applications, these costs must be accounted for in the B/C calculation, but these costs (over standard crosswalk markings) must be tracked separately and are not federally reimbursable and will increase the agency's local-funding share for the project costs.				
General Qualities (Time, Cost and Effectiveness):				
Costs associated with this strategy will vary widely, depending upon if curb ramps and sidewalk modifications are required with the crossing. When considered at a single location, these low cost improvements are usually funded through local funding by local crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian and Bicycle	CRF:	25 %

NS21PB, Install/upgrade pedestrian crossing at uncontrolled locations (with enhanced safety features)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	35%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the new crossing (influence area) with enhanced safety features. This CM is not intended to be used for high-cost aesthetic enhancements to intersection crosswalks (i.e. stamped concrete or stamped asphalt).		

General information				
Where to use:				
Non-signalized intersections where pedestrians are known to be crossing intersections that involve significant vehicular traffic. They are especially important at school crossings and intersections with turn pockets. Based on the Zegeer study (Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations) at many locations, a marked crosswalk alone may not be sufficient to adequately protect non-motorized users. In these cases, **flashing beacons, curb extensions, advanced "stop" or "yield" markings, and other safety features** should be added to complement the standard crossing elements.				
Why it works:				
Adding pedestrian crossings that include enhances safety features has the opportunity to enhance pedestrian safety at locations noted as being especially problematic. The enhanced safety elements help delineate a portion of the roadway that is designated for pedestrian crossing. Incorporating advanced "yield" markings provide an extra safety buffer and can be effective in reducing the 'multiple-threat' danger to pedestrians. Nearly one-third of all pedestrian-related crashes occur at or within 50 feet of an intersection. When agencies opt to install aesthetic enhancement to intersection crosswalks like stamped concrete/asphalt, the project design and construction costs can significantly increase. For HSIP applications, these costs must be accounted for in the B/C calculation, but these costs (over standard crosswalk markings) must be tracked separately and are not federally reimbursable and will increase the agency's local-funding share for the project costs.				
General Qualities (Time, Cost and Effectiveness):				
Costs associated with this strategy will vary widely, depending upon the types of enhanced features that will be combined with the standard crossing improvements. The need for new curb ramps and sidewalk modifications will also be a factor. This CM may be effectively and efficiently implemented using a systematic approach with more than one location and can have relatively high B/C ratios based on past non-motorized crash history.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian and Bicycle	CRF:	37%

NS22PB, Install Rectangular Rapid Flashing Beacon (RRFB)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	35%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the influence area (expected to be a maximum of within 250') of the crossing which includes the RRFB.		

General information				
Where to use:				
Rectangular Rapid Flashing Beacon (RRFB) includes pedestrian-activated flashing lights and additional signage that enhance the visibility of marked crosswalks and alert motorists to pedestrian crossings. It uses an irregular flash pattern that is similar to emergency flashers on police vehicles. RRFBs are installed at unsignalized intersections and mid-block pedestrian crossings.				
Why it works:				
RRFBs can enhance safety by increasing driver awareness of potential pedestrian conflicts and reducing crashes between vehicles and pedestrians at unsignalized intersections and mid-block pedestrian crossings. The addition of RRFB may also increase the safety effectiveness of other treatments, such as crossing warning signs and markings.				
General Qualities (Time, Cost and Effectiveness):				
RRFBs are a lower cost alternative to traffic signals and hybrid signals. This CM can often be effectively and efficiently implemented using a systematic approach with numerous locations.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	7 – 47.4%

NS23PB, Install Pedestrian Signal (including Pedestrian Hybrid Beacon (HAWK))

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	55%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the intersection/crossing with the new signal. For HAWK or other pedestrian signals, the justification may be Warrant 4, 5 and/or 7, or passing the test in Figure 4F-1/4F-2 in Chapter 4F of CA MUTCD. Please refer to Chapter 4F of CA MUTCD for more details		

General information				
Where to use:				
Intersections noted as having a history of pedestrian vs. vehicle crashes and in areas where the likelihood of the pedestrian presence is high. Corridors should also be assessed to determine if there are adequate safe opportunities for non-motorists to cross and if a pedestrian signal, or a Pedestrian Hybrid Beacon (PHB) (also called High-Intensity Activated crossWalK beacon (HAWK)) are needed to provide an active warning to motorists when a pedestrian is in the crosswalk.				
Why it works:				
Adding a pedestrian signal has the opportunity to greatly enhance pedestrian safety at locations noted as being problematic. Nearly one-third of all pedestrian-related crashes occur at or within 50 feet of an intersection. In combination with this CM, better guidance signs and markings for non-motorized and motorized roadway users should be considered, including: sign and markings directing pedestrians and cyclists on appropriate/legal travel paths and signs and markings warning motorists of non-motorized uses of the roadway that should be expected.				
General Qualities (Time, Cost and Effectiveness):				
The cost of improvements are generally high, but can vary dependent on the type of signal and overall scope of the project. In most cases the project duration can be short. The expected effectiveness of this CM must be assessed for each individual location.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian and Bicycle	CRF:	15 - 69%

B.3 Roadway Countermeasures

R01, Add Segment Lighting

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Night	35%	20 years
Notes:	This CM only applies to "night" crashes (all types) occurring within limits of the proposed roadway lighting 'engineered' area.		

General information				
Where to use:				
Where to use: Noted substantial patterns of nighttime crashes. In particular, patterns of rear-end, right-angle, turning or roadway departure collisions on the roadways may indicate that night-time drivers can be unaware of the roadway characteristics.				
Why it works:				
Providing roadway lighting improves the safety during nighttime conditions by (1) making drivers more aware of the surroundings, which improves drivers' perception-reaction times, (2) enhancing drivers' available sight distances to perceive roadway characteristic in advance of the change, and (3) improving non-motorist's visibility and navigation.				
General Qualities (Time, Cost and Effectiveness):				
It expected that projects of this type may be constructed in a year or two and are relatively costly. There are several types of costs associated with providing lighting, including the cost of providing a permanent source of power to the location, the cost for the luminaire supports (i.e., poles), and the cost for routinely replacing the bulbs and maintenance of the luminaire supports. Some locations can result in high B/C ratios, but due to higher costs, these projects often result in medium to low B/C ratios.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Night, All	CRF:	18 - 69 %

R02, Remove or relocate fixed objects outside of Clear Recovery Zone

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	35%	20 years
Notes:	This CM only applies to crashes occurring within the limits of the new clear recovery zone (per Caltrans' HDM).		

General information				
Where to use:				
Known locations or roadway segments prone to collisions with fixed objects such as utility poles, drainage structures, trees, and other fixed objects, such as the outside of a curve, end of lane drops, and in traffic islands. A clear recovery zone should be developed on every roadway, as space is available. In situations where public right-of-way is limited, steps should be taken to request assistance from property owners, as appropriate.				
Why it works:				
While this strategy does not prevent the vehicle leaving the roadway, it does provide a mechanism to reduce the severity of a resulting crash. A clear zone is an unobstructed, traversable roadside area that allows a driver to stop safely or regain control of a vehicle that has left the roadway. Removing or moving fixed objects, flattening slopes, or providing recovery areas reduces the likelihood of a crash.				
General Qualities (Time, Cost and Effectiveness):				
Projects involving removing fixed objects from highway right-of-way can typically be accomplished quickly, assuming the objects are readily moveable. Clearing objects on private property requires more time for discussions with the property owner. Costs will generally be low, assuming that in most cases the objects to be removed are within the right-of-way. This CMs can be very effective and can be implemented by agencies' maintenance staff and/or implemented on a systematic approach. High-cost removals or removals implemented using a systematic approach would be good candidates for Caltrans Federal Safety Funding.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Fixed Object	CRF:	17 - 100 %

R03, Install Median Barrier

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	20 years
Notes:	Note: For Caltrans' statewide Calls-for-Projects, this CM only applies to crashes occurring within the limits of the new barrier.		

General information
Where to use:
Areas where crash history indicates drivers are unintentionally crossing the median and the cross-overs are resulting in high severity crashes. The installation of median barriers can increase the number of PDO and non-severe injuries. The net result in safety from this countermeasure is connected more to reducing the severity of crashes not the number of crashes. It is recommended to review the warrants as outlined in Chapter 7 of the Caltrans Traffic Manual when considering whether to install median barriers.
Why it works:
This strategy is designed to prevent head-on collisions by providing a barrier between opposing lanes of traffic. The variety of median barriers available makes it easier to choose a site-specific solution. The main advantage is the reduction of the severity of the crashes. The key to success would be in selecting an appropriate barrier based on the site, previous crash history, maintenance needs, and median width.
General Qualities (Time, Cost and Effectiveness):
This strategy would in many cases be possible to implement within a short period after site selection. Costs will vary depending on the type of median barrier selected and whether the strategy is implemented as a stand-alone project or incorporated as part of a reconstruction or resurfacing effort. Maintenance costs and worker exposure will also vary depending on the type of barrier selected. The expected effectiveness of this CM must be assessed for each individual location.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Head-on	CRF:	0 - 94 %

R04, Install Guardrail

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	20 years
Notes:	This CM only applies to crashes occurring within the limits of the new guardrail. This CM is not intended to be used for general maintenance activities (i.e. the replacement of existing damaged rail). For projects proposing to upgrade existing guardrail to current standards, this CM and corresponding CRF should only be applied to locations where past crash data or engineering judgment applied to the existing rail conditions suggests the upgraded guardrail may result in fewer or less severe crashes (justifying the use of the 25% CRF for this CM).		

General information
Where to use:
Guardrail is installed to reduce the severity of lane departure crashes. However, guardrail can reduce crash severity only for those conditions where striking the guardrail is less severe than going down an embankment or striking a fixed object. Guardrail should only be installed where it is clear that crash severity will be reduced, or there is a history of run-off-the-road crashes at a given location that have resulted in severe crashes. New and upgraded guardrail and end-treatments must meet current safety standards; see Method for Assessing Safety Hardware (MASH) for more information. Caltrans (or other national accepted guidance) slope/height criteria need to be considered and documented.
Why it works:
Guardrail redirects a vehicle away from embankment slopes or fixed objects and dissipates the energy of an errant vehicle.
General Qualities (Time, Cost and Effectiveness):
Strategies range from relatively inexpensive too costly. Costly projects may include those that upgrade existing guardrail applications to more semi-rigid and rigid barrier systems over extended distances. In general, this CMs can be effective and can be implemented by agencies' maintenance staff and/or implemented on a systematic approach.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Fixed Object, Run-off Road	CRF:	11 - 78 %

R05, Install impact attenuators

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	10 years
Notes:	This CM only applies to crashes occurring within the limits of the new attenuators. This CM is not intended to be used for general maintenance activities (i.e. the replacement of existing damaged attenuators). For projects proposing to upgrade existing attenuators to current standards, this CM and corresponding CRF should only be applied to locations where past crash data or engineering judgment applied to the existing attenuator conditions suggests the upgraded attenuators may result in fewer or less severe crashes (justifying the use of the 25% CRF for this CM).		

General information				
Where to use:				
Impact attenuators are typically used to shield rigid roadside objects such as concrete barrier ends, steel guardrail ends and bridge pillars from oncoming automobiles. Attenuators should only be installed where it is impractical for the objects to be removed. New and upgraded barrier end-treatments must meet current safety standards; see MASH for more information.				
Why it works:				
Attenuators bring an errant vehicle to a more-controlled stop or redirect the vehicle away from a rigid object. Attenuators are effective at absorbing impact energy and increasing occupant safety. They also tend to draw attention to the fixed object, which helps drivers steer clear of the fixed objects.				
General Qualities (Time, Cost and Effectiveness):				
Costs depending on the scope of the project, type(s) used, and associated ongoing maintenance costs. Time to install is fairly quick once site is identified.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Fixed Object, Run-off Road	CRF:	5 - 50 %

R06, Flatten side slopes

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	30%	20 years
Notes:	This CM only applies to crashes occurring within the limits of the new side slopes. Minor/incidental flattening of side slopes would not likely result in the CRF shown below and may not be appropriate for use in Caltrans B/C calculations.		

General information				
Where to use:				
Roadways experiencing frequent lane departure crashes that result in roll-over type crashes as a result of the roadway slope being so severe as to not accommodate a reasonable degree of driver correction. When there is a need to reduce the severity of lane departure crashes without installing a barrier system that could result in increased numbers of crashes.				
Why it works:				
Flattened slopes provide a greater area for a driver to regain control of a vehicle. Steep slopes, ditches or unprotected hazardous drops-offs adjacent to a travel lane offer little opportunities to correct an inappropriate action by a driver and can result in sever crashes.				
General Qualities (Time, Cost and Effectiveness):				
Roadside modifications range from relatively inexpensive to very costly. Strategies that include creating safer side slopes where none exists can be moderately expensive based on the scope of the project and the associated clearing, grading, etc. The potential for high environmental and right-of-way impacts is high which can take several years to clear. In other cases This CM can be effective and can be implemented by agencies' maintenance staff and/or implemented on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Fixed Object, Run-off Road	CRF:	5 - 62 %

R07, Flatten side slopes and remove guardrail

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	40%	20 years
Notes:	This CM only applies to crashes occurring within the limits of both the removed guardrail and the new side slopes.		

General information				
Where to use:				
Locations where high number of crashes originate as a lane departure and result in collision with guardrail or a fixed object located on the side slope shielded by guardrail. The guardrail may or may not meet current standards. Even though guardrails are generally installed to reduce the severity of departure crashes, they still can result in severe crashes in some locations.				
Why it works:				
Flattened side slopes and an unobstructed clear zone provide a greater area for a driver to regain control of a vehicle. The existing guardrail may help protect the steep slopes, fixed objects, or unprotected hazardous drops-offs adjacent to a travel lane, but removing all of these obstacles generally improves safety.				
General Qualities (Time, Cost and Effectiveness):				
Roadside modifications range from relatively inexpensive to very costly. Strategies that include creating safer side slopes where none exists can be moderately expensive based on the scope of the project and the associated clearing, grading, etc. The potential for high environmental and right-of-way impacts is high which can take several years to clear.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Roll Over, Fixed Object	CRF:	42%

R08, Install raised median

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	20 years
Notes:	This CM only applies to crashes occurring within the limits of the new raised median. All new raised medians funded with federal HSIP funding should not include the removal of the existing roadway structural section and should be doweled into the existing roadway surface. This requirement is being implemented to maximize the safety-effectiveness of the limited HSIP funding and to minimize project impacts. Landscaping, if included in the project, is considered non-participating.		

General information				
Where to use:				
Areas experiencing head-on collisions that may be affected by both the number of vehicles that cross the centerline and by the speed of oncoming vehicles. Installing a raised median is a more restrictive approach in that it represents a more rigid barrier between opposing traffic. Application of raised medians on roadways with higher speeds is not advised - instead a median barrier should be considered. Including landscaping in new raised medians can be counterproductive to the HSIP safety goals and should only be done in ways that do not increase drivers' exposure to fixed objects and that will maintain driver's sight distance needs throughout the life of the proposed landscaping. **Agencies need to consider and document impacts of additional turning movements at nearby intersections.**				
Why it works:				
Adding raised medians is a particularly effective strategy as it adds to or reallocates the existing cross section to incorporate a buffer between the opposing travel lanes and reinforces the limits of the travel lane. Raised median may also be used to limit unsafe turning movements along a roadway.				
General Qualities (Time, Cost and Effectiveness):				
In some cases this strategy may be a retrofit into the existing roadway by utilizing a portion of the existing paved shoulder. These raised medians can be installed directly over the existing pavement. Cost and time to implement could significantly increase if the paved area is not sufficient to include a median. The surface treatment of the raised median also significantly affects their cost-effectiveness: standard concrete or other hardscape surfaces are usually more cost effective than landscaped medians. When agencies opt to install landscaping in conjunction with new raised medians, the project design and construction costs can significantly increase due to excavation, backfill/top-soil, water-connection, irrigation, planting, maintenance needed for the landscaping. When agencies opt to install landscaping in conjunction with new raised medians, the portion of the cost for landscaping and other non-safety related items that exceeds 10% of the project total cost is not federally participated and must be funded by the applicant.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Head-on	CRF:	20 - 75 %

R09, Install median (flush)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	15%	20 years
Notes:	This CM only applies to crashes occurring within the limits of the new flush median. The new median must be a minimum of 4 feet wide (or "wider" if a narrow median exists before the proposed project).		

General information
Where to use:
Areas experiencing head-on collisions that may be affected by both the number of vehicles that cross the centerline and by the speed of oncoming vehicles. Roadways with oversized lanes offer an opportunity to restripe the roadway to reduce the lanes to standard widths and use the extra width for the median.
Why it works:
Adding medians is a particularly effective strategy as it adds to or reallocates the existing cross section to incorporate a narrow buffer median between opposing flows, thereby providing a greater opportunity to correct an errant maneuver and further reinforce the limits of the travel lane. Application widths can vary based on the available cross section and intended application. Additional safety can be provided by combining this CM with rumble strips.
General Qualities (Time, Cost and Effectiveness):
In some cases this strategy may be retrofitted into the existing roadway by utilizing a portion of the existing paved shoulder and can ultimately be as simple as restriping the roadway. Costs and time to implement could significantly increase if the paved area is not sufficient to include a median.

FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	15 - 78 %

R10PB, Install pedestrian median fencing

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	35%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring on the approaches/influence area of the new pedestrian median fencing.		

General information
Where to use:
Roadway segments with high pedestrian-generators and pedestrian-destinations nearby (e.g. transit stops) may experience a high volume of pedestrians J-walking across the travel lanes at mid-block locations instead of walking to the nearest intersection or designated mid-block crossing. When this safety issue cannot be mitigated with shoulder, sidewalk and/or crossing treatments, then installing a continuous pedestrian barrier in the median may be a viable solution.
Why it works:
Adding pedestrian median fencing has the opportunity to enhance pedestrian safety at locations noted as being problematic involving pedestrians running/darting across the roadway outside designated pedestrian crossings. Pedestrian median fencing can significantly reduce this safety issue by creating a positive barrier, forcing pedestrians to the designated pedestrian crossing.
General Qualities (Time, Cost and Effectiveness):
Costs associated with this strategy will vary widely depending on the type and placement of the median fencing. Impacts to transit and other land uses may need to be considered and controversy can delay the implementation. In general, this CM can be effective as a spot-location approach.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	25 - 40%

R11, Install acceleration/ deceleration lanes

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	20 years
Notes:	This CM only applies to crashes occurring within the limits of the new accel/decel lanes on high speed roadways. Significant improvements to the merge length for lane-drop locations is also an acceptable use of this CM.		

General information				
Where to use:				
Areas proven to have crashes that are the result of drivers not being able to turn onto a high speed roadway to accelerate until the desired roadway speed is reached and areas that do not provide the opportunity to safety decelerate to negotiate a turning movement. This CM can also be used to improve the safety of merging vehicles at a lane-drop location.				
Why it works:				
A lane that does not provide enough deceleration length and storage space for turning traffic may cause the turn queue to back up into the adjacent through lane. This can contribute to rear-end and sideswipe crashes. An acceleration lane is an auxiliary or speed-change lane that allows vehicles to accelerate to highway speeds (high speed roadways) before entering the through-traffic lanes of a highway. Additionally, if acceleration by entering traffic takes place directly on the traveled way, it may disrupt the flow of through-traffic and cause rear-end and sideswipe collisions.				
General Qualities (Time, Cost and Effectiveness):				
Costs are highly variable. Where sufficient median or shoulder space exists it may be possible to provide acceleration/deceleration lanes at a moderate cost. Where the roadway must be widened and additional right-of-way must be acquired, higher costs and a lengthy time-to-construct are likely. The expected effectiveness of this CM must be assessed for each individual location.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Sideswipe, Rear-End	CRF:	10 - 75 %

R12, Widen lane (initially less than 10 ft)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	20 years
Notes:	Note: For Caltrans' statewide Calls-for-Projects, this CM only applies to crashes occurring within the limits of the widened lanes. Widening must a minimum of 1 foot.		

General information				
Where to use:				
Horizontal curves or tangents and low speed or high speed roadways identified as having lane departure crashes, sideswipe or head-on crashes that can be attributed to an existing pavement width less than 10 feet.				
Why it works:				
Increasing pavement width can affect almost all crash types. A common practice is to widen the traveled way on horizontal curves to make operating conditions on curves comparable to those on tangents. Speed is a primary consideration when evaluating potential adverse impacts of lane width on safety. On high-speed, rural two-lane highways, an increased risk of cross-centerline head-on or cross-centerline sideswipe crashes is a concern because drivers may have more difficulty staying within the travel lane.				
General Qualities (Time, Cost and Effectiveness):				
Costs will depend on the amount of reconstruction necessary and on whether additional right-of-way is required. In general, this is one of the higher-cost strategies recommended, but it can also be very beneficial. Since this is a relatively expensive treatment, one of the keys to creating a cost effective project with at least a medium B/C ratio is targeting higher-hazard roadways.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	5 - 70 %

R13, Add two-way left-turn lane

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	30%	20 years
Notes:	This CM only applies to crashes occurring within the limits of the new lane, where an existing median did not already exist.		

General information
Where to use:
Roadways having a high frequency of drivers being rear-ended while attempting to make a left turn across oncoming traffic. Also can be effective for drivers crossing the centerline of an undivided multilane roadway inadvertently.
Why it works:
Two-way left-turn lanes provide a buffer between opposing directions of travel and separate left turning traffic from through traffic. They can also help to allow vehicles to begin to accelerate before entering the through-traffic lanes. They reduce the disruption of flow of through-traffic and reducing rear-end and sideswipe collisions. For some roadways the option of converting a four-lane undivided arterials to two-vehicle-lane roadways with a center left-turn lane and bike lanes should be considered (see "Road Diet" CM.)
General Qualities (Time, Cost and Effectiveness):
In some cases this strategy may be retrofitted into the existing roadway by utilizing a portion of the existing paved shoulder and can ultimately be as simple as restriping the roadway. Costs and time to implement could significantly increase if the paved area is not sufficient to include a median, requiring new right-of-way, and having significant environmental impacts. The expected effectiveness of this CM must be assessed for each individual location as the B/C ratios will vary from low to high.

FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	8 - 50 %

R14, Road Diet (Reduce travel lanes and add a two way left-turn and bike lanes)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	35%	20 years
Notes:	This CM only applies to crashes occurring within the limits of the new lane striping. "Intersection" crashes can only be applied when they resulted from turning movements that had no designated turn lanes/phases in the existing condition and the Road Diet will provide turn lanes/phases for these movements. This CM does not apply to roadway sections that already included left turn lanes or two way left turn lanes before the lane reductions. New bike lanes are also expected to be part of these projects. if any pavement is planned to be removed for the purpose of adding landscaping, planter-boxes, or other non-roadway user features, the cost should be non-participating.		

General information
Where to use:
Areas noted as having a higher frequency of head-on, left-turn, and rear-end crashes with traffic volumes that can be handled by only 2 free flowing lanes. Using this strategy in locations with traffic volumes that are too high could result in diversion of traffic to routes less safe than the original four-lane design. It may also result in congestion levels that contribute to other crashes.
Why it works:
The application of this strategy usually reduces the roadway segment speeds and serious head-on crashes. In many cases the extra pavement width can be used for the installation of bike lanes. In addition to increasing bicycle safety, these bike lanes can improve the safety of on-street parking.
General Qualities (Time, Cost and Effectiveness):
Implementation would require more time than in other low-cost treatments to complete environmental analyses, traffic studies and public input. Projects that only require new lane markings and minor signalization modifications will have relatively low cost and can be very effective and can be considered on a systematic approach. These striping and signal modification costs should be considered part of this CM and not an additional CM. (If additional signal hardware improvements are being made, over what is needed for the road diet, then the Improve Signal Hardware CM may also be used.) Often road diet projects need a seal-coat placed on the roadway to fully remove the old striping. These seal coats are considered part of the proper installation of this CM. In contrast, structural-overlays should not be considered part of this CM and are not considered eligible for funding in the California Local HSIP.

FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	26 - 43 %

R15, Widen shoulder

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	30%	20 years
Notes:	This CM only applies to crashes occurring within the limits of the new paved shoulder. A minimum of 2 feet width must be added and the new/resulting shoulders must be a minimum of 4 feet wide. This CM is not eligible unless it is done as the last step of an "incremental approach", for which the agency documents that: 1) they have already pursued and installed lower cost and lower impact CMs (i.e. signing/striping upgrades to MUTCD standards/recommendations, rumble strips, etc.), 2) they have already monitored the crash occurrences after these improvements were installed, and 3) the 'after' crash rate is still unacceptably high. This 'incremental approach' (or a special exception from the HSIP program manager) must be documented in the Narrative Questions in the application and a summary of the 'before' and 'after' crash analysis must be attached to the application.		

General information				
Where to use:				
Roadways that have a frequent incidence of vehicles leaving the travel lane resulting in an unsuccessful attempt to reenter the roadway. The probability of a safe recovery is increased if an errant vehicle is provided with an increased paved area in which to initiate such a recovery.				
Why it works:				
Based on the best available research, adding shoulder or widening an existing shoulder provides a greater area to regain control of a vehicle, as well as lateral clearance to roadside objects such as guardrail, signs and poles. They may also provide space for disabled vehicles to stop or drive slowly, provide increased sight distance for through vehicles and for vehicles entering the roadway, and in some cases reduce passing conflicts between motor vehicles and bicyclists and pedestrians. The likely safety benefits for adding or widening an existing shoulder generally increase as the widening width increases - practitioners should refer to NCHRP Report 500 Series, the CMF Clearinghouse or other references for more details.				
General Qualities (Time, Cost and Effectiveness):				
Shoulder widening costs would depend on whether new right-of-way is required and whether extensive roadside modification is needed. Since shoulder widening can be a relatively expensive treatment, one of the keys to creating a cost effective project with at least a medium B/C ratio is targeting higher-hazard roadways.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Fixed Object, Run-off Road, Sideswipe	CRF:	15 - 75 %

R16, Curve Shoulder widening (Outside Only)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	45%	20 years
Notes:	This CM only applies to crashes occurring within the limits (or influence area) of the new shoulder widening at curves. A minimum of 2-4 feet width must be added to the outside of horizontal curves and the new traversable shoulder must be a minimum of 4 feet wide.		

General information		
Where to use:		
Roadway curves noted as having frequent lane departure crashes due to inadequate or no shoulders, resulting in an unsuccessful attempt to reenter the roadway.		
Why it works:		
Adding shoulders (outside only) creates a recovery area in which a driver can regain control of a vehicle, as well as lateral clearance to roadside objects.		
General Qualities (Time, Cost and Effectiveness):		
To minimize the R/W needs and the cost, only outside shoulder at curves is to be widened. This CM can be implemented in a relatively short timeframe.		
FHWA CMF Clearinghouse:	NA	

R17, Improve horizontal alignment (flatten curves)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	50%	20 years

Notes:	This CM only applies to crashes occurring within the limits (or influence area) of the improved alignment. **This CM is not eligible unless** it is done as the last step of an "incremental approach", including: the agency documents that: 1) they have already pursued and installed lower cost and lower impact CMs (i.e. signing/striping upgrades to MUTCD standards/recommendations, rumble strips, etc.), 2) they have already monitored the crash occurrences after these improvements were installed, and 3) the 'after' crash rate is still unacceptably high. This 'incremental approach' (or a special exception from the HSIP program manager) must be documented in the Narrative Questions in the application and a summary of the agency's 'before' and 'after' crash analysis must be attached to the application.

General information				
Where to use:				
Roadways with horizontal curves that have experienced lane departure crashes as a result of a roadway segment having compound curves or a severe radius. This strategy should generally be considered only when less expensive strategies involving clearing of specific sight obstructions or modifying traffic control devices have been tried and have failed to ameliorate the crash patterns.				
Why it works:				
Increasing the radius of a horizontal curve can be very effective in improving the safety performance of the curve. Curve modification reduces the likelihood of a vehicle leaving its lane, crossing the roadway centerline, or leaving the roadway at a horizontal curve; and minimizes the adverse consequences of leaving the roadway. Horizontal alignment improvement projects are expected to include standard/improved superelevation elements, which should be considered part of this CM and not an additional CM.				
General Qualities (Time, Cost and Effectiveness):				
This strategy is a long-term, higher-cost alternative for improving the safety of a horizontal curve because it usually involves total reconstruction of the roadway. It may also require acquisition of additional right-of-way and an environmental review. This strategy, albeit costly, has shown that increasing the radius of curvature can significantly reduce total curve-related crashes by up to 80 percent. The expected effectiveness of this CM must be assessed for each individual location.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	24 - 90%

R18, Flatten crest vertical curve

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	20 years
Notes:	This CM only applies to crashes occurring within the limits (or influence area) of the improved alignment. This CM is not eligible unless it is done as the last step of an "incremental approach", including: the agency documents that: 1) they have already pursued and installed lower cost and lower impact CMs (i.e. signing/striping upgrades to MUTCD standards/recommendations, rumble strips, etc.), 2) they have already monitored the crash occurrences after these improvements were installed, and 3) the 'after' crash rate is still unacceptably high. This 'incremental approach' (or a special exception from the HSIP program manager) must be documented in the Narrative Questions in the application and a summary of the agency's 'before' and 'after' crash analysis must be attached to the application.		

General information				
Where to use:				
The target for this strategy is usually unsignalized intersections with restricted sight distance due to vertical geometry and with patterns of crashes related to that lack of sight distance that cannot be ameliorated by less expensive methods. This strategy should generally be considered only when less expensive strategies involving clearing of specific sight obstructions or modifying traffic control devices have been tried and have failed to ameliorate the crash patterns.				
Why it works:				
Adequate sight distance for drivers at stopped approaches to intersections has long been recognized as among the most important factors contributing to overall intersection safety. Vertical alignment improvement projects are expected to include standard/improved superelevation elements, which should be considered part of this CM and not an additional CM.				
General Qualities (Time, Cost and Effectiveness):				
Projects involving changing the horizontal and/or vertical alignment to provide more sight distance are quite extensive and usually take several years to accomplish. If additional right-of-way is required or environmental impacts are expected, these projects will require a substantial period of time. Since this is usually an expensive treatment, one of the keys to creating a cost effective project with at least a medium B/C ratio is targeting higher-hazard locations.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	20 - 51 %

R19, Improve curve superelevation

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	45%	20 years
Notes:	This CM only applies to crashes occurring within the limits (or influence area) of the improved superelevation. This CM does not apply to sections of roadways where the horizontal or vertical alignments are changing via another CM.		

General information				
Where to use:				
Roadways noted as having frequent lane departure crashes and inadequate or no superelevation. Safety can be enhanced when the superelevation is improved or restored along curves where the actual superelevation is less than the optimal.				
Why it works:				
Superelevation works with friction between the tires and pavement to counteract the forces on the vehicle associated with cornering. Many curves may have inadequate superelevation because of vehicles traveling at higher speeds than were originally designed for, because of loss of effective superelevation after resurfacing, or because of changes in design policy after the curve was originally constructed.				
General Qualities (Time, Cost and Effectiveness):				
This strategy can be a higher-cost alternative for improving the safety of a curve because it involves reconstruction to some degree. Other projects may be able to be constructed by simple overlays and minimal reconstruction of roadways features. When simple overlay fixes are pursued, a systematic installation approach may be appropriate. The expected effectiveness of this CM must be assessed for each individual location.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Run-off Road, All	CRF:	40 - 50 %

R20, Convert from two-way to one-way traffic

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	35%	20 years
Notes:	This CM only applies to crashes occurring within the limits of the new one-way sections.		

General information				
Where to use:				
One-way streets can offer improved signal timing and accommodate odd-spaced signals. One-way streets can simplify crossings for pedestrians, who must look for traffic in only one direction. While studies have shown that conversion of two-way streets to one-way generally reduces pedestrian crashes and the number of conflict points, one-way streets tend to have higher speeds which creates new problems. Care must be taken not to create conditions that cause driver confusion and erratic maneuvers.				
Why it works:				
Studies have shown a 10 to 50-percent reduction in total crashes after conversion of a two-way street to one-way operation. While studies have shown that con-version of two-way streets to one-way generally reduces pedestrian crashes, one-way streets tend to have higher speeds which creates new problems. At the same time, this strategy (1) increases capacity significantly and (2) can have safety-related drawbacks including pedestrian confusion and minor sideswipe crashes.				
General Qualities (Time, Cost and Effectiveness):				
The costs will vary depending on length of treatment and if the conversion requires modification to signals. Conversion costs can be high to build "crossovers" where the one-way streets convert back to two-way streets and to rebuild traffic signals. It's also likely that these types of modifications will require public involvement and could significantly add to the time it takes to complete the project. The expected effectiveness of this CM must be assessed for each individual location.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	26 - 43 %

R21, Improve pavement friction (High Friction Surface Treatments)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	55%	10 years
Notes:	This CM only applies to crashes occurring within the limits of the improved friction overlay. This CM is not intended to apply to standard chip-seal or open-graded **maintenance** projects for long segments of corridors or structure repaving projects intended to fix failed pavement.		

General information				
Where to use:				
Nationally, this countermeasure is referred to as "High Friction Surface Treatments" or HFST. Areas as noted having crashes on wet pavements or under dry conditions when the pavement friction available is significantly less than actual roadway speeds; including but not limited to curves, loop ramps, intersections, and areas with short stopping or weaving distances. This treatment is intended to target locations where skidding is determined to be a problem, in wet or dry conditions and the target vehicle is one that runs (skids) off the road or is unable to stop due to insufficient skid resistance.				
Why it works:				
Improving the skid resistance at locations with high frequencies of wet-road crashes and/or failure to stop crashes can result in a reduction of 50 percent for wet-road crashes and 20 percent for total crashes. Applying HFST can double friction numbers, e.g. low 40s to high 80s. This CM represents a special focus area for both FHWA and Caltrans, which means there are extra resources available for agencies interested in more details on High Friction Surface Treatment projects.				
General Qualities (Time, Cost and Effectiveness):				
This strategy can be relatively inexpensive and implemented in a short timeframe. The installation would be done by either agency personnel or contractors and can be done by hand or machine. In general, This CM can be very effective and can be considered on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Wet, Rear-End, All	CRF:	17 - 68 %

R22, Install/Upgrade signs with new fluorescent sheeting (regulatory or warning)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	15%	10 years
Notes:	This CM only applies to crashes occurring within the influence area of the new/upgraded signs. This CM is not intended for maintenance upgrades of street-name, parking, guide, or any other signs without a primary focus on roadway safety. **This CM is not eligible unless** it is done as part of a larger sign audit project, including the study of: 1) the existing signs' locations, sizes and information per MUTCD standards, 2) missing signs per MUTCD standards, and 3) sign retroreflectivity. The overall sign audit scope (or a special exception from the HSIP program manager) must be documented in the Narrative Questions in the application. Based on the scope of the project/audit, it may be appropriate to combine other CMs in the B/C calculation.		

General information				
Where to use:				
The target for this strategy should be on roadway segments with patterns of head on, nighttime, non-intersection, run-off road, and sideswipe crashes related to lack of driver awareness of the presence of a specific roadway feature or regulatory requirement. Ideally this type of safety CM would be combined with other sign evaluations and upgrades (install chevrons, warning signs, delineators, markers, beacons, and relocation of existing signs per MUTCD standards.)				
Why it works:				
This strategy primarily addresses crashes caused by lack of driver awareness (or compliance) roadway signing. It is intended to get the drivers attention and give them a visual warning by using fluorescent yellow sheeting (or other retroreflective material).				
General Qualities (Time, Cost and Effectiveness):				
Signing improvements do not require a long development process and can typically be implemented quickly. Costs for implementing this strategy are nominal and depend on the number of signs. When considered at a single location, these low cost improvements are usually funded through local funding by local maintenance crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding. When considering any type of federally funded sign upgrade project, California local agencies are encouraged to consider "Roadway Safety Signing Audit (RSSA) and Upgrade Projects". Including RSSAs in the development phase of sign projects are expected to identify non-standard (per MUTCD) sign features and missing signs that may otherwise go unnoticed. More information on RSSA is available on the Local Assistance HSIP webpage.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Head on, Run-off road, Sideswipe, Night	CRF:	18 - 35%

R23, Install chevron signs on horizontal curves

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	40%	10 years
Notes:	This CM only applies to crashes occurring within the influence area of the new signs. (i.e. only through the curve).		

General information				
Where to use:				
Roadways that have an unacceptable level of crashes on relatively sharp curves during periods of light and darkness. Ideally this type of safety CM would be combined with other sign evaluations and upgrades (install warning signs, delineators, markers, beacons, and relocation of existing signs per MUTCD standards.)				
Why it works:				
Post-mounted chevrons are intended to warn drivers of an approaching curve and provide tracking information and guidance to the drivers. While they are intended to act as a warning, it should also be remembered that the posts, placed along the roadside, represent a possible object with which an errant vehicle can crash into. Design of posts to minimize damage and injury is an important part of the considerations to be made when selecting these treatments.				
General Qualities (Time, Cost and Effectiveness):				
Signing improvements do not require a long development process and can typically be implemented quickly. Costs for implementing this strategy are nominal and depend on the number of signs. When considered at a single location, these low cost improvements are usually funded through local funding by local maintenance crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding. When considering any type of federally funded sign upgrade project, California local agencies are encouraged to consider "Roadway Safety Signing Audit (RSSA) and Upgrade Projects". Including RSSAs in the development phase of sign projects are expected to identify non-standard (per MUTCD) sign features and missing signs that may otherwise go unnoticed. More information on RSSA is available on the Local Assistance HSIP webpage.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Run-off Road, All	CRF:	6 - 64 %

R24, Install curve advance warning signs

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	10 years
Notes:	This CM only applies to crashes occurring within the influence area of the new signs. (i.e. only through the curve)		

General information				
Where to use:				
Roadways that have an unacceptable level of crashes on relatively sharp curves during periods of light and darkness. This countermeasure may also include horizontal alignment and/or advisory speed warning signs. Ideally this type of safety CM would be combined with other sign evaluations and upgrades (install warning signs, chevrons, delineators, markers, beacons, and relocation of existing signs per MUTCD standards.)				
Why it works:				
This strategy primarily addresses problem curves, and serves as an advance warning of an unexpected or sharp curve. It provides advance information and gives drivers a visual warning that their added attention is needed.				
General Qualities (Time, Cost and Effectiveness):				
Signing improvements do not require a long development process and can typically be implemented quickly. Costs for implementing this strategy are nominal and depend on the number of signs. When considered at a single location, these low cost improvements are usually funded through local funding by local maintenance crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding. When considering any type of federally funded sign upgrade project, California local agencies are encouraged to consider "Roadway Safety Signing Audit (RSSA) and Upgrade Projects". Including RSSAs in the development phase of sign projects are expected to identify non-standard (per MUTCD) sign features and missing signs that may otherwise go unnoticed. More information on RSSA is available on the Local Assistance HSIP webpage.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Run-off Road, All	CRF:	20 - 30 %

R25, Install curve advance warning signs (flashing beacon)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	30%	10 years
Notes:	This CM only applies to crashes occurring within the influence area of the new signs. (i.e. only through the curve)		

General information				
Where to use:				
Roadways that have an unacceptable level of crashes on relatively sharp curves. Flashing beacons in conjunction with warning signs should only be used on horizontal curves that have an established severe crash history to help maintain their effectiveness.				
Why it works:				
This strategy primarily addresses problem curves, and serves as an enhanced advance warning of an unexpected or sharp curve. It provides advance information and gives drivers a visual warning that their added attention is needed. Flashing beacons are an added indication that a curve may be particularly challenging.				
General Qualities (Time, Cost and Effectiveness):				
Use of flashing beacons requires minimal development process, allowing flashing beacons to be installed within a short time period. Before choosing this CM, the agency needs to confirm the ability to provide power to the site (solar may be an option). In general, This CM can be very effective and can be considered on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	30 %

R26, Install dynamic/variable speed warning signs

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	30%	10 years
Notes:	This CM only applies to crashes occurring within the influence area of the new signs. (i.e. through the curve) {**<u>This CM does not apply to dynamic regulatory speed warning signs.</u>** There are currently no nationally accepted CRFs for dynamic regulatory signs (also known as Radar Speed Feedback Signs). CRFs are being developed and Caltrans hopes to include these CMs and CRFs in future calls for projects.}		

General information				
Where to use:				
Curvilinear roadways that have an unacceptable level of crashes due to excessive speeds on relatively sharp curves.				
Why it works:				
This strategy primarily addresses crashes caused by motorists traveling too fast around sharp curves. It is intended to get the drivers attention and give them a visual warning that they may be traveling over the recommended speed for the approaching curve. Care should be taken to limit the placement of these signs to help maintain their effectiveness.				
General Qualities (Time, Cost and Effectiveness):				
Use of dynamic speed warning signs requires minimal development process, allowing them to be installed within a short time period. Before choosing this CM, the agency needs to confirm the ability to provide power to the site (solar may be an option). In general, This CM can be very effective and can be considered on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	0 - 41 %

R27, Install delineators, reflectors and/or object markers

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	15%	10 years
Notes:	This CM only applies to crashes occurring within the limits / influence area of the new features. {**This is not a striping-related CM**}		

General information				
Where to use:				
Roadways that have an unacceptable level of crashes on curves (relatively flat to sharp) during periods of light and darkness. Any road with a history of fixed object crashes is a candidate for this treatment, as are roadways with similar fixed objects along the roadside that have yet to experience crashes. If a fixed object cannot be relocated or made break-away, placing an object marker can provide additional information to motorists. Ideally this type of safety CM would be combined with other sign evaluations and upgrades (install warning signs, chevrons, beacons, and relocation of existing signs per MUTCD standards.)				
Why it works:				
Delineators, reflectors and/or object markers are intended to warn drivers of an approaching curve or fixed object that cannot easily be removed. They are intended to provide tracking information and guidance to the drivers. They are generally less costly than Chevron Signs as they don't require posts to place along the roadside, avoiding an additional object with which an errant vehicle can crash into.				
General Qualities (Time, Cost and Effectiveness):				
These improvements do not require a long development process and can typically be implemented quickly. Costs for implementing this strategy are nominal and depend on the number of locations. When considered at a single location, these low cost improvements are usually funded through local funding by local maintenance crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in low to moderate cost projects that are more appropriate to seek state or federal funding. When considering any type of federally funded sign upgrade project, California local agencies are encouraged to consider "Roadway Safety Signing Audit (RSSA) and Upgrade Projects". Including RSSAs in the development phase of sign projects are expected to identify non-standard (per MUTCD) sign features and missing signs that may otherwise go unnoticed. More information on RSSA is available on the Local Assistance HSIP webpage.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	0 - 30 %

R28, Install edge-lines and centerlines

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	10 years
Notes:	This CM only applies to crashes occurring within the limits of the new centerlines and/or edge-lines. This CM is not intended to be used for general maintenance activities (i.e. the replacement of existing striping and RPMs in-kind) and must include upgraded safety features over the existing striping. For two lane roadways allowing passing, a striping audit must be done to ensure the passing limits meeting the MUTCD standards. Both the centerline and edge-lines are expected to be upgraded, unless prior approval is granted by Caltrans staff in writing and attached to application.		

General information				
Where to use:				
Any road with a history of run-off-road right, head-on, opposite-direction-sideswipe, or run-off-road-left crashes is a candidate for this treatment - install where the existing lane delineation is not sufficient to assist the motorist in understanding the existing limits of the roadway. Depending on the width of the roadway, various combinations of edge line and/or center line pavement markings may be the most appropriate. Incorporating raised/reflective pavement markers (RPMs) into centerlines (and edge-lines) should be considered as it has been shown to improve safety.				
Why it works:				
Installing edge-lines and centerlines where none exists or making significant upgrades to existing lines (paint to thermoplastic, adding audible disks/bumps in the thermoplastic stripes, or adding RPMs) are intended/designed to help drivers who might leave the roadway because of their inability to see the edge of the roadway along the horizontal edge of the pavement or cross-over the centerline of the roadway into oncoming traffic. New pavement marking products tend to be more durable, are all-weather, more visible, and have a higher retroreflectivity than traditional pavement markings.				
General Qualities (Time, Cost and Effectiveness):				
These improvements do not require a long development process and can typically be implemented quickly. Costs for implementing this strategy are nominal and depend on the number and length of locations. This CM can be effectively and efficiently implemented using a systematic approach with numerous and long locations, resulting in low to moderate cost projects that are more appropriate to seek state or federal funding. When considering any type of federally funded striping upgrade project, California local agencies are encouraged to consider "Roadway Safety Striping Audit and Upgrade Projects". Including wide-scale striping audits in the development phase of striping projects are expected to identify non-standard (per MUTCD) striping/marking features, no-passing zone limits needing adjustment, and missing striping/markings that may otherwise go unnoticed. More information on this concepts is available on the Local Assistance HSIP webpage under an RSSA example document. Note: When federal safety funding is used for these installations in high-wear-locations, the local agency is expected to maintain the improvement for a minimum of 10 years.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Head-on, Run-off Road, All	CRF:	0 - 44 %

R29, Install no-passing line

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	45%	10 years
Notes:	This CM only applies to crashes occurring within the limits of the new or extended no-passing zones.		

General information
Where to use:
Roadways that have a high percentage of head-on crashes suggesting that many head-on crashes may relate to failed passing maneuvers. No-passing lines should be installed where drivers "passing sight distance" is not available due to horizontal or vertical obstructions. General restriping projects can be good opportunities to reevaluate and incorporate new no-passing zones limits. The incorporation 'No Passing Zone' pennants should also be considered when reevaluating the limits of no-passing zones. Installing no-passing limits in areas that are not warranted may reduce the overall safety of the corridor as drivers may become frustrated and attempt passing maneuvers at other locations without the necessary sight distance.
Why it works:
When the centerline markings do not differentiate between passing and no-passing areas, drivers may have difficulty determining where passing maneuvers can be completed safely. Providing clear and engineered passing and no-passing areas can encourage drivers to wait patiently for safe passing areas and avoid aggressively looking for passing opportunities.
General Qualities (Time, Cost and Effectiveness):
These improvements do not require a long development process and can typically be implemented quickly. Costs for implementing this strategy are nominal and depend on the number and length of locations. When considered at a single location, these low cost improvements are usually funded through local funding by local maintenance crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous and long locations, resulting in low to moderate cost projects that are more appropriate to seek state or federal funding.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Head-on, Side-swipe	CRF:	40 - 53%

R30, Install centerline rumble strips/stripes

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	20%	10 years
Notes:	This CM only applies to crashes occurring within the limits of the new rumble strips/stripes.		

General information
Where to use:
Center Line rumble strips/stripes can be used on virtually any roadway – especially those with a history of head-on crashes. It is recommended that rumble strips/stripes be applied systematically along an entire route instead of only at spot locations. For all rumble strips/stripes, pavement condition should be sufficient to accept milled rumble strips. Care should be taken when considering installing rumble strips in locations with residential land uses or in areas with high bicycle volumes.
Why it works:
Rumble strips provide an auditory indication and tactile rumble when driven on, alerting drivers that they are drifting out of their travel lane, giving them time to recover before they depart the roadway or cross the center line. Additionally, rumble stripes (pavement marking in the rumble itself) provide an enhanced marking, especially in wet dark conditions.
General Qualities (Time, Cost and Effectiveness):
These improvements do not require a long development process and can typically be implemented quickly. Costs for implementing this strategy are nominal and depend on the number and length of locations. This CM can be effectively and efficiently implemented using a systematic approach with numerous and long locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Head-on, Side-swipe, All	CRF:	15 - 68%

R31, Install edgeline rumble strips/stripes

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	15%	10 years
Notes:	This CM only applies to crashes occurring within the limits of the new rumble strips/stripes.		

General information				
Where to use:				
Shoulder and edge line milled rumble strips/stripes should be used on roads with a history of roadway departure crashes. It is recommended that rumble strips/stripes be applied systematically along an entire route instead of only at spot locations. For all rumble strips/stripes, pavement condition should be sufficient to accept milled rumble strips. Special requirements may apply and care should be taken when considering installing rumble strips in locations with residential land uses or in areas with high bicycle volumes.				
Why it works:				
Rumble strips provide an auditory indication and tactile rumble when driven on, alerting drivers that they are drifting out of their travel lane, giving them time to recover before they depart the roadway or cross the center line. Additionally, rumble stripes (pavement marking in the rumble itself) provide an enhanced marking, especially in wet dark conditions.				
General Qualities (Time, Cost and Effectiveness):				
These improvements do not require a long development process and can typically be implemented quickly. Costs for implementing this strategy are nominal and depend on the number and length of locations. This CM can be effectively and efficiently implemented using a systematic approach with numerous and long locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Run-off Road	CRF:	10 - 41%

R32PB, Install bike lanes

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	35%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring within the limits of the Class II (not Class III) bike lanes. When an off-street bike-path is proposed that is not adjacent to the roadway, the applicant must document the engineering judgment used to determine which "Ped & Bike" crashes to apply.		

General information				
Where to use:				
Roadway segments noted as having crashes between bicycles and vehicles or crashes that may be preventable with a buffer/shoulder. Most studies suggest that bicycle lanes may provide protection against bicycle/motor vehicle collisions. Striped bike lanes can be incorporated into a roadway when is desirable to delineate which available road space is for exclusive or preferential use by bicyclists.				
Why it works:				
Most studies present evidence that bicycle lanes provide protection against bicycle/motor vehicle collisions. Bicycle lanes provide marked areas for bicyclist to travel along the roadway and provide for more predictable movements for both bicyclist and motorist. Evidence also shows that riding with the flow of vehicular traffic reduces bicyclists' chances of collision with a motor vehicle. Locations with bicycle lanes have lower rates of wrong-way riding. In combination with this CM, better guidance signs and markings for non-motorized and motorized roadway users should be considered, including: sign and markings directing cyclists on appropriate/legal travel paths and signs and markings warning motorists of non-motorized uses of the roadway that should be expected.				
General Qualities (Time, Cost and Effectiveness):				
Adding striped bicycle lanes can range from the simply restriping the roadway and minor signing to projects that require roadway widening, right-of-way, and environmental impacts. It is most cost efficient to create bike lanes during street reconstruction, street resurfacing, or at the time of original construction. The expected effectiveness of this CM must be assessed for each individual location. For simple installation scenarios, This CM can be very effective and can be considered on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	0 - 53 %

R33PB, Install Separated Bike Lanes

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	45%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring within the limits of the separated bike lanes. When an off-street bike-path is proposed that is not adjacent to the roadway, the applicant must document the engineering judgment used to determine which "Ped & Bike" crashes to apply.		

General information				
Where to use:				
Separated bikeways are most appropriate on streets with high volumes of bike traffic and/or high bike-vehicle collisions, presumably in an urban or suburban area. Separation types range from simple, painted buffers and flexible delineators, to more substantial separation measures including raised curbs, grade separation, bollards, planters, and parking lanes. These options range in feasibility due to roadway characteristics, available space, and cost. In some cases, it may be possible to provide additional space in areas where pedestrian and bicyclists may interact, such as the parking buffer, or loading zones, or extra bike lane width for cyclists to pass one another.				
Why it works:				
Separated bike lanes provide increased safety and comfort for bicyclists beyond conventional bicycle lanes. By separating bicyclists from motor traffic, "protected" or physically separated bike lanes can offer a higher level of comfort and are attractive to a wider spectrum of the public. Intersections and approaches must be carefully designed to promote safety and facilitate left-turns for bicyclists from the primary corridor to cross street. In combination with this CM, better guidance signs and markings for non-motorized and motorized roadway users should be considered, including: sign and markings directing cyclists on appropriate/legal travel paths and signs and markings warning motorists of non-motorized uses of the roadway that should be expected.				
General Qualities (Time, Cost and Effectiveness):				
The cost of Installing separated bike lanes can be low to medium or high, depending on whether roadway widening, right-of-way and environmental impacts are involved. It is most cost efficient to create bike lanes during street reconstruction, street resurfacing, or at the time of original construction. The expected effectiveness of this CM must be assessed for each individual location.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	3.7 - 100 %

R34PB, Install sidewalk/pathway (to avoid walking along roadway)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	80%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring within the limits of the new walkway. This CM is not intended to be used where an existing sidewalk is being replaced with a wider one, unless prior Caltrans approval is included in the application. When an off-street multi-use path is proposed that is not adjacent to the roadway, the applicant must document the engineering judgment used to determine which "Ped & Bike" crashes to apply.		

General information
Where to use:
Areas noted as not having adequate or no sidewalks and a history of walking along roadway pedestrian crashes. In rural areas asphalt curbs and/or separated walkways may be appropriate.
Why it works:
Sidewalks and walkways provide people with space to travel within the public right-of-way that is separated from roadway vehicles. The presence of sidewalks on both sides of the street has been found to be related to significant reductions in the "walking along roadway" pedestrian crash risk compared to locations where no sidewalks or walkways exist. Reductions of 50 to 90 percent of these types of pedestrian crashes. In combination with this CM, better guidance signs and markings for non-motorized and motorized roadway users should be considered, including: sign and markings directing pedestrians and cyclists on appropriate/legal travel paths and signs and markings warning motorists of non-motorized uses of the roadway that should be expected.
General Qualities (Time, Cost and Effectiveness):

Costs for sidewalks will vary, depending upon factors such as width, materials, and existing of curb, gutter and drainage. Asphalt curbs and walkways are less expensive, but require more maintenance. The expected effectiveness of this CM must be assessed for each individual location. These projects can be very effective in areas of high-pedestrian volumes with a past history of crashes involving pedestrians.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	65 - 89 %

R35PB, Install/upgrade pedestrian crossing (with enhanced safety features)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	35%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the influence area (expected to be a maximum of within 250') of the new crossing which includes new enhanced safety features. Note: This CM is not intended to be combined with the "Install raised pedestrian crossing" when calculating the improvement's B/C ratio. This CM is not intended to be used for high-cost aesthetic enhancements (i.e. stamped concrete or stamped asphalt).		

General information				
Where to use:				
Roadway segments with no controlled crossing for a significant distance in high-use midblock crossing areas and/or multilane roads locations. Based on the Zegeer study (Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations) at many locations, a marked crosswalk alone may not be sufficient to adequately protect non-motorized users. In these cases, flashing beacons, curb extensions, medians and pedestrian crossing islands and/or other safety features should be added to complement the standard crossing elements. For multi-lane roadways, advance "yield" markings can be effective in reducing the 'multiple-threat' danger to pedestrians.				
Why it works:				
Adding pedestrian crossings has the opportunity to greatly enhance pedestrian safety at locations noted as being problematic. The enhanced safety elements, which may include curb extensions, medians and pedestrian crossing islands, beacons, and lighting, combined with pavement markings delineating a portion of the roadway that is designated for pedestrian crossing. Care must be taken to warn drivers of the potential for pedestrians crossing the roadway and enhanced improvements added to the crossing increase the likelihood of pedestrians crossing in a safe manner. In combination with this CM, better guidance signs and markings for non-motorized and motorized roadway users should be considered, including: sign and markings directing pedestrians and cyclists on appropriate/legal travel paths and signs. When agencies opt to install aesthetic enhancement to crossing like stamped concrete/asphalt, the project design and construction costs can significantly increase. For HSIP applications, these costs must be accounted for in the B/C calculation, but these costs (over standard crosswalk markings) must be tracked separately and are not federally reimbursable and will increase the agency's local-funding share for the project costs.				
General Qualities (Time, Cost and Effectiveness):				
Costs associated with this strategy will vary widely, depending on the extent of the curb extensions, raised medians, flashing beacons, and other pedestrian safety elements that are needed with the crossing. When considered at a single location, these improvements can sometimes be low cost and funded through local funding by local crews. This CM can often be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate to high cost projects that are appropriate to seek state or federal funding.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	8 - 56%

R36PB, Install raised pedestrian crossing

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	35%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the area with the new raised crossing. Note: This CM is not intended to be combined with the "Install pedestrian crossing (with enhanced safety features)" when calculating the improvement's B/C ratio.		

General information				
Where to use:				
On lower-speed roadways, where pedestrians are known to be crossing roadways that involve significant vehicular traffic. Based on the Zegeer study (Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations) at many locations, a marked crosswalk alone, may not be sufficient to adequately protect non-motorized users. In these cases, raised crossings can be added to complement the standard crossing elements. Special requirements may apply and extra care should be taken when considering installing raised crossings to ensure unintended safety issues are not created, such as: emergency vehicle access or truck route issues.				
Why it works:				
Adding a raised pedestrian crossing has the opportunity to enhance pedestrian safety at locations noted as being especially problematic. The raised crossing encourages motorists to reduce their speed and provides improved delineation for the portion of the roadway that is designated for pedestrian crossing. In combination with this CM, better guidance signs and markings for non-motorized and motorized roadway users should be considered, including: sign and markings directing pedestrians and cyclists on appropriate/legal travel paths.				
General Qualities (Time, Cost and Effectiveness):				
Costs associated with this strategy will vary widely, depending upon the elements of the raised crossing and the need for new curb ramps and sidewalk modifications. This CM may be effectively and efficiently implemented using a systematic approach with more than one location and can have medium to high B/C ratios based on past non-motorized crash history.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	30 - 46%

R37PB, Install Rectangular Rapid Flashing Beacon (RRFB)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	35%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the influence area (expected to be a maximum of within 250') of the crossing which includes the RRFB.		

General information				
Where to use:				
Rectangular Rapid Flashing Beacon (RRFB) includes pedestrian-activated flashing lights and additional signage that enhance the visibility of marked crosswalks and alert motorists to pedestrian crossings. It uses an irregular flash pattern that is similar to emergency flashers on police vehicles. RRFBs are installed at unsignalized intersections and mid-block pedestrian crossings.				
Why it works:				
RRFBs can enhance safety by increasing driver awareness of potential pedestrian conflicts and reducing crashes between vehicles and pedestrians at unsignalized intersections and mid-block pedestrian crossings. The addition of RRFB may also increase the safety effectiveness of other treatments, such as crossing warning signs and markings.				
General Qualities (Time, Cost and Effectiveness):				
RRFBs are a lower cost alternative to traffic signals and hybrid signals. This CM can often be effectively and efficiently implemented using a systematic approach with numerous locations.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	7 – 47.4%

R38, Install Animal Fencing

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Animal	80%	20 years
Notes:	This CM only applies to "animal" crashes occurring within the limits of the new fencing.		

General information				
Where to use:				
At locations with high percent of vehicular/animal crashes (reactive) or where there is a known high percent of animals crossing due to migratory patterns (proactive).				
Why it works:				
Animal fencing helps to channelize the identified animals to a natural or man-made crossing, eliminating the conflict between vehicles and animals on the same place. Animal fencing is typically installed at a bridge location with its "run of need" dependent on the surrounding terrain.				
General Qualities (Time, Cost and Effectiveness):				
Time to install fencing can be moderate to lengthy depending on the environmental commitments and agreed upon solution to mitigating project impacts. Costs will be fairly low and depend on the "run of need" length. There will be minimal reoccurring maintenance costs on keeping the fence intact. The expected effectiveness of this CM must be assessed for each individual location.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Animal	CRF:	70 - 90 %

APPENDIX G: B/C RATIO CALCULATION

Years of Collision Data›llision Data 5

Cost, Benefit and B/C Ratio Calculation Table

FID	Location	CM 1	CM 2	CM 3	CM 4	CM 5	CM 6	CM1_CRF	CM2_CRF	CM3_CRF	CM4_CRF	CM5_CRF	CM6_CRF	CM1_Life (Year)	CM2_Life (Year)	CM3_Life (Year)	CM4_Life (Year)	CM5_Life (Year)
	Project 1: Signalized Intersections: Install Raised Pavement Markers and Stripping Through Intersection, Improve signal timing																	
1	San Pablo Ave/SR-123 at Brighton Ave	S03	S09					0.15	0.1					10	10			
2	San Pablo Ave/SR-123 at Marin St	S03	S09					0.15	0.1					10	10			
3	San Pablo Ave/SR-123 at Solano Ave	S03	S09					0.15	0.1					10	10			
4	Marin St at Masonic Ave	S03						0.15						10				
5	San Pablo Ave/SR-123 at Monroe St	S03	S09					0.15	0.1					10	10			
6	Marin at Santa Fe Ave	S03						0.15						10				
	Project 2: Signalized Intersections: Install advance stop bar before crosswalk, Modify signal phasing to implement a Leading Pedestrian Interval, Improve signal hardware																	
1	San Pablo Ave/SR-123 at Brighton Ave		S20PB	S21PB					0.15	0.6					10	10		
2	San Pablo Ave/SR-123 at Marin St	S02						0.15						10				
3	San Pablo Ave/SR-123 at Solano Ave	S02	S20PB	S21PB				0.15	0.15	0.6				10	10	10		
4	Marin St at Masonic Ave	S02	S20PB	S21PB				0.15	0.15	0.6				10	10	10		
5	San Pablo Ave/SR-123 at Monroe St	S02	S20PB	S21PB				0.15	0.15	0.6				10	10	10		
6	Marin at Santa Fe Ave	S02	S20PB	S21PB				0.15	0.15	0.6				10	10	10		
	Project 3: Unsignalized Intersection: Install larger or additional stop sign or other intersection warning/regulatory signs, Install Flashing Beacons at Stop-controlled intersections, Install splitter-island on the minor road approaches, and install raised me																	
1	San Pablo Ave/SR-123 at Garfield Ave	NS06			NS14			0.15			0.25			10			20	
2	Solano Ave at Stannage Ave	NS06	NS08					0.15	0.15					10	10			
3	San Pablo Ave/SR-123 at Portland Ave	NS06		NS13	NS14			0.15		0.4	0.25			10		20	20	
4	Solano Ave at Peralta Ave		NS08	NS13	NS14				0.15	0.4	0.25				10	20	30	
5	Buchanan St at Madison St	NS06						0.15						10				
6	Solano Ave at Jackson St	NS06						0.15						10				
	Project 4: Improvements at Unsignalized Intersection: Install Rectangular Rapid Flashing Beacon (RRFB), Install/upgrade pedestrian crossing at uncontrolled locations (with enhanced safety features)																	
1	San Pablo Ave/SR-123 at Garfield Ave	NS21PB	NS22PB					0.35	0.35					20	20			
2	Solano Ave at Stannage Ave																	
3	San Pablo Ave/SR-123 at Portland Ave		NS22PB						0.35						20			
4	Solano Ave at Peralta Ave		NS22PB						0.35						20			
5	Solano Ave at Jackson St		NS22PB						0.35						20			
6	Buchanan at Madison St		NS22PB						0.35						20			
7	Key Route Boulevard at Solano Avenue		NS22PB						0.35						20			
	Project 8: Lighting/Nightime/Visibility/Reduce Hit object and Improper Turning																	
1	Solano Ave: Cleveland Ave to City Limit (East)			R27			R31			0.15			0.15			10		
2	San Pablo Ave/SR-123: City Limit (North) to 450’ S of Marin Ave	R03	R22					0.25	0.15					20	10			
3	Buchanan St: I-80 EB Ramps to San Pablo Ave		R22						0.15						10			
4	Santa Fe Ave: 200’ N of Solano Ave to City Limit (South)		R22	R27					0.15	0.15					10	10		
5	Madison St: 400’ N of Washington St to 450’ S of Solano Ave				R28						0.25						10	
6	Washington St: 100’ W of Cerrito Ave to San Pablo Ave				R28	R30						0.2						10
	Project 9: Pedestrian and Bike Safety																	
1	San Pablo Ave/SR-123: City Limit (North) to 450’ S of Marin Ave	R33PB	R36PB	R37PB				0.45	0.35	0.35				20	20	20		
2	Santa Fe Ave: 200’ N of Solano Ave to Solano Ave to 550' S of Marin Ave			R37PB						0.35						20		
3	Madison St: 400’ N of Washington St to 450’ S of Solano Ave			R37PB						0.35						20		
4	Solano Ave: Ramona Ave to Peralta Ave			R37PB						0.35						20		
5	Buchanan St: I-80 EB Ramps to San Pablo Ave			R37PB						0.35						20		
6	Marin St: Buchanan St to City Limit (East)			R37PB						0.35						20		

CM R22 use 25%

			10%	5%	25%	0%	0%	15%											
													1	2	3	4	0	1	
													Collisions (2016-2020)						
CM6_Life (Year)	**Unused & Desired CM**	**CM Cost**	**Contingency Cost**	**Environmental Cost**	**PS&E Cost**	**Right of Way Engineering Cost**	**Appraisals, Acqusitions & Utilities Cost**	**Construction Engineering (CE) Cost**	**Cost Per Location**	**All Locations (Cost 2022)**	**20% More**	**Total #Collisions**	**Fatal**	**Severe Injury**	**Other Visible Injury**	**Compliant of Pain**	**PDO**	**Fatal**	
		$ 6,630	$ 663	$ 332	$ 663			$ 995	$ 9,282			6	0	1	2	3	0		
		$ 8,100	$ 810	$ 405	$ 810			$ 1,215	$ 11,340			4	0	1	1	2	0		
		$ 6,870	$ 687	$ 344	$ 687			$ 1,031	$ 9,618	$ 57,414	$ 68,897	4	0	1	1	2	0		
		$ 6,150	$ 615	$ 308	$ 615			$ 923	$ 8,610			3	0	1	1	1	0		
		$ 7,110	$ 711	$ 356	$ 711			$ 1,067	$ 9,954			3	0	1	1	1	0		
		$ 6,150	$ 615	$ 308	$ 615			$ 923	$ 8,610			0	0	0	0	0	0		
		$ 80,000	$ 8,000	$ 4,000	$ 8,000			$ 12,000	$ 112,000			3	0	1	0	2	0		
		$ 12,800	$ 1,280	$ 640	$ 1,280			$ 1,920	$ 17,920			0	0	0	0	0	0		
		$ 93,050	$ 9,305	$ 4,653	$ 9,305			$ 13,958	$ 130,270	$ 599,872	$ 719,846	0	0	0	0	0	0		
		$ 103,510	$ 10,351	$ 5,176	$ 10,351			$ 15,527	$ 144,914			0	0	0	0	0	0		
		$ 51,950	$ 5,195	$ 2,598	$ 5,195			$ 7,793	$ 72,730			2	0	2	0	0	0		
		$ 87,170	$ 8,717	$ 4,359	$ 8,717			$ 13,076	$ 122,038			1	0	1	0	0	0		
dians on approaches																			
		$ 75,885	$ 7,589	$ 3,794	$ 7,589			$ 11,383	$ 106,239			4	0	1	2	1	0		
		$ 30,550	$ 3,055	$ 1,528	$ 3,055			$ 4,583	$ 42,770			2	0	1	1	0	0		
		$ 81,890	$ 8,189	$ 4,095	$ 8,189			$ 12,284	$ 114,646			2	0	1	1	0	0		
		$ 29,560	$ 2,956	$ 1,478	$ 2,956			$ 4,434	$ 41,384	$ 329,861	$ 395,833	1	0	0	1	0	0		
		$ 6,700	$ 670	$ 335	$ 670			$ 1,005	$ 9,380			1	0	1	0	0	0		
		$ 11,030	$ 1,103	$ 552	$ 1,103			$ 1,655	$ 15,442			0	0	0	0	0	0		
		$ 100,160	$ 10,016	$ 5,008	$ 10,016			$ 15,024	$ 140,224			2	0	0	1	1	0		
		$ -	$ -	$ -	$ -			$ -	$ -			0	0	0	0	0	0		
		$ 87,300	$ 8,730	$ 4,365	$ 8,730			$ 13,095	$ 122,220			0	0	0	0	0	0		
		$ 175,200	$ 17,520	$ 8,760	$ 17,520			$ 26,280	$ 245,280	$ 755,804	$ 906,965	2	0	0	1	1	0		
		$ 88,600	$ 8,860	$ 4,430	$ 8,860			$ 13,290	$ 124,040			1	0	1	0	0	0		
		$ -	$ -	$ -	$ -			$ -	$ -			0	0	0	0	0	0		
		$ 88,600	$ 8,860	$ 4,430	$ 8,860			$ 13,290	$ 124,040			0	0	0	0	0	0		
10		$ 50,280	$ 5,028	$ 2,514	$ 5,028			$ 7,542	$ 70,392			19	0	3	12	4	0		
		$ 1,197,270	$ 119,727	$ 59,864	$ 299,318			$ 179,591	$ 1,855,769			20	0	3	8	9	0		
		$ 19,000	$ 1,900	$ 950	$ 4,750			$ 2,850	$ 29,450			8	0	1	3	4	0		
		$ 27,500	$ 2,750	$ 1,375	$ 6,875			$ 4,125	$ 42,625	$ 1,998,236	$ 2,397,883	5	0	1	3	1	0		
		$ -	$ -	$ -	$ -			$ -	$ -			1	0	1	0	0	0		
		$ -	$ -	$ -	$ -			$ -	$ -			1	0	1	0	0	0		
		$ 551,930	$ 55,193	$ 27,597	$ 55,193			$ 82,790	$ 772,702			10	0	2	4	4	0		
		$ 233,480	$ 23,348	$ 11,674	$ 23,348			$ 35,022	$ 326,872			3	0	1	1	1	0		
		$ 350,520	$ 35,052	$ 17,526	$ 35,052			$ 52,578	$ 490,728	$ 3,877,790	$ 4,653,348	1	0	1	0	0	0		
		$ 559,440	$ 55,944	$ 27,972	$ 55,944			$ 83,916	$ 783,216			8	0	1	4	3	0		
		$ 141,480	$ 14,148	$ 7,074	$ 14,148			$ 21,222	$ 198,072			1	0	0	0	1	0		
		$ 933,000	$ 93,300	$ 46,650	$ 93,300			$ 139,950	$ 1,306,200			2	0	0	1	1	0		

2 3 4 0

Ped and Bike Collisons (2016-2020)				Bike and Ped Crash Costs						Crash Costs						
Severe Injury	Other Visible Injury	Compliant of Pain	PDO	Fatal	Severe Injury	Other Visible Injury	Compliant of Pain	PDO	Crash Costs	Fatal	Severe Injury	Other Visible Injury	Compliant of Pain	PDO	Crash Costs	Total Crash Cost
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,590,000.00	$ 284,600	$ 242,700.00	$ -	$ 2,117,300.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,590,000.00	$ 142,300	$ 161,800.00	$ -	$ 1,894,100.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,590,000.00	$ 142,300	$ 161,800.00	$ -	$ 1,894,100.00	$ 9,531,900.00
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,590,000.00	$ 142,300	$ 80,900.00	$ -	$ 1,813,200.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,590,000.00	$ 142,300	$ 80,900.00	$ -	$ 1,813,200.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,590,000.00	$ -	$ 161,800.00	$ -	$ 1,751,800.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 6,521,800.00
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,180,000.00	$ -	$ -	$ -	$ 3,180,000.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,590,000.00	$ -	$ -	$ -	$ 1,590,000.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,590,000.00	$ 284,600	$ 80,900.00	$ -	$ 1,955,500.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,590,000.00	$ 142,300	$ -	$ -	$ 1,732,300.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,590,000.00	$ 142,300	$ -	$ -	$ 1,732,300.00	$ 7,152,400.00
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 142,300	$ -	$ -	$ 142,300.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,590,000.00	$ -	$ -	$ -	$ 1,590,000.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 142,300	$ 80,900.00	$ -	$ 223,200.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 142,300	$ 80,900.00	$ -	$ 223,200.00	$ 2,036,400.00
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,590,000.00	$ -	$ -	$ -	$ 1,590,000.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,770,000.00	$ 1,707,600	$ 323,600.00	$ -	$ 6,801,200.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,770,000.00	$ 1,138,400	$ 728,100.00	$ -	$ 6,636,500.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,590,000.00	$ 426,900	$ 323,600.00	$ -	$ 2,340,500.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,590,000.00	$ 426,900	$ 80,900.00	$ -	$ 2,097,800.00	$ 21,056,000.00
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,590,000.00	$ -	$ -	$ -	$ 1,590,000.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,590,000.00	$ -	$ -	$ -	$ 1,590,000.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,180,000.00	$ 569,200	$ 323,600.00	$ -	$ 4,072,800.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,590,000.00	$ 142,300	$ 80,900.00	$ -	$ 1,813,200.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,590,000.00	$ -	$ -	$ -	$ 1,590,000.00	$ 10,182,000.00
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,590,000.00	$ 569,200	$ 242,700.00	$ -	$ 2,401,900.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 80,900.00	$ -	$ 80,900.00	
				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 142,300	$ 80,900.00	$ -	$ 223,200.00	

CM Annual Benefit						CM Life Benefit						Benefit
CM1_Benefit (Annual)	CM2_Benefit (Annual)	CM3_Benefit (Annual)	CM4_Benefit (Annual)	CM5_Benefit (Annual)	CM6_Benefit (Annual)	CM1_Benefit (Life)	CM2_Benefit (Life)	CM3_Benefit (Life)	CM4_Benefit (Life)	CM5_Benefit (Life)	CM6_Benefit (Life)	Benefit per Location (Life)
$ 63,519.00	$ 42,346.00	$ -	$ -	$ -	$ -	$ 635,190.00	$ 423,460.00	$ -	$ -	$ -	$ -	$ 1,058,650.00
$ 56,823.00	$ 37,882.00	$ -	$ -	$ -	$ -	$ 568,230.00	$ 378,820.00	$ -	$ -	$ -	$ -	$ 947,050.00
$ 56,823.00	$ 37,882.00	$ -	$ -	$ -	$ -	$ 568,230.00	$ 378,820.00	$ -	$ -	$ -	$ -	$ 947,050.00
$ 54,396.00	$ -	$ -	$ -	$ -	$ -	$ 543,960.00	$ -	$ -	$ -	$ -	$ -	$ 543,960.00
$ 54,396.00	$ 36,264.00	$ -	$ -	$ -	$ -	$ 543,960.00	$ 362,640.00	$ -	$ -	$ -	$ -	$ 906,600.00
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ -	$ 52,554.00	$ 210,216.00	$ -	$ -	$ -	$ -	$ 525,540.00	$ 2,102,160.00	$ -	$ -	$ -	$ 2,627,700.00
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ 95,400.00	$ 95,400.00	$ 381,600.00	$ -	$ -	$ -	$ 954,000.00	$ 954,000.00	$ 3,816,000.00	$ -	$ -	$ -	$ 5,724,000.00
$ 47,700.00	$ 47,700.00	$ 190,800.00	$ -	$ -	$ -	$ 477,000.00	$ 477,000.00	$ 1,908,000.00	$ -	$ -	$ -	$ 2,862,000.00
$ 58,665.00	$ -	$ -	$ 97,775.00	$ -	$ -	$ 586,650.00	$ -	$ -	$ 1,955,500.00	$ -	$ -	$ 2,542,150.00
$ 51,969.00	$ 51,969.00	$ -	$ -	$ -	$ -	$ 519,690.00	$ 519,690.00	$ -	$ -	$ -	$ -	$ 1,039,380.00
$ 51,969.00	$ -	$ 138,584.00	$ 86,615.00	$ -	$ -	$ 519,690.00	$ -	$ 2,771,680.00	$ 1,732,300.00	$ -	$ -	$ 5,023,670.00
$ -	$ 4,269.00	$ 11,384.00	$ 7,115.00	$ -	$ -	$ -	$ 42,690.00	$ 227,680.00	$ 213,450.00	$ -	$ -	$ 483,820.00
$ 47,700.00	$ -	$ -	$ -	$ -	$ -	$ 477,000.00	$ -	$ -	$ -	$ -	$ -	$ 477,000.00
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ 15,624.00	$ 15,624.00	$ -	$ -	$ -	$ -	$ 312,480.00	$ 312,480.00	$ -	$ -	$ -	$ -	$ 624,960.00
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ -	$ 15,624.00	$ -	$ -	$ -	$ -	$ -	$ 312,480.00	$ -	$ -	$ -	$ -	$ 312,480.00
$ -	$ 111,300.00	$ -	$ -	$ -	$ -	$ -	$ 2,226,000.00	$ -	$ -	$ -	$ -	$ 2,226,000.00
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ -	$ -	$ 204,036.00	$ -	$ -	$ 204,036.00	$ -	$ -	$ 2,040,360.00	$ -	$ -	$ 2,040,360.00	$ 4,080,720.00
$ 331,825.00	$ 199,095.00	$ -	$ -	$ -	$ -	$ 6,636,500.00	$ 1,990,950.00	$ -	$ -	$ -	$ -	$ 8,627,450.00
$ -	$ 70,215.00	$ -	$ -	$ -	$ -	$ -	$ 702,150.00	$ -	$ -	$ -	$ -	$ 702,150.00
$ -	$ 62,934.00	$ 62,934.00	$ -	$ -	$ -	$ -	$ 629,340.00	$ 629,340.00	$ -	$ -	$ -	$ 1,258,680.00
$ -	$ -	$ -	$ 79,500.00	$ -	$ -	$ -	$ -	$ -	$ 795,000.00	$ -	$ -	$ 795,000.00
$ -	$ -	$ -	$ -	$ 63,600.00	$ -	$ -	$ -	$ -	$ -	$ 636,000.00	$ -	$ 636,000.00
$ 366,552.00	$ 285,096.00	$ 285,096.00	$ -	$ -	$ -	$ 7,331,040.00	$ 5,701,920.00	$ 5,701,920.00	$ -	$ -	$ -	$ 18,734,880.00
$ -	$ -	$ 126,924.00	$ -	$ -	$ -	$ -	$ -	$ 2,538,480.00	$ -	$ -	$ -	$ 2,538,480.00
$ -	$ -	$ 111,300.00	$ -	$ -	$ -	$ -	$ -	$ 2,226,000.00	$ -	$ -	$ -	$ 2,226,000.00
$ -	$ -	$ 168,133.00	$ -	$ -	$ -	$ -	$ -	$ 3,362,660.00	$ -	$ -	$ -	$ 3,362,660.00
$ -	$ -	$ 5,663.00	$ -	$ -	$ -	$ -	$ -	$ 113,260.00	$ -	$ -	$ -	$ 113,260.00
$ -	$ -	$ 15,624.00	$ -	$ -	$ -	$ -	$ -	$ 312,480.00	$ -	$ -	$ -	$ 312,480.00

Total Benefit	B/C	BCR Analyzer		
Total_Benefit (Life)	B/C	Total_Benefit (Life)	B/C	Received funds from previous HSIP Cycles?

$	4,403,310.00

Combined Benefit	$	4,403,310.00
Combined Cost	$	57,414
B/C	$	76.69

$	11,213,700.00

Combined Benefit	$	11,213,700.00
Combined Cost	$	599,872
B/C	$	18.69

$	9,566,020.00

Combined Benefit	$	9,566,020.00
Combined Cost	$	329,861
B/C	$	29.00

$	3,163,440.00

Combined Benefit	$	3,163,440.00
Combined Cost	$	755,804
B/C		4.19

$	16,100,000.00

Combined Benefit	$	16,100,000.00
Combined Cost	$	1,998,236
B/C	$	8.06

$	27,287,760.00

Combined Benefit	$	27,287,760.00
Combined Cost	$	3,877,790
B/C	$	7.04